Plume Core Evaluation Summary Report

Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

PREPARED FOR:
Davis Site Performing Party Group

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ESS Project No. D164-002

October 24, 2013

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TABLE OF CONTENTS

SECTION **PAGE**

1.0 INTRODUCTION 1

2.0 FIELD INVESTIGATION METHODS 1
- 2.1 Former Source Area Soil Borings 1
  - 2.1.1 Advancement of Borings 2
  - 2.1.2 Field Screening 2
  - 2.1.3 Soil Sampling and Analysis 2
  - 2.1.4 Soil Characterization 3
- 2.2 Plume Core Well Installations 3
  - 2.2.1 Groundwater Sampling 4

3.0 FIELD INVESTIGATION RESULTS 4
- 3.1 Soil Conditions 5
- 3.2 Field Headspace 6
- 3.3 Non-Aqueous Phase Liquid Screening 6
- 3.4 Plume Core Soil Sampling 6
  - 3.4.1 Volatile Organic Compounds 6
  - 3.4.2 Semi-volatile Organic Compounds 7
  - 3.4.3 PCBs and Pesticides 8
  - 3.4.4 TAL Metals 9
  - 3.4.5 Treatability Analytes 10
- 3.5 Plume Core Well Sampling 11
  - 3.5.1 Initial Treatability Sampling 11
  - 3.5.2 VOC Sampling 12
  - 3.5.3 Performance Monitoring Sampling 15
- 3.6 Investigation Derived Waste Management 15

4.0 DISCUSSION OF FINDINGS 16
- 4.1 Subsurface Conditions 16
- 4.2 Residual Contaminant Mass 16
  - 4.2.1 Methodology 17
  - 4.2.2 Plume Core Boring Program 18
  - 4.2.3 Plume Core and Phase 4 Boring Programs 19
  - 4.2.4 CONCLUSIONS 20
- 4.3 Initial Active Treatment Zone 21

5.0 CONCLUSIONS 22

TABLE OF CONTENTS (CONTINUED)

SECTION

TABLES

Table 2-1 Well Specification Summary
Table 3-1 Summary of VOC Analytical Results
Table 3-2 Summary of SVOC Analytical Results
Table 3-3 Summary of PCB and Pesticide Analytical Results
Table 3-4 Summary of TAL Metal Analytical Results
Table 3-5 Select Treatability Analyte Results – Physical Parameters (embedded)
Table 3-6 Summary of Treatability Analyte Results – Groundwater (embedded)
Table 3-7 Summary of VOC Analytical Results – Plume Core Wells
Table 3-8 Monitoring Well Water Quality Measurements – Plume Core Wells
Table 4-1 Summaries of Residual Contaminant Mass Estimates – Plume Core Borings
Table 4-2 Summaries of Residual Contaminant Mass Estimates – Combined 2008/2012
Table 4-3 Summary of VOC Analytical Results – OW-55 and OW-304-O

FIGURES

Figure 1-1 Site Location Map
Figure 1-2 Site Plan and Monitoring Well Location Map
Figure 2-1 Plume Core Boring Locations
Figure 2-2 Plume Core Well Locations
Figure 3-1 Conceptual Schematic – Former Source Area
Figure 3-2 Geologic Cross Section A-A'
Figure 3-3 Geologic Cross Section B-B'
Figure 3-4 Refusal Summary Plan
Figure 3-5 Revised Bedrock Surface Elevation Contour Plan
Figure 3-6 TVOC Isoconcentration Map – Shallow Wells
Figure 3-7 Extent of VOC Exceedances of ROD Criteria – Shallow Wells
Figure 3-8 TVOC Isoconcentration Map – Deep Wells
Figure 3-9 Extent of VOC Exceedances of ROD Criteria – Deep Wells
Figure 4-1 Residual Mass Calculation Grid Cells and Areas
Figure 4-2 Summary of Plume Core TVOC Analytical Results – Soils
Figure 4-3 Preliminary Decision Matrix – Development of Active Treatment Zone
Figure 4-4 Delineation of Initial Active Treatment Zone
Figure 4-5 Composite Evaluation of Initial Active Treatment Zone

APPENDICES

Appendix A Soil Boring Logs
Appendix B Well Development Forms **(Provided on CD)**
Appendix C Laboratory Analytical Reports **(Provided on CD)**
Appendix D Data Validation Reports **(Provided on CD)**
Appendix E Treatability Analyte Testing Results – Soil
Appendix F Initial VOC and Treatability Results – Groundwater
Appendix G Groundwater Sampling Forms and Calibration Forms **(Provided on CD)**
Appendix H Performance Monitoring Analysis Results – Groundwater (Fall 2012) **(Provided on CD)**
Appendix I IDW Management Documentation
Appendix J Residual Mass Calculation Detail Sheets
Appendix J1 Plume Core Borings
Appendix J2 Combined 2008/2012
Appendix K Phase 4 Analytical Results and Soil Boring Logs **(Provided on CD)**

1.0 INTRODUCTION

This submittal presents the findings of the Plume Core Evaluation at the Davis Liquid Waste Superfund Site in Smithfield, Rhode Island (the Site). This Report is submitted on behalf of the Davis Site Performing Party Group (Davis Site Group) in accordance with the Consent Decree between the Davis Site Group, the U.S. Environmental Protection Agency (EPA) and the Rhode Island Department of Environmental Management (RIDEM). This investigation was performed in accordance with the Remedial Design Work Plan Submittal (ESS Group, March 2012), in particular, Section 3.1.1 (Plume Core Evaluation) of the Pre-Design Investigation Plan (PDI Plan) and the associated Project Operations Plan.

The Project Operations Plan is comprised of the following plans:

- Site Management Plan
- Sampling and Analysis Plan (SAP) which is made up of the Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP)
- Health and Safety Plan

The primary objectives of the Plume Core Evaluation field program, as stated in the Statement of Work (SOW; Appendix B of the CD), are as follows:

- Characterize the type and extent of contaminants (both soil and groundwater) that are underlying the approximate boundary of the Former Source Area (FSA); and;
- Collect soil samples for laboratory analysis to provide additional data on the nature of residual soil impacts in the Plume Core and for other parameters that might affect the design and/or performance of the OU-2 remedy.

The Site location is detailed on **Figure 1-1**. A general Site Plan is shown on **Figure 1-2**.

2.0 FIELD INVESTIGATION METHODS

2.1 Former Source Area Soil Borings

Between May 18 and June 12, 2012, a total of twenty-eight (28) soil borings were completed to competent bedrock in the FSA using direct push drilling techniques. In addition, one background soil boring was performed to the southeast of the FSA. **Figure 2-1** shows the approximate locations of the completed borings. Soil samples for the evaluation of conditions within the Plume Core were collected from each of the 28 soil borings. Soil samples from the background soil boring were only analyzed for the soil treatability analytes. Additional soil samples were collected on August 20, 2012, during the collection of the soil samples for the Mixed Slurry Microcosm bench-testing program, and submitted for laboratory analysis of select treatability parameters.

The twenty-eight soil borings completed within the FSA were also used for the collection of soil samples within the Treated Backfill. The results of that investigation were presented in the Draft Treated Backfill Leachability Evaluation and Risk Assessment technical memorandum, which was submitted to the Agencies on January 25, 2013.

Direct push drilling technology was used to allow for the collection of continuous, minimally-disturbed soil cores and to assess the potential to use this drilling technique during the proposed Pilot Test and full-scale injection program in the FSA. Due to concerns about shallow refusals and the presence of cobbles and boulders within the unconsolidated deposits in the FSA, a large Geoprobe 7822DT drilling rig and heavy-duty tooling were used to complete the soil borings. Continuous soil cores were collected using a 2.25-inch outer diameter macro-core sampler throughout the entire overburden, with headspace screening at one-foot intervals. Field headspace screening was performed in accordance with standard

operating procedure (SOP) A-2 in the FSP. Any soil samples exhibiting field headspace readings exceeding 100ppm$_v$ were to be screened for non-aqueous phase liquid (NAPL) using a soil-water shake test and Oil Red O shake test using the SOP for the NAPL screening that was included in the FSP.

Soil samples were collected in accordance with the sampling strategy and rationale presented in Table 3.2 of the PDI Plan that was based on the objectives of the evaluation.

2.1.1 Advancement of Borings

Each boring was completed using direct push drilling techniques and soil samples were collected using the macro-core sampler equipped with acetate liners, allowing for continuous soil core collection through the unconsolidated deposits. The direct push sampler was typically advanced at 5-foot intervals or less. Soil cores were collected continuously down to competent bedrock or drilling refusal at all locations. Soil borings were logged in the field by an ESS field scientist. Subsurface conditions encountered during the boring program are documented on the boring logs which are included in **Appendix A**.

Drill tooling was decontaminated following completion of each boring. In general, the drill tooling was decontaminated using pressurized steam cleaning within a decontamination pad which was constructed at the Site within the northern portion of the FSA. The water generated during decontamination activities was either allowed to evaporate from the decontamination pad or containerized in 55-gallon drums for characterization and potential off-Site management.

2.1.2 Field Screening

Field screening of unconsolidated deposits was performed using a RAE Systems MiniRAE 2000 photoionization detector (PID). Headspace screening was conducted at approximately one-foot intervals down to competent bedrock or drilling refusal. Immediately upon the recovery of soil cores, samples were collected at the appropriate intervals and sealed in 18 ounce polyethylene sample bags for headspace screening. In general, field headspace screening and equipment calibration was performed in accordance with SOP A-3 (Headspace Screening) in the FSP. The PID was calibrated at the start of each day using 100 ppm isobutylene gas to a response factor of 1.0 and was generally checked for calibration once during the day and at the end of each day.

In accordance with the PDI Plan, soil samples that had PID readings greater than 100 ppm$_v$ were to be screened for NAPL using the soil-water shake test and Oil Red O screening methodologies as outlined in SOP A-5 in the FSP. The NAPL screening consisted of a two-step process wherein the soil-water shake test was performed initially. A small amount of the Oil Red O was then added to the container to perform the Oil Red O shake test.

Sample intervals and corresponding headspace readings were recorded on headspace monitoring forms or within field books and were later transcribed to the boring logs included herein as Appendix A.

2.1.3 Soil Sampling and Analysis

In general, soil samples were collected for laboratory analysis in accordance with the sampling strategy and rationale presented in Table 3.2 of the PDI Plan that was based on the objectives of the evaluation and presence/absence of targeted stratigraphic layers. Utilizing this approach, the following table summarizes the samples collected.

Stratigraphic Layer	Number of Samples[1]	Analysis
Clean Fill/Screened Material	5	VOCs
Peat	7	VOCs
	5[2]	SVOCs, Pest, PCBs, Metals
Grey Silt/Sand/Clay	10	VOCs
	7[2]	SVOCs, Pest, PCBs, Metals
Sand and Sand & Gravel	72	VOCs
	41	SVOCs, Pest, PCBs, Metals

Notes:
[1] Number of samples does not include duplicates
[2] Number of samples may reflect a sample collected within two adjacent strata (i.e., Peat and Grey Silt)

In addition to the samples summarized above four duplicate samples were submitted for volatile organic compounds (VOCs), and two duplicates were submitted for laboratory analysis of semi-volatile compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs) and target analyte list (TAL) metals. All laboratory soil samples were collected in accordance with the FSP and were immediately placed in an ice filled cooler for delivery via courier to TestAmerica's laboratory in Westfield, Massachusetts.

Soil samples from select soil borings were also submitted for laboratory analysis of the soil treatability analytes outlined on Table 3.3 of the PDI Plan. These analyses were performed either by TestAmerica, Microseeps (Pittsburgh, Pennsylvania) or Microbial Insights (Rockford, Tennessee) in accordance with the QAPP. Refer to Section 3.4.5 for additional detail on the sampling and laboratory analysis for the treatability analytes.

2.1.4 Soil Characterization

The lithology of the soil samples was logged in the field by an ESS field scientist using the United States Geological Survey (USGS) visual-manual classification system in general accordance with SOP A-2 (Soil Logging and Physical Parameter Soil Sampling) of the FSP. Detailed descriptions of the lithology at each boring location are provided in the boring logs contained herein as **Appendix A**.

2.2 Plume Core Well Installations

ESS installed a total of sixteen (16) Plume Core monitoring wells, which were all completed in the unconsolidated deposits, in accordance with the PDI Plan. The well installation activities included the installation of thirteen (13) Plume Core overburden wells (PC-2, PC-3S, PC-8S, PC-11S, PC-11D, PC-17D, PC-20S, PC-20D, PC-23D, PC-24PS, PC-25D, PC-28D, and PC-28PS), and three (3) Plume Core delineation wells (PCD-1, PCD-2, and PCD-3). The surveyed locations of the Plume Core wells are shown on **Figure 2-2**.

The objective of the well installations was to allow for collection of groundwater samples for:

- Analysis of VOCs to support the delineation of the Active Treatment Zone;
- Analysis of treatability parameters and performance monitoring parameters to support the design of the bench-testing program and the pilot testing program; and
- Analysis of VOCs to support the further delineation of the Plume Core (i.e., FSA).

The well installations were performed in general accordance with SOP A-1 (Soil and Bedrock Boring, Drilling, and Sampling) and SOP A-6 (Monitoring Well Construction and Development) in the FSP and the methodology outlined in the PDI Plan. Characterization of unconsolidated deposit and bedrock samples was performed in general accordance with SOP A-3 (Soil Logging, Rock Characterization and Physical Parameter Soil Sampling).

All of the monitoring wells, with the exception of PC-24PS and PC-28PS, were constructed using GeoProbe pre-packed well screens to guarantee that an adequate sand pack would be present around the well screen given that the wells were installed within smaller diameter direct push casing. Monitoring wells PC-24PS and PC-28PS were constructed using conventional 2-inch diameter PVC well materials. Both of these wells were constructed using two feet of PVC well screen installed within the Organic Peat and Grey Silts and Silty Sands to allow for the collection of groundwater samples from within these stratigraphic units. All of the wells were developed using a submersible pump and pump and surge techniques in general accordance with SOP A-6 (Monitoring Well Construction and Development). Well development details are provided on the well development forms in **Appendix B**. Purge water generated during well development was containerized pending characterization and/or off-Site management.

Following the installation and development of the Plume Core wells, the location and vertical elevation of the wells was surveyed by DiPrete Engineering. Surveying was performed relative to Rhode Island State Plane (NAD 83) for horizontal location and relative to NAVD 88 for vertical elevations. Vertical elevations were then converted to NGVD 29 using the Corpscon 6.0.1 program to be consistent with existing Site elevations. **Table 2-1** provides a summary of the well specifications for the Plume Core monitoring wells and Plume Core delineation wells.

2.2.1 Groundwater Sampling

Plume Core monitoring wells, in conjunction with select existing monitoring wells located within the FSA, were sampled to support the objectives stated above. Details of these sampling events are provided in Section 3.5. Monitoring well sampling was performed in general accordance with SOP A-11 (Groundwater Purging and Sample Collection and Field Parameter Monitoring). Purge water generated during well sampling was containerized pending characterization and/or off-Site management.

3.0 FIELD INVESTIGATION RESULTS

This section summarizes field headspace measurements, laboratory soil analytical data for soil samples collected as part of the Plume Core Evaluation, as well as the results of the Plume Core groundwater sampling activities as they pertain to this evaluation. Figure 2-1 shows the approximate locations of the completed soil borings within the FSA.

Data packages were generated by TestAmerica for the Plume Core soil samples: SDGs 360-40656-1, 360-40689-1, 360-40711-1, 360-40738-1, 360-40787-1, 360-40791-1, 360-40815-1, 360-40826-1, 360-40834-1, 360-40862-1, 360-40915-1, 360-40941-1, 360-40968-1, and 360-41025-1 for VOCs, SVOCs, pesticides, PCBs and metals. The laboratory data packages were validated as described in the QAPP by New Environmental Horizons, Inc. (NEH). The TestAmerica data packages underwent either a Tier III-type validation (one SDG) or a Tier II-type (for all other SDGs) validation according to the Region I, EPA-NE *Data Validation Guidelines for Evaluating Organic Analyses* (December 1996 and updates). Specific validation approach details are provided in the QAPP. The laboratory analytical reports are provided in **Appendix C**. The data validation reports are included in **Appendix D**. No data were rejected during data validation, and all qualified and unqualified results were considered useable for project objectives.

Data packages were generated by TestAmerica for the Summer 2012 groundwater sampling of the Plume Core monitoring wells: 360-42131-1 and 360-42220-1 for VOCs. The TestAmerica data packages underwent a Tier II-type validation. Specific validation approach details are provided in the QAPP. The

laboratory analytical reports are provided in **Appendix C**. The data validation reports are included in **Appendix D**. No data were rejected during data validation, and all qualified and unqualified results were considered useable for project objectives.

All other data packages associated with the analysis of Plume Core soil samples for the treatability analytes, the initial VOC and treatability sampling of the Plume Core monitoring wells in June 2012 and the performance monitoring sampling of select FSA wells in November 2012 underwent a Tier I completeness review in accordance with the QAPP. The laboratory analytical reports are provided in **Appendix C**.

3.1 Soil Conditions

Figure 3.1 presents a schematic of the general stratigraphy encountered within the FSA during the drilling program, taking into consideration the findings of other historic drilling activities, and the nomenclature that is being used to describe each zone within the FSA (e.g., Clean Fill / Screened Material).

Figure 2-1 shows the approximate locations of the completed soil borings and the areas of organic peat and/or grey silts and silty sands, which occur predominantly within the eastern portion of the FSA. Two small areas of organic peat were also identified during the 2008 soil boring program within the northwestern portion of the FSA at soil boring NW-8 and within the southeastern portion of the FSA at boring SE-13. Three additional areas of silt and sand were identified in soil borings PC-3, PC-8 and PC-16 during the 2012 boring program within the interbedded sand and sand and gravel deposits. These areas do not appear to be associated with the grey silts which underlie the organic peat in the eastern portion of the FSA and are not shown on Figure 2-1. The thickness of these layers range from 1 foot (PC-3) to 7 feet (PC-16). For reference, the approximate area of the FSA as shown on Figure 2-1 is approximately 245,000 square feet (ft^2), while the approximate area underlain by Organic Peat and/or Grey Silts and Silty Sands is approximately 66,118 ft^2 (approximately 27% of the FSA), exclusive of the three isolated areas of silt located at borings PC-3, PC-8 and PC-16.

More detailed geologic cross sections are presented on **Figures 3-2 and 3-3**. The approximate locations of the cross sections are shown on Figure 2-1. Figure 3-2 is oriented approximately north-south through the central portion of the FSA. Figure 3-3 is also oriented approximately north-south and is located through the eastern portion of the FSA. Figure 3-3 shows the locations of the Organic Peat and Grey Silts and Silty Sands relative to the saturated Sands and Sand and Gravel within this portion of the FSA.

One of the ancillary objectives of the Plume Core drilling and sampling program was to assess the feasibility of using direct push drilling technologies within the FSA. All of the completed soil borings documented herein were completed using direct push drilling technology. **Figure 3-4** provides a summary of the drilling refusals that were encountered on a boring-by-boring basis. As summarized on the figure, frequent drilling refusals were encountered throughout the FSA with drilling refusal often encountered at multiple depths in multiple boreholes at the same boring location. The figure also shows that multiple drilling refusals were encountered at 12 of the 28 soil boring locations (~43% of the locations). This information will be incorporated into an Injectability Assessment that will be completed as part of the design of the OU-2 remedy.

Based on the results of the Plume Core boring program, the bedrock surface contours were also updated, taking into consideration other historic bedrock elevation information from within the FSA. The updated bedrock surface contours are shown on **Figure 3-5**. This figure shows that over the majority of the FSA, the elevation of the bedrock surface is approximately 390 feet with minor undulations. The figure also shows that the bedrock surface drops off significantly within the eastern portion of the FSA, to elevations less than 370 feet.

3.2 Field Headspace

In accordance with the PDI Plan, field headspace screening was performed at one-foot intervals, at a minimum, to competent bedrock. The field headspace readings collected during the implementation of the Plume Core Evaluation are summarized on the boring logs in Appendix A.

Measured headspace readings ranged from 0.0 ppm (non-detect) to 565 ppm. Low soil headspace readings (</= 0.2 ppmv across the entire soil core) were measured at six locations (PC-1, PC-2, PC-3, PC-5, PC-16, and PC-22). Headspace readings of less than 2.0 ppm across the entire soil core were measured at nine locations (PC-9, PC-11, PC-14, PC-17, PC-18, PC-21, PC-23, PC-26, and PC-27). The highest headspace readings, 287 ppm (PC-8) and 565 ppm (PC-15) were measured within soil samples exhibiting visible staining.

3.3 Non-Aqueous Phase Liquid Screening

In accordance with the Work Plan, NAPL screening was performed on all soil samples exhibiting field headspace readings greater than 100 ppm_v. Oil-Red-O screening was performed on two samples [287 ppm (14 to 15 feet bgs at PC-8) and 565 ppm (14 to 15 feet bgs at PC-15)] and both results did not yield positive responses indicative of NAPL presence.

3.4 Plume Core Soil Sampling

The following sections briefly summarize the findings based on the laboratory analysis of Plume Core soil samples for the target analytes as specified in the PDI Plan. Soil sampling was generally performed in accordance with the sampling rationale outlined on Table 3.2 of the PDI Plan.

3.4.1 Volatile Organic Compounds

A complete summary of the VOC analytical results is provided on **Table 3-1**. The following summarizes the detected VOC compounds, their highest detected concentration and the soil lithology at this sample depth and their detection frequency.

Compound	Highest Concentration, Location and Soil Type	Detection Frequency
1,1,1-Trichloroethane	130J ug/Kg (PC-12 - Sand & Gravel)	31 of 89
1,1-Dichloroethane	1,700J ug/Kg (PC-25 - Peat)	25 of 89
1,2,3-Trichlorobenzene	6.1 ug/Kg (PC-13 - Sand & Gravel)	4 of 89
1,2,4-Trichlorobenzene	170J ug/kg (PC-28 - Peat)	12 of 89
1,2-Dichlorobenzene	3200 ug/kg (PC-28 - Peat)	26 of 89
1,3-Dichlorobenzene	130J ug/Kg (PC-28 - Peat)	5 of 89
1,4-Dichlorobenzene	1,000 ug/Kg (PC-28 - Peat)	6 of 89
Benzene	4.6 ug/Kg (PC-23 - Peat)	1 of 89
Carbon Disulfide	12 ug/Kg (PC-25 - Sand & Gravel)	15 of 89
Chloroethane	27 ug/Kg (PC-19 - Silt)	9 of 89
Cyclohexane	280J (PC-28 - Peat)	2 of 89
cis-1,2-Dichloroethylene	68,000J ug/Kg (PC-24 - Peat)	67 of 89
Ethylbenzene	14,000 ug/Kg (PC-28 - Peat)	28 of 89
Isopropylbenzene	390 ug/Kg (PC-28 - Peat)	9 of 89
Methyl ethyl ketone (MEK)	110J ug/Kg (PC-27 - Peat)	3 of 89
Methylcyclohexane	1,800 ug/Kg (PC-28 - Peat)	3 of 89

Compound	Highest Concentration, Location and Soil Type	Detection Frequency
Methylene chloride	23J ug/Kg (PC-27 - Peat)	14 of 89
Tetrachloroethylene	590J ug/Kg (PC-25 - Peat)	20 of 89
Toluene	9,700 ug/Kg (PC-19 - Silt)	4 of 89
Trans-1,2-Dichloroethene	4,000J ug/Kg (PC-24 - Peat)	16 of 89
Trichloroethylene	2,200J ug/Kg (PC-25 - Peat)	15 of 89
Vinyl chloride	2,400 ug/Kg (PC-24 - Peat)	43 of 89
Xylenes (total)	67,000 ug/Kg (PC-28 – Peat)	14 of 89

NOTES:
Duplicate sample results not included in detection frequency
J – Estimated concentration

The six most-detected VOCs included cis-1,2-DCE, vinyl chloride, 1,1,1-TCA, ethylbenzene, 1,2-dichlorobenzene and 1,1-dichloroethane. With the exception of ethylbenzene, all of these compounds are chlorinated VOCs and four of the six are target COCs for the OU-2 remedy, excluding ethylbenzene and 1,2-dichlorobenzene.

In addition, five (5) soil samples were collected from within the Clean Fill/Screened Material zone during the boring program and submitted for laboratory analysis of VOCs. The following summarizes the detected compounds, maximum detected concentrations and detection frequency in the soil samples collected from within this soil zone.

Compound	Highest Concentration and Location	Detection Frequency
1,2,3-Trichlorobenzene	9.3 ug/Kg (PC-13)	2 of 5
1,2,4-Trichlorobenzene	29 ug/Kg (PC-13)	3 of 5
1,2-Dichlorobenzene	22J ug/Kg (PC-19)	3 of 5
1,3-Dichlorobenzene	15 ug/Kg (PC-19)	2 of 5
1,4-Dichlorobenzene	110 ug/kg (PC-19)	2 of 5
cis-1,2-Dichloroethylene	1.2J ug/kg (PC-11)	1 of 5
Ethylbenzene	1.9J ug/Kg (PC-19)	1 of 5
Methyl ethyl ketone (MEK)	11J ug/Kg (PC-19)	1 of 5
Methylene chloride	9.2J ug/Kg (PC-13)	1 of 5
Tetrachloroethylene	22 ug/Kg (PC-13)	3 of 5
Trichloroethylene	2.3J ug/Kg (PC-13)	1 of 5
Xylenes (total)	93.9 ug/Kg (PC-19)	1 of 5

The three most-detected VOCs include PCE, 1,2,4-dichlorobenzene and 1,2 dichlorobenzene. Of these three compounds, only PCE is a target compound for the OU-2 remedy.

3.4.2 Semi-volatile Organic Compounds

A complete summary of the SVOC analytical results is provided on **Table 3-2**. Twenty (20) SVOCs were detected within the Plume Core samples. Of these sixteen SVOCs, seven are polyaromatic hydrocarbons. All of the detected SVOCs are listed below along with the maximum detected concentration and the soil lithology at this sample depth and the detection frequency.

Compound	Highest Concentration, Location and Soil Type	Detection Frequency
1,2,4,5-Tetrachlorobenzene	51 ug/Kg (PC-11 - Sand & Gravel)	3 of 53
2-Methylnaphthalene	100J ug/Kg (PC-8 – Silt and Sand / Sand)	3 of 53
3 & 4 Methylphenol	720 ug/Kg (PC-19 - SIlt)	2 of 53
Benzaldehyde	29J ug/Kg (PC-13 - Sand & Gravel)	2 of 53
Benzo(a)anthracene*	260 ug/Kg (PC-8 - Silt and Sand / Sand)	1 of 53
Benzo(a)pyrene*	230 ug/Kg (PC-8 - Silt and Sand / Sand)	2 of 53
Benzo(b)fluoranthene*	290 ug/Kg (PC-8 - Silt and Sand / Sand)	1 of 53
Benzo(ghi)perylene*	150J ug/Kg (PC-8 - Silt and Sand / Sand)	1 of 53
Benzo(k)fluoranthene*	130J ug/Kg (PC-8 - Silt and Sand / Sand)	1 of 53
Biphenyl	69J ug/Kg (PC-6 - Sand)	2 of 53
Bis(2-ethylhexyl)phthalate (BEHP)	1900 ug/Kg (PC-7 - Sand & Gravel)	12 of 53
Butyl benzyl phthalate	88J ug/Kg (PC-6 - Sand & Gravel)	3 of 53
Chrysene	250 ug/Kg (PC-8 - Silt and Sand / Sand)	1 of 53
Di-n-octyl phthalate	220 ug/Kg (PC-8 - Silt and Sand / Sand)	7 of 53
Fluoranthene	390 ug/Kg (PC-8 - Silt and Sand / Sand)	3 of 53
Indeno(1,2,3-cd)pyrene	140J (PC-8 - Silt and Sand / Sand)	1 of 53
Naphthalene	78J ug/Kg (PC-8 - Silt and Sand / Sand)	3 of 53
N-Nitrosodiphenylamine	44 ug/Kg (PC-18 - Sand & Gravel)	1 of 53
Phenanthrene*	230 ug/Kg (PC-8 - Silt and Sand / Sand)	2 of 53
Pyrene*	390 ug/Kg (PC-8 - Silt and Sand / Sand)	4 of 53

NOTES:
Duplicate sample results not included in detection frequency
* – Indicates SVOC is a polyaromatic hydrocarbon
J – Estimated concentration

The two most frequently detected SVOCs are both phthalate compounds (BEHP and Di-n-octyl phthalate). BEHP has been detected very infrequently and Di-n-octyl phthalate has not been detected in groundwater samples collected during the 2012 Site-wide monitoring events (Spring and Summer events). All other SVOCs were detected very infrequently (frequency of 3 of 53 or less). It is apparent from these results that SVOCs are not significant COCs within the FSA.

3.4.3 PCBs and Pesticides

Polychlorinated biphenyls (PCBs) were not detected in the fifty-three (53) samples analyzed. A complete summary of the PCB and pesticide analytical results is provided on **Table 3-3**. Three (3) pesticides were detected within the Plume Core samples as summarized in the following table.

Compound	Highest Concentration and Location	Detection Frequency
4,4-DDE	35 ug/Kg (PC-8)	1 of 53
4,4-DDT	14 ug/Kg (PC-8)	1 of 53
Heptachlor	22 ug/Kg (PC-10)	1 of 53

NOTE:
Duplicate sample results not included in detection frequency

Based on these results, it is readily apparent that neither PCBs nor pesticides are COCs within the FSA. PCBs and pesticides are not target COCs for the OU-2 remedy.

3.4.4 TAL Metals

A complete summary of the analytical results for metals is provided on **Table 3-4**. All TAL metals were detected at least once within the Plume Core soil samples with the exception of thallium. None of the TAL metals are target COCs for the OU-2 remedy and this data will be used primarily to support the ongoing bench-testing and pilot testing programs and the design of the OU-2 remedy. The following provides an overview of the metals results.

Metal	Minimum Concentration (mg/Kg)	Maximum Concentration (mg/Kg)	Detection Frequency
Aluminum	3,300	18,000	53 of 53
Antimony	0.56U	0.98J	1 of 53
Arsenic	1.2U	10	40 of 53
Barium	14	330	53 of 53
Beryllium	0.24U	2	43 of 53
Cadmium	0.23U	0.83	5 of 53
Calcium	570	11,000	53 of 53
Total Chromium	1.8	28	53 of 53
Cobalt	1.4	12	53 of 53
Copper	2	69	53 of 53
Iron	4,700	42,000	53 of 53
Lead	0.71	1,500	48 of 53
Magnesium	590	5200	53 of 53
Manganese	76	690	53 of 53
Mercury	0.073U	0.55J	2 of 53
Nickel	1.5	23	52 of 53
Potassium	700	13,000	53 of 53
Selenium	0.59U	5.3	40 of 53
Silver	0.56U	2.1	8 of 53
Sodium	110U	340U	1 of 53
Thallium	1.1U	3.4U	Not Detected
Vanadium	4.8	25	53 of 53
Zinc	17	310	53 of 53

NOTES:
Duplicate sample results not included in detection frequency
U – Compound was not detected at detection limit presented
J – Estimated concentration

3.4.5 Treatability Analytes

To support the bench-testing program and to collect data on the physical properties of the various soil types within the FSA, select soil samples were submitted for laboratory analysis of treatability parameters in accordance with Table 3.3 in the PDI Plan. Select soil samples from the various soil types were submitted for the following analyses.

- Total organic carbon (TOC)
- Grain size distribution
- Soil bulk density
- Cation exchange capacity
- Bioavailable ferric iron
- AMIBA analysis
- Acidity/pH Buffering

The AMIBA analysis includes the analysis of weak acid soluble iron, strong acid soluble iron, acid volatile sulfide and chromium extractable sulfide. Select physical parameter results are listed in the following table for the three predominant soil types identified within the FSA.

Table 3-5 – Summary of Select Treatability Analyte Results – Physical Parameters

	Location	Depth Interval (ft bgs)	Grain Size Distribution (%)				TOC (mg/Kg)	Soil Bulk Density (g/cc)
			Gravel	Sand	Silt	Clay		
Organic Peat	PC-24	12-13.5	3.4	48.2	40.2	8.2	420,000	0.447
	PC-28	4.5-5.5	0.4	24.9	48.6	26.1	400,000	0.359
Grey Silts and Silty Sands	PC-24	13.5-16	0.9	11.4	76.3	11.4	2,300	1.65
	PC-28	5.5-8.5	1.3	64.1	30.6	4	12,000	1.78
Sand and Sand & Gravel	PC-10	13-18	21.7	57.2	17.5	3.7	<1,100	2.03
	PC-24	20-24	0	90	9.1	0.9	<1,200	1.84
	PC-28	10-15	0	68	27.9	4.1	2,100	1.79

NOTES:
ft – Feet
bgs – Below ground surface
mg/kg – Milligrams per kilogram
g – Grams
cc – Cubic centimeters

A complete summary of the results for the treatability analyte sampling are provided in **Appendix E**. As summarized in Table 3-5, the physical properties of the three predominant soil types identified within the FSA vary greatly. Of particular note is the variability in fines (silt and clay) content and organic matter observed between the soil samples. High proportions of fines were recorded in the organic peat and silt and silty sand samples. In addition high TOC (up to 1.2%) was recorded in the silts and silty sands. Both the physical properties of the soil and the variability both vertically and laterally across the area will be important considerations in the design of the remedy.

3.5 Plume Core Well Sampling

The following summarizes the sampling activities associated with the Plume Core wells and the Plume Core delineation wells and focused sampling of other existing wells in the FSA completed as part of the Plume Core Evaluation. Groundwater sampling activities were performed in general accordance with Section 3.1.1.3 of the PDI Plan and the rationale detailed on Table 3.5 in the PDI Plan. All monitoring wells were inspected prior to sample collection and no issues with well security or integrity were identified during the three sampling rounds detailed below.

3.5.1 Initial Treatability Sampling

To support the design of the bench-scale testing program, groundwater samples from select Plume Core and existing monitoring wells located within the FSA were submitted for laboratory analysis of the groundwater treatability analytes listed on Table 3.3 of the PDI Plan during the Spring 2012 Site-wide Monitoring Event. Groundwater samples from six (6) monitoring wells (OW-54, PC-11S, PC-24PS, PC-28D, PC-28PS, PCD-3) were submitted for laboratory analysis of the following parameters.

- VOCs
- Selected treatability parameters (alkalinity, ammonia, hardness, iron, manganese, nitrate, nitrite, phosphorous, sulfate, sulfide, and total dissolved solids)
- Ferrous and ferric iron
- Divalent manganese
- Acidity/pH buffering

The following table presents a summary of the treatability analyte results.

Table 3-6 – Summary of Treatability Analyte Results - Groundwater

Analysis	Units	Peat & Silt		Sands, and Sands and Gravels			
		PC-24PS	PC-28PS	PC-11S	PC-28D	PCD-3	OW-54
Alkalinity	mg/L	82	170	12	110	17	56
Ammonia (as N)	mg/L	3.3	4.9	0.10U	0.53	0.10U	0.35
Hardness (as CaCO3)	mg/L	64	190	25	93	15	49
Iron	mg/L	31	27	0.1U	11	3.5	7.2
Manganese	mg/L	1.1	0.48	0.02	5.6	1.2	1.5
Nitrate	mg/L	0.050U	0.050U	0.54	0.050U	0.050U	0.050U
Nitrite (as N)	mg/L	0.010U	0.010U	0.010U	0.010U	0.010U	0.010U
Phosphorous	mg/L	1.7	0.10U	0.10U	0.10U	0.10U	0.10U
Sulfate	mg/L	2.0U	4.2	18	18	12	2.0U
Sulfide	mg/L	1.1U	1.1U	1.1U	1.1U	1.1U	1.1U
Total Dissolved Solids	mg/L	150	220	71	160	60	88
Ferric Iron	mg/L	1.3	0.69	0.50U	1.1	0.36J	0.60
Ferrous Iron	mg/L	22	7.9	0.50U	10	2.8	7.0
Divalent Manganese	mg/L	1.1	0.27J	<0.50	6.0	1.3	1.6

NOTES:
U – Compound was not detected at detection limit presented
J – Estimated concentration

A complete summary of the VOC and treatability parameter analytical results are provided in **Appendix F**. Groundwater sampling forms are provided in **Appendix G**. This data was not validated based on the intended use of the data, in accordance with the QAPP.

3.5.2 VOC Sampling

As noted in Section 3.1.1.3 of the PDI Plan, analysis of groundwater samples from Plume Core monitoring wells and Plume Core delineation wells was performed to:

- Support the delineation of the Active Treatment Zone (ATZ)
- Support the further delineation of the Plume Core (i.e., FSA)

This sampling was performed during the Summer 2012 Site-wide Monitoring Event and included the collection and laboratory analysis of groundwater samples from twelve (12) Plume Core characterizations wells (PC-#) and three (3) Plume Core delineation wells (PCD-#) that were installed as part of the Plume Core drilling program. In addition, samples for VOC analysis were also collected from the following unconsolidated deposit wells located within or proximal to the FSA as part of the Summer 2012 Site-wide Monitoring Event.

- OW-51
- OW-52
- OW-55
- OW-93-O
- OW-94-O
- OW-300-O through OW-304-O
- OW-102-O

All samples collected were analyzed for VOCs and the results of these analyses were used to assess the extent of the FSA and the delineation of the initial ATZ. A complete summary of these results are provided in **Table 3.7**.

Four figures have been prepared that present the analytical results from the Plume Core wells, similar to the figures typically included in the Site-wide Monitoring Event reports. **Figure 3-6** presents an isoconcentration map of the TVOC concentrations in the shallow monitoring wells during this monitoring event. **Figure 3-7** presents a map of the analytical results for the six VOCs (TCE, PCE, benzene, vinyl chloride, cis-1,2-DCE, and 1,1-DCA) identified in the 2010 Amended Record of Decision and also identifies concentrations in excess of the Interim Groundwater Remediation Goals (IGRGs) for the shallow wells. **Figure 3-8** presents an isoconcentration map of the TVOC concentrations in the deep monitoring wells during this monitoring event. **Figure 3-9** presents a map of the analytical results for the six VOCs (TCE, PCE, benzene, vinyl chloride, cis-1,2-DCE, and 1,1-DCA) identified in the 2010 Amended Record of Decision and also identifies concentrations in excess of the Interim Groundwater Remediation Goals (IGRGs) for the deep wells.

This analytical data was validated in accordance with the QAPP. Groundwater sampling forms are provided in **Appendix G**. A summary of the pre-sample field water quality measurements collected during this sampling round is provided on **Table 3.8**.

The following provides an overview of the analytical results.

Compound	Highest Concentration, Location	Detection Frequency
1,1,1-Trichloroethane	580 ug/L (PC-20D)	16 of 27
1,1,2-Trichloroethane	2.7J ug/L (OW-52)	4 of 27
1,1-Dichloroethane	150 ug/L (PC-20D)	21 of 27
1,1-Dichloroethene	62J ug/L (PC-20D)	16 of 27
1,2,3-Trichlorobenzene	0.34J ug/L (PC-8S)	2 of 27
1,2,4-Trichlorobenzene	1.2 ug/L (PC-8S)	4 of 27
1,2-Dichlorobenzene	43J ug/L (PC-20D)	14 of 27
1,2-Dichloroethane	0.37J ug/L (OW-303-O)	3 of 27
1,3-Dichlorobenzene	0.45J ug/L (PC-)	2 of 27
1,4-Dichlorobenzene	6.4J ug/L (OW-52)	6 of 27
1,4-Dioxane	130 ug/L (PC-28PS)	11 of 27
Benzene	15 ug/L (PC-28PS)	6 of 27
Carbon Disulfide	3.2J ug/L (OW-52)	7 of 27
Chlorobenzene	3J ug/L (OW-52)	6 of 27
Chloroethane	23 ug/L (PC-28PS)	11 of 27
Chloroform	9.2 ug/L (PC-17D)	2 of 27
cis-1,2-Dichloroethylene	3,300 ug/L (PC-20D)	23 of 27
Cyclohexane	0.37J ug/L (OW-303-O)	3 of 27
Diethyl ether	24 ug/L (PC-28PS)	2 of 27
Ethylbenzene	840 ug/L (OW-300-O)	11 of 27
Isopropylbenzene	24 ug/L (OW-300-O)	13 of 27
Methyl chloride	0.31 ug/L (PC-8S)	5 of 27
Methylcyclohexane	6.8J ug/L (OW-300-O)	6 of 27
Methylene chloride	110J ug/L (PC-20D)	2 of 27
Tetrachloroethylene	100 ug/L (PC-3S)	19 of 27
Tetrahydrofuran	46 ug/L (PC-28PS)	2 of 27
Toluene	70 ug/L (PC-28PS)	10 of 27
Trans-1,2-Dichloroethene	68J ug/L (PC-20D)	18 of 27
Trichloroethylene	28 ug/L (OW-301-O)	20 of 27
Trichlorofluoromethane	1.2 ug/L (PC-3S)	2 of 27
Vinyl chloride	1,100 ug/L (PC-20D)	21 of 27
Xylenes (total)	2,000 ug/L (PC-300-O)	11 of 27

NOTES:
Duplicate sample results not included in detection frequency
J – Estimated concentration

The Plume Core VOC analytical results from the Summer 2012 sampling event are similar to previous sampling events, however, the additional wells do provide better resolution on the nature and distribution of groundwater impacts within the FSA. The following observations are provided.

- The most frequently detected VOCs include: cis-1,2-DCE, 1,1-DCA, vinyl chloride, TCE and PCE.
- The highest concentrations of each of the compounds with Site Interim Groundwater Remedial Goals (IGRGs) are as follows:
  - 1,1-DCA 150 ug/L (PC-20D)
  - Benzene 15 ug/L (PC-28PS)
  - Cis-1,2-DCE 3,300 ug/L (PC-20D)
  - PCE 100 ug/L (PC-3S)
  - TCE 28 ug/L (OW-301-O)
  - Vinyl Chloride 1,100 ug/L (PC-20D)
- All of the wells listed above are located within areas of elevated soil concentrations, based on the results for the Plume Core soil borings, with the exception of PC-3S.
- Other compounds detected at concentrations exceeding applicable RIDEM GA Groundwater Objectives include the following.
  - 1,1,1-TCA 580 ug/L (PC-20D)
  - 1,1-DCE 62J ug/L (PC-20D)
  - Ethylbenzene 840 ug/L (OW-300-O)
  - Methylene Chloride 110 ug/L (PC-20D)
- The five wells exhibiting TVOC concentrations in excess of 1,000 ug/L include PC-20D (5,512 ug/L), OW-300-O (2,953 ug/L), OW-52 (1,682 ug/L), PC-20S (1,158 ug/L) and PC-28D (1,147.7 ug/L).
  - PC-20S, PC-20D and PC-28D are located in areas of elevated soil concentrations
  - The detected concentrations at OW-300-O are predominantly BTEX compounds
  - OW-52 is located downgradient of the FSA
- 1,4-Dioxane was detected in samples from 11 of the 27 wells sampled, at concentrations ranging up to 130 ug/L.

Based on Figures 3-6 through 3-9, the following additional observations are provided.

- The highest TVOC concentrations were detected within the deeper groundwater zone in the Plume Core in monitoring wells OW-300-O (2,953 ug/L) and OW-20D (5,512 ug/L).
- Benzene was only detected at a concentration (15 ug/L) exceeding the applicable IGRG in one monitoring well (PC-28PS) sampled within the Plume Core.
- Detected concentrations of PCE were typically higher within the shallow monitoring wells located in the Plume Core. The highest concentrations of PCE were detected in monitoring wells PC-2S (97 ug/L) and PC-3S (100 ug/L).

- The highest concentrations of 1,1-DCA, cis-DCE and vinyl chloride were all detected in deep monitoring well PC-20D.
- The highest TCE concentrations were detected in shallow monitoring wells PC-3S (27 ug/L) and OW-301-O (28 ug/L) and deep monitoring wells PC-20D (21J ug/L) and PC-28D (21 ug/L).

Further discussion and interpretation of the results is provided in Section 4.2 of this report relative to the delineation of the FSA and development of the initial Active Treatment Zone. Additional evaluation of these analytical results will be included in the design submittals for the OU-2 remedy.

3.5.3 Performance Monitoring Sampling

As noted in Section 3.1.1.3 of the PDI Plan, additional sampling of the Plume Core wells will be performed, as necessary, for performance monitoring parameters to support the ongoing bench-scale and pilot testing programs and to provide data to support the evaluation of performance monitoring parameters for the pilot test. This section of the PDI Plan also notes that this additional sampling will be performed at the direction of the design engineer. To this end, groundwater samples were collected from eight (8) overburden monitoring wells (OW-52, OW-93-O, OW-94-O, OW-300, OW-301, OW-302, OW-303, and OW-304) during the Fall 2012 Site-wide monitoring event and submitted for laboratory analysis of select dissolved gases (ethane, ethane, methane, and acetylene). This data was collected to characterize the nature of dissolved gases within the Plume Core. This data will be used to facilitate assessment of the ongoing bench testing and for design and implementation of the pilot testing program. A complete summary of the results are provided in **Appendix H**. Groundwater sampling forms which include field observations are provided in **Appendix G**. It should be noted that this data was not validated based on the intended use of the data, in accordance with the QAPP.

3.6 Investigation Derived Waste Management

Soil and groundwater generated during the Plume Core Evaluation field activities was handled in accordance with Section 6.3.2 of the FSP. Investigation derived wastes (IDW) generated during the Plume Core activities included:

1. Non-hazardous solid waste such as packaging materials and paper waste
2. Drilling spoils
3. Decontamination fluids
4. Purged well water
5. Used personal protective equipment (PPE)

Non-hazardous solid waste materials and used PPE were collected in plastic bags and were disposed of off-Site. Purge water generated during well development and groundwater sampling activities was collected in 5-gallon buckets and then transferred to 55-gallon drums. Decontamination fluids were contained within the decontamination pad constructed for the Project and allowed to evaporate or transferred to 55-gallon drums. Approximately four drums of purge water were generated during these activities.

All of the drilling spoils generated during the Plume Core soil boring program were either placed back down the borehole from which they were generated or field screened and determined to exhibit headspace readings less than 10 ppm_v such that they could be spread on the ground surface.

All of the drummed water from the Plume Core drilling, well development and groundwater sampling activities has been removed from the Site as bulk fluids under manifest. Documentation for the management of the IDW is provided in **Appendix I**.

4.0 DISCUSSION OF FINDINGS

In accordance with the objectives of the Plume Core Evaluation as noted in the PDI Plan, the following sections discuss the findings of the Plume Core Evaluation relative to nature and distribution of the residual contaminant mass within the Plume Core and the extent of the FSA and initial ATZ.

4.1 Subsurface Conditions

The results of the Plume Core boring program were used along with the results of historic drilling activities in the FSA to advance the understanding of the nature of the subsurface materials within this area of the Site. This information will be very important during the design of the OU-2 remedy since the delivery of the selected reagent(s) to the different lithologic units and the units containing mass will be integral to the overall success of the remedial action.

The vast majority of the FSA consists of inter-bedded sands and sand and gravel, with occasional layers of silty sand and silt, as evidenced at boring locations PC-3, PC-8 and PC-16. Within the eastern portion of the FSA, layers of highly organic peat and grey, lacustrine-type silty sands and silts are present within the shallow portion of the saturated zone. These deposits are underlain by the interbedded sands and sand and gravel deposits. Figure 2-1 shows the estimated areas within the FSA where the organic peat deposits and/or the grey silty sand and silts are present. The extent of these lower permeability and organic rich units is based on the results of the Plume Core boring program, the Phase 4 boring program completed in 2008 and other historic drilling activities within the FSA. The locations of the soil borings completed during the Phase 4 boring program in 2008 are also shown on Figure 2-1 for reference. As previously noted, additional, isolated silty sand layers were also identified at boring locations PC-3, PC-8 and PC-16 during the Plume Core boring program.

Geologic cross sections through the FSA are presented on Figures 3-2 and 3-3. The cross sections help to depict the spatial relationships between the three primary types of unconsolidated deposits (organic peat, grey silts, and interbedded sand and sand and gravel) that have been identified within the FSA. The observed subsurface conditions within the FSA, as documented in the boring logs in Appendix A, were highly variable. Additionally, the physical properties of each of the three types of unconsolidated deposits were also variable, as previously discussed in Section 3.4.5. The subsurface variability within the FSA was also evident in the seemingly random occurrences of drilling refusal encountered during the performance of the Plume Core drilling program, as previously discussed in Section 3.1. This variability will need to be addressed during the evaluation of injection technologies for the performance of the OU-2 remedy and in the design of the remedy.

The findings of the Plume Core boring program were consistent with the results of previous drilling activities in the FSA.

4.2 Residual Contaminant Mass

An evaluation of residual contaminant mass was performed using the analytical data from the 2012 Plume Core boring program and the analytical results from the previously completed 2008 Phase 4 boring program. As stated in the PDI Plan, two of the three objectives for this evaluation are as follows:

- Provide better estimates of the contaminant mass to be addressed during remediation.
- Provide data to assess the nature and distribution of residual contaminant mass within the different stratigraphic layers previously identified within the FSA (e.g., organic peat, fine-grained silt/sand, and sand/sand and gravel).

To accomplish this objective, the assessment of mass was completed on a boring-by-boring basis in accordance with the general methodology outlined below for the data generated from the Plume Core Evaluation boring program. A hybrid approach was used to incorporate the analytical results from the

2008 Phase 4 boring program into the evaluation of residual contaminant mass. The methodology for the performance of the combined 2008/2012 evaluation of residual contaminant mass is also provided in Section 4.2.1.

4.2.1 Methodology

Each boring was assigned an area within the FSA as shown on **Figure 4-1** utilizing the grid spacing of the borings (90 feet), the boundary of the FSA (with the exception of PC-1) and the eastern edge of the FSA, as denoted by the top of the embankment between the FSA and the adjacent Eastern Ponded Wetland. The area assigned to each grid cell is also shown on Figure 4-1. The results for soil samples collected from within the Clean Fill/Screened Material zone were not used in these calculations.

The VOC analytical results were then allocated to each boring from the top of the Plume Core to the bedrock/refusal surface by allocating a portion of each boring to each analytical result. For example, at PC-28, the analytical results were allocated to the stratigraphy observed within the soil boring as follows.

Sample Depth	Stratigraphic Unit	Top of Interval (ft bgs)	Bottom of Interval (ft bgs)	Thickness (feet)
4.75	Organic Peat	4.5	5.5	1.0
6.75	Grey Silts and Silty Sands	5.5	8	2.5
9.25	Grey Silts and Silty Sands	8	10	2
12.75	Sand/S&G	10	16	4
19.25	Sand/S&G	16	25	9
30.75	Sand/S&G	25	34	9

NOTES:
ft – Feet
bgs – Below ground surface

In this example, only one sample was collected from the organic peat layer so that the entire thickness of organic peat was allocated to that analytical result. For the grey silts and silty sands, two samples were collected so the interval was allocated from the top of the layer to the mid-point between the sample depths to the upper analytical result and from the mid-point between the samples to the bottom of the interval for the lower analytical result. This same approach was utilized for the allocation of the analytical results to the soil column consisting of sand and sand & gravel from 10 to 34 feet bgs. Non-detect values were not factored into the assessment.

As previously discussed in Sections 3.1 and 4.1, the lateral extent of the area underlain by organic peat and/or grey silts as shown on Figure 4-1 was developed primarily based on the findings during the Phase 4 boring program in 2008 and the Plume Core boring program completed in 2012. For the purposes of the estimation of residual mass, if a grid boring encountered organic peat or grey silt, the thickness of each observed strata was assigned to the complete area of that grid cell. For example, Plume Core boring PC-22 did not encounter organic peat, therefore, it was assumed that peat was not present in this grid cell for the purposes of residual mass estimation. However, boring PC-22 did encounter grey silt, therefore, grey silt was assumed to be present throughout this grid cell at the thickness observed at PC-22. The following table provides a comparison of the areas of organic peat and grey silt based on the lateral extents shown in Figure 4-1 and the areas assigned to these soil types using the grid method described above.

Soil Type	Actual Area (feet^2)	Area Assigned by Grid Method (feet^2)
Organic Peat	57,822*	53,547
Grey Silt	57,822*	59.168

NOTE:
* – Area of organic peat and/or grey silt exclusive of the two smaller areas shown on Figure 4-1

This table shows that the area assigned to these two soil types using the grid method are comparable (within 8%) of the mapped areas on Figure 4-1. The two smaller areas of organic peat and/or grey silt shown on Figure 4-1 were excluded from this comparison, and the estimation of residual mass, since no 2012 Plume Core borings were completed in these areas.

The analytical results from the Phase 4 boring program, completed in 2008, were incorporated into the analysis by allocating the individual borings to the grid cells established for the 2012 Plume Core investigation. Refer to **Figure 4-1**. The Phase 4 analytical results were then applied to the stratigraphic units and/or intervals previously established for the Plume Core borings based on primary soil type and depth. The combined residual mass evaluation was then completed using the average concentration within each stratigraphic unit and/or interval. Similar to the previous assessment, non-detect values were not included. The Phase 4 soil boring logs and the soil VOC analytical summary table are included in Appendix K.

4.2.2 Plume Core Boring Program

Refer to **Table 4-1** herein for a summary of the estimated residual mass within the FSA using the results from the Plume Core boring program. The residual mass was estimated based on the Total VOC concentrations and concentrations for the Target Design Compounds, as specified in Attachment D of the SOW. The residual mass estimates are tabulated on a boring-by-boring basis, by stratigraphic unit, and over the entire FSA. Refer to **Appendix J** for the documentation for the residual mass calculations, including a calculation key and individual calculation sheets for each soil boring.

Based on the residual mass estimates tabulated on Table 4-1, the majority of the residual mass is located within the organic peat and grey silts and silty sands, even though these deposits only occur within approximately 27% of the overall area of the FSA and occupy only a relatively small volume of the overall FSA. Further, the greatest residual mass is concentrated within the highly organic peat deposits. The residual mass density is summarized in the following table.

Stratigraphic Unit	Approx. Area (ft^2)	Average Thickness (feet)	Estimated Volume of Strata (ft^3)	Residual TVOC Mass (lbs)	TVOC Mass Density (lbs/ft^3)	Residual Target COC Mass (lbs)	Target COC Residual Mass Density (lbs/ft^3)
Organic Peat	53,547*	1.3	69,611	28.6	4.1×10^{-4}	15.8	2.3×10^{-4}
Grey Silts and Silty Sands	83,468**	4.1	342,220	10.6	3.1×10^{-5}	4.1	1.2×10^{-5}
Sand and Sand & Gravel	245,000	14.5	3,552,500	22.6	6.4×10^{-6}	14.0	3.9×10^{-6}

NOTES:
lbs – Pounds
* – Represents area assigned to organic peat deposits using the grid method
** – Represents the area assigned to grey silts using the grid method plus the grid cell areas assigned to borings PC-3, PC-8 and PC-16 for the three isolated areas of sand and silt

Figure 4-2 presents a plan view of the VOC analytical results for each of the 28 completed soil borings and shows the highest TVOC concentrations are detected within the area of the organic peat deposits and the grey silts and silty sands in the eastern portion of the FSA. The TVOC concentrations are also posted on the geologic cross-sections (Figures 3-1 and 3-2). These two figures also demonstrate that the highest TVOC concentrations were detected in soil samples collected from within the highly organic and finer-grained organic peat and grey silts and silty sands.

4.2.3 Plume Core and Phase 4 Boring Programs

Refer to **Table 4-2** herein for a summary of the estimated residual mass within the FSA using the results from the Plume Core boring program and the Phase 4 boring program completed in 2008. The residual mass was estimated based on the Total VOC concentrations and concentrations for the Target Design Compounds, as specified in Attachment D of the SOW. The residual mass estimates are tabulated on a boring-by-boring basis, by stratigraphic unit, and over the entire FSA. Refer to **Appendix J** for the documentation for the residual mass calculations, including a calculation key and individual calculation sheets for each soil boring.

The 2008 field investigation was a more focused assessment of conditions within the FSA compared to the 2012 Plume Core Evaluation. Borings completed during the 2008 field program were targeted in areas of suspected residual soil impacts and sample collection focused on samples exhibiting elevated field headspace readings. By contrast, the 2012 boring program was performed on a fixed grid and included the collection of samples from all soil types observed regardless of field headspace results. On this basis, the results from the 2008 boring program may present a more biased representation of residual mass conditions within the FSA compared to the 2012 boring program. Additionally, as noted above, non-detects were not factored into the calculations which results in conservative estimates of residual mass.

The following summary table shows that the mass density is still highest in the Organic Peat deposits.

Stratigraphic Unit	Approx. Area (ft^2)	Average Thickness (feet)	Estimated Volume of Strata (ft^3)	Residual TVOC Mass (lbs)	TVOC Mass Density (lbs/ft^3)	Residual Target COC Mass (lbs)	Target COC Residual Mass Density (lbs/ft^3)
Organic Peat	53,547	1.3	69,611	14.57	$2.1x10^{-4}$	14.98	$2.2x10^{-4}$
Grey Silts and Silty Sands	83,468	4.1	342,220	41.43	$1.2x10^{-4}$	4.37	$1.3x10^{-5}$
Sand and Sand & Gravel	245,000	14.5	3,552,500	74.43	$2.1x10^{-5}$	54.72	$1.5x10^{-5}$

The biggest factors that contribute to the changes in the TVOC residual mass estimates following incorporation of the 2008 analytical data include:

- Additional mass within the Grey Silts and Silty Sands associated with BTEX and petroleum-related compounds (e.g., isopropylbenzene) at 2008 boring NE-6 (2012 grid cell PC-19). It is important to note that these compounds are not detected at significant concentrations in groundwater.
- Additional mass within the Sands and Sand & Gravel associated with chlorobenzene compounds and BTEX compounds at 2008 borings SW-2, SW-5, SW-6, and NW-4 (2012 grid cells PC-4, PC-8, and PC-13) and within the Grey Silts and Silty Sands at 2008 boring NE-6 (2012 grid cell PC-

19). It is important to note that these compounds are not detected at significant concentrations in groundwater.

- Additional mass within the Sands and Sand & Gravel associated with PCE at 2008 borings SE-2, SW-8 and NE-4 (2012 grid cells PC-8, PC-17 and PC-27).
- Lower concentrations within the organic peat deposits at the 2008 borings (SE-4 and NE-2) located within grid cells PC-24 and PC-28. These results emphasize the variability of the detected concentrations within these highly organic deposits.

The biggest factors that contribute to the changes in the Target COC residual mass estimates following incorporation of the 2008 analytical data include:

- Significant increase in the estimated Target COC mass in grid cell PC-17 (approximately 20 pounds) within the Sands and Sand & Gravel due to 2008 boring SE-2.
- Significant increase in the estimate Target COC mass in grid cell PC-27 (approximately 16.5 pounds) within the Sands and Sand & Gravel due to 2008 boring NE-4.

These changes in the residual mass estimates are particularly driven by 2008 analytical results for soil samples collected within the Sands and Sand & Gravel and the residual mass conditions appear to emphasize the interbedded nature of these deposits. For example, the elevated concentrations at 2008 borings SW-2 and NE-4 appear to be associated with dense layers of fine sand. The residual mass within the Sands and Sand & Gravel also appears to be widely distributed throughout the FSA, while the residual impacts within the Organic Peat and Grey Silts and Silty Sands are obviously focused within the eastern portion of the FSA.

The following table provides a comparison between the two estimates of residual contaminant mass within the FSA.

Category	Mass Estimates (2012 Only)	Mass Estimates (Combined 2008/2012)
Mass of TVOCs (pounds)	61.77	130.43
Organic Peat	28.6	14.57
Grey Silts and Silty Sands	10.6	41.43
Sands and Sand & Gravel	22.57	74.43
Mass of Target COCs (pounds)	33.91	74.07
Organic Peat	15.83	14.98
Grey Silts and Silty Sands	4.09	4.37
Sands and Sand & Gravel	13.99	54.72

In general, the results of the 2008 field investigation support the findings from the Plume Core Evaluation with respect to the nature of the residual soil impacts, but also emphasize the widespread distribution of impacts within the Sands and Sand & Gravel and the variability of impacts within each of the three stratigraphic units.

4.2.4 CONCLUSIONS

These two analyses of residual contaminant mass (Plume Core borings and combined 2008/2012) appear to provide a reasonable range of estimates, particularly given the apparent bias of the 2008 field program contrasted by the more systematic approach used for the 2012 field program. The analyses of residual contaminant mass are also conservative given that the frequent non-detect

values were not incorporated into either assessment. The detailed mass estimates for the individual grid cells, as provided in Appendix J, also provide useful information on the nature and location of residual contaminant mass that will be useful during the design of the OU-2 remedy.

Based on the concentrations and distribution of impacts, the treatability of VOCs within the silt and organic peat deposits will be integral to the success of the remedy. The significant residual mass within these units is attributable to the strong sorption of organic constituents to the organic carbon and the low permeability of these units which limits mass transfer. Mass partitioning (diffusion) from the silts and organic peat will also be an important control on the restoration of the overlying and underlying coarser grained units.

4.3 Initial Active Treatment Zone

As previously discussed in Section 3.5.2, the VOC analytical results from the Plume Core monitoring wells are generally consistent with historic sampling results and the additional wells located in the FSA provide increased resolution into the nature of the groundwater impacts in this area of the Site. In accordance with the Statement of Work and the PDI Plan, the results of the Plume Core evaluation will also be used to:

- Confirm that residual contaminant impacts do not extend beyond the current delineation of the Plume Core (i.e., FSA); and
- Determine the extent of the Initial Treatment Zone for the OU-2 remedy.

To meet these objectives, all of the Plume Core monitoring wells (PC-#), with the exception of the two peat/silt wells PC-24PS and PC-28PS, and Plume Core delineation wells (PCD-#), in addition to all of the existing unconsolidated deposit monitoring wells within and immediately proximal to the FSA were sampled for VOCs during the Summer 2012 Site-wide Monitoring Event. The analytical results from these wells are summarized on **Table 3-7**, including the Spring 2012 results for wells PC-24PS and PC-28PS, and compared to the IGRGs and the RIDEM GA Groundwater Objectives.

Based on the results, the Plume Core delineation wells have defined the extent of groundwater impacts and confirmed that residual mass impacts do not extend beyond the current delineation of the Plume Core (i.e., FSA). . It should be noted that PCE at a concentration of 6.7 ug/L was detected in the Plume Core delineation well PCD-2. However this detection only slightly exceeds the applicable standard (5.0 ug/L). Further all of the other VOC concentrations within this well and the other Plume Core delineation wells meet the IGRGs and the RIDEM GA Groundwater Objectives. On this basis it is concluded that residual mass is unlikely to extend beyond the Plume Core delineation wells with higher concentrations (indicative of residual mass) observed in wells located within the interior of the Plume Core.

As outlined in the SOW, the investigations of the Plume Core were designed to allow for delineation of the ATZ. The Preliminary Decision Matrix, Attachment F to the SOW, is included as **Figure 4-3**, and the proposed extent of the ATZ (based on the flow chart) provided as **Figure 4-4**

Due to the slight exceedance of the applicable standards for PCE in the sample from monitoring well PCD-2, the extent of the ATZ was extended beyond this monitoring location. The initial ATZ is well-defined along all boundaries, utilizing the eastern boundary between the FSA and the Eastern Ponded Wetland, with the exception of in the vicinity of monitoring wells OW-55 and OW-304-O. As noted on **Table 4-3**, the VOC concentrations at OW-55 exhibited a steady decline from 2001 through 2004 with all VOC concentrations remaining at or below the applicable IGRGs and RIDEM GA Groundwater Objectives from 2005 through, at least, 2008. However, the 2012 analytical results for select chlorinated VOCs (PCE, TCE, cis-1,2-DCE, 1,1,1-TCA) have shown a steady increase and based on the Summer 2012 analytical results, the concentrations of PCE (26 ug/L) and TCE (8.3 ug/L) exceed their applicable IGRGs. Similarly, the VOC concentrations in 2008 at nearby monitoring well OW-304-O were all less than the Site IGRGs

and applicable RIDEM GA Groundwater Objectives. However, the 2012 sampling results at this location show exceedances of the Site IGRGs for PCE, TCE and vinyl chloride.

To account for the exceedances of the Site IGRGs in this area of the Site, the initial ATZ has been expanded to encompass these two well locations (OW-55 and OW-304-O). Ongoing monitoring of groundwater, including wells PCD-2, OW-55 and OW-304-O, will be performed, with all the groundwater monitoring data used to define the initial ATZ based on the criteria described above. Any proposed revisions to the initial delineation of the ATZ will be provided in the design submittals for the OU-2 remedy.

Additionally, **Figure 4-5** has been prepared which provides a compilation of stratigraphic information and soil and groundwater data to further support the delineation of the initial ATZ, as shown on the revised Figure 4-4. This figure clearly demonstrates that, in addition to complying with the requirements of the Preliminary Decision Matrix in the SOW (Figure 4-3), the initial ATZ also encompasses:

- Elevated areas of groundwater impacts (TVOC > 1,000 ug/L) in the shallow and deep wells in the FSA and immediately adjacent areas;
- Elevated areas of residual soil impacts (TVOC ≥ 1,000 ug/Kg) in the Plume Core based on the results of the 2008 and 2012 boring programs; and
- Bedrock monitoring wells exhibiting elevated VOC concentrations (OW-94-R, OW-403-R and OW-404-R) suggestive of potential DNAPL in the shallow bedrock beneath the FSA.

New Figures 3-6 through 3-9 also demonstrate that the proposed initial ATZ encompasses the areas of elevated groundwater concentrations based both on TVOC concentrations and extent of exceedances of the IGRGS.

As noted above, given the elevated VOC concentrations detected in select shallow bedrock monitoring wells located within the FSA (OW-94-R, OW-403-R, OW-404-R), it is very possible that the residual contaminant mass in the shallow bedrock may also be impacting groundwater quality within and downgradient of the FSA. The locations of these three wells are also shown on Figure 4-5. This condition will need to be evaluated further during the design of the OU-2 remedy as it will be important to account for this mass flux from the underlying bedrock.

5.0 CONCLUSIONS

Based on the investigations and findings summarized above the following can be concluded:

1. The presence of cobbles and boulders within the FSA poses some impediments to the use of direct push investigation and injection technologies and this condition will need to be factored into the design of the pilot test program and the OU-2 remedy.
2. The primary constituents detected in both soil and groundwater within the Plume Core are VOCs. Sporadic low concentrations of SVOCs and pesticides were detected in soil and are not considered a major source of ongoing impact to groundwater.
    a. The VOCs detected in soil and groundwater are dominated by CVOCs and aromatic hydrocarbons.
    b. Bis(2-chloroethyl)ether, the only target SVOC in the 2010 ROD Amendment, was not detected in any of the soil samples submitted for laboratory analysis.
    c. Aldrin and Dieldrin, the two target pesticide compounds in the 2010 ROD Amendment, were not detected in any of the soil samples submitted for laboratory analysis.

3. An evaluation of residual contaminant of concern mass was performed using two scenarios: only the data from the 2012 Plume Core borings, and using the data from both the 2012 Plume Core borings and the 2008 Phase 4 investigation program. The evaluation using the 2012 Plume Core borings may be considered a better estimate of the overall average conditions whereas the combined 2008 and 2012 data set evaluation provides some insight into the sensitivity of the residual mass estimate to the assumptions used for the Sands and Sand & Gravel.
4. The total COC mass estimate for the Peat layer and Grey Silts and Silty Sand layer were in good agreement using both approaches. The Peat layer represents only about 2% of the volume of the potential treatment area and has an estimated COC residential contaminant mass that ranged from 20% to 47% of the total. The evaluation supports that the highest density of contamination is within the Peat layer.
5. The total COC mass estimate for the Sands and Sand & Gravel layer varies significantly between the two approaches. Since this layer accounts for 90% of the volume of the treatment area, small changes in the concentration term can have a substantial impact on the mass estimate. The total COC mass estimate for the Sands and Sand & Gravel layer ranged from 41% to 74% of the total. Despite the low density of contamination, this layer contains a significant amount of the residual COC contaminant mass.
6. The Plume Core Boring and the combined 2008/2012 estimates of residual contaminant mass appear to provide a reasonable, yet conservative, range of estimates of the residual VOC mass within the FSA.
7. The Plume Core monitoring wells and delineation wells have successfully defined the limits of the ATZ and confirmed the extent of the FSA.
    a. Low concentrations of PCE (just above the IGRG) were detected in one Plume Core delineation well (PCD-2) but it is considered unlikely that significant mass is present in, or beyond, this area.
    b. Increasing concentrations of certain CVOCs were detected in two monitoring wells in the northwestern portion of the FSA. Based on the results of the Plume Core boring program, it is likely that this condition is the result of groundwater migration rather than the presence of residual mass in this area of the FSA. Ongoing monitoring is proposed for the area to assess the need for future revisions to the extent of the initial ATZ.
8. Figures 3-6 through 3-9 and Figure 4-5 clearly demonstrate that the initial ATZ delineation encompasses the areas of elevated groundwater concentrations within and immediately downgradient of the FSA and the areas of elevated soil concentrations as defined by the 2008 and 2012 boring programs.

Tables

Table 2-1
Monitoring Well Specifications Summary
Plume Core Evaluation
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Well ID	Ground Surface Elevation (feet)	Competent Bedrock		As-Built Well Construction Information			
		Depth (feet bgs)	Elevation (feet)	Top of Screen (feet bgs)	Top of Screen Elevation (feet)	Bottom of Screeen (feet bgs)	Bottom of Screen Elevation (feet)
PC-2	413.43	19	394.43	12	401.43	17	396.43
PC-3S	415.16	23.7	391.46	12	403.16	17	398.16
PC-8S	417	21.5	395.5	11	406	16	401
PC-11S	416.22	21.5	394.72	11	405.22	16	400.22
PC-11D	416.35	21.5	394.85	16.5	21.5	49.75	366.6
PC-17D	418.43	24	394.43	16.9	401.53	21.9	396.53
PC-20S	413.44	27	386.44	11	402.44	16	397.44
PC-20D	413.5	27	386.5	20.7	392.8	25.7	387.8
PC-23	416.36	34.5	381.86	26	390.36	31	385.36
PC-24PS	415.62	19	396.62	13	402.62	15	400.62
PC-25	413.76	40	373.76	33	380.76	38	375.76
PC-28D	409.02	34	375.02	29	380.02	34	375.02
PC-28PS	408.83	34	374.83	5.5	403.33	7.5	401.33
PCD-1	415.48	18	397.48	13	402.48	18	397.48
PCD-2	411.89	19.5	392.39	12	399.89	17	394.89
PCD-3	412.1	17	395.1	8	404.1	13	399.1

NOTES:
bgs - below ground surface
All elevations are relative to NGVD 29 and based on Site survey performed by DiPrete Engineering in October/November 2012.
All bedrock elevations are estimated based on drilling refusal.

TABLE 3-1
SUMMARY OF VOLATILE ORGANIC COMPOUNDS - PLUME CORE SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location		PC-1	PC-1	PC-1	PC-2	PC-2	PC-3	PC-3	PC-3	PC-4	PC-4	PC-4	PC-5	PC-5	PC-5	PC-6
Sample ID		SB-FS-PC-1-8.5-9.0	SB-FS-PC-1-14.5-15.0	SB-FS-PC-1-16.5-17.0	SB-FS-PC-2-9.0-9.5	SB-FS-PC-2-17.0-17.5	SB-FS-PC-3-19.0-19.5	SB-FS-PC-3-13.5-14.0	SB-FS-PC-3-22.5-23.0	SB-FS-PC-4-11.0-11.5	SB-FS-PC-4-22.5-23.0	SB-FS-PC-4-25.5-26.0	SB-FS-PC-5-11.0-11.5	SB-FS-PC-5-20.0-20.5	SB-FS-PC-5-23.5-24.0	SB-FS-PC-6-0.5-1.0
Sample Depth (feet)		8.75	14.75	16.75	9.25	17.25	19.25	13.75	22.75	11.25	22.75	25.75	11.25	20.25	23.75	0.75
Sample Date		5/18/2012	5/18/2012	5/18/2012	5/21/2012	5/21/2012	5/21/2012	5/21/2012	5/21/2012	5/18/2012	5/18/2012	5/18/2012	5/18/2012	5/18/2012	5/18/2012	5/31/2012
CONSTITUENTS	Units															Clean Fill
1,1,1-Trichloroethane	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	**3.2**	2.5 U	**4.9**	3.9 U	**3**	**10**	2.5 U	**12**	**9.8**	2.5 U
1,1,2,2-Tetrachloroethane	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
1,1,2-Trichloroethane	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
1,1-Dichloroethane	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
1,1-Dichloroethylene	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
1,2,3-Trichlorobenzene	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	**3.8** J	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
1,2,4-Trichlorobenzene	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	**2.5** J	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
1,2-Dichlorobenzene	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	1.4 J	3.9 U	**0.89** J	**2.6**	2.5 U	**5.3**	**1.9** J	2.5 U
1,2-Dichloroethane	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
1,2-Dichloropropane	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
1,3-Dichlorobenzene	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
1,4-Dichlorobenzene	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
2-Hexanone	(ug/kg)	33 U	22 U	19 U	24 UJ	27 UJ	23 UJ	25 UJ	25 UJ	39 U	22 U	20 U	25 U	30 U	28 U	25 UJ
Acetone	(ug/kg)	330 UJ	220 UJ	190 UJ	240 UJ	270 UJ	230 UJ	250 UJ	250 UJ	390 UJ	220 UJ	200 UJ	250 UJ	300 UJ	280 UJ	250 UJ
Benzene	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
Bromochloromethane	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
Bromodichloromethane	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
Bromoform	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
Carbon Disulfide	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	**2.7** J	2.8 U	2.5 U
Carbon Tetrachloride	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
Chlorobenzene	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
Chloroethane	(ug/kg)	6.5 U	4.3 U	3.8 U	4.8 U	5.3 U	4.6 U	5 U	5 U	7.7 U	4.4 U	4 U	4.9 U	6 U	5.6 U	5 U
Chloroform	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
cis-1,2-Dichloroethylene	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	**1.5** J	**9.1**	**3.4**	3.9 U	**6.9**	**7.1**	**6.2**	**33**	**9.3**	2.5 U
cis-1,3-Dichloropropene	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
Cyclohexane	(ug/kg)	33 U	22 U	19 U	24 U	27 U	23 U	25 U	25 U	39 U	22 U	20 U	25 U	30 U	28 U	25 U
DBCP	(ug/kg)	33 U	22 U	19 U	24 U	27 U	23 U	25 U	25 U	39 U	22 U	20 U	25 U	30 U	28 U	25 U
Dibromochloromethane	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
Dichlorodifluoromethane	(ug/kg)	6.5 U	4.3 U	3.8 U	4.8 U	5.3 U	4.6 U	5 U	5 U	7.7 U	4.4 U	4 U	4.9 U	6 U	5.6 U	5 U
Diethyl ether	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
Ethylene dibromide (EDB)	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
Ethylbenzene	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	**4.4**	2.8 U	2.5 U
Freon 113	(ug/kg)	16 U	11 U	9.5 U	12 U	13 U	11 U	13 U	13 U	19 U	11 U	9.9 U	12 U	15 U	14 U	13 U
Isopropylbenzene	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
Methyl Acetate	(ug/kg)	65 UJ	43 UJ	38 UJ	48 UJ	53 UJ	46 UJ	50 UJ	50 UJ	77 UJ	44 UJ	40 UJ	49 UJ	60 UJ	56 UJ	50 U
Methyl bromide	(ug/kg)	6.5 U	4.3 U	3.8 U	4.8 U	5.3 U	4.6 U	5 U	5 U	7.7 U	4.4 U	4 U	4.9 U	6 U	5.6 U	5 U
Methyl chloride	(ug/kg)	6.5 U	4.3 U	3.8 U	4.8 U	5.3 U	4.6 U	5 U	5 U	7.7 U	4.4 U	4 U	4.9 U	6 U	5.6 U	5 U
Methyl ethyl ketone (MEK)	(ug/kg)	33 UJ	22 UJ	19 UJ	24 UJ	27 UJ	23 UJ	25 UJ	25 UJ	39 UJ	22 UJ	20 UJ	25 UJ	30 UJ	28 UJ	25 UJ
Methyl isobutyl ketone	(ug/kg)	33 U	22 U	19 U	24 UJ	27 UJ	23 UJ	25 UJ	25 UJ	39 U	22 U	20 U	25 U	30 U	28 U	25 U
Methyl tert Butyl Ether (MTBE)	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
Methylcyclohexane	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
Methylene chloride	(ug/kg)	13 U	9.4 U	7.6 U	16 U	17 U	34 U	44 U	40 U	15 U	8.7 U	7.9 U	9.9 U	12 U	11 U	10 U
m-Xylene & p-Xylene	(ug/kg)	6.5 U	4.3 U	3.8 U	4.8 U	5.3 U	4.6 U	5 U	5 U	7.7 U	4.4 U	4 U	4.9 U	6 U	5.6 U	5 U
o-Xylene	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
Styrene	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
Tetrachloroethylene	(ug/kg)	3.3 U	2.2 U	1.9 U	**2.9**	**3.9**	**19**	2.5 U	**16**	**5.3**	**11**	**32**	**8.3**	**3.6**	2.8 U	2.5 U
Tetrahydrofuran	(ug/kg)	65 U	43 U	38 U	48 U	53 U	46 U	50 U	50 U	77 U	44 U	40 U	49 U	60 U	56 U	50 UJ
Toluene	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
Trans-1,2-Dichloroethene	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
trans-1,3-Dichloropropene	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
Trichloroethylene	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	**5.4**	2.5 U	**6**	3.9 U	**3**	**11**	**2.8**	**5.6**	2.8 U	2.5 U
Trichlorofluoromethane	(ug/kg)	6.5 U	4.3 U	3.8 U	4.8 U	5.3 U	4.6 U	5 U	5 U	7.7 U	4.4 U	4 U	4.9 U	6 U	5.6 U	5 U
Vinyl chloride	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	**6.6**	**14**	2.5 U
Xylene (total)	(ug/kg)	3.3 U	2.2 U	1.9 U	2.4 U	2.7 U	2.3 U	2.5 U	2.5 U	3.9 U	2.2 U	2 U	2.5 U	3 U	2.8 U	2.5 U
Sum of Constituents	**(ug/kg)**	**0**	**0**	**0**	**2.9**	**3.9**	**29.1**	**9.1**	**30.3**	**11.6**	**24.79**	**62.7**	**17.3**	**73.2**	**35**	**0**

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
ug/kg = micrograms per kilogram
Detections are in **Bold**

TABLE 3-1
SUMMARY OF VOLATILE ORGANIC COMPOUNDS - PLUME CORE SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location		PC-6	PC-6	PC-7	PC-7	PC-8	PC-8	PC-9	PC-10	PC-10	PC-10	PC-11	PC-11	PC-12	PC-12	PC-13
Sample ID		SB-FS-PC-6-13.0-13.5	SB-FS-PC-6-22.0-22.5	SB-FS-PC-7-13.0-13.5	SB-FS-PC-7-18.0-18.5	SB-FS-PC-8-19.0-19.5	SB-FS-PC-8-14.0-14.5	SB-FS-PC-9-15.5-16.0	SB-FS-PC-10-14.5-15.0	SB-FS-PC-10-17.5-18.0	SB-FS-PC-10-23.5-24.0	SB-FS-PC-11-6.0-6.5	SB-FS-PC-11-20.0-20.5	SB-FS-PC-12-14.0-14.5	SB-FS-PC-12-21.5-22	SB-FS-PC-13-2.0-2.5
Sample Depth (feet)		13.25	22.25	13.25	18.25	19.25	14.25	15.75	14.75	17.75	23.75	6.25	20.25	14.25	21.75	2.25
Sample Date		6/1/2012	6/1/2012	6/1/2012	6/1/2012	5/22/2012	5/22/2012	6/5/2012	5/23/2012	6/8/2012	5/23/2012	5/25/2012	5/25/2012	5/25/2012	5/25/2012	5/31/2012
CONSTITUENTS	Units											Clean Fill				Clean Fill
1,1,1-Trichloroethane	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	**9.4**	**61**	2.5 U	**20**	**130** J	**16**	2.4 U
1,1,2,2-Tetrachloroethane	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 UJ	2.8 UJ	130 U	2.1 UJ	2.4 U
1,1,2-Trichloroethane	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	2.4 U
1,1-Dichloroethane	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	**4**	2.5 U	**5.9**	130 U	**2.6**	2.4 U
1,1-Dichloroethylene	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	**1.4** J	2.5 U	2.8 U	130 U	2.1 U	2.4 U
1,2,3-Trichlorobenzene	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	**5.3**	2.2 U	2.2 U	**3.8**	2.8 U	130 U	2.1 U	**9.3**
1,2,4-Trichlorobenzene	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	**12**	2.2 U	2.2 U	**8**	2.8 U	130 U	2.1 U	**29**
1,2-Dichlorobenzene	(ug/kg)	**1.1** J	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	**37**	2.2 U	2.2 U	**7.8** J	**1.8** J	130 U	**1.1** J	**2.8**
1,2-Dichloroethane	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	2.4 U
1,2-Dichloropropane	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	2.4 U
1,3-Dichlorobenzene	(ug/kg)	**7.4**	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	**1.1** J
1,4-Dichlorobenzene	(ug/kg)	**70**	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	**14**
2-Hexanone	(ug/kg)	24 UJ	26 UJ	1400 UJ	24 U	23 U	1500 U	28 UJ	24 U	22 U	22 U	25 U	28 U	1300 U	21 U	24 U
Acetone	(ug/kg)	240 UJ	260 UJ	14000 UJ	240 UJ	230 UJ	15000 UJ	280 UJ	240 UJ	220 U	220 UJ	250 UJ	280 UJ	13000 UJ	210 UJ	240 UJ
Benzene	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	2.4 U
Bromochloromethane	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	2.4 U
Bromodichloromethane	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	2.4 U
Bromoform	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	2.4 U
Carbon Disulfide	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	2.4 U
Carbon Tetrachloride	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	2.4 U
Chlorobenzene	(ug/kg)	13	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	2.4 U
Chloroethane	(ug/kg)	4.8 U	5.1 U	280 U	4.8 U	4.6 U	300 UJ	5.6 U	4.9 U	4.3 U	4.5 U	5 UJ	5.6 UJ	270 UJ	4.3 UJ	4.8 U
Chloroform	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	2.4 U
cis-1,2-Dichloroethylene	(ug/kg)	**1.5** J	**5.2**	140 U	**4.6**	2.3 U	150 U	**8.6**	**10**	**46**	**220**	**1.2** J	**96**	**110** J	**66**	2.4 U
cis-1,3-Dichloropropene	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	2.4 U
Cyclohexane	(ug/kg)	**1.6** J	26 U	1400 U	24 U	23 U	1500 U	28 U	24 U	22 U	22 U	25 U	28 U	1300 U	21 U	24 U
DBCP	(ug/kg)	24 U	26 U	1400 U	24 U	23 U	1500 U	28 U	24 U	22 U	22 U	25 UJ	28 UJ	1300 U	21 UJ	24 U
Dibromochloromethane	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	2.4 U
Dichlorodifluoromethane	(ug/kg)	4.8 U	5.1 U	280 U	4.8 U	4.6 U	300 U	5.6 U	4.9 U	4.3 U	4.5 U	5 U	5.6 U	270 U	4.3 U	4.8 U
Diethyl ether	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	2.4 U
Ethylene dibromide (EDB)	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	2.4 U
Ethylbenzene	(ug/kg)	**4.3**	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	**310**	**1.5** J	2.4 U
Freon 113	(ug/kg)	12 U	13 U	700 U	12 U	12 U	750 U	14 U	12 U	11 U	11 U	12 U	14 U	660 U	11 U	12 U
Isopropylbenzene	(ug/kg)	**2** J	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	**4.5**	2.2 U	2.2 U	2.5 U	**8.8**	130 U	2.1 U	2.4 U
Methyl Acetate	(ug/kg)	48 U	51 U	2800 U	48 U	46 U	3000 U	56 U	49 U	43 U	45 U	50 UJ	56 UJ	2700 U	43 UJ	48 U
Methyl bromide	(ug/kg)	4.8 U	5.1 U	280 U	4.8 U	4.6 U	300 U	5.6 U	4.9 U	4.3 U	4.5 U	5 U	5.6 U	270 U	4.3 U	4.8 U
Methyl chloride	(ug/kg)	4.8 U	5.1 U	280 U	4.8 U	4.6 U	300 U	5.6 U	4.9 U	4.3 U	4.5 U	5 U	5.6 U	270 U	4.3 U	4.8 U
Methyl ethyl ketone (MEK)	(ug/kg)	24 UJ	26 UJ	1400 UJ	24 UJ	23 UJ	1500 UJ	28 UJ	24 UJ	22 U	22 UJ	25 UJ	28 UJ	1300 UJ	21 UJ	24 UJ
Methyl isobutyl ketone	(ug/kg)	24 U	26 U	1400 U	24 U	23 U	1500 U	28 U	24 U	22 U	22 U	25 U	28 U	1300 U	21 U	24 U
Methyl tert Butyl Ether (MTBE)	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	2.4 U
Methylcyclohexane	(ug/kg)	**8.6**	2.6 U	**540**	2.4 U	2.3 U	**210**	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	2.4 U
Methylene chloride	(ug/kg)	9.5 U	10 U	770 U	6.5 U	19 U	600 U	11 U	9.8 U	8.7 U	9 U	9.9 U	11 U	1200 U	8.6 U	**9.2** J
m-Xylene & p-Xylene	(ug/kg)	4.8 U	5.1 U	280 U	4.8 U	4.6 U	300 U	5.6 U	4.9 U	4.3 U	4.5 U	5 U	5.6 U	270 U	4.3 U	4.8 U
o-Xylene	(ug/kg)	**6.3**	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	**2.6**	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	2.4 U
Styrene	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	2.4 U
Tetrachloroethylene	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	**9.3**	**18**	2.2 U	2.2 U	**22**	2.8 U	130 U	2.1 U	**1.9** J
Tetrahydrofuran	(ug/kg)	48 UJ	51 UJ	2800 UJ	48 UJ	46 U	3000 U	56 UJ	49 U	43 UJ	45 U	50 U	56 U	2700 U	43 U	48 UJ
Toluene	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	2.4 U
Trans-1,2-Dichloroethene	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	**3.1**	2.5 U	**2.1** J	130 U	**1.3** J	2.4 U
trans-1,3-Dichloropropene	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	2.4 U
Trichloroethylene	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	**2.6**	2.2 U	**1.9** J	**2.3** J	2.8 U	130 U	2.1 U	2.4 U
Trichlorofluoromethane	(ug/kg)	4.8 U	5.1 U	280 U	4.8 U	4.6 U	300 U	5.6 U	4.9 U	4.3 U	4.5 U	5 U	5.6 U	270 U	4.3 U	4.8 U
Vinyl chloride	(ug/kg)	2.4 U	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.4 U	**4.2**	**13**	2.5 UJ	**33** J	130 U	**9.4** J	2.4 U
Xylene (total)	(ug/kg)	6.3	2.6 U	140 U	2.4 U	2.3 U	150 U	2.8 U	2.6	2.2 U	2.2 U	2.5 U	2.8 U	130 U	2.1 U	2.4 U
Sum of Constituents	**(ug/kg)**	**115.8**	**5.2**	**540**	**4.6**	**0**	**210**	**17.9**	**92**	**59.6**	**304.4**	**45.1**	**167.6**	**550**	**97.9**	**67.3**

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
ug/kg = micrograms per kilogram
Detections are in **Bold**

TABLE 3-1
SUMMARY OF VOLATILE ORGANIC COMPOUNDS - PLUME CORE SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location		PC-13	PC-13	PC-13	PC-14	PC-14	PC-14	PC-14	PC-15	PC-15	PC-16	PC-16	PC-16	PC-17	PC-17	PC-17
Sample ID		SB-FS-PC-13-10.0-10.5	SB-FS-PC-13-15.0-15.5	SB-FS-PC-13-22.0-22.5	SB-FS-PC-14-11.0-11.5	SB-PCB-5	SB-FS-PC-14-15.0-15.5	SB-FS-PC-14-19.5-20.0	SB-FS-PC-15-14.5-15.0	SB-FS-PC-15-16.5-17.0	SB-FS-PC-16-16.0-16.5	SB-FS-PC-16-20.0-20.5	SB-FS-PC-16-25.0-25.5	SB-FS-PC-17-16.0-16.5	SB-FS-PC-17-19.0-19.5	SB-FS-PC-17-21.0-21.5
Sample Depth (feet)		10.25	15.25	22.25	11.25	11.25	15.25	19.75	14.75	16.75	16.25	20.25	25.25	16.25	19.25	21.25
Sample Date		6/4/2012	5/31/2012	5/31/2012	5/31/2012	5/31/2012	5/31/2012	5/31/2012	5/22/2012	5/22/2012	5/23/2012	5/23/2012	5/23/2012	6/5/2012	6/5/2012	6/5/2012
CONSTITUENTS	Units					Duplicate										
1,1,1-Trichloroethane	(ug/kg)	2.5 U	**3.7**	2.3 J	2.7 U	1.7 U	**3.4**	**3.2**	120 U	2.5 U	3 U	2.6 U	2.6 U	**7**	**3.5**	**3.5**
1,1,2,2-Tetrachloroethane	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 UJ	2.6 UJ	2.6 UJ	3.3 U	2 U	3.3 U
1,1,2-Trichloroethane	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
1,1-Dichloroethane	(ug/kg)	2.5 U	**1.5** J	2.4 J	2.7 U	1.7 U	2.3 U	**2.4**	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
1,1-Dichloroethylene	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
1,2,3-Trichlorobenzene	(ug/kg)	**6.1**	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
1,2,4-Trichlorobenzene	(ug/kg)	**4.7**	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
1,2-Dichlorobenzene	(ug/kg)	**6.3**	**0.97** J	**1.5** J	**2.9**	**2.4**	**2** J	**1.5** J	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
1,2-Dichloroethane	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
1,2-Dichloropropane	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
1,3-Dichlorobenzene	(ug/kg)	**1.7** J	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
1,4-Dichlorobenzene	(ug/kg)	**5.6**	2 U	2.6 U	**2.1** J	**1.6** J	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
2-Hexanone	(ug/kg)	25 UJ	20 U	26 U	27 U	17 U	23 U	23 U	1200 U	25 U	30 U	26 U	26 U	33 UJ	20 UJ	33 UJ
Acetone	(ug/kg)	250 UJ	200 UJ	260 UJ	270 UJ	170 UJ	230 UJ	230 UJ	12000 UJ	250 UJ	300 UJ	260 UJ	260 UJ	330 UJ	200 UJ	330 UJ
Benzene	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
Bromochloromethane	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
Bromodichloromethane	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
Bromoform	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
Carbon Disulfide	(ug/kg)	2.5 U	**3.4** J	**2.6** J	2.7 U	1.7 U	**2.6** J	2.3 U	120 U	2.5 U	3 U	**3.5**	**2.8**	**5.2**	**7.7**	3.3 U
Carbon Tetrachloride	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
Chlorobenzene	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
Chloroethane	(ug/kg)	5 U	4 U	5.2 U	5.5 U	3.4 U	4.5 U	4.7 U	250 UJ	4.9 U	6 U	5.1 U	5.3 U	6.6 U	4 U	6.6 U
Chloroform	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
cis-1,2-Dichloroethylene	(ug/kg)	**3.2**	**7.6**	**14**	**3.8**	1.7 U	**15**	**14**	120 U	2.5 U	3 U	2.6 U	2.6 U	**46**	**19**	**3.6**
cis-1,3-Dichloropropene	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
Cyclohexane	(ug/kg)	25 U	20 U	26 U	27 U	17 U	23 U	23 U	1200 U	25 U	30 U	26 U	26 U	33 U	20 U	33 U
DBCP	(ug/kg)	25 U	20 U	26 U	27 U	17 U	23 U	23 U	1200 U	25 U	30 UJ	26 UJ	26 UJ	33 U	20 U	33 U
Dibromochloromethane	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
Dichlorodifluoromethane	(ug/kg)	5 U	4 U	5.2 U	5.5 U	3.4 U	4.5 U	4.7 U	250 U	4.9 U	6 U	5.1 U	5.3 U	6.6 U	4 U	6.6 U
Diethyl ether	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
Ethylene dibromide (EDB)	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
Ethylbenzene	(ug/kg)	**9.5**	**19**	**12**	2.7 U	1.7 U	**3.9**	**1.7** J	120 U	2.5 U	3 U	2.6 U	**2.5** J	**7.9**	**5.7**	**4.9**
Freon 113	(ug/kg)	13 U	10 U	13 U	14 U	8.4 U	11 U	12 U	610 U	12 U	15 U	13 U	13 U	16 U	10 U	16 U
Isopropylbenzene	(ug/kg)	**3.6**	**1.8** J	**1.8** J	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
Methyl Acetate	(ug/kg)	50 U	40 U	52 U	55 U	34 U	45 U	47 U	2500 U	49 U	60 U	51 U	53 U	66 U	40 U	66 U
Methyl bromide	(ug/kg)	5 U	4 U	5.2 U	5.5 U	3.4 U	4.5 U	4.7 U	250 U	4.9 U	6 U	5.1 U	5.3 U	6.6 U	4 U	6.6 U
Methyl chloride	(ug/kg)	5 U	4 U	5.2 U	5.5 U	3.4 U	4.5 U	4.7 U	250 U	4.9 U	6 U	5.1 U	5.3 U	6.6 U	4 U	6.6 U
Methyl ethyl ketone (MEK)	(ug/kg)	25 UJ	20 UJ	26 UJ	27 UJ	17 UJ	23 UJ	23 UJ	1200 UJ	25 UJ	30 U	26 U	26 U	33 UJ	20 UJ	33 UJ
Methyl isobutyl ketone	(ug/kg)	25 U	20 U	26 U	27 U	17 U	23 U	23 U	1200 U	25 U	30 U	26 U	26 U	33 U	20 U	33 U
Methyl tert Butyl Ether (MTBE)	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
Methylcyclohexane	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
Methylene chloride	(ug/kg)	10 U	**6.3** J	**6.7** J	**7.9** J	6.1 J	**5.2** J	**6.5** J	490 U	27 U	12 U	10 U	11 U	13 U	8 U	13 U
m-Xylene & p-Xylene	(ug/kg)	5 U	4 U	5.2 U	5.5 U	3.4 U	4.5 U	4.7 U	250 U	4.9 U	6 U	5.1 U	5.3 U	6.6 U	**3.7** J	6.6 U
o-Xylene	(ug/kg)	**2.2** J	2 U	2.6 U	2.7 U	1.7 U	**1.8** J	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	**1.8** J	3.3 U
Styrene	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
Tetrachloroethylene	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	**29**	2.6 U	2.6 U	**2.6** J	2 U	3.3 U
Tetrahydrofuran	(ug/kg)	50 UJ	40 UJ	52 UJ	55 UJ	34 UJ	45 UJ	47 UJ	2500 U	49 U	60 U	51 U	53 U	66 UJ	40 UJ	66 UJ
Toluene	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
Trans-1,2-Dichloroethene	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
trans-1,3-Dichloropropene	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	2 U	3.3 U
Trichloroethylene	(ug/kg)	2.5 U	2 U	2.6 U	2.7 U	1.7 U	2.3 U	2.3 U	120 U	2.5 U	**3.5**	2.6 U	2.6 U	3.3 U	2 U	3.3 U
Trichlorofluoromethane	(ug/kg)	5 U	4 U	5.2 U	5.5 U	3.4 U	4.5 U	4.7 U	250 U	4.9 U	6 U	5.1 U	5.3 U	6.6 U	4 U	6.6 U
Vinyl chloride	(ug/kg)	2.5 U	**9.8**	**8.8**	2.7 U	1.7 U	**6.9**	**7.3**	120 U	2.5 U	3 U	2.6 U	**8.8**	**7.4**	**2.8**	**7.6**
Xylene (total)	(ug/kg)	2.2 J	2 U	2.6 U	2.7 U	1.7 U	1.8 J	2.3 U	120 U	2.5 U	3 U	2.6 U	2.6 U	3.3 U	5.5	3.3 U
Sum of Constituents	**(ug/kg)**	**42.9**	**54.07**	**52.1**	**16.7**	**10.1**	**40.8**	**36.6**	**0**	**0**	**32.5**	**3.5**	**14.1**	**76.1**	**44.2**	**19.6**

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
ug/kg = micrograms per kilogram
Detections are in **Bold**

TABLE 3-1
SUMMARY OF VOLATILE ORGANIC COMPOUNDS - PLUME CORE SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location		PC-17	PC-17	PC-18	PC-18	PC-18	PC-19	PC-19	PC-19	PC-19	PC-19	PC-19	PC-19	PC-20	PC-20	PC-20
Sample ID		SB-PCB-6	SB-FS-PC-17-23.5-24.0	SB-FS-PC-18-16.0-16.5	SB-FS-PC-18-20.0-20.5	SB-FS-PC-18-23.0-23.5	SB-FS-PC-19-5.5-6.0	SB-FS-PC-19-11.5-12.0	SB-PCB-3	SB-FS-PC-19-15.5-16.0	SB-FS-PC-19-18.5-19.0	SB-FS-PC-19-21.0-21.5	SB-FS-PC-19-24.5-25.0	SB-FS-TB-PC-20-9.0-9.5	SB-FS-PC-20-15.5-16.0	SB-FS-PC-20-18.0-18.5
Sample Depth (feet)		21.25	23.75	16.25	20.25	23.25	5.75	11.75	11.75	15.75	18.75	21.25	24.75	9.25	15.75	18.25
Sample Date		6/5/2012	6/5/2012	5/29/2012	5/29/2012	5/29/2012	5/29/2012	5/29/2012	5/29/2012	6/5/2012	5/29/2012	6/5/2012	6/5/2012	5/29/2012	6/4/2012	6/4/2012
CONSTITUENTS	Units	Duplicate					Clean Fill		Duplicate							
1,1,1-Trichloroethane	(ug/kg)	**3.4**	2.4 U	**2** J	**46**	**4.2**	2.3 U	260 U	240 U	2 U	**20**	**20**	**37**	240 U	**4.9**	2.6 U
1,1,2,2-Tetrachloroethane	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 UJ	2 UJ	2.3 UJ	260 U	240 U	2 U	2 UJ	2.8 U	2.3 U	240 U	2.4 U	2.6 U
1,1,2-Trichloroethane	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	2.3 U	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
1,1-Dichloroethane	(ug/kg)	2.4 U	2.4 U	2.5 U	**5.2**	2 U	2.3 U	260 U	240 U	**2.9**	**7.1**	**8.5**	**15**	240 U	**7.7**	**2** J
1,1-Dichloroethylene	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	2.3 U	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
1,2,3-Trichlorobenzene	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	2.3 U	260 U	240 U	2 U	**1.2** J	2.8 U	2.3 U	240 U	2.4 U	2.6 U
1,2,4-Trichlorobenzene	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	**3.2**	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
1,2-Dichlorobenzene	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 UJ	2 UJ	**22** J	260 U	240 U	2 U	2 UJ	2.8 U	2.3 U	240 U	2.4 U	2.6 U
1,2-Dichloroethane	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	2.3 U	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
1,2-Dichloropropane	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	2.3 U	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
1,3-Dichlorobenzene	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	**15**	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
1,4-Dichlorobenzene	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	**110**	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
2-Hexanone	(ug/kg)	24 UJ	24 UJ	25 U*	34 U	20 U	23 U	2600 U	2400 U	20 UJ	20 UJ	28 UJ	23 UJ	2400 U	24 UJ	26 UJ
Acetone	(ug/kg)	240 UJ	240 UJ	250 UJ	340 UJ	200 UJ	230 UJ	26000 UJ	24000 UJ	200 UJ	200 UJ	280 UJ	230 UJ	24000 UJ	240 UJ	260 UJ
Benzene	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	2.3 U	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
Bromochloromethane	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	2.3 U	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
Bromodichloromethane	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	2.3 U	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
Bromoform	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	2.3 U	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
Carbon Disulfide	(ug/kg)	2.4 U	2.4 U	2.5 U*	**4.8**	**1.6** J	2.3 U	260 U	240 U	2 U	2 U	2.8 U	**2.4**	240 U	2.4 U	2.6 U
Carbon Tetrachloride	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U*	**2** U*	2.3 U*	260 U	240 U	2 U	2 U*	2.8 U	2.3 U	240 U	2.4 U	2.6 U
Chlorobenzene	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	**12**	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
Chloroethane	(ug/kg)	4.8 U	4.8 U	5.1 U	6.7 UJ	4 UJ	4.6 UJ	520 UJ	470 UJ	**27**	**3.4** J	**3.7** J	**6.5**	470 UJ	**2.5** J	5.3 U
Chloroform	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	2.3 U	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
cis-1,2-Dichloroethylene	(ug/kg)	**3.5**	2.4 U	**3.5**	**71**	**7.3**	2.3 U	**5600** J	**4200** J	**1.2** J	**170** J	**170**	**270**	240 U	**160**	**37**
cis-1,3-Dichloropropene	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	2.3 U	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
Cyclohexane	(ug/kg)	24 U	24 U	25 U	34 U	20 U	23 U	2600 U	2400 U	20 U	20 U	28 U	23 U	2400 U	24 U	26 U
DBCP	(ug/kg)	24 U	24 U	25 U	34 UJ	20 UJ	23 UJ	2600 U	2400 U	20 U	20 UJ	28 U	23 U	2400 U	24 U	26 U
Dibromochloromethane	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	2.3 U	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
Dichlorodifluoromethane	(ug/kg)	4.8 U	4.8 U	5.1 U	6.7 U	4 U	4.6 U	520 U	470 U	4 U	4 U	5.7 U	4.7 U	470 U	4.8 U	5.3 U
Diethyl ether	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	2.3 U	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
Ethylene dibromide (EDB)	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	2.3 U	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
Ethylbenzene	(ug/kg)	**4.9**	**2** J	**2.4** J	**33**	**1.5** J	**1.9** J	**310** J	**940** J	**2.6**	**4.2**	2.8 U	2.3 U	**190** J	**2.3** J	2.6 U
Freon 113	(ug/kg)	12 U	12 U	13 U	17 U	9.9 U	11 U	1300 U	1200 U	10 U	10 UJ	14 U	12 U	1200 U	12 U	13 U
Isopropylbenzene	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	2.3 U	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
Methyl Acetate	(ug/kg)	48 U	48 U	51 U	67 UJ	40 UJ	46 UJ	5200 U	4700 U	40 U	40 UJ	57 U	47 U	4700 U	48 U	53 U
Methyl bromide	(ug/kg)	4.8 U	4.8 U	5.1 U	6.7 U	4 U	4.6 U	520 U	470 U	4 U	4 U	5.7 U	4.7 U	470 U	4.8 U	5.3 U
Methyl chloride	(ug/kg)	4.8 U	4.8 U	5.1 U	6.7 U	4 U	4.6 U	520 U	470 U	4 U	4 U	5.7 U	4.7 U	470 U	4.8 U	5.3 U
Methyl ethyl ketone (MEK)	(ug/kg)	24 UJ	24 UJ	25 UJ	34 UJ	20 UJ	**11** J	2600 UJ	2400 UJ	20 UJ	20 UJ	28 UJ	23 UJ	2400 UJ	24 UJ	26 UJ
Methyl isobutyl ketone	(ug/kg)	24 U	24 U	25 U	34 U	20 U	23 U	2600 U	2400 U	20 U	20 U	28 U	23 U	2400 U	24 U	26 U
Methyl tert Butyl Ether (MTBE)	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	2.3 U	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
Methylcyclohexane	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	**2** J	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
Methylene chloride	(ug/kg)	9.6 U	9.6 U	**4.8** J	13 U	7.9 U	9.1 U	1000 U	950 U	8 U	8 U	11 U	9.3 U	940 U	9.6 U	11 U
m-Xylene & p-Xylene	(ug/kg)	4.8 U	4.8 U	5.1 U	**8.1**	4 U	**4.9**	**670** J	**2200** J	**5.7**	4 U	5.7 U	4.7 U	**2400**	4.8 U	5.3 U
o-Xylene	(ug/kg)	2.4 U	2.4 U	2.5 U	**2.6** J	2 U	**89**	**250** J	**800** J	**2.8**	2 U	2.8 U	2.3 U	**1200**	2.4 U	2.6 U
Styrene	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	2.3 U	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
Tetrachloroethylene	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	2.3 U	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
Tetrahydrofuran	(ug/kg)	48 UJ	48 UJ	51 UJ	67 U	40 U	46 U	5200 U	4700 U	40 UJ	40 U	57 UJ	47 UJ	4700 U	48 UJ	53 UJ
Toluene	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	2.3 U	**5900**	**9700**	**68**	**1.7** J	2.8 U	2.3 U	240 U	2.4 U	2.6 U
Trans-1,2-Dichloroethene	(ug/kg)	2.4 U	2.4 U	2.5 U	**2.8** J	2 U	2.3 U	**460**	**430**	**4.4**	**1.7** J	**1.8** J	**2.7**	240 U	**2.4**	2.6 U
trans-1,3-Dichloropropene	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	2.3 U	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
Trichloroethylene	(ug/kg)	2.4 U	2.4 U	2.5 U	3.4 U	2 U	2.3 U	260 U	240 U	2 U	2 U	2.8 U	2.3 U	240 U	2.4 U	2.6 U
Trichlorofluoromethane	(ug/kg)	4.8 U	4.8 U	5.1 U	6.7 U	4 U	4.6 U	520 U*	470 U*	4 U	4 U	5.7 U	4.7 U	470 U*	4.8 U	5.3 U
Vinyl chloride	(ug/kg)	**8.4**	**2.3** J	**4.7**	**53** J	**5.5** J	2.3 UJ	260 U	**250**	2 U	**7.8** J	**11**	**22**	240 U	**11**	**1.8** J
Xylene (total)	(ug/kg)	2.4 U	2.4 U	2.5 U	11	2 U	94	920 J	**3000** J	8.5	2 U	2.8 U	2.3 U	3600	2.4 U	2.6 U
Sum of Constituents	**(ug/kg)**	**20.2**	**4.3**	**17.4**	**226.5**	**20.1**	**271**	**13190**	**18520**	**114.6**	**217.1**	**215**	**355.6**	**3790**	**190.8**	**40.8**

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
ug/kg = micrograms per kilogram
Detections are in **Bold**

TABLE 3-1
SUMMARY OF VOLATILE ORGANIC COMPOUNDS - PLUME CORE SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location		PC-20	PC-21	PC-21	PC-21	PC-22	PC-22	PC-22	PC-22	PC-23	PC-23	PC-23	PC-23	PC-23	PC-23
Sample ID		SB-FS-PC-20-25.0-25.5	SB-FS-PC-21-6.5-7.0	SB-FS-PC-21-11.0-11.5	SB-FS-PC-21-12.5-13.0	SB-FS-PC-22-1.0-1.5	SB-FS-PC-22-13.5-14.0	SB-FS-PC-22-16.0-16.5	SB-FS-PC-22-28.5-29.0	SB-FS-PC-23-13.0-13.5	SB-FS-PC-23-14.0-14.5	SB-PCB-2	SB-FS-PC-23-18.0-18.5	SB-FS-PC-23-24.0-24.5	SB-FS-PC-23-29.0-29.5
Sample Depth (feet)		25.25	6.75	11.25	12.75	1.25	13.75	16.25	28.75	13.25	14.25	14.25	18.25	24.25	29.25
Sample Date		6/4/2012	5/31/2012	6/7/2012	6/7/2012	5/23/2012	5/23/2012	5/23/2012	5/23/2012	5/24/2012	5/24/2012	5/24/2012	5/24/2012	5/24/2012	5/24/2012
CONSTITUENTS	Units					Clean Fill						Duplicate			
1,1,1-Trichloroethane	(ug/kg)	**20**	**3.8**	**2.4** J	**2.6** J	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
1,1,2,2-Tetrachloroethane	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 UJ	2.7 UJ	2.6 UJ	3.1 UJ	2.2 UJ	2.7 UJ
1,1,2-Trichloroethane	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
1,1-Dichloroethane	(ug/kg)	**5.5**	**1.8** J	2.6 U	**2.8**	2.2 U	3 U	2.8 U	2.2 U	**81**	**3.8**	**3.1**	**2.3** J	2.2 U	2.7 U
1,1-Dichloroethylene	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
1,2,3-Trichlorobenzene	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 UJ	2.7 U	2.6 U	3.1 UJ	2.2 U	2.7 U
1,2,4-Trichlorobenzene	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 UJ	2.7 U	2.6 U	3.1 UJ	2.2 U	2.7 U
1,2-Dichlorobenzene	(ug/kg)	**5.4**	**1.3** J	**2.3** J	**1.4** J	2.2 U	3 U	2.8 U	2.2 U	3.1 UJ	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
1,2-Dichloroethane	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
1,2-Dichloropropane	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
1,3-Dichlorobenzene	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
1,4-Dichlorobenzene	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 UJ	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
2-Hexanone	(ug/kg)	26 UJ	25 U	26 U	27 U	22 U	30 U	28 U	22 U	31 U	27 U	26 U	31 U	22 U	27 U
Acetone	(ug/kg)	260 UJ	250 UJ	260 U	270 UJ	220 UJ	300 UJ	280 UJ	220 UJ	310 UJ	270 UJ	260 UJ	310 UJ	220 UJ	270 UJ
Benzene	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	4.6	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Bromochloromethane	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Bromodichloromethane	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Bromoform	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 UJ	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Carbon Disulfide	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	**1.9** J	**3** J	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Carbon Tetrachloride	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Chlorobenzene	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Chloroethane	(ug/kg)	5.1 U	5.1 U	5.2 U	5.5 U	4.4 U	6 U	5.5 U	4.4 U	**16**	5.4 U	5.3 U	6.2 U	4.3 U	5.4 U
Chloroform	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
cis-1,2-Dichloroethylene	(ug/kg)	**130**	**19**	**13**	**10**	2.2 U	3 U	2.8 U	2.2 U	**8.1**	2.7 U	2.6 U	**18**	2.2 U	2.7 U
cis-1,3-Dichloropropene	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Cyclohexane	(ug/kg)	26 U	25 U	26 U	27 U	22 U	30 U	28 U	22 U	31 U	27 U	26 U	31 U	22 U	27 U
DBCP	(ug/kg)	26 U	25 U	26 U	27 U	22 U	30 U	28 U	22 U	31 UJ	27 UJ	26 UJ	31 UJ	22 UJ	27 UJ
Dibromochloromethane	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Dichlorodifluoromethane	(ug/kg)	5.1 U	5.1 U	5.2 U	5.5 U	4.4 U	6 U	5.5 U	4.4 U	6.2 U	5.4 U	5.3 U	6.2 U	4.3 U	5.4 U
Diethyl ether	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Ethylene dibromide (EDB)	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Ethylbenzene	(ug/kg)	2.6 U	2.5 U	**3.8**	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Freon 113	(ug/kg)	13 U	13 U	13 U	14 U	11 U	15 U	14 U	11 U	16 U	14 U	13 U	15 U	11 U	14 U
Isopropylbenzene	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Methyl Acetate	(ug/kg)	51 U	51 U	52 U	55 U	44 U	60 U	55 U	44 U	62 U	54 U	53 U	62 U	43 U	54 U
Methyl bromide	(ug/kg)	5.1 U	5.1 U	5.2 U	5.5 U	4.4 U	6 U	5.5 U	4.4 U	6.2 U	5.4 U	5.3 U	6.2 U	4.3 U	5.4 U
Methyl chloride	(ug/kg)	5.1 U	5.1 U	5.2 U	5.5 U	4.4 U	6 U	5.5 U	4.4 U	6.2 U	5.4 U	5.3 U	6.2 U	4.3 U	5.4 U
Methyl ethyl ketone (MEK)	(ug/kg)	26 UJ	25 UJ	26 U	27 U	22 UJ	30 UJ	28 UJ	22 UJ	31 U	27 U	26 U	31 UJ	22 U	27 U
Methyl isobutyl ketone	(ug/kg)	26 U	25 U	26 U	27 U	22 U	30 U	28 U	22 U	31 U	27 U	26 U	31 U	22 U	27 U
Methyl tert Butyl Ether (MTBE)	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Methylcyclohexane	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Methylene chloride	(ug/kg)	10 U	**8.4** J	10 U	11 U	8.8 U	12 U	11 U	8.7 U	12 U	11 U	11 U	12 U	8.7 U	11 U
m-Xylene & p-Xylene	(ug/kg)	5.1 U	5.1 U	5.2 U	5.5 U	4.4 U	6 U	5.5 U	4.4 U	6.2 U	5.4 U	5.3 U	6.2 U	4.3 U	5.4 U
o-Xylene	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Styrene	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Tetrachloroethylene	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	**1.8** J	3 U	**4.2**	2.2 U	**17**	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Tetrahydrofuran	(ug/kg)	51 UJ	51 UJ	52 UJ	55 U	44 U	60 U	55 U	44 U	62 U	54 U	53 U	62 U	43 U	54 U
Toluene	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	**10**	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Trans-1,2-Dichloroethene	(ug/kg)	**2** J	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
trans-1,3-Dichloropropene	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Trichloroethylene	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	**13**	2.7 U	2.6 U	**37**	2.2 U	2.7 U
Trichlorofluoromethane	(ug/kg)	5.1 U	5.1 U	5.2 U	5.5 U	4.4 U	6 U	5.5 U	4.4 U	6.2 U	5.4 U	5.3 U	6.2 U	4.3 U	5.4 U
Vinyl chloride	(ug/kg)	**11**	**6.6**	**4.3**	**6.6**	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	**2.1** J	2.2 U	2.7 U
Xylene (total)	(ug/kg)	2.6 U	2.5 U	2.6 U	2.7 U	2.2 U	3 U	2.8 U	2.2 U	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Sum of Constituents	**(ug/kg)**	**173.9**	**40.9**	**25.8**	**23.4**	**1.8**	**0**	**4.2**	**1.9**	**152.7**	**3.8**	**3.1**	**59.4**	**0**	**0**

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
ug/kg = micrograms per kilogram
Detections are in **Bold**

TABLE 3-1
SUMMARY OF VOLATILE ORGANIC COMPOUNDS - PLUME CORE SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location		PC-23	PC-23	PC-23	PC-23	PC-23	PC-23	PC-24	PC-24	PC-24	PC-24	PC-24	PC-25	PC-25	PC-25	PC-25
Sample ID		SB-FS-PC-23-13.0-13.5	SB-FS-PC-23-14.0-14.5	SB-PCB-2	SB-FS-PC-23-18.0-18.5	SB-FS-PC-23-24.0-24.5	SB-FS-PC-23-29.0-29.5	SB-FS-PC-24-12.5-13.0	SB-FS-PC-24-14.5-15.0	SB-FS-PC-24-18.0-18.5	SB-FS-PC-24-24.0-24.5	SB-FS-PC-24-34.0-34.5	SB-FS-PC-25-11.5-12.0	SB-FS-PC-25-12.5-13.0	SB-FS-PC-25-27.0-27.5	SB-FS-PC-25-35.0-35.5
Sample Depth (feet)		13.25	14.25	14.25	18.25	24.25	29.25	12.75	14.75	18.25	24.25	34.25	11.75	12.75	27.25	35.25
Sample Date		5/24/2012	5/24/2012	5/24/2012	5/24/2012	5/24/2012	5/24/2012	5/30/2012	5/30/2012	6/8/2012	5/30/2012	5/30/2012	5/24/2012	5/24/2012	5/24/2012	5/24/2012
CONSTITUENTS	Units			Duplicate												
1,1,1-Trichloroethane	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
1,1,2,2-Tetrachloroethane	(ug/kg)	3.1 UJ	2.7 UJ	2.6 UJ	3.1 UJ	2.2 UJ	2.7 UJ	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 UJ	2.3 UJ	2.6 UJ
1,1,2-Trichloroethane	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
1,1-Dichloroethane	(ug/kg)	**81**	**3.8**	**3.1**	**2.3** J	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	**1700** J	**39**	2.3 U	2.6 U
1,1-Dichloroethylene	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
1,2,3-Trichlorobenzene	(ug/kg)	3.1 UJ	2.7 U	2.6 U	3.1 UJ	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
1,2,4-Trichlorobenzene	(ug/kg)	3.1 UJ	2.7 U	2.6 U	3.1 UJ	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
1,2-Dichlorobenzene	(ug/kg)	3.1 UJ	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
1,2-Dichloroethane	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
1,2-Dichloropropane	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
1,3-Dichlorobenzene	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
1,4-Dichlorobenzene	(ug/kg)	3.1 UJ	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
2-Hexanone	(ug/kg)	31 U	27 U	26 U	31 U	22 U	27 U	8800 UJ	1700 UJ	25 U	27 U*	23 U*	7400 UJ	58 U	23 U	26 U
Acetone	(ug/kg)	310 UJ	270 UJ	260 UJ	310 UJ	220 UJ	270 UJ	88000 UJ	17000 UJ	250 U	270 U*	230 U*	74000 UJ	580 UJ	230 UJ	260 UJ
Benzene	(ug/kg)	4.6	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
Bromochloromethane	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
Bromodichloromethane	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
Bromoform	(ug/kg)	3.1 UJ	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
Carbon Disulfide	(ug/kg)	**3** J	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U*	2.3 U*	740 UJ	5.8 U	2.3 U	**12**
Carbon Tetrachloride	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
Chlorobenzene	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
Chloroethane	(ug/kg)	**16**	5.4 U	5.3 U	6.2 U	4.3 U	5.4 U	1800 UJ	340 U	4.9 U	5.5 U	4.6 U	1500 UJ	**16**	4.5 U	5.2 U
Chloroform	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
cis-1,2-Dichloroethylene	(ug/kg)	**8.1**	2.7 U	2.6 U	**18**	2.2 U	2.7 U	**68000** J	**1100**	**2.5**	**2.5** J	2.3 U	**15000** J	**130**	2.3 U	**1.5** J
cis-1,3-Dichloropropene	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
Cyclohexane	(ug/kg)	31 U	27 U	26 U	31 U	22 U	27 U	8800 UJ	1700 U	25 U	27 U	23 U	7400 UJ	58 U	23 U	26 U
DBCP	(ug/kg)	31 UJ	27 UJ	26 UJ	31 UJ	22 UJ	27 UJ	8800 UJ	1700 U	25 U	27 U	23 U	7400 UJ	58 UJ	23 UJ	26 UJ
Dibromochloromethane	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
Dichlorodifluoromethane	(ug/kg)	6.2 U	5.4 U	5.3 U	6.2 U	4.3 U	5.4 U	1800 UJ	340 U	4.9 U	5.5 U	4.6 U	1500 UJ	12 U	4.5 U	5.2 U
Diethyl ether	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
Ethylene dibromide (EDB)	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
Ethylbenzene	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	**2.9**
Freon 113	(ug/kg)	16 U	14 U	13 U	15 U	11 U	14 U	4400 UJ	850 U	12 U	14 U	12 U	3700 UJ	29 U	11 U	13 U
Isopropylbenzene	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
Methyl Acetate	(ug/kg)	62 U	54 U	53 U	62 U	43 U	54 U	18000 UJ	3400 U	49 U	55 U	46 U	15000 UJ	120 U	45 U	52 U
Methyl bromide	(ug/kg)	6.2 U	5.4 U	5.3 U	6.2 U	4.3 U	5.4 U	1800 UJ	340 U	4.9 U	5.5 U	4.6 U	1500 UJ	12 U	4.5 U	5.2 U
Methyl chloride	(ug/kg)	6.2 U	5.4 U	5.3 U	6.2 U	4.3 U	5.4 U	1800 UJ	340 U	4.9 U	5.5 U	4.6 U	1500 UJ	12 U	4.5 U	5.2 U
Methyl ethyl ketone (MEK)	(ug/kg)	31 U	27 U	26 U	31 UJ	22 U	27 U	8800 UJ	1700 UJ	25 U	27 U*	23 U*	7400 UJ	**51** J	23 U	26 U
Methyl isobutyl ketone	(ug/kg)	31 U	27 U	26 U	31 U	22 U	27 U	8800 UJ	1700 U	25 U	27 U	23 U	7400 UJ	58 U	23 U	26 U
Methyl tert Butyl Ether (MTBE)	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
Methylcyclohexane	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
Methylene chloride	(ug/kg)	12 U	11 U	11 U	12 U	8.7 U	11 U	4200 UJ	830 U	9.8 U	**8** J	**7.1** J	2900 UJ	23 U	9.1 U	10 U
m-Xylene & p-Xylene	(ug/kg)	6.2 U	5.4 U	5.3 U	6.2 U	4.3 U	5.4 U	1800 UJ	340 U	4.9 U	5.5 U	4.6 U	1500 UJ	12 U	4.5 U	5.2 U
o-Xylene	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
Styrene	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
Tetrachloroethylene	(ug/kg)	**17**	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	**590** J	5.8 U	2.3 U	2.6 U
Tetrahydrofuran	(ug/kg)	62 U	54 U	53 U	62 U	43 U	54 U	18000 UJ	3400 UJ	49 UJ	55 U	46 U	15000 UJ	120 U	45 U	52 U
Toluene	(ug/kg)	**10**	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
Trans-1,2-Dichloroethene	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	**4000** J	170 U	2.5 U	2.7 U	2.3 U	**570** J	**11**	2.3 U	2.6 U
trans-1,3-Dichloropropene	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
Trichloroethylene	(ug/kg)	**13**	2.7 U	2.6 U	**37**	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	**2200** J	5.8 U	2.3 U	2.6 U
Trichlorofluoromethane	(ug/kg)	6.2 U	5.4 U	5.3 U	6.2 U	4.3 U	5.4 U	1800 UJ	340 U	4.9 U	5.5 U	4.6 U	1500 UJ	12 U	4.5 U	5.2 U
Vinyl chloride	(ug/kg)	3.1 U	2.7 U	2.6 U	**2.1** J	2.2 U	2.7 U	**2400** J	170 U	**1.6** J	**8.3**	2.3 U	**950** J	**100**	**6.4**	**6.7**
Xylene (total)	(ug/kg)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U	880 UJ	170 U	2.5 U	2.7 U	2.3 U	740 UJ	5.8 U	2.3 U	2.6 U
Sum of Constituents	**(ug/kg)**	**152.7**	**3.8**	**3.1**	**59.4**	**0**	**0**	**74400**	**1100**	**4.1**	**18.8**	**7.1**	**21010**	**347**	**6.4**	**23.1**

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
ug/kg = micrograms per kilogram
Detections are in **Bold**

TABLE 3-1
SUMMARY OF VOLATILE ORGANIC COMPOUNDS - PLUME CORE SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location		PC-26	PC-26	PC-26	PC-26	PC-26	PC-27	PC-27	PC-27	PC-27	PC-28	PC-28	PC-28	PC-28	PC-28	PC-28
Sample ID		SB-FS-PC-26-10.0-10.5	SB-FS-PC-26-14.0-14.5	SB-FS-PC-26-19.5-20.0	SB-FS-PC-26-27.0-27.5	SB-FS-PC-26-32.5-33.0	SB-FS-PC-27-6.0-6.5	SB-FS-PC-27-10.5-11.0	SB-FS-PC-27-19.5-20.0	SB-FS-PC-27-35.5-36.0	SB-FS-PC-28-4.5-5.0	SB-FS-PC-28-6.5-7.0	SB-FS-PC-28-9.0-9.5	SB-FS-PC-28-12.5-13.0	SB-FS-PC-28-19.0-19.5	SB-FS-PC-28-30.5-31.0
Sample Depth (feet)		10.25	14.25	19.75	27.25	32.75	6.25	10.75	19.75	35.75	4.75	6.75	9.25	12.75	19.25	30.75
Sample Date		6/6/2012	6/6/2012	6/6/2012	6/6/2012	6/6/2012	5/30/2012	5/30/2012	5/30/2012	5/30/2012	5/30/2012	5/30/2012	5/30/2012	6/7/2012	5/30/2012	5/30/2012
CONSTITUENTS	Units															
1,1,1-Trichloroethane	(ug/kg)	2.8 U	3 U	**2.4** J	2.3 U	**2.4**	7.6 U	2.8 U	**3.1**	2.9 U	330 U	160 U	1.9 U	**8.4**	**16**	**7**
1,1,2,2-Tetrachloroethane	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 UJ	2.8 U	2.8 UJ	3 UJ
1,1,2-Trichloroethane	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
1,1-Dichloroethane	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	**2.8**	**1.9** J	2.9 U	330 U	160 U	1.9 U	**11**	**11**	**6.3**
1,1-Dichloroethylene	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
1,2,3-Trichlorobenzene	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
1,2,4-Trichlorobenzene	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	**170** J	160 U	1.9 U	2.8 U	2.8 U	3 U
1,2-Dichlorobenzene	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	**3200**	**88** J	1.9 U	**1.2** J	**1.6** J	3 U
1,2-Dichloroethane	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 UJ	2.8 U	2.8 UJ	3 UJ
1,2-Dichloropropane	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
1,3-Dichlorobenzene	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	**130** J	160 U	1.9 U	2.8 U	2.8 U	3 U
1,4-Dichlorobenzene	(ug/kg)	**6**	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	**1000**	160 U	1.9 U	2.8 U	2.8 U	3 U
2-Hexanone	(ug/kg)	28 U	30 UJ	25 U	23 UJ	21 UJ	76 U	28 U	23 U	29 U	3300 U	1600 U	19 U	28 U	28 U	30 U
Acetone	(ug/kg)	280 U	300 UJ	250 U	230 UJ	210 UJ	760 UJ	280 UJ	230 UJ	290 UJ	33000 UJ	16000 UJ	190 UJ	280 U	280 UJ	300 UJ
Benzene	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Bromochloromethane	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Bromodichloromethane	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Bromoform	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Carbon Disulfide	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	**7.8**	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Carbon Tetrachloride	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Chlorobenzene	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Chloroethane	(ug/kg)	5.6 U	6 U	5 U	4.5 U	4.1 U	15 U	5.6 U	4.6 U	5.7 U	660 UJ	310 UJ	3.8 UJ	**2.5** J	**2.7** J	6 UJ
Chloroform	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
cis-1,2-Dichloroethylene	(ug/kg)	2.8 U	**5.7**	**5.6**	2.3 U	**3.7**	7.6 U	**20**	**6.5**	**1.5** J	330 U	160 U	**1.7** J	**99**	**150**	**72**
cis-1,3-Dichloropropene	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Cyclohexane	(ug/kg)	28 U	30 U	25 U	23 U	21 U	76 U	28 U	23 U	29 U	**280** J	1600 U	19 U	28 U	28 U	30 U
DBCP	(ug/kg)	28 U	30 U	25 U	23 U	21 U	76 U	28 U	23 U	29 U	3300 U	1600 U	19 UJ	28 U	28 UJ	30 UJ
Dibromochloromethane	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Dichlorodifluoromethane	(ug/kg)	5.6 U	6 U	5 U	4.5 U	4.1 U	15 U	5.6 U	4.6 U	5.7 U	660 U	310 U	3.8 U	5.7 U	5.5 U	6 U
Diethyl ether	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Ethylene dibromide (EDB)	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Ethylbenzene	(ug/kg)	2.8 U	3 U	**2.1** J	2.3 U	**2.1**	7.6 U	2.8 U	2.3 U	2.9 U	**14000**	160 U	1.9 U	2.8 U	2.8 U	3 U
Freon 113	(ug/kg)	14 U	15 U	13 U	11 U	10 U	38 U	14 U	12 U	14 U	1600 U	780 U	9.5 U	14 U	14 U	15 U
Isopropylbenzene	(ug/kg)	**8.6**	3 U	2.5 U	2.3 U	2.1 U	**35**	2.8 U	2.3 U	2.9 U	**390**	160 U	1.9 U	2.8 U	2.8 U	3 U
Methyl Acetate	(ug/kg)	56 U	60 U	50 U	45 U	41 U	150 U	56 U	46 U	57 U	6600 U	3100 U	38 UJ	57 U	55 UJ	60 UJ
Methyl bromide	(ug/kg)	5.6 U	6 U	5 U	4.5 U	4.1 U	15 U	5.6 U	4.6 U	5.7 U	660 U	310 U	3.8 U	5.7 U	5.5 U	6 U
Methyl chloride	(ug/kg)	5.6 U	6 U	5 U	4.5 U	4.1 U	15 U	5.6 U	4.6 U	5.7 U	660 U	310 U	3.8 U	5.7 U	5.5 U	6 U
Methyl ethyl ketone (MEK)	(ug/kg)	28 U	30 UJ	25 U	23 UJ	21 UJ	**110** J	28 UJ	23 UJ	29 UJ	3300 UJ	1600 UJ	19 UJ	28 U	28 UJ	30 UJ
Methyl isobutyl ketone	(ug/kg)	28 U	30 U	25 U	23 U	21 U	76 U	28 U	23 U	29 U	3300 U	1600 U	19 U	28 U	28 U	30 U
Methyl tert Butyl Ether (MTBE)	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Methylcyclohexane	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	**1800**	160 U	1.9 U	2.8 U	2.8 U	3 U
Methylene chloride	(ug/kg)	11 U	12 U	10 U	9.1 U	8.2 U	**23** J	**6** J	**7.7** J	**7.7** J	1300 U	630 U	7.6 U	11 U	11 U	12 U
m-Xylene & p-Xylene	(ug/kg)	**7.5**	6 U	5 U	4.5 U	4.1 U	**10** J	5.6 U	4.6 U	5.7 U	**49000**	**2700**	3.8 U	5.7 U	5.5 U	6 U
o-Xylene	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	**5.8** J	2.8 U	2.3 U	2.9 U	**18000**	**640**	1.9 U	2.8 U	2.8 U	3 U
Styrene	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Tetrachloroethylene	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 U	**4.2**	2.8 U	3 U
Tetrahydrofuran	(ug/kg)	56 UJ	60 UJ	50 UJ	45 UJ	41 UJ	150 UJ	56 UJ	46 UJ	57 UJ	6600 U	3100 U	38 U	57 UJ	55 U	60 U
Toluene	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	**1500**	160 U	1.9 U	2.8 U	2.8 U	3 U
Trans-1,2-Dichloroethene	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 U	2.8 U	**3.5**	**1.7** J
trans-1,3-Dichloropropene	(ug/kg)	2.8 U	3 U	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Trichloroethylene	(ug/kg)	2.8 U	**5**	2.5 U	2.3 U	2.1 U	7.6 U	2.8 U	2.3 U	2.9 U	330 U	160 U	1.9 U	**2.5** J	2.8 U	3 U
Trichlorofluoromethane	(ug/kg)	5.6 U	6 U	5 U	4.5 U	4.1 U	15 U	5.6 U	4.6 U	5.7 U	660 U*	310 U	3.8 U	5.7 U	5.5 U	6 U
Vinyl chloride	(ug/kg)	2.8 U	**3.4**	**11**	2.3 U	**5**	7.6 U	**4.7**	**9.3**	2.9 U	330 U	160 U	1.9 UJ	**33**	**31** J	**16** J
Xylene (total)	(ug/kg)	**7.5**	3 U	2.5 U	2.3 U	2.1 U	**16**	2.8 U	2.3 U	2.9 U	**67000**	**3300**	1.9 U	2.8 U	2.8 U	3 U
Sum of Constituents	**(ug/kg)**	**22.1**	**14.1**	**21.1**	**0**	**21**	**184**	**33.5**	**28.5**	**9.2**	**89470**	**3388**	**1.7**	**161.8**	**215.8**	**103**

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
ug/kg = micrograms per kilogram
Detections are in **Bold**

TABLE 3-2
SUMMARY OF SEMI-VOLATILE ORGANIC COMPOUNDS - PLUME CORE SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location		PC-1	PC-1	PC-2	PC-2	PC-3	PC-3	PC-4	PC-4	PC-5	PC-5	PC-6	PC-6	PC-7	PC-7	PC-8	PC-8	PC-9	PC-10	PC-10	PC-11	PC-11
Sample ID		SB-FS-PC-1-8.0-10.0	SB-FS-PC-1-14.0-16.0	SB-FS-PC-2-9.0-11.0	SB-FS-PC-2-17.0-19.0	SB-FS-PC-3-12.0-14.0	SB-FS-PC-3-21.5-23.5	SB-FS-PC-4-11.0-13.0	SB-FS-PC-4-25-26.7	SB-FS-PC-5-11.0-13.0	SB-FS-PC-5-23.0-25.0	SB-FS-PC-6-12.0-14.0	SB-FS-PC-6-20.0-22.5	SB-FS-PC-7-13.0-15.0	SB-FS-PC-7-16.0-18.5	SB-FS-PC-8-14.0-16.0	SB-FS-PC-8-19.0-21.0	SB-FS-PC-9-14.0-16.0	SB-FS-PC-10-14.0-16.0	SB-FS-PC-10-22.0-24.0	SB-FS-PC-11-5.0-10.0	SB-FS-PC-11-19.0-21.0
Sample Depth (feet)		9	15	10	18	13	22.5	12	25.85	12	24	13	21.25	14	17.25	15	20	15	15	23	7.5	20
Sample Date		5/18/2012	5/18/2012	5/21/2012	5/21/2012	5/21/2012	5/21/2012	5/18/2012	5/18/2012	5/18/2012	5/18/2012	6/1/2012	6/1/2012	6/1/2012	6/1/2012	5/22/2012	5/22/2012	6/5/2012	5/23/2012	5/23/2012	5/25/2012	5/25/2012
CONSTITUENTS	Units																					
1,2,4,5-Tetrachlorobenzene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	**20 J**	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	**30 J**	73 U	37 U	**51**	37 U
2,3,4,6-tetrachlorophenol	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	41 UJ	180 U	35 U	34 U	35 U	38 UJ	37 UJ	36 U	36 UJ	38 UJ	180 UJ	38 UJ
2,4,5-Trichlorophenol	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
2,4,6-Trichlorophenol	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
2,4-Dichlorophenol	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
2,4-Dimethylphenol	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
2,4-Dinitrophenol	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 UJ	35 UJ	34 UJ	35 UJ	190 UJ	37 UJ	36 UJ	73 UJ	37 UJ	36 UJ	37 UJ
2,4-Dinitrotoluene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
2,6-Dinitrotoluene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
2-Chloronaphthalene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
2-Chlorophenol	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
2-Methylnaphthalene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	**100 J**	37 U	36 U	73 U	37 U	36 U	37 U
2-Methylphenol	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
2-Nitroanaline	(ug/kg)	180 UJ	180 UJ	190 UJ	180 UJ	200 UJ	190 UJ	180 UJ	190 UJ	180 UJ	200 UJ	900 U	180 U	170 U	180 U	960 U	190 U	180 U	360 U	190 U	180 U	180 U
2-Nitrophenol	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
3 & 4 Methylphenol	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
3,3-Dichlorobenzidine	(ug/kg)	74 UJ	71 UJ	74 UJ	71 UJ	79 UJ	77 UJ	71 UJ	78 UJ	73 UJ	80 UJ	360 U	71 U	69 U	71 U	380 U	75 UJ	72 U	150 U	75 U	72 U	74 U
3-Nitroaniline	(ug/kg)	180 UJ	180 UJ	190 UJ	180 UJ	200 UJ	190 UJ	180 UJ	190 UJ	180 UJ	200 UJ	900 U	180 U	170 U	180 U	960 U	190 U	180 U	360 U	190 U	180 U	180 U
4,6-Dinitro-2-methylphenol	(ug/kg)	180 UJ	180 UJ	190 UJ	180 UJ	200 UJ	190 UJ	180 UJ	190 UJ	180 UJ	200 UJ	900 UJ	180 UJ	170 UJ	180 UJ	960 UJ	190 UJ	180 UJ	360 UJ	190 UJ	180 UJ	180 UJ
4-Bromophenyl phenyl ether	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 UJ	36 U	73 U	37 U	36 U	37 U
4-Chloro-3-methylphenol	(ug/kg)	74 UJ	71 UJ	74 UJ	71 UJ	79 UJ	77 UJ	71 UJ	78 UJ	73 UJ	80 UJ	360 U	71 U	69 U	71 U	380 U	75 U	72 U	150 U	75 U	72 U	74 U
4-Chloroaniline	(ug/kg)	74 UJ	71 UJ	74 UJ	71 UJ	79 UJ	77 UJ	71 UJ	78 UJ	73 UJ	80 UJ	360 U	71 U	69 U	71 U	380 U	75 U	72 U	150 U	75 U	72 U	74 U
4-Chlorophenyl phenyl ether	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
4-Nitroaniline	(ug/kg)	180 UJ	180 UJ	190 UJ	180 UJ	200 UJ	190 UJ	180 UJ	190 UJ	180 UJ	200 UJ	900 U	180 U	170 U	180 U	960 U	190 U	180 U	360 U	190 U	180 U	180 U
4-Nitrophenol	(ug/kg)	180 UJ	180 UJ	190 UJ	180 UJ	200 UJ	190 UJ	180 UJ	190 UJ	180 UJ	200 UJ	900 U	180 U	170 U	180 U	960 U	190 U	180 U	360 U	190 U	180 U	180 U
Acenaphthene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
Acenaphthylene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
Acetophenone	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
Anthracene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 UJ	36 U	73 U	37 U	36 U	37 U
Atrazine	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	41 UJ	180 U	35 U	34 U	35 U	38 UJ	37 UJ	36 U	36 UJ	38 UJ	180 UJ	38 UJ
Benzaldehyde	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	41 UJ	180 U	35 U	34 U	35 U	38 UJ	37 UJ	36 U	36 UJ	38 UJ	180 UJ	38 UJ
Benzo(a)anthracene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	**260**	37 UJ	36 U	73 U	37 U	36 U	37 U
Benzo(a)pyrene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	**230**	37 UJ	36 U	73 U	37 U	36 U	37 U
Benzo(b)fluoranthene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	**290**	37 UJ	36 U	73 U	37 U	36 U	37 U
Benzo(ghi)perylene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	**150 J**	37 UJ	36 U	73 U	37 U	36 U	37 U
Benzo(k)fluoranthene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	**130 J**	37 UJ	36 U	73 U	37 U	36 U	37 U
Biphenyl	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	41 UJ	**69 J**	35 U	34 U	35 U	38 UJ	37 UJ	36 U	36 UJ	38 UJ	180 UJ	38 UJ
Bis(2-chloro-1-methylethyl) ether	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
Bis(2-chloroethoxy)methane	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
Bis(2-chloroethyl)ether	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
Bis(2-ethylhexyl)phthalate (BEHP)	(ug/kg)	180 UJ	180 UJ	190 UJ	180 UJ	**97 J**	190 UJ	180 UJ	190 UJ	180 UJ	200 UJ	**1500**	180 U	**1900**	180 U	**390 J**	190 UJ	180 U	**150 J**	190 U	**190**	180 U
Butyl benzyl phthalate	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	**88 J**	35 U	34 U	35 U	190 U	37 UJ	36 U	73 U	37 U	36 U	37 U
Caprolactam	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	41 UJ	180 U	35 U	34 U	35 U	38 UJ	37 UJ	36 U	36 UJ	38 UJ	180 UJ	38 UJ
Carbazole	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 UJ	36 U	73 U	37 U	36 U	37 U
Chrysene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	**250**	37 UJ	36 U	73 U	37 U	36 U	37 U
Dibenzo(a,h)anthracene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 UJ	36 U	73 U	37 U	36 U	37 U
Dibenzofuran	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
Diethyl phthalate	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
Dimethyl phthalate	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
Di-n-butyl phthalate	(ug/kg)	180 UJ	180 UJ	190 UJ	180 UJ	200 UJ	190 UJ	180 UJ	190 UJ	180 UJ	200 UJ	900 U	180 U	170 U	180 U	960 U	190 UJ	180 U	360 U	190 U	180 U	180 U
Di-n-octyl phthalate	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	**160 J**	35 U	34 U	35 U	**220**	37 UJ	36 U	**28 J**	37 U	36 U	37 U
Fluoranthene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	**12 J**	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	**390**	37 UJ	36 U	73 U	37 U	36 U	37 U
Fluorene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
Hexachlorobenzene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 UJ	36 U	73 U	37 U	36 U	37 U
Hexachlorobutadiene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
Hexachlorocyclopentadiene	(ug/kg)	74 UJ	71 UJ	74 UJ	71 UJ	79 UJ	77 UJ	71 UJ	78 UJ	73 UJ	80 UJ	360 U	71 UJ	69 U	71 U	380 U	75 UJ	72 U	150 U	75 U	72 U	74 U
Hexachloroethane	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
Indeno(1,2,3-cd)pyrene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	**140 J**	37 UJ	36 U	73 U	37 U	36 U	37 U
Isophorone	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
Naphthalene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	**78 J**	37 U	36 U	73 U	37 U	36 U	37 U
Nitrobenzene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
N-Nitroso-di-n-propylamine	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
N-Nitrosodiphenylamine	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 UJ	36 U	73 U	37 U	36 U	37 U
Pentachlorophenol	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 UJ	36 U	73 U	37 U	36 U	37 U
Phenanthrene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	**230**	37 UJ	36 U	73 U	37 U	36 U	37 U
Phenol	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	40 UJ	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	190 U	37 U	36 U	73 U	37 U	36 U	37 U
Pyrene	(ug/kg)	37 UJ	36 UJ	37 UJ	36 UJ	**16 J**	38 UJ	36 UJ	39 UJ	36 UJ	40 UJ	180 U	35 U	34 U	35 U	**390**	37 UJ	36 U	73 U	**12 J**	36 U	37 U

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
ug/kg = micrograms per kilogram
Detections are in **Bold**

TABLE 3-2
SUMMARY OF SEMI-VOLATILE ORGANIC COMPOUNDS - PLUME CORE SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location		PC-12	PC-12	PC-13	PC-13	PC-14	PC-14	PC-15	PC-16	PC-16	PC-17	PC-17	PC-18	PC-18	PC-19	PC-19	PC-20	PC-20	PC-21	PC-21	PC-22	PC-22
Sample ID		SB-FS-PC-12-12.0-15.0	SB-FS-PC-12-20-22	SB-FS-PC-13-10.0-12.0	SB-FS-PC-13-20.0-25.0	SB-FS-PC-14-10.0-12.0	SB-FS-PC-14-18.0-20.0	SB-FS-PC-15-14.0-17.0	SB-FS-PC-16-14.5-18.0	SB-FS-PC-16-23.5-26.0	SB-FS-PC-17-14.0-17.0	SB-FS-PC-17-21.0-24.0	SB-FS-PC-18-14.0-17.0	SB-FS-PC-18-20.0-22.0	SB-FS-PC-19-11.0-14.0	SB-FS-PC-19-23.0-25.0	SB-FS-PC-20-14.0-16.0	SB-FS-PC-20-24.0-25.5	SB-FS-PC-21-11.0-13.0	SB-PCB-7	SB-FS-PC-22-16.0-18.0	SB-FS-PC-22-27.0-29.0
Sample Depth (feet)		13.5	21	11	22.5	11	19	15.5	16.25	24.75	15.5	22.5	15.5	21	12.5	24	15	24.75	12	12	17	28
Sample Date		5/25/2012	5/25/2012	6/4/2012	5/31/2012	6/4/2012	5/31/2012	5/22/2012	5/23/2012	5/23/2012	6/5/2012	6/5/2012	5/29/2012	5/29/2012	6/5/2012	6/5/2012	6/4/2012	6/4/2012	6/7/2012	6/7/2012	5/23/2012	5/23/2012
CONSTITUENTS	Units																			Duplicate		
1,2,4,5-Tetrachlorobenzene	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
2,3,4,6-tetrachlorophenol	(ug/kg)	36 UJ	36 UJ	37 U	36 U	36 U	180 U	37 UJ	38 UJ	39 UJ	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	36 UJ
2,4,5-Trichlorophenol	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
2,4,6-Trichlorophenol	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
2,4-Dichlorophenol	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
2,4-Dimethylphenol	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
2,4-Dinitrophenol	(ug/kg)	36 UJ	37 UJ	37 UJ	36 UJ	36 UJ	180 UJ	37 UJ	39 UJ	39 UJ	38 UJ	38 UJ	38 UJ	38 UJ	190 UJ	37 UJ	37 UJ	38 UJ	36 U	36 U	39 UJ	37 UJ
2,4-Dinitrotoluene	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
2,6-Dinitrotoluene	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
2-Chloronaphthalene	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
2-Chlorophenol	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
2-Methylnaphthalene	(ug/kg)	**21 J**	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	**28 J**	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
2-Methylphenol	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
2-Nitroanaline	(ug/kg)	180 U	180 U	190 U	180 U	180 U	900 U	180 U	190 U	190 U	190 U	190 U	190 U	190 U	970 U	190 U	190 U	190 U	180 U	180 U	200 U	180 U
2-Nitrophenol	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
3 & 4 Methylphenol	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	**720**	37 U	37 U	38 U	36 U	36 U	39 U	37 U
3,3-Dichlorobenzidine	(ug/kg)	72 U	74 U	74 U	71 U	72 U	360 U	74 U	78 U	77 U	77 U	75 U	76 U	76 U	390 U	74 U	75 U	76 U	72 U	71 U	78 UJ	73 U
3-Nitroaniline	(ug/kg)	180 U	180 U	190 U	180 U	180 U	900 U	180 U	190 U	190 U	190 U	190 U	190 U	190 U	970 U	190 U	190 U	190 U	180 U	180 U	200 U	180 U
4,6-Dinitro-2-methylphenol	(ug/kg)	180 UJ	180 UJ	190 UJ	180 UJ	180 UJ	900 UJ	180 UJ	190 UJ	190 UJ	190 UJ	190 UJ	190 UJ	190 UJ	970 UJ	190 UJ	190 UJ	190 UJ	180 U	180 U	200 UJ	180 UJ
4-Bromophenyl phenyl ether	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	37 U
4-Chloro-3-methylphenol	(ug/kg)	72 U	74 U	74 U	71 U	72 U	360 U	74 U	78 U	77 U	77 U	75 U	76 U	76 U	390 U	74 U	75 U	76 U	72 U	71 U	78 U	73 U
4-Chloroaniline	(ug/kg)	72 U	74 U	74 U	71 U	72 U	360 U	74 U	78 U	77 U	77 U	75 U	76 U	76 U	390 U	74 U	75 U	76 U	72 U	71 U	78 U	73 U
4-Chlorophenyl phenyl ether	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
4-Nitroaniline	(ug/kg)	180 U	180 U	190 U	180 U	180 U	900 U	180 U	190 U	190 U	190 U	190 U	190 U*	190 U*	970 U	190 U	190 U	190 U	180 U	180 U	200 U	180 U
4-Nitrophenol	(ug/kg)	180 U	180 U	190 U	180 U	180 U	900 U	180 U	190 U	190 U	190 U	190 U	190 U	190 U	970 U	190 U	190 U	190 U	180 U	180 U	200 U	180 U
Acenaphthene	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
Acenaphthylene	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
Acetophenone	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
Anthracene	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	37 U
Atrazine	(ug/kg)	36 UJ	36 UJ	37 U	36 U	36 U	180 U	37 UJ	38 UJ	39 UJ	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	36 UJ
Benzaldehyde	(ug/kg)	36 UJ	36 UJ	**29 J**	36 U	**14 J**	180 U	37 UJ	38 UJ	39 UJ	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	36 UJ
Benzo(a)anthracene	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	37 U
Benzo(a)pyrene	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	37 U
Benzo(b)fluoranthene	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	37 U
Benzo(ghi)perylene	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	37 U
Benzo(k)fluoranthene	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	37 U
Biphenyl	(ug/kg)	36 UJ	36 UJ	37 U	36 U	36 U	180 U	37 UJ	38 UJ	39 UJ	38 U	38 U	38 U	**20 J**	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	36 UJ
Bis(2-chloro-1-methylethyl) ether	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
Bis(2-chloroethoxy)methane	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
Bis(2-chloroethyl)ether	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
Bis(2-ethylhexyl)phthalate (BEHP)	(ug/kg)	**1800 J**	180 U	**680**	180 U	**580**	900 U	180 U	190 U	190 U	**240**	190 U	190 U	190 U	970 U	190 U	190 U	190 U	**180**	**120 J**	200 UJ	180 U
Butyl benzyl phthalate	(ug/kg)	**52**	37 U	37 U	**38**	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	37 U
Caprolactam	(ug/kg)	36 UJ	36 UJ	37 U	36 U	36 U	180 U	37 UJ	38 UJ	39 UJ	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	36 UJ
Carbazole	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U*	38 U*	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	37 U
Chrysene	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	37 U
Dibenzo(a,h)anthracene	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	37 U
Dibenzofuran	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
Diethyl phthalate	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
Dimethyl phthalate	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
Di-n-butyl phthalate	(ug/kg)	180 U	180 U	190 U	180 U	180 U	900 U	180 U	190 U	190 U	190 U	190 U	190 U*	190 U*	970 U	190 U	190 U	190 U	180 U	180 U	200 UJ	180 U
Di-n-octyl phthalate	(ug/kg)	**120**	37 U	**51**	36 U	**51**	180 U	37 U	39 U	39 U	38 U	38 U	**15 J**	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	37 U
Fluoranthene	(ug/kg)	**37**	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	37 U
Fluorene	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
Hexachlorobenzene	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	37 U
Hexachlorobutadiene	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
Hexachlorocyclopentadiene	(ug/kg)	72 U	74 U	74 U	71 U	72 U	360 U	74 U	78 U	77 U	77 U	75 U	76 U	76 U	390 U	74 U	75 U	76 U	72 U	71 U	78 U	73 U
Hexachloroethane	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
Indeno(1,2,3-cd)pyrene	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	37 U
Isophorone	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
Naphthalene	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
Nitrobenzene	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
N-Nitroso-di-n-propylamine	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
N-Nitrosodiphenylamine	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	**44**	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	37 U
Pentachlorophenol	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	37 U
Phenanthrene	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	**14 J**	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	37 U
Phenol	(ug/kg)	36 U	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 U	37 U
Pyrene	(ug/kg)	**24 J**	37 U	37 U	36 U	36 U	180 U	37 U	39 U	39 U	38 U	38 U	38 U	38 U	190 U	37 U	37 U	38 U	36 U	36 U	39 UJ	37 U

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
ug/kg = micrograms per kilogram
Detections are in **Bold**

TABLE 3-2
SUMMARY OF SEMI-VOLATILE ORGANIC COMPOUNDS - PLUME CORE SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location		PC-23	PC-23	PC-24	PC-24	PC-25	PC-25	PC-26	PC-26	PC-27	PC-27	PC-28	PC-28	PC-28
Sample ID		SB-FS-PC-23-14.0-16.0	SB-FS-PC-23-28.0-31.0	SB-FS-PC-24-12.5-15.5	SB-FS-PC-24-34.0-38.0	SB-FS-PC-25-11.0-13.0	SB-FS-PC-25-34.0-36.0	SB-FS-PC-26-14.0-18.0	SB-FS-PC-26-32.0-35.0	SB-FS-PC-27-6.0-8.0	SB-FS-PC-27-34.0-36.0	SB-FS-PC-28-5.0-7.0	SB-FS-PC-28-27.0-34.0	SB-PCB-4
Sample Depth (feet)		15	29.5	14	36	12	35	16	33.5	7	35	6	30.5	30.5
Sample Date		5/24/2012	5/24/2012	5/30/2012	5/30/2012	5/24/2012	5/24/2012	6/6/2012	6/6/2012	5/30/2012	5/30/2012	5/30/2012	5/30/2012	5/30/2012
CONSTITUENTS	Units													Duplicate
1,2,4,5-Tetrachlorobenzene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
2,3,4,6-tetrachlorophenol	(ug/kg)	37 UJ	41 UJ	86 U	37 U	1000 UJ	38 UJ	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
2,4,5-Trichlorophenol	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
2,4,6-Trichlorophenol	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
2,4-Dichlorophenol	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
2,4-Dimethylphenol	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
2,4-Dinitrophenol	(ug/kg)	38 UJ	42 UJ	86 U	37 U	500 UJ	38 UJ	43 U	36 U	1600 U	40 U	44 UJ	37 U	38 U
2,4-Dinitrotoluene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
2,6-Dinitrotoluene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
2-Chloronaphthalene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
2-Chlorophenol	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
2-Methylnaphthalene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
2-Methylphenol	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
2-Nitroanaline	(ug/kg)	190 U	210 U	430 U	190 U	2500 U	190 U	220 U	180 U	8200 U	200 U	220 U	190 U	190 U
2-Nitrophenol	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
3 & 4 Methylphenol	(ug/kg)	38 U	42 U	**64 J**	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
3,3-Dichlorobenzidine	(ug/kg)	76 U	84 U	170 U	75 U	1000 U	76 U	86 U	72 U	3300 U	79 U	89 U	75 U	76 U
3-Nitroaniline	(ug/kg)	190 U	210 U	430 U	190 U	2500 U	190 U	220 U	180 U	8200 U	200 U	220 U	190 U	190 U
4,6-Dinitro-2-methylphenol	(ug/kg)	190 UJ	210 UJ	430 U	190 U	2500 UJ	190 UJ	220 UJ	180 U	8200 U	200 U	220 UJ	190 U	190 U
4-Bromophenyl phenyl ether	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
4-Chloro-3-methylphenol	(ug/kg)	76 U	84 U	170 U	75 U	1000 U	76 U	86 U	72 U	3300 U	79 U	89 U	75 U	76 U
4-Chloroaniline	(ug/kg)	76 U	84 U	170 U	75 U	1000 U	76 U	86 U	72 U	3300 U	79 U	89 U	75 U	76 U
4-Chlorophenyl phenyl ether	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
4-Nitroaniline	(ug/kg)	190 U	210 U	430 U	190 U	2500 U	190 U	220 U	180 U	8200 U	200 U	220 U	190 U	190 U
4-Nitrophenol	(ug/kg)	190 U	210 U	430 U	190 U	2500 U	190 U	220 U	180 U	8200 U	200 U	220 U	190 U	190 U
Acenaphthene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Acenaphthylene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Acetophenone	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Anthracene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Atrazine	(ug/kg)	37 UJ	41 UJ	86 U	37 U	1000 UJ	38 UJ	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Benzaldehyde	(ug/kg)	37 UJ	41 UJ	86 U	37 U	1000 UJ	38 UJ	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Benzo(a)anthracene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Benzo(a)pyrene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	**34 J**	37 U	38 U
Benzo(b)fluoranthene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Benzo(ghi)perylene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Benzo(k)fluoranthene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Biphenyl	(ug/kg)	37 UJ	41 UJ	86 U	37 U	1000 UJ	38 UJ	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Bis(2-chloro-1-methylethyl) ether	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Bis(2-chloroethoxy)methane	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Bis(2-chloroethyl)ether	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Bis(2-ethylhexyl)phthalate (BEHP)	(ug/kg)	190 U	210 U	430 U	190 U	2500 U	190 U	220 U	180 U	8200 U	200 U	220 U	190 U	190 U
Butyl benzyl phthalate	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Caprolactam	(ug/kg)	37 UJ	41 UJ	86 U	37 U	1000 UJ	38 UJ	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Carbazole	(ug/kg)	38 U	42 U	86 U*	37 U*	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Chrysene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Dibenzo(a,h)anthracene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Dibenzofuran	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Diethyl phthalate	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Dimethyl phthalate	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Di-n-butyl phthalate	(ug/kg)	190 U	210 U	430 U*	190 U*	2500 U	190 U	220 U	180 U	8200 U	200 U	220 U	190 U	190 U
Di-n-octyl phthalate	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Fluoranthene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Fluorene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Hexachlorobenzene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Hexachlorobutadiene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Hexachlorocyclopentadiene	(ug/kg)	76 U	84 U	170 U	75 U	1000 U	76 U	86 UJ	72 U	3300 U	79 U	89 U	75 U	76 U
Hexachloroethane	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Indeno(1,2,3-cd)pyrene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Isophorone	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Naphthalene	(ug/kg)	38 U	**15 J**	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	**26 J**	37 U	38 U
Nitrobenzene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
N-Nitroso-di-n-propylamine	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
N-Nitrosodiphenylamine	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Pentachlorophenol	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Phenanthrene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Phenol	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U
Pyrene	(ug/kg)	38 U	42 U	86 U	37 U	500 U	38 U	43 U	36 U	1600 U	40 U	44 U	37 U	38 U

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
ug/kg = micrograms per kilogram
Detections are in **Bold**

TABLE 3-3
SUMMARY OF PCBs AND PESTICIDES - PLUME CORE SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location		PC-1	PC-1	PC-2	PC-2	PC-3	PC-3	PC-4	PC-4	PC-5	PC-5	PC-6	PC-6	PC-7	PC-7
Sample ID		SB-FS-PC-1-8.0-10.0	SB-FS-PC-1-14.0-16.0	SB-FS-PC-2-9.0-11.0	SB-FS-PC-2-17.0-19.0	SB-FS-PC-3-12.0-14.0	SB-FS-PC-3-21.5-23.5	SB-FS-PC-4-11.0-13.0	SB-FS-PC-4-25-26.7	SB-FS-PC-5-11.0-13.0	SB-FS-PC-5-23.0-25.0	SB-FS-PC-6-12.0-14.0	SB-FS-PC-6-20.0-22.5	SB-FS-PC-7-13.0-15.0	SB-FS-PC-7-16.0-18.5
Sample Depth (feet)		9	15	10	18	13	22.5	12	25.85	12	24	13	21.25	14	17.25
Sample Date		5/18/2012	5/18/2012	5/21/2012	5/21/2012	5/21/2012	5/21/2012	5/18/2012	5/18/2012	5/18/2012	5/18/2012	6/1/2012	6/1/2012	6/1/2012	6/1/2012
CONSTITUENTS	Units														
Aroclor 1016	(ug/kg)	100 U	110 U	110 U	100 U	120 U	110 U	100 U	110 U	110 U	110 U	100 U	110 U	100 U	100 U
Aroclor 1221	(ug/kg)	100 U	110 U	110 U	100 U	120 U	110 U	100 U	110 U	110 U	110 U	100 U	110 U	100 U	100 U
Aroclor 1232	(ug/kg)	100 U	110 U	110 U	100 U	120 U	110 U	100 U	110 U	110 U	110 U	100 U	110 U	100 U	100 U
Aroclor 1242	(ug/kg)	100 U	110 U	110 U	100 U	120 U	110 U	100 U	110 U	110 U	110 U	100 U	110 U	100 U	100 U
Aroclor 1248	(ug/kg)	100 U	110 U	110 U	100 U	120 U	110 U	100 U	110 U	110 U	110 U	100 U	110 U	100 U	100 U
Aroclor 1254	(ug/kg)	100 U	110 U	110 U	100 U	120 U	110 U	100 U	110 U	110 U	110 U	100 U	110 U	100 U	100 U
Aroclor 1260	(ug/kg)	100 U	110 U	110 U	100 U	120 U	110 U	100 U	110 U	110 U	110 U	100 U	110 U	100 U	100 U
Aroclor 1262	(ug/kg)	100 U	110 U	110 U	100 U	120 U	110 U	100 U	110 U	110 U	110 U	100 U	110 U	100 U	100 U
Aroclor 1268	(ug/kg)	100 U	110 U	110 U	100 U	120 U	110 U	100 U	110 U	110 U	110 U	100 U	110 U	100 U	100 U
4,4'-DDD	(ug/kg)	10 U	11 U	11 U	10 U	12 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	10 U	10 U
4,4'-DDE	(ug/kg)	10 U	11 U	11 U	10 U	12 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	10 U	10 U
4,4'-DDT	(ug/kg)	10 U	11 U	11 U	10 U	12 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	10 U	10 U
Aldrin	(ug/kg)	10 U	11 U	11 U	10 U	12 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	10 U	10 U
alpha-BHC	(ug/kg)	10 U	11 U	11 U	10 U	12 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	10 U	10 U
beta-BHC	(ug/kg)	10 U	11 U	11 U	10 U	12 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	10 U	10 U
Chlordane	(ug/kg)	210 U	210 U	550 U	520 U	600 U	580 U	200 U	230 U	220 U	230 U	200 U	210 U	210 U	200 U
delta-BHC	(ug/kg)	10 U	11 U	11 U	10 U	12 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	10 U	10 U
Dieldrin	(ug/kg)	10 U	11 U	11 U	10 U	12 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	10 U	10 U
Endosulfan I	(ug/kg)	10 U	11 U	11 U	10 U	12 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	10 U	10 U
Endosulfan II	(ug/kg)	10 U	11 U	11 U	10 U	12 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	10 U	10 U
Endosulfan sulfate	(ug/kg)	10 U	11 U	11 U	10 U	12 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	10 U	10 U
Endrin	(ug/kg)	10 U	11 U	11 U	10 U	12 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	10 U	10 U
Endrin aldehyde	(ug/kg)	10 U	11 U	11 U	10 U	12 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	10 U	10 U
Endrin ketone	(ug/kg)	10 U	11 U	11 U	10 U	12 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	10 U	10 U
gamma-Chlordane	(ug/kg)	10 U	11 U	11 U	10 U	12 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	10 U	10 U
Heptachlor	(ug/kg)	10 U	11 U	11 U	10 U	12 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	10 U	10 U
Heptachlor expoxide	(ug/kg)	10 U	11 U	11 U	10 U	12 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	10 U	10 U
gamma-BHC (Lindane)	(ug/kg)	3.1 U	3.2 U	3.3 U	3.1 U	3.5 U	3.4 U	3.1 U	3.4 U	3.3 U	3.4 U	3 U	3.2 U	3.1 U	3.1 U
Methoxychlor	(ug/kg)	10 U	11 U	11 U	10 U	12 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	10 U	10 U
Toxaphene	(ug/kg)	210 U	210 U	550 U	520 U	600 U	580 U	200 U	230 U	220 U	230 U	200 U	210 U	210 U	200 U

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
ug/kg = micrograms per kilogram
Detections are in **Bold**

TABLE 3-3
SUMMARY OF PCBs AND PESTICIDES - PLUME CORE SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location		PC-8	PC-8	PC-9	PC-10	PC-10	PC-11	PC-11	PC-12	PC-12	PC-13	PC-13	PC-14	PC-14	PC-15
Sample ID		SB-FS-PC-8-14.0-16.0	SB-FS-PC-8-19.0-21.0	SB-FS-PC-9-14.0-16.0	SB-FS-PC-10-14.0-16.0	SB-FS-PC-10-22.0-24.0	SB-FS-PC-11-5.0-10.0	SB-FS-PC-11-19.0-21.0	SB-FS-PC-12-12.0-15.0	SB-FS-PC-12-20-22	SB-FS-PC-13-10.0-12.0	SB-FS-PC-13-20.0-25.0	SB-FS-PC-14-10.0-12.0	SB-FS-PC-14-18.0-20.0	SB-FS-PC-15-14.0-17.0
Sample Depth (feet)		15	20	15	15	23	7.5	20	13.5	21	11	22.5	11	19	15.5
Sample Date		5/22/2012	5/22/2012	6/5/2012	5/23/2012	5/23/2012	5/25/2012	5/25/2012	5/25/2012	5/25/2012	6/4/2012	5/31/2012	6/4/2012	5/31/2012	5/22/2012
CONSTITUENTS	Units														
Aroclor 1016	(ug/kg)	110 U	110 U	110 U	100 U	110 U	100 U	110 U	110 U	110 U	110 U	100 U	100 U	110 U	100 U
Aroclor 1221	(ug/kg)	110 U	110 U	110 U	100 U	110 U	100 U	110 U	110 U	110 U	110 U	100 U	100 U	110 U	100 U
Aroclor 1232	(ug/kg)	110 U	110 U	110 U	100 U	110 U	100 U	110 U	110 U	110 U	110 U	100 U	100 U	110 U	100 U
Aroclor 1242	(ug/kg)	110 U	110 U	110 U	100 U	110 U	100 U	110 U	110 U	110 U	110 U	100 U	100 U	110 U	100 U
Aroclor 1248	(ug/kg)	110 U	110 U	110 U	100 U	110 U	100 U	110 U	110 U	110 U	110 U	100 U	100 U	110 U	100 U
Aroclor 1254	(ug/kg)	110 U	110 U	110 U	100 U	110 U	100 U	110 U	110 U	110 U	110 U	100 U	100 U	110 U	100 U
Aroclor 1260	(ug/kg)	110 U	110 U	110 U	100 U	110 U	100 U	110 U	110 U	110 U	110 U	100 U	100 U	110 U	100 U
Aroclor 1262	(ug/kg)	110 U	110 U	110 U	100 U	110 U	100 U	110 U	110 U	110 U	110 U	100 U	100 U	110 U	100 U
Aroclor 1268	(ug/kg)	110 U	110 U	110 U	100 U	110 U	100 U	110 U	110 U	110 U	110 U	100 U	100 U	110 U	100 U
4,4'-DDD	(ug/kg)	11 U	11 U	11 U	10 U	11 U	10 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U	10 U
4,4'-DDE	(ug/kg)	**35**	11 U	11 U	10 U	11 U	10 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U	10 U
4,4'-DDT	(ug/kg)	**14**	11 U	11 U	10 U	11 U	10 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U	10 U
Aldrin	(ug/kg)	11 U	11 U	11 U	10 U	11 U	10 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U	10 U
alpha-BHC	(ug/kg)	11 U	11 U	11 U	10 U	11 U	10 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U	10 U
beta-BHC	(ug/kg)	11 U	11 U	11 U	10 U	11 U	10 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U	10 U
Chlordane	(ug/kg)	210 U	220 U	210 U	210 U	220 U	210 U	220 U	210 U	210 U	230 U	200 U	210 U	220 U	210 U
delta-BHC	(ug/kg)	11 U	11 U	11 U	10 U	11 U	10 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U	10 U
Dieldrin	(ug/kg)	11 U	11 U	11 U	10 U	11 U	10 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U	10 U
Endosulfan I	(ug/kg)	11 U	11 U	11 U	10 U	11 U	10 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U	10 U
Endosulfan II	(ug/kg)	11 U	11 U	11 U	10 U	11 U	10 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U	10 U
Endosulfan sulfate	(ug/kg)	11 U	11 U	11 U	10 U	11 U	10 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U	10 U
Endrin	(ug/kg)	11 U	11 U	11 U	10 U	11 U	10 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U	10 U
Endrin aldehyde	(ug/kg)	11 U	11 U	11 U	10 U	11 U	10 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U	10 U
Endrin ketone	(ug/kg)	11 U	11 U	11 U	10 U	11 U	10 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U	10 U
gamma-Chlordane	(ug/kg)	11 U	11 U	11 U	10 U	11 U	10 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U	10 U
Heptachlor	(ug/kg)	11 U	11 U	11 U	**22**	11 U	10 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U	10 U
Heptachlor expoxide	(ug/kg)	11 U	11 U	11 U	10 U	11 U	10 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U	10 U
gamma-BHC (Lindane)	(ug/kg)	3.2 U	3.3 U	3.2 U	3.1 U	3.3 U	3.1 U	3.2 U	3.2 U	3.2 U	3.4 U	3.1 U	3.1 U	3.2 U	3.1 U
Methoxychlor	(ug/kg)	11 U	11 U	11 U	10 U	11 U	10 U	11 U	11 U	11 U	11 U	10 U	10 U	11 U	10 U
Toxaphene	(ug/kg)	210 U	220 U	210 U	210 U	220 U	210 U	220 U	210 U	210 U	230 U	200 U	210 U	220 U	210 U

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
ug/kg = micrograms per kilogram
Detections are in **Bold**

TABLE 3-3
SUMMARY OF PCBs AND PESTICIDES - PLUME CORE SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location		PC-16	PC-16	PC-17	PC-17	PC-18	PC-18	PC-19	PC-19	PC-20	PC-20	PC-21	PC-21	PC-22	PC-22
Sample ID		SB-FS-PC-16-14.5-18.0	SB-FS-PC-16-23.5-26.0	SB-FS-PC-17-14.0-17.0	SB-FS-PC-17-21.0-24.0	SB-FS-PC-18-14.0-17.0	SB-FS-PC-18-20.0-22.0	SB-FS-PC-19-11.0-14.0	SB-FS-PC-19-23.0-25.0	SB-FS-PC-20-14.0-16.0	SB-FS-PC-20-24.0-25.5	SB-FS-PC-21-11.0-13.0	SB-PCB-7	SB-FS-PC-22-16.0-18.0	SB-FS-PC-22-27.0-29.0
Sample Depth (feet)		16.25	24.75	15.5	22.5	15.5	21	12.5	24	15	24.75	12	12	17	28
Sample Date		5/23/2012	5/23/2012	6/5/2012	6/5/2012	5/29/2012	5/29/2012	6/5/2012	6/5/2012	6/4/2012	6/4/2012	6/7/2012	6/7/2012	5/23/2012	5/23/2012
CONSTITUENTS	Units												Duplicate		
Aroclor 1016	(ug/kg)	110 U	120 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	100 U	110 U	110 U	110 U
Aroclor 1221	(ug/kg)	110 U	120 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	100 U	110 U	110 U	110 U
Aroclor 1232	(ug/kg)	110 U	120 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	100 U	110 U	110 U	110 U
Aroclor 1242	(ug/kg)	110 U	120 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	100 U	110 U	110 U	110 U
Aroclor 1248	(ug/kg)	110 U	120 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	100 U	110 U	110 U	110 U
Aroclor 1254	(ug/kg)	110 U	120 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	100 U	110 U	110 U	110 U
Aroclor 1260	(ug/kg)	110 U	120 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	100 U	110 U	110 U	110 U
Aroclor 1262	(ug/kg)	110 U	120 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	100 U	110 U	110 U	110 U
Aroclor 1268	(ug/kg)	110 U	120 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	110 U	100 U	110 U	110 U	110 U
4,4'-DDD	(ug/kg)	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	1.5 U	1.6 U	11 U	11 U
4,4'-DDE	(ug/kg)	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	1.5 U	1.6 U	11 U	11 U
4,4'-DDT	(ug/kg)	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	1.5 U	1.6 U	11 U	11 U
Aldrin	(ug/kg)	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	1.5 U	1.6 U	11 U	11 U
alpha-BHC	(ug/kg)	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	1.5 U	1.6 U	11 U	11 U
beta-BHC	(ug/kg)	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	2.2 U	2.3 U	11 U	11 U
Chlordane	(ug/kg)	230 U	230 U	220 U	220 U	220 U	220 U	220 U	220 U	220 U	210 U	51 U	53 U	220 U	220 U
delta-BHC	(ug/kg)	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	1.5 U	1.6 U	11 U	11 U
Dieldrin	(ug/kg)	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	1.5 U	1.6 U	11 U	11 U
Endosulfan I	(ug/kg)	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	1.5 U	1.6 U	11 U	11 U
Endosulfan II	(ug/kg)	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	1.5 U	1.6 U	11 U	11 U
Endosulfan sulfate	(ug/kg)	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	1.5 U	1.6 U	11 U	11 U
Endrin	(ug/kg)	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	1.5 U	1.6 U	11 U	11 U
Endrin aldehyde	(ug/kg)	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	1.5 U	1.6 U	11 U	11 U
Endrin ketone	(ug/kg)	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	1.9 U	2 U	11 U	11 U
gamma-Chlordane	(ug/kg)	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	1.5 U	1.6 U	11 U	11 U
Heptachlor	(ug/kg)	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	1.5 U	1.6 U	11 U	11 U
Heptachlor expoxide	(ug/kg)	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	1.5 U	1.6 U	11 U	11 U
gamma-BHC (Lindane)	(ug/kg)	3.4 U	3.5 U	3.4 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.4 U	3.2 U	1.5 U	1.6 U	3.3 U	3.3 U
Methoxychlor	(ug/kg)	11 U	12 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	11 U	2.9 U	3.1 U	11 U	11 U
Toxaphene	(ug/kg)	230 U	230 U	220 U	220 U	220 U	220 U	220 U	220 U	220 U	210 U	51 U	53 U	220 U	220 U

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
ug/kg = micrograms per kilogram
Detections are in **Bold**

TABLE 3-3
SUMMARY OF PCBs AND PESTICIDES - PLUME CORE SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location		PC-23	PC-23	PC-24	PC-24	PC-25	PC-25	PC-26	PC-26	PC-27	PC-27	PC-28	PC-28	PC-28
Sample ID		SB-FS-PC-23-14.0-16.0	SB-FS-PC-23-28.0-31.0	SB-FS-PC-24-12.5-15.5	SB-FS-PC-24-34.0-38.0	SB-FS-PC-25-11.0-13.0	SB-FS-PC-25-34.0-36.0	SB-FS-PC-26-14.0-18.0	SB-FS-PC-26-32.0-35.0	SB-FS-PC-27-6.0-8.0	SB-FS-PC-27-34.0-36.0	SB-FS-PC-28-5.0-7.0	SB-FS-PC-28-27.0-34.0	SB-PCB-4
Sample Depth (feet)		15	29.5	14	36	12	35	16	33.5	7	35	6	30.5	30.5
Sample Date		5/24/2012	5/24/2012	5/30/2012	5/30/2012	5/24/2012	5/24/2012	6/6/2012	6/6/2012	5/30/2012	5/30/2012	5/30/2012	5/30/2012	5/30/2012
CONSTITUENTS	Units													Duplicate
Aroclor 1016	(ug/kg)	110 U	120 U	130 U	110 U	300 U	110 U	120 U	110 U	230 U	110 U	130 U	110 U	110 U
Aroclor 1221	(ug/kg)	110 U	120 U	130 U	110 U	300 U	110 U	120 U	110 U	230 U	110 U	130 U	110 U	110 U
Aroclor 1232	(ug/kg)	110 U	120 U	130 U	110 U	300 U	110 U	120 U	110 U	230 U	110 U	130 U	110 U	110 U
Aroclor 1242	(ug/kg)	110 U	120 U	130 U	110 U	300 U	110 U	120 U	110 U	230 U	110 U	130 U	110 U	110 U
Aroclor 1248	(ug/kg)	110 U	120 U	130 U	110 U	300 U	110 U	120 U	110 U	230 U	110 U	130 U	110 U	110 U
Aroclor 1254	(ug/kg)	110 U	120 U	130 U	110 U	300 U	110 U	120 U	110 U	230 U	110 U	130 U	110 U	110 U
Aroclor 1260	(ug/kg)	110 U	120 U	130 U	110 U	300 U	110 U	120 U	110 U	230 U	110 U	130 U	110 U	110 U
Aroclor 1262	(ug/kg)	110 U	120 U	130 U	110 U	300 U	110 U	120 U	110 U	230 U	110 U	130 U	110 U	110 U
Aroclor 1268	(ug/kg)	110 U	120 U	130 U	110 U	300 U	110 U	120 U	110 U	230 U	110 U	130 U	110 U	110 U
4,4'-DDD	(ug/kg)	11 U	12 U	13 U	11 U	30 U	11 U	12 U	11 U	23 U	11 U	13 U	11 U	11 U
4,4'-DDE	(ug/kg)	11 U	12 U	13 U	11 U	30 U	11 U	12 U	11 U	23 U	11 U	13 U	11 U	11 U
4,4'-DDT	(ug/kg)	11 U	12 U	13 U	11 U	30 U	11 U	12 U	11 U	23 U	11 U	13 U	11 U	11 U
Aldrin	(ug/kg)	11 U	12 U	13 U	11 U	30 U	11 U	12 U	11 U	23 U	11 U	13 U	11 U	11 U
alpha-BHC	(ug/kg)	11 U	12 U	13 U	11 U	30 U	11 U	12 U	11 U	23 U	11 U	13 U	11 U	11 U
beta-BHC	(ug/kg)	11 U	12 U	13 U	11 U	30 U	11 U	12 U	11 U	23 U	11 U	13 U	11 U	11 U
Chlordane	(ug/kg)	210 U	240 U	260 U	230 U	590 U	220 U	240 U	210 U	450 U	220 U	260 U	210 U	220 U
delta-BHC	(ug/kg)	11 U	12 U	13 U	11 U	30 U	11 U	12 U	11 U	23 U	11 U	13 U	11 U	11 U
Dieldrin	(ug/kg)	11 U	12 U	13 U	11 U	30 U	11 U	12 U	11 U	23 U	11 U	13 U	11 U	11 U
Endosulfan I	(ug/kg)	11 U	12 U	13 U	11 U	30 U	11 U	12 U	11 U	23 U	11 U	13 U	11 U	11 U
Endosulfan II	(ug/kg)	11 U	12 U	13 U	11 U	30 U	11 U	12 U	11 U	23 U	11 U	13 U	11 U	11 U
Endosulfan sulfate	(ug/kg)	11 U	12 U	13 U	11 U	30 U	11 U	12 U	11 U	23 U	11 U	13 U	11 U	11 U
Endrin	(ug/kg)	11 U	12 U	13 U	11 U	30 U	11 U	12 U	11 U	23 U	11 U	13 U	11 U	11 U
Endrin aldehyde	(ug/kg)	11 U	12 U	13 U	11 U	30 U	11 U	12 U	11 U	23 U	11 U	13 U	11 U	11 U
Endrin ketone	(ug/kg)	11 U	12 U	13 U	11 U	30 U	11 U	12 U	11 U	23 U	11 U	13 U	11 U	11 U
gamma-Chlordane	(ug/kg)	11 U	12 U	13 U	11 U	30 U	11 U	12 U	11 U	23 U	11 U	13 U	11 U	11 U
Heptachlor	(ug/kg)	11 U	12 U	13 U	11 U	30 U	11 U	12 U	11 U	23 U	11 U	13 U	11 U	11 U
Heptachlor expoxide	(ug/kg)	11 U	12 U	13 U	11 U	30 U	11 U	12 U	11 U	23 U	11 U	13 U	11 U	11 U
gamma-BHC (Lindane)	(ug/kg)	3.2 U	3.7 U	3.8 U	3.4 U	8.9 U	3.4 U	3.6 U	3.2 U	6.8 U	3.3 U	3.9 U	3.2 U	3.3 U
Methoxychlor	(ug/kg)	11 U	12 U	13 U	11 U	30 U	11 U	12 U	11 U	23 U	11 U	13 U	11 U	11 U
Toxaphene	(ug/kg)	210 U	240 U	260 U	230 U	590 U	220 U	240 U	210 U	450 U	220 U	260 U	210 U	220 U

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
ug/kg = micrograms per kilogram
Detections are in **Bold**

TABLE 3-4
SUMMARY OF METALS - PLUME CORE SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location		PC-1	PC-1	PC-2	PC-2	PC-3	PC-3	PC-4	PC-4	PC-5	PC-5	PC-6	PC-6	PC-7	PC-7
Sample ID		SB-FS-PC-1-8.0-10.0	SB-FS-PC-1-14.0-16.0	SB-FS-PC-2-9.0-11.0	SB-FS-PC-2-17.0-19.0	SB-FS-PC-3-12.0-14.0	SB-FS-PC-3-21.5-23.5	SB-FS-PC-4-11.0-13.0	SB-FS-PC-4-25-26.7	SB-FS-PC-5-11.0-13.0	SB-FS-PC-5-23.0-25.0	SB-FS-PC-6-12.0-14.0	SB-FS-PC-6-20.0-22.5	SB-FS-PC-7-13.0-15.0	SB-FS-PC-7-16.0-18.5
Sample Depth (feet)		9	15	10	18	13	22.5	12	25.85	12	24	13	21.25	14	17.25
Sample Date		5/18/2012	5/18/2012	5/21/2012	5/21/2012	5/21/2012	5/21/2012	5/18/2012	5/18/2012	5/18/2012	5/18/2012	6/1/2012	6/1/2012	6/1/2012	6/1/2012
CONSTITUENTS	Units														
Aluminum	(mg/kg)	**4300**	**8200**	**8100**	**4700**	**9500**	**6900**	**4100**	**8600**	**5700**	**5100**	**9300**	**5200**	**5300**	**7200**
Antimony	(mg/kg)	0.6 U	0.66 U	0.69 U	0.66 U	0.78 U	0.59 U	0.64 U	0.67 U	0.63 U	0.64 U	0.59 UJ	0.66 UJ	0.66 UJ	0.64 UJ
Arsenic	(mg/kg)	**1.4**	**1.6**	**2.2**	1.3 U	**1.8**	**2.9**	1.3 U	**1.6**	**1.5**	**1.3**	**2.1**	**1.7**	**1.6**	**1.6**
Barium	(mg/kg)	**27**	**50**	**42**	**14**	**25**	**32**	**14**	**59**	**34**	**34**	**49**	**34**	**31**	**59**
Beryllium	(mg/kg)	**0.29**	**0.58**	**0.56**	0.26 U	**0.35**	**0.38**	0.26 U	**0.56**	**0.4**	**0.33**	**0.5**	**0.32**	**0.33**	**0.49**
Cadmium	(mg/kg)	0.24 U	0.26 U	0.28 U	0.26 U	0.31 U	0.23 U	0.26 U	0.27 U	0.25 U	0.26 U	0.23 U	0.26 U	0.27 U	0.25 U
Calcium	(mg/kg)	**570**	**1800**	**1400**	**680**	**1000**	**1100**	**820**	**1500**	**1200**	**1300**	**1600**	**1300**	**1100**	**1200**
Total Chromium	(mg/kg)	**2.4**	**4.4**	**5.6**	**2.9**	**4.6**	**3.1**	**3**	**4**	**3.1**	**3.1**	**9.3**	**2.8**	**4.4**	**12**
Cobalt	(mg/kg)	**2.3**	**4.9**	**4.5**	**1.9**	**4.6**	**3.6**	**1.9**	**4.1**	**3.2**	**2.5**	**5.1**	**3**	**3.3**	**4**
Copper	(mg/kg)	**3.2**	**7.3**	**69**	**3.1**	**7.4**	**16**	**2.7**	**5.7**	**4.1**	**6.3**	**10**	**9.9**	**11**	**10**
Iron	(mg/kg)	**9200**	**18000**	**20000**	**9200**	**14000**	**18000**	**7300**	**19000**	**14000**	**12000**	**20000**	**12000**	**12000**	**18000**
Lead	(mg/kg)	**1.5**	**2.3**	**3.6**	**2**	**3.8**	**3.3**	**1.4**	**1.5**	**2.9**	**3.9**	**49**	**2.6**	**2.2**	**3.5**
Magnesium	(mg/kg)	**1100**	**2300**	**1700**	**590**	**2000**	**1500**	**670**	**1500**	**1400**	**1100**	**2000**	**1400**	**1600**	**1900**
Manganese	(mg/kg)	**160**	**200**	**300**	**89**	**130**	**240**	**85**	**220**	**180**	**130**	**250** J	**150** J	**170** J	**260** J
Mercury	(mg/kg)	0.11 U	0.086 U	0.1 UJ	0.1 UJ	0.097 UJ	0.11 UJ	0.09 U	0.088 U	0.077 U	0.096 U	0.091 UJ	0.083 UJ	0.096 UJ	0.1 UJ
Nickel	(mg/kg)	**1.7**	**5.2**	**3**	**1.5**	**6.3**	**4.1**	**1.9**	**1.9**	**2.1**	**1.8**	**4**	**3.1**	**3.6**	**4.1**
Potassium	(mg/kg)	**1800**	**3600**	**3200**	**1500**	**1500**	**2400**	**1200**	**4000**	**2400**	**2100**	**4200** J	**2300** J	**2300** J	**4000** J
Selenium	(mg/kg)	**1.1**	**1.2**	**2.3**	0.66 U	**0.91**	**1.8**	0.64 U	**1.6**	**1.2**	**0.91**	**1.6**	**1**	**1**	**1.6**
Silver	(mg/kg)	0.6 U	0.66 U	0.69 U	0.66 U	0.78 U	0.59 U	0.64 U	**0.9**	0.63 U	0.64 U	**1.2**	0.66 U	0.66 U	0.64 U
Sodium	(mg/kg)	120 U	130 U	140 U	130 U	160 U	120 U	130 U	130 U	130 U	130 U	120 U	130 U	130 U	130 U
Thallium	(mg/kg)	1.2 U	1.3 U	1.4 U	1.3 U	1.6 U	1.2 U	1.3 U	1.3 U	1.3 U	1.3 U	1.2 U	1.3 U	1.3 U	1.3 U
Vanadium	(mg/kg)	**6.2**	**13**	**9.8**	**4.8**	**14**	**8.9**	**4.9**	**7.8**	**8.2**	**7.2**	**12**	**8.3**	**8.6**	**11**
Zinc	(mg/kg)	**28**	**50**	**44**	**22**	**43**	**37**	**22**	**60**	**44**	**33**	**59**	**38**	**37**	**48**

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
mg/kg = milligrams per kilogram
Detections are in **Bold**

TABLE 3-4
SUMMARY OF METALS - PLUME CORE SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location		PC-8	PC-8	PC-9	PC-10	PC-10	PC-11	PC-11	PC-12	PC-12	PC-13	PC-13	PC-14	PC-14	PC-15
Sample ID		SB-FS-PC-8-14.0-16.0	SB-FS-PC-8-19.0-21.0	SB-FS-PC-9-14.0-16.0	SB-FS-PC-10-14.0-16.0	SB-FS-PC-10-22.0-24.0	SB-FS-PC-11-5.0-10.0	SB-FS-PC-11-19.0-21.0	SB-FS-PC-12-12.0-15.0	SB-FS-PC-12-20-22	SB-FS-PC-13-10.0-12.0	SB-FS-PC-13-20.0-25.0	SB-FS-PC-14-10.0-12.0	SB-FS-PC-14-18.0-20.0	SB-FS-PC-15-14.0-17.0
Sample Depth (feet)		15	20	15	15	23	7.5	20	13.5	21	11	22.5	11	19	15.5
Sample Date		5/22/2012	5/22/2012	6/5/2012	5/23/2012	5/23/2012	5/25/2012	5/25/2012	5/25/2012	5/25/2012	6/4/2012	5/31/2012	6/4/2012	5/31/2012	5/22/2012
CONSTITUENTS	Units														
Aluminum	(mg/kg)	**8600**	**8700**	**7300**	**7000**	**7900**	**7900**	**13000**	**7500**	**6100**	**7900**	**4900**	**6500**	**8700**	**14000**
Antimony	(mg/kg)	**0.98** J	0.74 UJ	0.56 U	0.68 UJ	0.71 UJ	0.61 U	1.3 U	0.58 U	0.72 U	0.57 U	0.59 UJ	0.65 U	0.69 UJ	1.3 UJ
Arsenic	(mg/kg)	**4.7**	**1.5**	**1.3**	**2.6**	1.4 U	**1.8**	2.6 U	**2.4**	1.4 U	**1.7**	**1.4**	**1.6**	**3.9**	2.6 U
Barium	(mg/kg)	**250**	**63**	**36**	**41**	**93**	**45**	**120**	**40**	**45**	**62**	**32**	**35**	**51**	**150**
Beryllium	(mg/kg)	**0.35**	**0.58**	**0.34**	**0.48**	**0.38**	**0.42**	**0.55**	**0.46**	**0.36**	**0.4**	**0.26**	**0.39**	**0.48**	**0.95**
Cadmium	(mg/kg)	**0.76**	0.29 U	0.23 U	0.27 U	0.28 U	0.25 U	0.52 U	0.23 U	0.29 U	0.23 U	0.24 U	0.26 U	**0.34**	0.51 U
Calcium	(mg/kg)	**5300**	**2200**	**1500**	**2000**	**2500**	**1500**	**3400**	**1300**	**1600**	**1300**	**1500**	**1200**	**1600**	**4300**
Total Chromium	(mg/kg)	**14**	**4.3**	**5.7**	**3.8**	**2.9**	**4.6**	**3.9**	**4.4**	**1.8**	**2.6**	**22**	**7.5**	**5.7**	**5.3**
Cobalt	(mg/kg)	**4.2**	**5.3**	**4.7**	**3.9**	**6.3**	**4.9**	**8.6**	**4**	**4.8**	**3.5**	**2.9**	**3.3**	**4.6**	**11**
Copper	(mg/kg)	**46**	**12**	**8**	**5.7**	**6.5**	**11**	**7.1**	**5.3**	**4.2**	**3.1**	**9.7**	**5.1**	**8.9**	**28**
Iron	(mg/kg)	**19000**	**21000**	**16000**	**15000**	**18000**	**16000**	**30000**	**18000**	**15000**	**19000**	**12000**	**16000**	**19000**	**34000**
Lead	(mg/kg)	**1500**	**1.8**	**3.9**	**4**	0.71 U	**7.6**	1.3 U	**3.7**	**0.85**	**2.4**	**2**	**3.9**	**8**	1.3 U
Magnesium	(mg/kg)	**1800**	**2300**	**1900**	**1500**	**2500**	**1900**	**3900**	**1700**	**1500**	**1700**	**1400**	**1200**	**2100**	**2400**
Manganese	(mg/kg)	**200**	**280**	**230**	**220**	**280**	**240**	**420**	**210**	**190**	**240**	**140** J	**190**	**230** J	**690**
Mercury	(mg/kg)	**0.55** J	0.11 UJ	**0.48**	0.11 U	0.081 U	0.094 U	0.11 U	0.1 U	0.097 U	0.12 U	0.073 UJ	0.095 U	0.096 UJ	0.11 UJ
Nickel	(mg/kg)	**8.1**	**2.5**	**5.5**	**2.8**	**3.7**	**4.1**	**3.5**	**3.4**	**2**	**2.2**	**4.8**	**2.8**	**4.7**	**7.5**
Potassium	(mg/kg)	**2300**	**4200**	**3800**	**3100**	**4800**	**3100**	**7100**	**3300**	**3000**	**4500**	**2200** J	**3400**	**3700** J	**7800**
Selenium	(mg/kg)	**1.4**	**2.3**	**1.4**	**1.6**	**2.1**	**1.7**	**3**	**1.4**	**1.5**	**1.5**	**0.88**	**1.1**	**1.5**	**5.3**
Silver	(mg/kg)	0.77 U	**1.1**	0.56 U	0.68 U	**1.1**	**0.9**	**1.9**	0.58 U	0.72 U	0.57 U	0.59 U	0.65 U	0.69 U	**2.1**
Sodium	(mg/kg)	**280**	150 U	110 U	140 U	140 U	120 U	260 U	120 U	140 U	110 U	120 U	130 U	140 U	260 U
Thallium	(mg/kg)	1.5 U	1.5 U	1.1 U	1.4 U	1.4 U	1.2 U	2.6 U	1.2 U	1.4 U	1.1 U	1.2 U	1.3 U	1.4 U	2.6 U
Vanadium	(mg/kg)	**12**	**11**	**11**	**9.8**	**14**	**13**	**17**	**11**	**7.5**	**8.8**	**7.5**	**7**	**11**	**11**
Zinc	(mg/kg)	**310**	**48**	**49**	**43**	**44**	**49**	**74**	**57**	**41**	**60**	**35**	**44**	**76**	**92**

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
mg/kg = milligrams per kilogram
Detections are in **Bold**

TABLE 3-4
SUMMARY OF METALS - PLUME CORE SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location		PC-16	PC-16	PC-17	PC-17	PC-18	PC-18	PC-19	PC-19	PC-20	PC-20	PC-21	PC-21	PC-22	PC-22
Sample ID		SB-FS-PC-16-14.5-18.0	SB-FS-PC-16-23.5-26.0	SB-FS-PC-17-14.0-17.0	SB-FS-PC-17-21.0-24.0	SB-FS-PC-18-14.0-17.0	SB-FS-PC-18-20.0-22.0	SB-FS-PC-19-11.0-14.0	SB-FS-PC-19-23.0-25.0	SB-FS-PC-20-14.0-16.0	SB-FS-PC-20-24.0-25.5	SB-FS-PC-21-11.0-13.0	SB-PCB-7	SB-FS-PC-22-16.0-18.0	SB-FS-PC-22-27.0-29.0
Sample Depth (feet)		16.25	24.75	15.5	22.5	15.5	21	12.5	24	15	24.75	12	12	17	28
Sample Date		5/23/2012	5/23/2012	6/5/2012	6/5/2012	5/29/2012	5/29/2012	6/5/2012	6/5/2012	6/4/2012	6/4/2012	6/7/2012	6/7/2012	5/23/2012	5/23/2012
CONSTITUENTS	Units												Duplicate		
Aluminum	(mg/kg)	**4800**	**9000**	**9600**	**9600**	**12000**	**6600**	**5100**	**8100**	**6700**	**13000**	**8700**	**6300**	**7500**	**7500**
Antimony	(mg/kg)	0.68 UJ	0.76 UJ	1.4 U	1.5 U	0.65 UJ	0.63 UJ	0.59 U	1.3 U	0.66 U	1.1 U	1.1 U	1.2 U	0.74 UJ	0.7 UJ
Arsenic	(mg/kg)	**1.6**	**1.8**	2.8 U	2.9 U	**2.2**	**2.7**	1.2 U	2.6 U	**1.5**	2.1 U	2.2 U	2.4 U	**1.5**	**2.6**
Barium	(mg/kg)	**20**	**68**	**100**	**89**	**68**	**31**	**20**	**75**	**52**	**130**	**98**	**62**	**27**	**60**
Beryllium	(mg/kg)	0.27 U	**0.55**	**0.82**	**0.74**	**0.5**	**0.45**	0.24 U	0.51 U	**0.38**	**0.53**	0.44 U	0.48 U	**0.31**	**0.51**
Cadmium	(mg/kg)	0.27 U	0.3 U	0.56 U	0.58 U	**0.38**	**0.28**	0.24 U	0.51 U	0.26 U	0.43 U	0.44 U	0.48 U	0.3 U	0.28 U
Calcium	(mg/kg)	**1100**	**3200**	**2800**	**3000**	**2200**	**1100**	**1200**	**2700**	**1600**	**3700**	**2300**	**1900**	**1200**	**900**
Total Chromium	(mg/kg)	**4.8**	**2.7**	**7**	**3.7**	**9.1**	**3.5**	**8**	**3.6**	**6.1**	**3.6**	**7.4**	**8.4**	**7.3**	**9**
Cobalt	(mg/kg)	**2.6**	**6.3**	**4.7**	**4.3**	**7**	**4.5**	**1.4**	**3.8**	**4.2**	**9.4**	**4.9**	**3.4**	**2.4**	**5.6**
Copper	(mg/kg)	**4.3**	**7.1**	**7**	**4.9**	**11**	**8.1**	**3.6**	**3.9**	**5.7**	**7.1**	**10**	**5.4**	**2.9**	**37**
Iron	(mg/kg)	**9600**	**21000**	**23000**	**21000**	**23000**	**15000**	**4700**	**17000**	**14000**	**32000**	**20000**	**14000**	**6500**	**16000**
Lead	(mg/kg)	**2.3**	**1.1**	**2.7**	1.5 U	**15**	**2.4**	**2.7**	1.3 U	**2**	1.1 U	**1.6**	**1.6**	**2.4**	**2.1**
Magnesium	(mg/kg)	**1000**	**2400**	**3000**	**2900**	**3000**	**1700**	**1100**	**2500**	**1800**	**4700**	**2800**	**2200**	**1200**	**2700**
Manganese	(mg/kg)	**110**	**310**	**650**	**360**	**280**	**320**	**96**	**260**	**180**	**520**	**270**	**190**	**83**	**160**
Mercury	(mg/kg)	0.087 U	0.098 U	0.12 U	0.13 U	0.086 U	0.085 U	0.12 U	0.11 U	0.11 U	0.12 U	0.082 U	0.12 U	0.12 U	0.1 U
Nickel	(mg/kg)	**2.6**	**3.3**	2.8 U	**2.9**	**6.5**	**5.2**	**3**	**2.7**	**3.5**	**4.2**	**5.3**	**4.2**	**3.4**	**12**
Potassium	(mg/kg)	**1500**	**5000**	**5900**	**5400**	**5400**	**2500**	**700**	**4100**	**4000**	**8800**	**3700**	**2400**	**1200**	**3600**
Selenium	(mg/kg)	**0.71**	**2.5**	1.4 U	1.5 U	**1.6**	**2**	0.59 U	1.3 U	**1.1**	**3.1**	1.1 U	1.2 U	0.74 U	**1.1**
Silver	(mg/kg)	0.68 U	**0.9**	1.4 U	1.5 U	**0.84**	0.63 U	0.59 U	1.3 U	0.66 U	1.1 U	1.1 U	1.2 U	0.74 U	0.7 U
Sodium	(mg/kg)	140 U	150 U	280 U	290 U	130 U	130 U	120 U	260 U	130 U	210 U	220 U	240 U	150 U	140 U
Thallium	(mg/kg)	1.4 U	1.5 U	2.8 U	2.9 U	1.3 U	1.3 U	1.2 U	2.6 U	1.3 U	2.1 U	2.2 U	2.4 U	1.5 U	1.4 U
Vanadium	(mg/kg)	**9.2**	**13**	**12**	**12**	**19**	**7.8**	**7.9**	**12**	**11**	**16**	**15**	**12**	**10**	**15**
Zinc	(mg/kg)	**36**	**53**	**60**	**61**	**110**	**56**	**23**	**50**	**43**	**73**	**60**	**43**	**17**	**52**

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
mg/kg = milligrams per kilogram
Detections are in **Bold**

TABLE 3-4
SUMMARY OF METALS - PLUME CORE SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location		PC-23	PC-23	PC-24	PC-24	PC-25	PC-25	PC-26	PC-26	PC-27	PC-27	PC-28	PC-28	PC-28
Sample ID		SB-FS-PC-23-14.0-16.0	SB-FS-PC-23-28.0-31.0	SB-FS-PC-24-12.5-15.5	SB-FS-PC-24-34.0-38.0	SB-FS-PC-25-11.0-13.0	SB-FS-PC-25-34.0-36.0	SB-FS-PC-26-14.0-18.0	SB-FS-PC-26-32.0-35.0	SB-FS-PC-27-6.0-8.0	SB-FS-PC-27-34.0-36.0	SB-FS-PC-28-5.0-7.0	SB-FS-PC-28-27.0-34.0	SB-PCB-4
Sample Depth (feet)		15	29.5	14	36	12	35	16	33.5	7	35	6	30.5	30.5
Sample Date		5/24/2012	5/24/2012	5/30/2012	5/30/2012	5/24/2012	5/24/2012	6/6/2012	6/6/2012	5/30/2012	5/30/2012	5/30/2012	5/30/2012	5/30/2012
CONSTITUENTS	Units													Duplicate
Aluminum	(mg/kg)	**4000**	**5100**	**7100**	**9400**	**11000**	**3300**	**4800**	**12000**	**7500**	**18000**	**8500**	**3500**	**4200**
Antimony	(mg/kg)	0.61 U	0.73 U	0.65 U	0.61 U	1.7 U	0.72 U	0.76 UJ	1.2 UJ	1.3 U	1.2 U	0.75 U	0.71 U	0.71 U
Arsenic	(mg/kg)	**1.6**	**1.6**	**2.8**	**2.9**	**10**	**2.2**	1.5 U	**3.3**	**5.7**	**3.7**	**1.7**	**1.8**	**1.8**
Barium	(mg/kg)	**24**	**48**	**36**	**120**	**180**	**26**	**34**	**170**	**69**	**330**	**35**	**26**	**26**
Beryllium	(mg/kg)	0.24 U	**0.44**	**0.45**	**0.58**	**2**	0.29 U	0.3 U	**0.64**	**2**	**0.63**	**0.47**	0.28 U	0.28 U
Cadmium	(mg/kg)	0.24 U	0.29 U	0.26 U	0.24 U	**0.83**	0.29 U	0.3 U	0.48 U	0.54 U	0.5 U	0.3 U	0.28 U	0.28 U
Calcium	(mg/kg)	**890**	**1400**	**2100**	**2100**	**11000**	**1200**	**2300**	**3300**	**4800**	**5800**	**1700**	**860**	**1200**
Total Chromium	(mg/kg)	**5.2**	**3.4**	**10**	**7.3**	**28**	**5.2**	**6.3**	**5.7**	**6.7**	**1.8**	**6.6**	**2.8** J	**6.7** J
Cobalt	(mg/kg)	**2.2**	**3.7**	**4.3**	**7**	**7.1**	**2.6**	**2.3**	**5.6**	**2.1**	**12**	**2.4**	**2.8**	**2.9**
Copper	(mg/kg)	**5.2**	**4.5**	**8**	**4.8**	**46**	**3.9**	**4.2**	**14**	**11**	**7.6**	**2**	**2.8**	**3.9**
Iron	(mg/kg)	**5900**	**11000**	**9000**	**24000**	**36000**	**9800**	**7000**	**30000**	**5900**	**42000**	**10000**	**11000**	**9400**
Lead	(mg/kg)	**1.8**	**2.5**	**3**	**4.1**	**180**	**1.6**	**1.6**	**1.8**	**5.8**	1.2 U	**4.8**	**1.1**	**1.4**
Magnesium	(mg/kg)	**1100**	**1200**	**2000**	**2400**	**1800**	**910**	**1800**	**3800**	**1100**	**5200**	**1100**	**920**	**1300**
Manganese	(mg/kg)	**77**	**120**	**110**	**180**	**350**	**100**	**130**	**340**	**76**	**500**	**110**	**100**	**110**
Mercury	(mg/kg)	0.11 U	0.12 U	0.12 U	0.085 U	0.26 U	0.11 U	0.12 U	0.12 U	0.23 U	0.088 U	0.12 U	0.09 U	0.1 U
Nickel	(mg/kg)	**3.2**	**2**	**6.9**	**3.5**	**23**	**2.3**	**3.5**	**3.7**	**3.1**	**4.2**	**3.4**	**2**	**3**
Potassium	(mg/kg)	**1300**	**2800**	**2000**	**6400**	**2800**	**1600**	**1400**	**5400**	**3900**	**13000**	**1400**	**2100**	**2000**
Selenium	(mg/kg)	0.61 U	**0.81**	**0.86**	**0.8**	**4.2**	0.72 U	0.76 U	**1.2** U	**1.5**	**3**	0.75 U	0.71 U	0.71 U
Silver	(mg/kg)	0.61 U	0.73 U	0.65 U	**0.8**	1.7 U	0.72 U	0.76 U	1.2 U	1.3 U	**2.1**	0.75 U	0.71 U	0.71 U
Sodium	(mg/kg)	120 U	150 U	130 U	120 U	340 U	140 U	150 U	240 U	270 U	250 U	150 U	140 U	140 U
Thallium	(mg/kg)	1.2 U	1.5 U	1.3 U	1.2 U	3.4 U	1.4 U	1.5 U	2.4 U	2.7 U	2.5 U	1.5 U	1.4 U	1.4 U
Vanadium	(mg/kg)	**8.1**	**7.5**	**16**	**10**	**12**	**8.3**	**13**	**18**	**7.6**	**25**	**12**	**6.6**	**7.8**
Zinc	(mg/kg)	**21**	**33**	**29**	**61**	**220**	**24**	**24**	**71**	**19**	**97**	**21**	**26**	**23**

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
mg/kg = milligrams per kilogram
Detections are in **Bold**

TABLE 3-7
SUMMARY OF VOC ANALYTICAL RESULTS
PLUME CORE WELLS - SUMMER 2012
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

CONSTITUENT	UNITS	IGRGs	RI GA GW Objectives	OW-051	OW-052	OW-052	OW-055	OW-093-O	OW-094-O	OW-102-O	OW-300-O	OW-301-O	OW-302-O	OW-303-O	OW-304-O	PC-2S	PC-2S	PC-3S	PC-8S	PC-11D	PC-11S
				8/6/2012	8/7/2012	8/7/2012	8/8/2012	8/9/2012	8/9/2012	8/2/2012	8/9/2012	8/8/2012	8/8/2012	8/8/2012	8/7/2012	8/10/2012	8/10/2012	8/10/2012	8/10/2012	8/13/2012	8/13/2012
				Primary	Primary	Duplicate 1	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Duplicate 1	Primary	Primary	Primary	Primary
1,1,1-Trichloroethane	(ug/l)		200	75	200	180	3.6	75	60	1U	20U	1U	3.8	7.1	11	9.4	9.6	24	1U	110	87
1,1,2,2-Tetrachloroethane	(ug/l)			5U	5U	5U	0.5U	5U	0.5U	0.5U	10U	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U	5U	0.5U
1,1,2-Trichloroethane	(ug/l)		5	10U	10U	2.7J	1U	10U	0.39J	1U	20U	1U	1U	0.64J	1U	1U	1U	1U	1U	10U	0.66J
1,1-Dichloroethane	(ug/l)	6		36	64	54	0.3J	12	12	1U	20U	5.2	14	40	2.6	1U	1U	4	13	26	11
1,1-Dichloroethylene	(ug/l)		7	3.5J	8.7J	7.8J	0.25J	3.5J	1.9	1U	20U	1.1	0.51J	2.2	1.2	0.39J	0.31J	0.58J	0.21J	3.6J	1.1
1,2,3-Trichlorobenzene	(ug/l)			10U	10U	10U	1U	10U	0.22J	1U	20U	1U	1U	1U	1U	1U	1U	1U	0.34J	10U	1U
1,2,4-Trichlorobenzene	(ug/l)		70	10U	10U	10U	1U	10U	0.27J	1U	20U	1U	1U	0.42J	0.25J	1U	1U	1U	1.2	10U	1U
1,2-Dichlorobenzene	(ug/l)		600	13	19	17	3.1	10U	1.1	1U	20U	2.1	1.4	2.8	3.7	1U	1U	1U	1U	3.4J	1U
1,2-Dichloroethane	(ug/l)		5	10U	10U	10U	1U	10U	1U	1U	20U	1U	0.29J	0.37J	1U	1U	1U	1U	1U	10U	1U
1,2-Dichloroethene	(ug/l)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	(ug/l)			10U	10U	10U	1U	10U	1U	1U	20U	1U	1U	1U	1U	1U	1U	1U	1U	10U	1U
1,3-Dichlorobenzene	(ug/l)		600	10U	10U	10U	1U	10U	1U	1U	20U	0.29J	1U	0.45J	1U	1U	1U	1U	1U	10U	1U
1,4-Dichlorobenzene	(ug/l)		75	10U	6.4J	5.9J	1U	10U	1U	1U	20U	0.24J	0.36J	0.44J	1.3	1U	1U	1U	0.86J	10U	1U
1,4-Dioxane	(ug/l)			30U	14J	14J	3U	30U	3.1	3U	60U	8.3	6.7	17	2.5J	3U	3U	3U	3U	30U	2.3J
2-Hexanone	(ug/l)			100U	100U	100U	10U	100U	10U	10U	200U	10U	10U	10U	10U	10U	10U	10U	10U	100U	10U
Acetone	(ug/l)			500U	500U	500U	50U	500U	50U	50U	1000U	50U	50U	50U	50U	50U	50U	50U	50U	500UJ	50UJ
Benzene	(ug/l)	5	5	10U	10U	10U	1U	10U	0.78J	1U	20U	0.47J	0.49J	0.88J	1U	1U	1U	1U	0.8J	10UJ	1U
Bromochloromethane	(ug/l)			10U	10U	10U	1U	10U	1U	1U	20U	1U	1U	1U	1U	1U	1U	1U	1U	10U	1U
Bromodichloromethane	(ug/l)			5U	5U	5U	0.5U	5U	0.5U	0.5U	10U	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U	5U	0.5U
Bromoform	(ug/l)			10UJ	10UJ	10U	1U	10U	1U	1U	20U	1U	1U	1U	1U	1U	1U	1U	1U	10U	1U
Carbon disulfide	(ug/l)			100U	100U	100U	10U	100U	10U	10U	200U	0.5J	10U	0.48J	10U	10U	10U	10U	0.46J	3.2J	10U
Carbon tetrachloride	(ug/l)			10U	10U	10U	1U	10U	1U	1U	20U	1U	1U	1U	1U	1U	1U	1U	1U	10U	1U
Chlorobenzene	(ug/l)			10U	10U	3J	1U	10U	1U	1U	20U	1.7	0.49J	0.33J	0.71J	1U	1U	1U	1U	10U	1U
Chloroethane	(ug/l)			3.7J	5J	4.3J	2U	20U	2U	2U	40U	7.3	1.1J	3.7	2U	2U	2U	0.74J	0.54J	20U	2U
Chloroform	(ug/l)			10U	10U	10U	1U	10U	1U	1U	20U	1U	1U	1U	1U	1U	1U	1U	1U	10U	1U
cis-1,2-Dichloroethylene	(ug/l)	70	70	120	370	330	18	350	150	1U	28	82	18	170	24	0.52J	0.53J	56	4	410	520J
cis-1,3-Dichloropropene	(ug/l)			4U	4U	4U	0.4U	4U	0.4U	0.4U	8U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	4U	0.4U
Cyclohexane	(ug/l)			10U	10UJ	10U	1U	10U	1U	1U	20U	1U	0.26J	0.37J	1U	1U	1U	1U	1U	10UJ	1U
DBCP	(ug/l)			50U	50U	50U	5U	50U	5U	5U	100U	5U	5U	5U	5U	5U	5U	5U	5U	50U	5U
Dibromochloromethane	(ug/l)			5U	5U	5U	0.5U	5U	0.5U	0.5U	10U	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U	0.5U	5U	0.5U
Dichlorodifluoromethane	(ug/l)			10UJ	10UJ	10U	1U	10U	1U	1U	20U	1U	1U	1U	1U	1U	1U	1U	1U	10U	1U
Diethyl ether	(ug/l)			10U	10U	10U	1U	10U	1U	1U	20U	1U	1U	1.9	1U	1U	1U	1U	1U	10U	1U
EDB	(ug/l)			10U	10U	10U	1U	10U	1U	1U	20U	1U	1U	1U	1U	1U	1U	1U	1U	10U	1U
Ethylbenzene	(ug/l)		700	7.6J	120	110	1U	37	12	1U	840	0.21J	1U	1U	1U	1U	1U	1U	3.2	8J	1U
Freon 113	(ug/l)			10U	10U	10U	1U	10U	1U	1U	20U	1U	1U	1U	1U	1U	1U	1U	1U	10U	1U
Isopropylbenzene	(ug/l)			7.4J	21	19	1U	10U	2.7	1U	24	0.31J	0.94J	3.1	1U	1U	1U	1U	0.91J	15	1U
Methyl Acetate	(ug/l)			200U	200U	200U	20U	200U	20U	20U	400U	20U	20U	20U	20U	20U	20U	20U	20U	200U	20U
Methyl bromide	(ug/l)			20U	20U	20U	2U	20U	2U	2U	40U	2U	2U	2U	2U	2U	2U	2U	2U	20U	2U
Methyl chloride	(ug/l)			20U	20U	20U	2U	20U	2U	2U	40U	2U	0.24J	0.3J	2U	2U	2U	0.22J	0.31J	20U	2U
Methyl ethyl ketone (MEK)	(ug/l)			100UJ	100UJ	100U	10U	100U	10U	10U	200U	10U	10U	10U	10U	10U	10U	10U	10U	100UJ	10UJ
Methyl isobutyl ketone	(ug/l)			100U	100U	100U	10U	100U	10U	10U	200U	10U	10U	10U	10U	10U	10U	10U	10U	100U	10U
Methyl tert-butyl ether	(ug/l)			10U	10U	10U	1U	10U	1U	1U	20U	1U	1U	1U	1U	1U	1U	1U	1U	10U	1U
Methylcyclohexane	(ug/l)			10U	5.9J	4.8J	1U	10U	0.4J	1U	6.8J	1U	1U	1U	1U	1U	1U	1U	1.8	10UJ	1U
Methylene chloride	(ug/l)		5	10J	12J	12J	2U	20U	2U	2U	40U	2U	2U	2U	2U	2U	2U	2U	2U	20U	2U
m-Xylene & p-Xylene	(ug/l)			20U	7.6J	7.4J	2U	5.7J	1.1J	2U	1400	2U	2U	2U	2U	2U	2U	2U	0.74J	20U	2U
o-Xylene	(ug/l)			10U	4.8J	4.4J	1U	3.6J	1.7	1U	600	0.21J	1U	0.3J	1U	1U	1U	1U	1.4	10U	1U
Styrene	(ug/l)			10U	10U	10U	1U	10U	1U	1U	20U	1U	1U	1U	1U	1U	1U	1U	1U	10U	1U
Tetrachloroethylene	(ug/l)	5	5	3.9J	4.1J	4.2J	26	4.3J	14	1U	20U	0.9J	3.1	0.9J	21	96	97	100	4.2	26	31
Tetrahydrofuran	(ug/l)		1000	100U	100U	100U	10U	100U	10U	10U	200U	10U	10U	6.8J	10U	10U	10U	10U	10U	100U	10U
Toluene	(ug/l)		1000	10U	2J	10U	1U	2.9J	1.1	1U	47	1.9	1U	1.4	1U	1U	1U	1U	0.64J	10U	1U
Trans-1,2-Dichloroethene	(ug/l)		100	5.7J	15	13	1U	6.2J	5.2	1U	20U	0.59J	1.7	5	0.3J	1U	1U	0.97J	1U	8J	4.5
trans-1,3-Dichloropropene	(ug/l)			4U	4U	4U	0.4U	4U	0.4U	0.4U	8U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	4U	0.4U
Trichloroethylene	(ug/l)	5	5	2.5J	2.6J	2.3J	8.3	7.7J	7.7	1U	20U	28	2.9	7	12	1	1	27	2.1	11	8.8
Trichlorofluoromethane	(ug/l)			10U	10U	10U	1U	10U	1U	1U	20U	1U	1U	1U	1U	1U	0.24J	1.2	1U	10U	1U
Vinyl chloride	(ug/l)	2	2	360J	800	710	0.61	110	250	0.5U	7.5J	85	98	130	3.2	0.5U	0.5U	11	13	240	0.5U
Xylene (total)	(ug/l)		10000	20U	12J	12J	2U	9.3J	2.8	2U	2000	2U	2U	2U	2U	2U	2U	2U	2.1	20U	2U
Sum of Constituents	(ug/l)			**648.3**	**1682.1**	**1505.8**	**60.16**	**617.9**	**525.66**	**0**	**2953.3**	**226.32**	**154.28**	**403.88**	**83.76**	**107.31**	**108.68**	**225.71**	**49.71**	**864.2**	**666.36**

Notes:

1. "NA" = Not Analyzed
2. "U" = Not detected above reporting limit
3. "ND" = Not Detected
4. "J" = Estimated Value
5. ug/L = micrograms per liter
6. IGRGs = Interim Groundwater Remediation Goals
7. Sum of constituents is a sum of detected compounds only
8. Only constituents detected at least once are presented.
9. Detections are bolded.
10. Exceedances of the IGRGs are highlighted.
11. Results for PC-24PS and PC-28PS were collected as part of the Initial Treatability Sampling Event in June 2012.

TABLE 3-7
SUMMARY OF VOC ANALYTICAL RESULTS
PLUME CORE WELLS - SUMMER 2012
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

CONSTITUENT	UNITS	IGRGs	RI GA GW Objectives	PC-17D 8/14/2012 Primary	PC-17D 8/14/2012 Duplicate 1	PC-20D 8/13/2012 Primary	PC-20S 8/13/2012 Primary	PC-23D 8/14/2012 Primary	PC-24PS[1] 6/20/2012 Primary	PC-25D 8/14/2012 Primary	PC-28PS[1] 6/20/2012 Primary	PC-28D 8/14/2012 Primary	PCD-1 8/10/2012 Primary	PCD-2 8/10/2012 Primary	PCD-3 8/10/2012 Primary
1,1,1-Trichloroethane	(ug/l)		200	**15**	**16**	**580**	**33**	1U	1.0U	**7.4**	1U	**81**	1U	1U	1U
1,1,2,2-Tetrachloroethane	(ug/l)			2U	2U	50U	13U	0.5U	0.5U	2U	0.5U	5U	0.5U	0.5U	0.5U
1,1,2-Trichloroethane	(ug/l)		5	4U	4U	100U	25U	1U	1.0U	4U	1U	10U	1U	1U	1U
1,1-Dichloroethane	(ug/l)	6		**8.4**	**9.2**	**150**	**44**	**0.36J**	**0.50J**	**11**	**73**	**52**	1U	1U	1U
1,1-Dichloroethylene	(ug/l)		7	**1.2J**	**0.93J**	**62J**	25U	1U	1.0U	4U	1U	**8.9J**	1U	1U	1U
1,2,3-Trichlorobenzene	(ug/l)			4U	4U	100U	25U	1U	1.0U	4U	1U	10U	1U	1U	1U
1,2,4-Trichlorobenzene	(ug/l)		70	4U	4U	100U	25U	1U	1.0U	4U	1U	10U	1U	1U	1U
1,2-Dichlorobenzene	(ug/l)		600	4U	**0.91J**	**43J**	25U	1U	1.0U	**3.2J**	**0.42J**	**4.9J**	1U	1U	1U
1,2-Dichloroethane	(ug/l)		5	4U	4U	100U	25U	1U	1.0U	4U	**0.36J**	10U	1U	1U	1U
1,2-Dichloroethene	(ug/l)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	(ug/l)			4U	4U	100U	25U	1U	1.0U	4U	1.0U	10U	1U	1U	1U
1,3-Dichlorobenzene	(ug/l)		600	4U	4U	100U	25U	1U	1.0U	4U	1.0U	10U	1U	1U	1U
1,4-Dichlorobenzene	(ug/l)		75	4U	4U	100U	25U	1U	1.0U	4U	1.0U	10U	1U	1U	1U
1,4-Dioxane	(ug/l)			**2.2J**	**2J**	300U	75U	3U	3.0U	**9.4**	**130**	**26J**	3U	3U	3U
2-Hexanone	(ug/l)			40U	40U	1000U	250U	10U	10U	40U	10U	100U	10U	10U	10U
Acetone	(ug/l)			200U	200U	5000UJ	1300U	50U	50U	200U	50U	500U	50U	50U	50U
Benzene	(ug/l)	5	5	4U	4U	100U	25U	1U	1.0U	**1.2J**	**15**	10U	1U	1U	1U
Bromochloromethane	(ug/l)			4U	4U	100U	25U	1U	NA	4U	NA	10U	1U	1U	1U
Bromodichloromethane	(ug/l)			2U	2U	50U	13U	0.5U	NA	2U	NA	5U	0.5U	0.5U	0.5U
Bromoform	(ug/l)			4U	4U	100U	25UJ	1U	1	4U	1.0U	10U	1U	1U	1U
Carbon disulfide	(ug/l)			40U	40U	1000U	250U	10U	**0.63J**	40U	**0.44J**	100U	10U	10U	**1.8J**
Carbon tetrachloride	(ug/l)			4U	4U	100U	25U	1U	1.0U	4U	1.0U	10U	1U	1U	1U
Chlorobenzene	(ug/l)			4U	4U	100U	25U	1U	1.0U	**0.95J**	1.0U	10U	1U	1U	1U
Chloroethane	(ug/l)			8U	8U	**78J**	**24J**	2U	2	8U	**23**	**20**	2U	2U	2U
Chloroform	(ug/l)			**8.8**	**9.2**	100U	25U	1U	**0.4J**	4U	1.0U	10U	1U	1U	1U
cis-1,2-Dichloroethylene	(ug/l)	70	70	**47**	**50**	**3300**	**730J**	**0.42J**	**160E**	**1.9J**	**22**	**440**	1U	1U	1U
cis-1,3-Dichloropropene	(ug/l)			1.6U	1.6U	40U	10U	0.4U	0.4U	1.6U	0.40U	4U	0.4U	0.4U	0.4U
Cyclohexane	(ug/l)			4U	4U	100U	25U	1U	1.0U	4U	**0.22J**	10U	1U	1U	1U
DBCP	(ug/l)			20U	20U	500U	130U	5U	NA	20U	NA	50U	5U	5U	5U
Dibromochloromethane	(ug/l)			2U	2U	50U	13U	0.5U	0.5U	2U	0.5U	5U	0.5U	0.5U	0.5U
Dichlorodifluoromethane	(ug/l)			4U	4U	100U	25U	1U	1	4U	1.0U	10U	1U	1U	1U
Diethyl ether	(ug/l)			4U	4U	100U	25U	1U	1.0U	4U	**24**	10U	1U	1U	1U
EDB	(ug/l)			4U	4U	100U	25U	1U	1.0U	4U	1.0U	10U	1U	1U	1U
Ethylbenzene	(ug/l)		700	**3.7J**	**4.2**	100U	**31**	1U	1.0U	**17**	**8**	10U	1U	1U	1U
Freon 113	(ug/l)			4U	4U	100U	25U	1U	NA	4U	NA	10U	1U	1U	1U
Isopropylbenzene	(ug/l)			**2.5J**	**2.5J**	100U	25U	1U	1.0U	**5**	**0.63J**	**4.4J**	1U	1U	1U
Methyl Acetate	(ug/l)			80U	80U	2000U	500U	20U	20U	80U	20U	200U	20U	20U	20U
Methyl bromide	(ug/l)			8U	8U	200U	50U	2U	NA	8U	NA	20U	2U	2U	2U
Methyl chloride	(ug/l)			8U	8U	200U	50U	2U	NA	8U	NA	20U	2U	2U	**0.21J**
Methyl ethyl ketone (MEK)	(ug/l)			40U	40U	1000UJ	250UJ	10U	NA	40U	NA	100U	10U	10U	10U
Methyl isobutyl ketone	(ug/l)			40U	40U	1000U	250U	10U	NA	40U	NA	100U	10U	10U	10U
Methyl tert-butyl ether	(ug/l)			4U	4U	100U	25U	1U	1.0U	4U	1.0U	10U	1U	1U	1U
Methylcyclohexane	(ug/l)			**1.8J**	**2J**	100U	25U	1U	1.0U	**3.7J**	1.0U	10U	1U	1U	1U
Methylene chloride	(ug/l)		5	8U	8U	**110J**	50U	2U	2.0U	8U	2.0U	20U	2U	2U	2U
m-Xylene & p-Xylene	(ug/l)			8U	8U	200U	**19J**	2U	2.0U	8U	**18**	20U	2U	2U	2U
o-Xylene	(ug/l)			**1.1J**	**1.3J**	100U	**13J**	1U	1.0U	**2.1J**	**5.5**	10U	1U	1U	1U
Styrene	(ug/l)			4U	4U	100U	25U	1UJ	1.0U	4U	1.0U	10U	1U	1U	1U
Tetrachloroethylene	(ug/l)	5	5	**3.5J**	**4**	100U	25U	1U	1.0U	4U	1.0U	**3.5J**	**0.35J**	**6.7**	**0.91J**
Tetrahydrofuran	(ug/l)		1000	40U	40U	1000U	250U	10U	10U	40U	**46**	100U	10U	10U	10U
Toluene	(ug/l)		1000	4U	4U	100U	25U	1U	**34**	**2.1J**	**70**	10U	1U	1U	1U
Trans-1,2-Dichloroethene	(ug/l)		100	**1.9J**	**2.2J**	**68J**	**14J**	1U	**7.4**	**4**	**2.3**	**16**	1U	1U	1U
trans-1,3-Dichloropropene	(ug/l)			1.6U	1.6U	40U	10U	0.4U	1.0U	1.6U	0.4U	4U	0.4U	0.4U	0.4U
Trichloroethylene	(ug/l)	5	5	**10**	**11**	**21J**	25U	1U	**0.78J**	**1.2J**	1.0U	**21**	1U	1U	**0.24J**
Trichlorofluoromethane	(ug/l)			4U	4U	100U	25U	1U	1.0U	4U	1.0U	10U	1U	1U	1U
Vinyl chloride	(ug/l)	2	2	**160**	**180**	**1100**	**250**	**0.91**	**27**	**140**	**6.8**	**470**	0.5U	0.5U	0.5U
Xylene (total)	(ug/l)		10000	8U	8U	200U	**32J**	2U	2.0U	**2.1J**	**24**	20U	2U	2U	2U
Sum of Constituents	(ug/l)			**267.1**	**295.44**	**5512**	**1158**	**1.69**	**230.71**	**210.15**	**307.67**	**1147.7**	**0.35**	**6.7**	**3.16**

Notes:

1. "NA" = Not Analyzed
2. "U" = Not detected above reporting limit
3. "ND" = Not Detected
4. "J" = Estimated Value
5. ug/L = micrograms per liter
6. IGRGs = Interim Groundwater Remediation Goals
7. Sum of constituents is a sum of detected compounds only
8. Only constituents detected at least once are presented.
9. Detections are bolded.
10. Exceedances of the IGRGs are highlighted.
11. Results for PC-24PS and PC-28PS were collected as part of the Initial Treatability San

TABLE 3-8
Monitoring Well Water Quality Measurements
Plume Core Wells - Summer 2012
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Sample Location	Collection Date	Time	Total Volume Purged (L)	Total Volume Purged (gal)	Temp (Celcius)	Specific Conductance (uS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)
Unconsolidated Deposit Wells										
PCD-1	08/10/12	12:58	4.30	1.14	16.02	56	1.39	5.69	180.7	4.21
PCD-2	08/10/12	11:34	10.37	2.74	14.26	38	1.80	5.63	191.0	1.49
PCD-3	08/10/12	10:26	5.53	1.46	17.11	79	0.38	5.56	98.9	4.52
PC-2S[2]	08/10/12	11:44	6.65	1.76	17.34	39	1.22	5.86	196.6	12.30
PC-3S	08/10/12	10:38	9.70	2.56	15.27	67	0.22	5.82	65.1	2.35
PC-8S	08/10/12	13:18	10.30	2.72	16.96	515	0.17	6.72	-103.2	3.50
PC-11S	08/13/12	13:13	6.60	1.74	16.74	105	2.47	5.49	202.4	0.74
PC-11D	08/13/12	13:10	5.10	1.35	15.88	251	0.49	5.91	52.8	4.67
PC-17D[2]	08/14/12	10:22	11.80	3.12	14.68	4	0.28	6.61	-51.8	56.40
PC-20S	08/13/12	10:53	11.50	3.04	16.35	336	0.26	6.07	-67.6	2.30
PC-20D[2]	08/13/12	10:41	4.75	1.25	16.17	348	0.40	6.19	-7.6	8.51
PC-23D	08/14/12	10:22	6.13	1.62	15.55	118	0.35	6.53	-107.5	3.04
PC-24PS[1]	06/20/12	10:38	1.65	0.44	20.84	274	0.85	6.10	-86.7	3.91
PC-25D[2]	08/14/12	13:07	12.50	3.30	14.18	245	0.20	6.52	-92.2	5.47
PC-28PS[1]	06/20/12	9:50	1.10	0.29	21.53	335	4.21	6.12	-63.8	5.31
PC-28D	08/14/12	12:59	5.56	1.47	16.11	254	0.53	6.28	-12.4	3.15

Notes:
1. mg/L = milligrams per liter
2. mS/cm = microsiemens per centimter
3. NTU = Nephelometric Turbidity Unit
4. L = liter
5. gal = gallon
6. ORP = Oxygen Reduction Potential
7. mV = millivolts
8. NM= not measured

[1] = Sampled during the Initital Treatability Sampling.
[2] = Samples collected despite turbidity readings >5 NTU; turbidity however was stable (within 10%).

TABLE 4-1
SUMMARIES OF RESIDUAL MASS ESTIMATES - PLUME CORE
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Table 4-1A - Mass of TVOCs (lbs)

Boring	Total Mass (lbs)	Total Mass of TVOCs by Strata		
		Peat	Grey Silt	Sand & Gravel
PC-1	0.00	-	-	0.00
PC-2	0.03	-	-	0.03
PC-3	0.18	-	0.02	0.16
PC-4	0.32	-	-	0.32
PC-5	0.61	-	-	0.61
PC-6	0.86	-	-	0.86
PC-7	3.87	-	-	3.87
PC-8	0.48	-	0.48	0.00
PC-9	0.06	-	-	0.06
PC-10	1.23	-	-	1.23
PC-11	1.39	-	-	1.39
PC-12	4.10	-	-	4.10
PC-13	0.69	-	-	0.69
PC-14	0.20	-	-	0.20
PC-15	0.00	-	-	0.00
PC-16	0.18	-	0.01	0.16
PC-17	0.40	-	-	0.40
PC-18	0.78	-	-	0.78
PC-19	4.89	2.9	0.32	1.67
PC-20	2.93	1.20	0.13	1.60
PC-21	0.21	-	-	0.21
PC-22	0.03	-	0.00	0.03
PC-23	0.16	0.01	0.14	0.01
PC-24	16.41	12.66	3.56	0.19
PC-25	2.64	2.09	0.32	0.23
PC-26	0.25	-	-	0.25
PC-27	0.50	0.03	-	0.47
PC-28	18.39	9.71	5.62	3.06
Totals (lbs)	**61.77**	**28.60**	**10.60**	**22.57**
% of Total		**46.3%**	**17.2%**	**36.5%**

Table 4-1B - Mass of Target COCs (lbs)

Boring	Total Mass (lbs)	Total Mass of Target COCs by Strata		
		Peat	Grey Silt	Sand & Gravel
PC-1	0.00	-	-	0.00
PC-2	0.03	-	-	0.03
PC-3	0.22	-	0.02	0.20
PC-4	0.28	-	-	0.28
PC-5	0.53	-	-	0.53
PC-6	0.03	-	-	0.03
PC-7	0.02	-	-	0.02
PC-8	0.00	-	ND	ND
PC-9	0.06	-	-	0.06
PC-10	1.01	-	-	1.01
PC-11	1.31	-	-	1.31
PC-12	1.96	-	-	1.96
PC-13	0.27	-	-	0.27
PC-14	0.11	-	-	0.11
PC-15	0.00	-	-	ND
PC-16	0.15	-	ND	0.15
PC-17	0.31	-	-	0.31
PC-18	0.60	-	-	0.60
PC-19	2.82	1.07	0.10	1.65
PC-20	1.69	ND	0.13	1.56
PC-21	0.18	-	-	0.18
PC-22	0.02	-	-	0.02
PC-23	0.15	0.01	0.14	0.00
PC-24	16.17	12.66	3.43	0.08
PC-25	2.50	2.09	0.27	0.14
PC-26	0.14	-	-	0.14
PC-27	0.32	ND	-	0.32
PC-28	3.04	ND	0.0028	3.04
Totals (lbs)	**33.91**	**15.83**	**4.09**	**13.99**
% of Total		**46.7%**	**12.1%**	**41.3%**

Table 4-1C - Mass of Target COCs (lbs)

Boring	Total Mass (lbs)	1,1,1-TCA	1,1-DCA	Chloroethane	cis-1,2-DCE	PCE	Trans-1,2-DCE	TCE	Vinyl Chloride
PC-1	0.00(ND)	ND	ND	ND	ND	ND	ND	ND	ND
PC-2	0.03	ND	ND	ND	ND	0.03	ND	ND	ND
PC-3	0.194	0.016	ND	ND	0.079	0.078	ND	0.021	ND
PC-4	0.28	0.04	ND	ND	0.05	0.15	ND	0.04	ND
PC-5	0.53	0.10	ND	ND	0.24	0.06	ND	0.04	0.09
PC-6	0.03	ND	ND	ND	0.03	ND	ND	ND	ND
PC-7	0.02	ND	ND	ND	0.02	ND	ND	ND	ND
PC-8	0.00(ND)	ND	ND	ND	ND	ND	ND	ND	ND
PC-9	0.06	ND	ND	ND	0.03	0.03	ND	ND	ND
PC-10	1.02	0.17	0.01	ND	0.71	0.06	0.01	0.01	0.05
PC-11	1.31	0.17	0.05	ND	0.8	ND	0.02	ND	0.27
PC-12	1.964	0.95	0.01	ND	0.97	ND	0.004	ND	0.03
PC-13	0.26	0.03	0.02	ND	0.12	ND	ND	ND	0.09
PC-14	0.113	0.01	0.003	ND	0.07	ND	ND	ND	0.03
PC-15	0.00 (ND)	ND	ND	ND	ND	ND	ND	ND	ND
PC-16	0.15	ND	ND	ND	ND	0.12	ND	0.01	0.02
PC-17	0.31	0.04	ND	ND	0.21	0.01	ND	ND	0.05
PC-18	0.61	0.15	0.02	ND	0.24	ND	0.01	ND	0.19
PC-19	2.81	0.16	0.07	0.1	2.25	ND	0.1	ND	0.13
PC-20	1.71	0.11	0.07	0.01	1.39	ND	0.02	ND	0.11
PC-21	0.17	0.02	0.01	ND	0.1	ND	ND	ND	0.04
PC-22	0.02	ND	ND	ND	ND	0.02	ND	ND	ND
PC-23	0.157	ND	0.02	0.001	0.04	0.001	ND	0.09	0.005
PC-24	16.11	ND	ND	ND	15.02	ND	0.68	ND	0.41
PC-25	2.49	ND	0.20	0.01	1.62	0.06	0.07	0.22	0.31
PC-26	0.14	0.02	ND	ND	0.05	ND	ND	0.01	0.06
PC-27	0.32	0.03	0.03	ND	0.16	ND	ND	ND	0.1
PC-28	3.04	0.2	0.18	0.03	2.07	0.02	0.04	0.01	0.49
Totals (lbs)	**33.85**	**2.216**	**0.69**	**0.15**	**26.269**	**0.64**	**0.954**	**0.45**	**2.48**
% of Total		**6.5**	**2.0**	**0.4**	**77.6**	**1.9**	**2.8**	**1.3**	**7.3**

Table 4-1D - Mass of Target COCs (lbs)

Boring	Total Mass (lbs)	Target COCs Mass (lbs)							
		1,1,1-TCA	1,1-DCA	Chloroethane	cis-1,2-DCE	PCE	Trans-1,2-DCE	TCE	Vinyl Chloride
Organic Peat	**15.87**	ND	0.17	0.0009	14.01	0.06	0.82	0.22	0.59
Grey Silt	**4.09**	0.002	0.06	0.09	3.72	0.01	0.02	0.09	0.10
Sand and S&G	**13.98**	2.21	0.460	0.07	8.54	0.56	0.11	0.15	1.89
Totals (lbs)	**33.94**	**2.21**	**0.69**	**0.16**	**26.27**	**0.63**	**0.94**	**0.46**	**2.58**

NOTES:
ND - Sample was non-detect for target COCs
COCs - Contaminants of Concern (Statement of Work, Attachment D - Target Design Compounds)
Calcs based on average moisture content for each stratigraphic unit
lbs = pounds

TABLE 4-2
SUMMARIES OF RESIDUAL MASS ESTIMATES - PLUME CORE
COMBINED 2008 AND 2012 DATA ANALYSIS - AVERAGE
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Table 4-2A - Mass of TVOCs (lbs)

Boring	Total Mass (lbs)	Total Mass of TVOCs by Strata		
		Peat	Grey Silt	Sand & Gravel
PC-1	0.00	-	-	0.00
PC-2	0.15	-	-	0.15
PC-3	0.18	-	0.02	0.16
PC-4	17.58	-	-	17.58
PC-5	0.61	-	-	0.61
PC-6	0.86	-	-	0.86
PC-7	4.29	-	-	4.29
PC-8	9.95	-	0.24	9.71
PC-9	0.06	-	-	0.06
PC-10	1.23	-	-	1.23
PC-11	1.39	-	-	1.39
PC-12	4.10	-	-	4.10
PC-13	4.78	-	-	4.78
PC-14	0.28	-	-	0.28
PC-15	0.00	-	-	0.00
PC-16	0.18	-	0.01	0.16
PC-17	11.65	-	-	11.65
PC-18	0.78	-	-	0.78
PC-19	35.16	2.36	31.39	1.41
PC-20	2.93	1.20	0.13	1.60
PC-21	0.21	-	-	0.21
PC-22	0.03	-	0.00	0.03
PC-23	0.40	0.02	0.14	0.24
PC-24	10.16	6.41	3.56	0.19
PC-25	1.69	1.15	0.32	0.23
PC-26	0.25	-	-	0.25
PC-27	9.66	0.05	-	9.62
PC-28	11.88	3.39	5.62	2.87
Totals (lbs)	**130.43**	**14.57**	**41.43**	**74.43**
% of Total		**11.2%**	**31.8%**	**57.1%**

Table 4-2B - Mass of Target COCs (lbs)

Boring	Total Mass (lbs)	Total Mass of Target COCs by Strata		
		Peat	Grey Silt	Sand & Gravel
PC-1	0.00	-	-	0.00
PC-2	0.15	-	-	0.15
PC-3	0.20	-	0.02	0.17
PC-4	0.66	-	-	0.66
PC-5	0.53	-	-	0.53
PC-6	0.03	-	-	0.03
PC-7	0.02	-	-	0.02
PC-8	3.27	-	ND	3.27
PC-9	0.06	-	-	0.06
PC-10	1.01	-	-	1.01
PC-11	1.31	-	-	1.31
PC-12	1.96	-	-	1.96
PC-13	0.27	-	-	0.27
PC-14	0.11	-	-	0.11
PC-15	0.00	-	-	ND
PC-16	0.15	-	ND	0.15
PC-17	20.31	-	-	20.31
PC-18	0.60	-	-	0.60
PC-19	2.92	1.09	0.37	1.46
PC-20	1.69	ND	0.13	1.56
PC-21	0.18	-	-	0.18
PC-22	0.02	-	-	0.02
PC-23	0.64	0.02	0.14	0.47
PC-24	16.17	12.66	3.43	0.08
PC-25	1.61	1.20	0.27	0.14
PC-26	0.14	-	-	0.14
PC-27	16.95	0.01	-	16.94
PC-28	3.13	ND	0.0028	3.12
Totals (lbs)	**74.07**	**14.98**	**4.37**	**54.72**
% of Total		**20.2%**	**5.9%**	**73.9%**

Table 4-2C - Mass of Target COCs (lbs)

Boring	Total Mass (lbs)	1,1,1-TCA	1,1-DCA	Chloroethane	cis-1,2-DCE	PCE	Trans-1,2-DCE	TCE	Vinyl Chloride
PC-1	0.00(ND)	ND	ND	ND	ND	ND	ND	ND	ND
PC-2	0.15	ND	ND	ND	ND	0.15	ND	ND	ND
PC-3	0.194	0.02	ND	ND	0.079	0.078	ND	0.021	ND
PC-4	0.67	0.04	ND	ND	0.23	0.36	ND	0.04	ND
PC-5	0.53	0.10	ND	ND	0.24	0.06	ND	0.04	0.09
PC-6	0.03	ND	ND	ND	0.03	ND	ND	ND	ND
PC-7	0.02	ND	ND	ND	0.02	ND	ND	ND	ND
PC-8	3.27	ND	ND	ND	0.69	2.58	ND	ND	ND
PC-9	0.06	ND	ND	ND	0.03	0.03	ND	ND	ND
PC-10	1.02	0.17	0.01	ND	0.71	0.06	0.01	0.01	0.05
PC-11	1.31	0.17	0.05	ND	0.8	ND	0.02	ND	0.27
PC-12	1.964	0.95	0.01	ND	0.97	ND	0.004	ND	0.03
PC-13	0.26	0.03	0.02	ND	0.12	ND	ND	ND	0.09
PC-14	0.113	0.01	0.003	ND	0.07	ND	ND	ND	0.03
PC-15	0.00 (ND)	ND	ND	ND	ND	ND	ND	ND	ND
PC-16	0.15	ND	ND	ND	ND	0.12	ND	0.01	0.02
PC-17	20.31	0.04	ND	ND	0.32	19.28	ND	0.62	0.05
PC-18	0.61	0.15	0.02	ND	0.24	ND	0.01	ND	0.19
PC-19	2.92	0.16	0.08	0.1	2.34	ND	0.1	ND	0.13
PC-20	1.71	0.11	0.07	0.01	1.39	ND	0.02	ND	0.11
PC-21	0.17	0.02	0.01	ND	0.1	ND	ND	ND	0.04
PC-22	0.02	ND	ND	ND	ND	0.02	ND	ND	ND
PC-23	0.64	ND	0.02	0.001	0.05	0.22	ND	0.33	0.01
PC-24	16.11	ND	ND	ND	15.02	ND	0.68	ND	0.41
PC-25	1.6	ND	0.15	0.01	0.88	0.06	0.07	0.12	0.31
PC-26	0.14	0.02	ND	ND	0.05	ND	ND	0.01	0.06
PC-27	16.95	0.03	0.36	ND	0.91	13.26	ND	2.29	0.1
PC-28	3.13	0.2	0.18	0.03	2.07	0.02	0.04	0.01	0.58
Totals (lbs)	**74.03**	**2.22**	**0.99**	**0.15**	**27.35**	**36.30**	**0.954**	**3.50**	**2.57**
% of Total		**3.0**	**1.3**	**0.2**	**36.9**	**49.0**	**1.3**	**4.7**	**3.5**

Table 4-2D - Mass of Target COCs (lbs)

Boring	Total Mass (lbs)	Target COCs Mass (lbs)							
		1,1,1-TCA	1,1-DCA	Chloroethane	cis-1,2-DCE	PCE	Trans-1,2-DCE	TCE	Vinyl Chloride
Organic Peat	**15.02**	ND	0.14	0.0009	13.29	0.06	0.82	0.17	0.54
Grey Silt	**4.37**	0.002	0.07	0.08	3.99	0.01	0.02	0.09	0.10
Sand and S&G	**54.73**	2.21	0.793	0.07	10.08	36.22	0.11	3.28	1.97
Totals (lbs)	**74.12**	**2.21**	**1.00**	**0.15**	**27.36**	**36.29**	**0.95**	**3.54**	**2.61**

NOTES:
ND - Sample was non-detect for target COCs
COCs - Contaminants of Concern (Statement of Work, Attachment D - Target Design Compounds)
Calcs based on average moisture content for each stratigraphic unit
lbs = pounds

TABLE 4-3
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS - VOCS

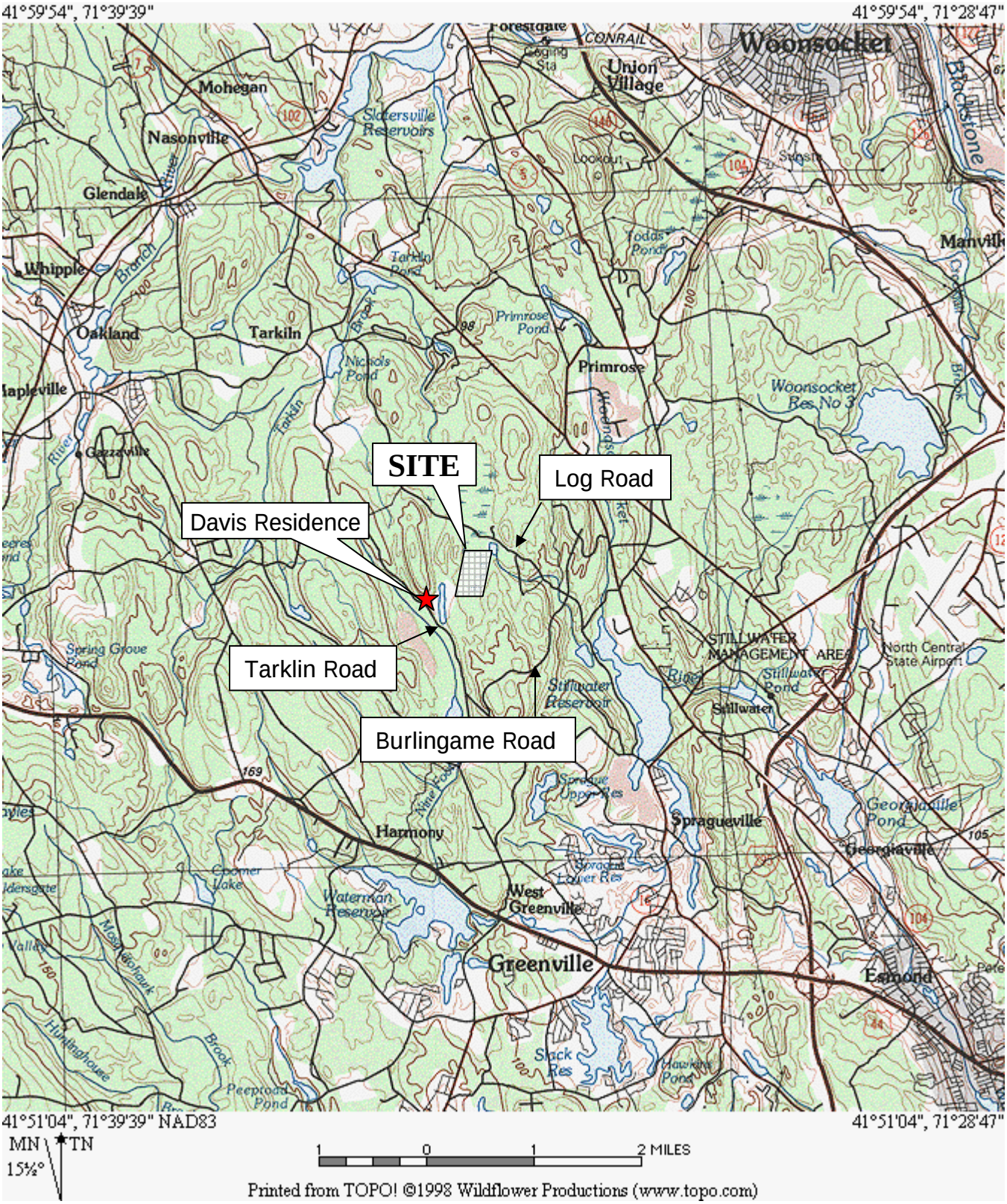
Monitoring Wells OW-55 and OW-304-O
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

CONSTITUENT	UNITS	IGRGs	RI GA GW Objectives	OW-055												OW-304-O		
				11/8/1991	11/14/2001	6/17/2003	7/30/2004	10/25/2004	4/21/2005	11/11/2005	4/24/2006	9/18/2006	10/21/2008	5/2/2012	8/8/2012	10/29/2008	5/1/2012	8/7/2012
				Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
1,1,1-Trichloroethane	(ug/L)		200	**19J**	**51**	**3J**	**4J**	**2J**	5U	**1J**	5U	5U	5U	**1.3**	**3.6**	**1J**	**14**	**11**
1,1,2-Trichloroethane	(ug/L)		5	NA	5U	5U	5U	5U	5U	5U	5U	5U	5U	1U	1U	5U	1U	1U
1,1-Dichloroethane	(ug/L)	6		ND	**13**	**1J**	**2J**	**1J**	5U	5U	5U	5U	5U	1U	**0.3J**	5U	**3.3**	**2.6**
1,1-Dichloroethylene	(ug/L)		7	NA	5U	5U	5U	5U	5U	5U	5U	5U	5U	1U	**0.25J**	5U	**1.2**	**1.2**
1,2,3-Trichlorobenzene	(ug/L)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1U	1U	NA	1U	1U
1,2,4-Trichlorobenzene	(ug/L)		70	NA	5U	5U	5U	5U	5U	5U	5U	5U	5U	1U	1U	**1J**	1U	**0.25J**
1,2-Dichlorobenzene	(ug/L)		600	NA	5U	5U	**4J**	**2J**	5U	5U	5U	5U	5U	**2.2**	**3.1**	**1J**	**4.1**	**3.7**
1,2-Dichloroethane	(ug/L)		5	NA	5U	5U	5U	5U	5U	5U	5U	5U	5U	1U	1U	5U	1U	1U
1,2-Dichloroethene	(ug/L)			ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	(ug/L)		600	NA	5U	5U	5U	5U	5U	5U	5U	5U	5U	1U	1U	5U	1U	1U
1,4-Dichlorobenzene	(ug/L)		75	NA	5U	5U	5U	5U	5U	5U	5U	5U	5U	1U	1U	**3J**	**1.7**	**1.3**
1,4-Dioxane	(ug/L)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3U	3U	NA	**1.8J**	**2.5J**
Acetone	(ug/L)			16U	20U	20U	20U	20U	20U	20U	20U	20U	20U	50U	50U	20U	50U	50U
Benzene	(ug/L)	5	5	ND	5U	5U	5U	5U	5U	5U	5U	5U	5U	1U	1U	5U	1U	1U
Carbon disulfide	(ug/L)			ND	5U	5U	5U	5U	5U	5U	5U	5U	5U	10U	10U	5U	10U	10U
Chlorobenzene	(ug/L)			NA	5U	5U	5U	5U	5U	5U	5U	5U	5U	1U	1U	5U	1U	**0.71J**
Chloroethane	(ug/L)			NA	5U	5U	5U	5U	5U	5U	5U	5U	5U	2U	2U	5U	2U	2U
Chloroform	(ug/L)			ND	**5**	5U	5U	5U	5U	5U	5U	5U	5U	1U	1U	5U	1U	1U
cis-1,2-Dichloroethylene	(ug/L)	70	70	NA	**170**	**13**	**37**	**17**	**2J**	**4J**	5U	**3J**	**1J**	**7.7**	**18**	**11**	**23**	**24**
Cyclohexane	(ug/L)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1U	1U	NA	1U	1U
Diethyl ether	(ug/L)			NA	NA	5U	5U	5U	5U	5U	5U	5U	5U	1U	1U	5U	1U	1U
Ethylbenzene	(ug/L)		700	ND	5U	5U	5U	5U	5U	5U	5U	5U	5U	1U	1U	5U	1U	1U
Isopropylbenzene	(ug/L)			NA	5U	5U	5U	5U	5U	5U	5U	5U	5U	1U	1U	5U	1U	1U
Methyl chloride	(ug/L)			NA	4U	1U	1U	1U	1U	1U	1U	1U	1U	2U	2U	1U	2U	2U
Methyl ethyl ketone (MEK)	(ug/L)			NA	10U	10U	10U	10U	10U	10U	10U	10U	10U	10UJ	10U	10U	10UJ	10U
Methyl Tert-Butyl Ether (MTBE)	(ug/L)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1U	1U	NA	1U	1U
Methylcyclohexane	(ug/L)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1U	1U	NA	1U	1U
Methylene chloride	(ug/L)		5	4.7U	5U	5U	5U	5U	5U	5U	5U	5U	5U	2U	2U	5U	2U	2U
m-Xylene & p-Xylene	(ug/L)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2U	2U	NA	2U	2U
o-Xylene	(ug/L)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1U	1U	NA	1U	1U
Tetrachloroethylene	(ug/L)	5	5	**150J**	**100**	**4J**	**34**	**14**	**1J**	**5J**	5U	**5**	**5J**	**14J**	**26**	**3J**	**31J**	**21**
Tetrahydrofuran	(ug/L)			NA	NA	10U	10U	10U	10U	10U	10U	10U	10U	10U	10U	10U	10U	10U
Toluene	(ug/L)		1000	ND	5U	5U	5U	5U	5U	5U	5U	5U	5U	1U	1U	5U	1U	1U
trans-1,2-Dichloroethene	(ug/L)		100	NA	**4J**	5U	5U	5U	5U	5U	5U	5U	5U	1U	1U	5U	**0.25J**	**0.3J**
Trichloroethylene	(ug/L)	5	5	**22J**	**69**	**5J**	**21**	**9**	**1J**	**3J**	5U	**3J**	**1J**	**4.1**	**8.3**	**4J**	**16**	**12**
Vinyl chloride	(ug/L)	2	2	ND	**2J**	1U	**1**	1U	1U	1U	1U	1U	1U	0.5U	**0.61**	1U	**2.9**	**3.2**
Xylene (total)	(ug/L)		10000	ND	5U	5U	5U	5U	5U	5U	5U	5U	5U	2U	2U	5U	2U	2U
Sum of Constituents	**(ug/L)**			**191**	**414**	**26**	**103**	**45**	**4**	**13**	**0**	**11**	**7**	**29.3**	**60.16**	**24**	**99.25**	**83.76**

Notes:

1. "NA" = Not Analyzed
2. "U" = Not detected above reporting limit
3. "ND" = Not Detected
4. "J" = Estimated Value
5. ug/L = micrograms per liter
6. IGRGs = Interim Groundwater Remediation Goals
7. Sum of constituents is a sum of detected compounds only.
8. Only constituents detected at least once are presented.
9. Only sites sampled for the Spring 2012 sampling event are shown.
10. Detections are bolded.
11. Exceedances of the IGRGs are highlighted.

Figures



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Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Site Locus Map

Figure 1-1

Scale: As Shown

Extent of Site As Shown is Approximate

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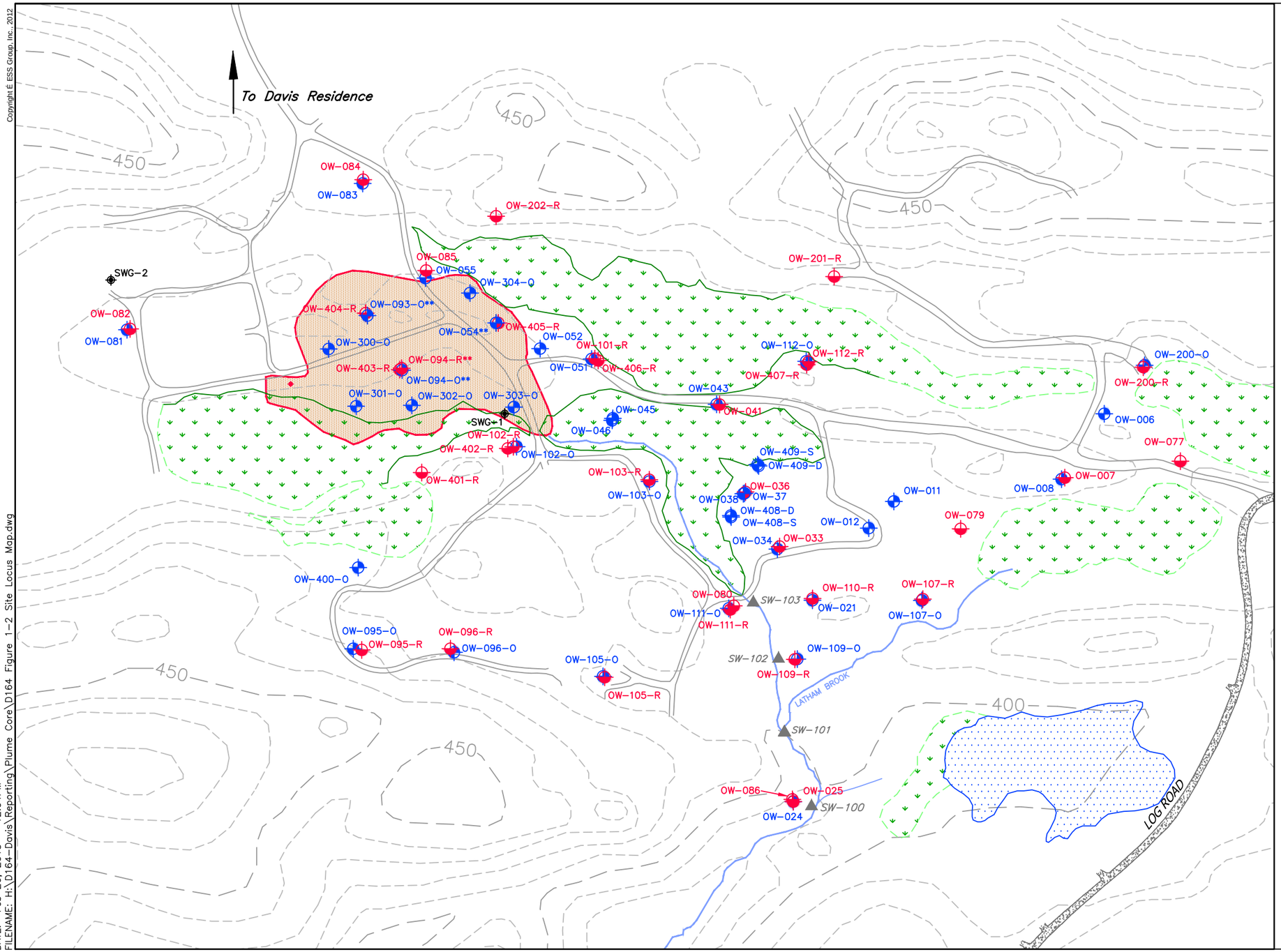

Z

LEGEND:

- OW-200-O — UNCONSOLIDATED DEPOSIT MONITORING WELL
- OW-200-R — BEDROCK MONITORING WELL
- SW-103 — SURFACE WATER SAMPLING LOCATION
- SWG-1 — SURFACE WATER GAUGING LOCATION
- ROADS (PAVED)
- ROADS (UNPAVED)
- DELINEATED WETLAND AREAS (DASHED WHERE APPROXIMATE)
- POND (APPROXIMATE)
- APPROXIMATE LIMIT OF SATURATED UNEXCAVATED SOIL (FORMER SOURCE AREA)

NOTES:

1. BASE PLAN HAS BEEN COMPILED FROM SITE SURVEYS CONDUCTED BY MARK N. NYBERG ASSOCIATES, INC. (DECEMBER 2001; MAY 2003, REVISED AUGUST 2003 AND DECEMBER 2003; AND OCTOBER 2008), SITE SURVEY CONDUCTED BY DIPRETE ENGINEERING (NOVEMBER 2012), AND WOODWARD-CLYDE FINAL PRE-DESIGN ENGINEERING REPORT II (OCTOBER 1993).
2. ** REPLACEMENT WELLS INSTALLED IN THE GENERAL LOCATION OF WELLS DECOMMISSIONED DURING SOURCE REMEDIATION.

DATE: Feb 26, 2013 – 12:04PM
FILENAME: H:\D164-Davis\Reporting\Plume Core\D164 Figure 1-2 Site Locus Map.dwg

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Smithfield, Rhode Island
Project No. D164-005

Scale: 1"=300'
0 300 FEET

Site Plan and Monitoring Well Location Map

Figure 1-2

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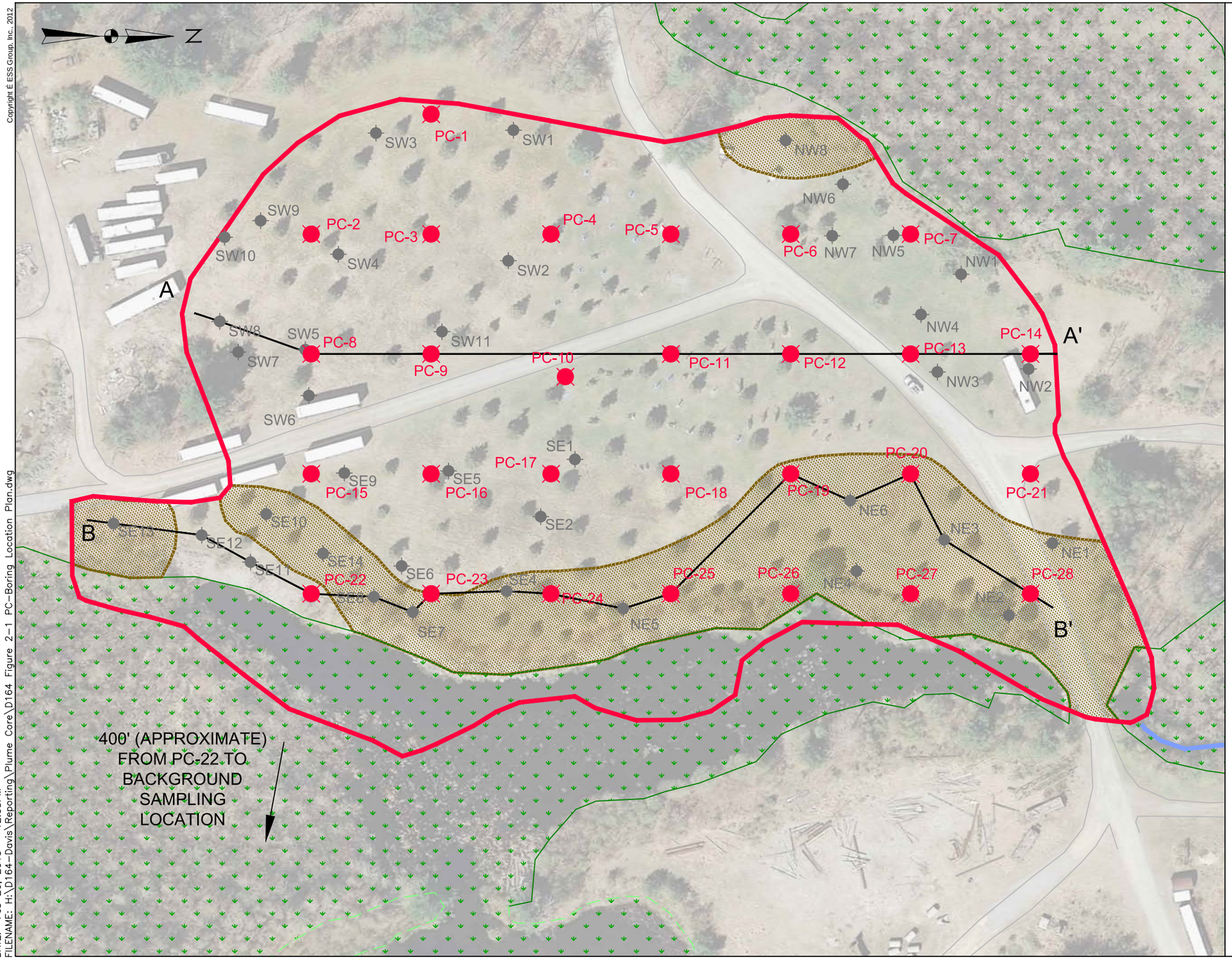

LEGEND:

- PC-1 — PLUME CORE BORING
- NE1 — PHASE 4 BORING
- ROADS (UNPAVED)
- APPROXIMATE LIMIT OF SATURATED UNEXCAVATED SOIL (FORMER SOURCE AREA)
- DELINEATED WETLAND AREAS (DASHED WHERE APPROXIMATE)
- APPROXIMATE AREA OF ORGANIC PEAT AND GREY SILTS

NOTES:

1. BASE PLAN HAS BEEN COMPILED FROM SITE SURVEYS CONDUCTED BY MARK N. NYBERG ASSOCIATES, INC. (DECEMBER 2001; MAY 2003, REVISED AUGUST 2003 AND DECEMBER 2003; AND OCTOBER 2008), SITE SURVEY CONDUCTED BY DIPRETE ENGINEERING (NOVEMBER 2012), AND WOODWARD-CLYDE FINAL PRE-DESIGN ENGINEERING REPORT II (OCTOBER 1993).
2. ** REPLACEMENT WELLS INSTALLED IN THE GENERAL LOCATION OF WELLS DECOMMISSIONED DURING SOURCE REMEDIATION.

DATE: Feb 26, 2013 – 12:05PM
FILENAME: H:\D164-Davis\Reporting\Plume Core\D164 Figure 2-1 PC-Boring Location Plan.dwg

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Smithfield, Rhode Island
Project No. D164-002

Scale: 1"=80'
0 — 80 FEET

Boring Location Plan

Figure 2-1

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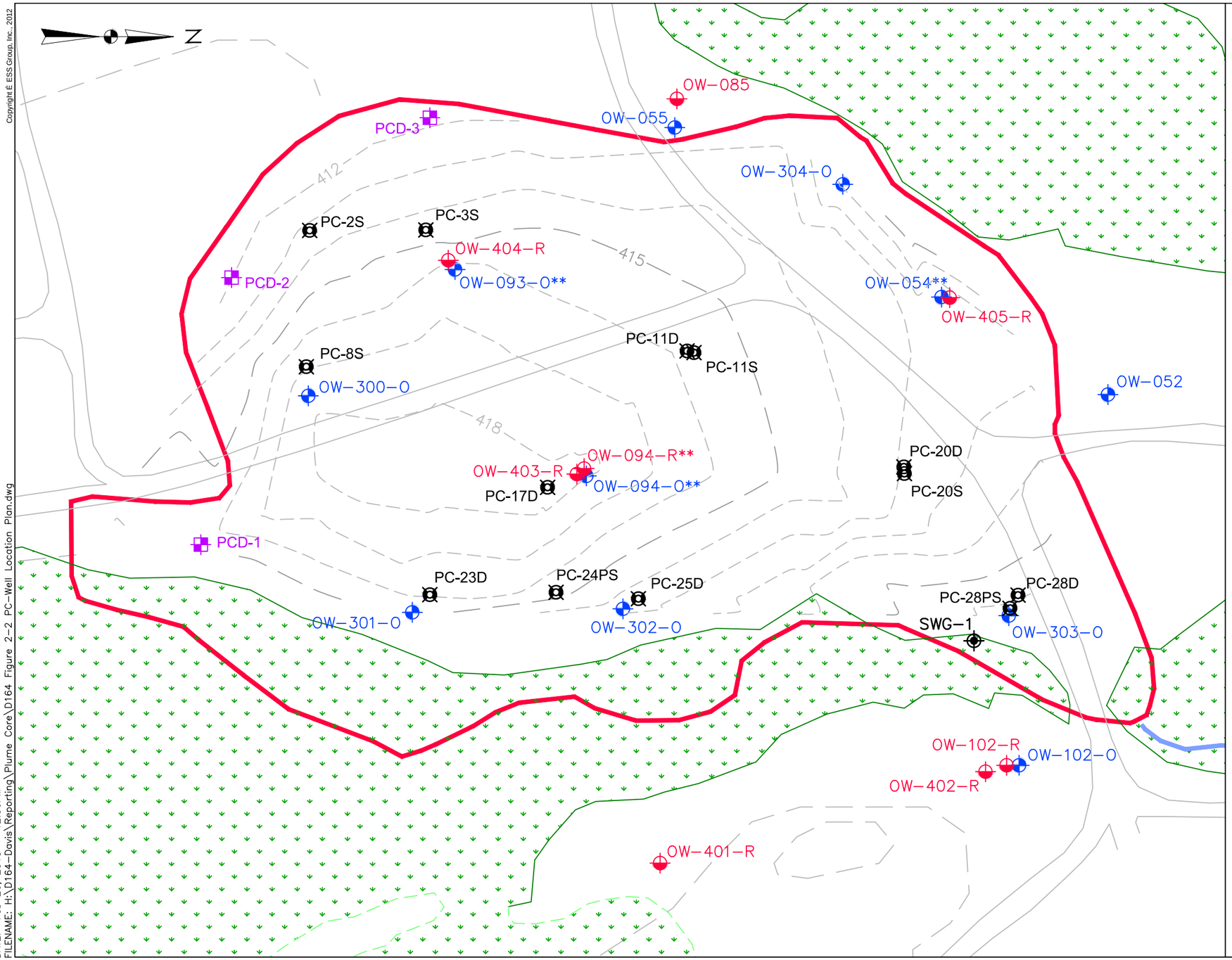

LEGEND:

- OW-055 — UNCONSOLIDATED DEPOSIT MONITORING WELL
- OW-085 — BEDROCK MONITORING WELL
- PC-3S — PLUME CORE MONITORING WELL (S-SHALLOW, D-DEEP)
- PCD-1 — PLUME CORE DELINEATION WELL
- SWG-1 — SURFACE WATER ELEVATION GAUGING STATION
- ROADS (UNPAVED)
- APPROXIMATE LIMIT OF SATURATED UNEXCAVATED SOIL (FORMER SOURCE AREA)
- DELINEATED WETLAND AREAS (DASHED WHERE APPROXIMATE)

NOTES:

1. BASE PLAN HAS BEEN COMPILED FROM SITE SURVEYS CONDUCTED BY MARK N. NYBERG ASSOCIATES, INC. (DECEMBER 2001; MAY 2003, REVISED AUGUST 2003 AND DECEMBER 2003; AND OCTOBER 2008), SITE SURVEY CONDUCTED BY DIPRETE ENGINEERING (NOVEMBER 2012), AND WOODWARD-CLYDE FINAL PRE-DESIGN ENGINEERING REPORT II (OCTOBER 1993).
2. ** REPLACEMENT WELLS INSTALLED IN THE GENERAL LOCATION OF WELLS DECOMMISSIONED DURING SOURCE REMEDIATION.

DATE: Feb 26, 2013 – 12:06PM
FILENAME: H:\D164-Davis\Reporting\Plume Core\D164 Figure 2-2 PC-Well Location Plan.dwg

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Davis Liquid Waste Superfund Site
Smithfield, Rhode Island
Project No. D164-002

Scale: 1"=80'
0 80 FEET

Well Location Plan

Figure 2-2

DATE: Jan 16, 2013 – 10:47AM
FILENAME: H:\D164–Davis\Reporting\Treated Backfill\D164 Figure 3–1 Concept Geo Schematic.dwg

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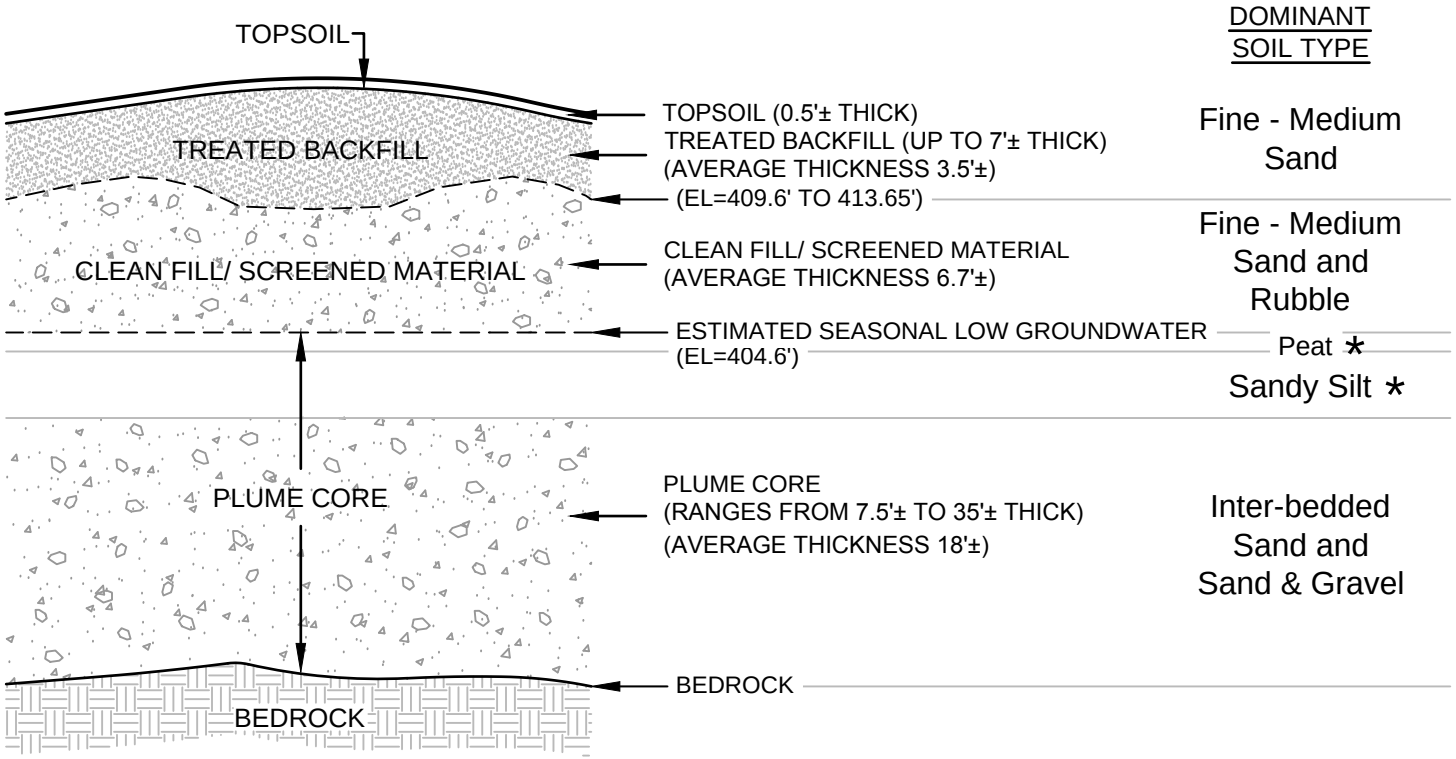

* Where present

GENERAL GEOLOGIC CHARACTER - FORMER SOURCE AREA

Davis Liquid Waste Superfund Site
Smithfield, Rhode Island
Project No. D164-004

Scale: 1"=10' (Approximate)

0 10 FEET

Date: September 2012

Conceptual Geologic Schematic
Former Source Area (FSA)

Figure 3-1

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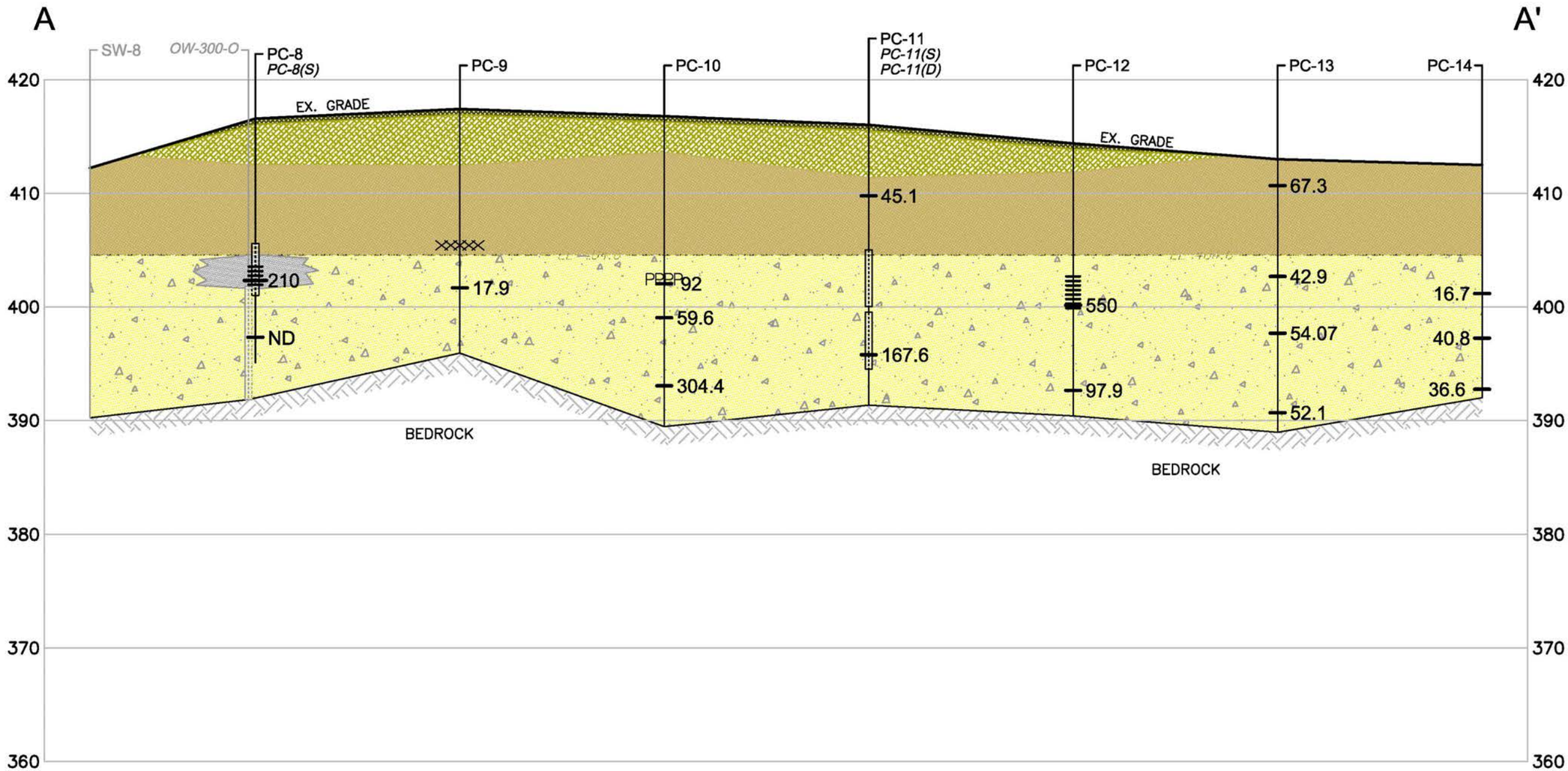

PROFILE A–A'

SCALE:
HORIZONTAL: 1"=50'
VERTICAL: 1"=10'

DATE: Feb 26, 2013 – 12:06PM
FILENAME: H:\D164-Davis\Reporting\Plume Core\D164 Figure 3-2 PC X-Section A-A.dwg

Davis Liquid Waste Superfund Site
Smithfield, Rhode Island
Project No. D164-002

0 As Shown

LEGEND:

- TOP SOIL
- TREATED BACKFILL
- CLEAN FILL
- SILT/ SILTY SAND
- SAND/ SAND & GRAVEL
- BEDROCK/ REFUSAL
- STAINED SOILS
- TIRE FRAGMENTS
- PPPP POLY SHEETING
- —210 TVOC CONCENTRATIONS (ug/kg)
- OW-300-O MONITORING WELL DESIGNATION SHOWN IN ITALICS

Cross Section A - A'

Figure 3-2

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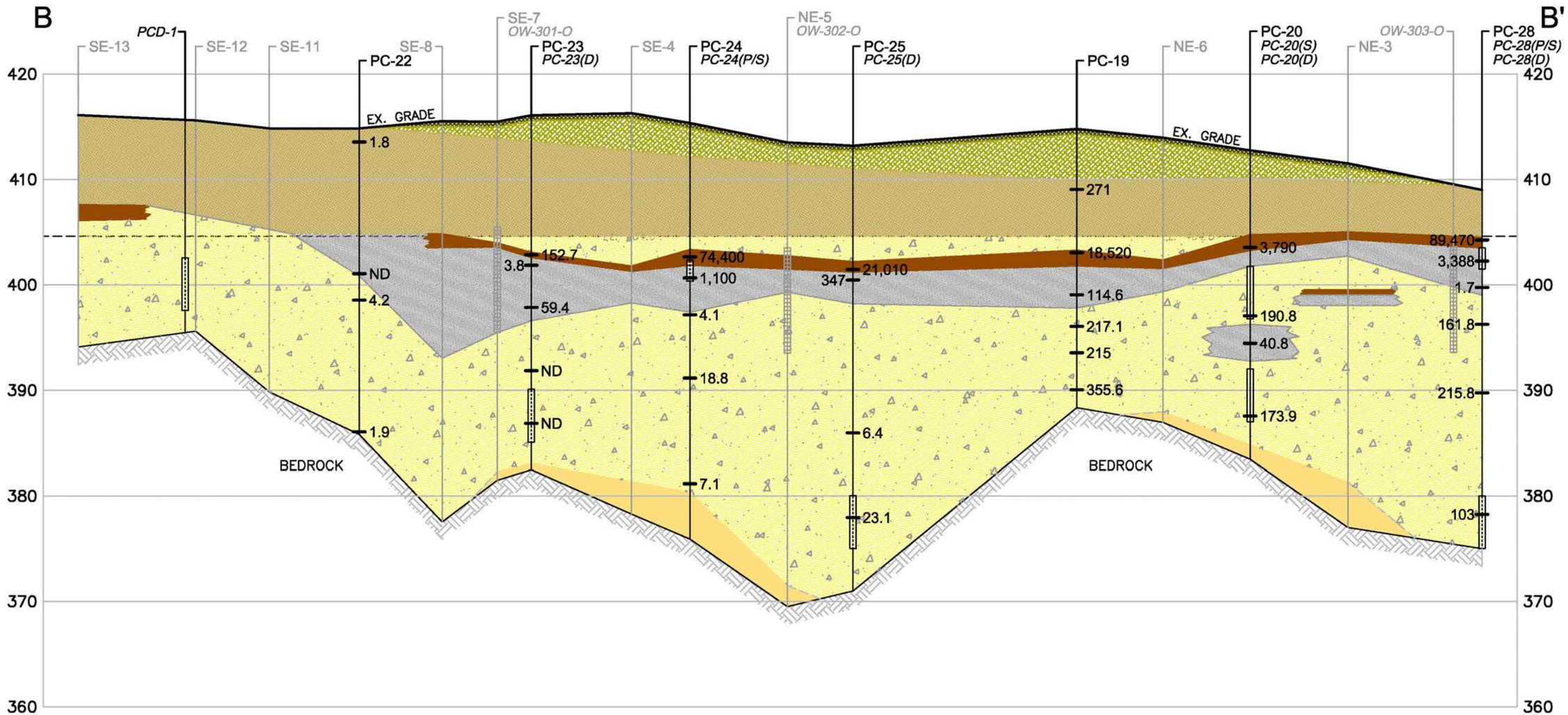

PROFILE B–B'

SCALE:
HORIZONTAL: 1"=60'
VERTICAL: 1"=10'

DATE: Feb 26, 2013 – 12:07PM
FILENAME: H:\D164-Davis\Reporting\Plume Core\D164 Figure 3-3 PC X-Section B-B.dwg

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Davis Liquid Waste Superfund Site
Smithfield, Rhode Island
Project No. D164-002

0 As Shown

LEGEND:

- TOP SOIL
- TREATED BACKFILL
- CLEAN FILL
- PEAT
- SILT/ SILTY SAND
- SAND/ SAND & GRAVEL
- TILL
- BEDROCK/ REFUSAL

—59.4 TVOC CONCENTRATIONS (ug/kg)

OW-300-O MONITORING WELL DESIGNATION SHOWN IN ITALICS

------- APPROXIMATE BASED ON FIELD OBSERVATIONS

Cross Section B - B'

Figure 3-3

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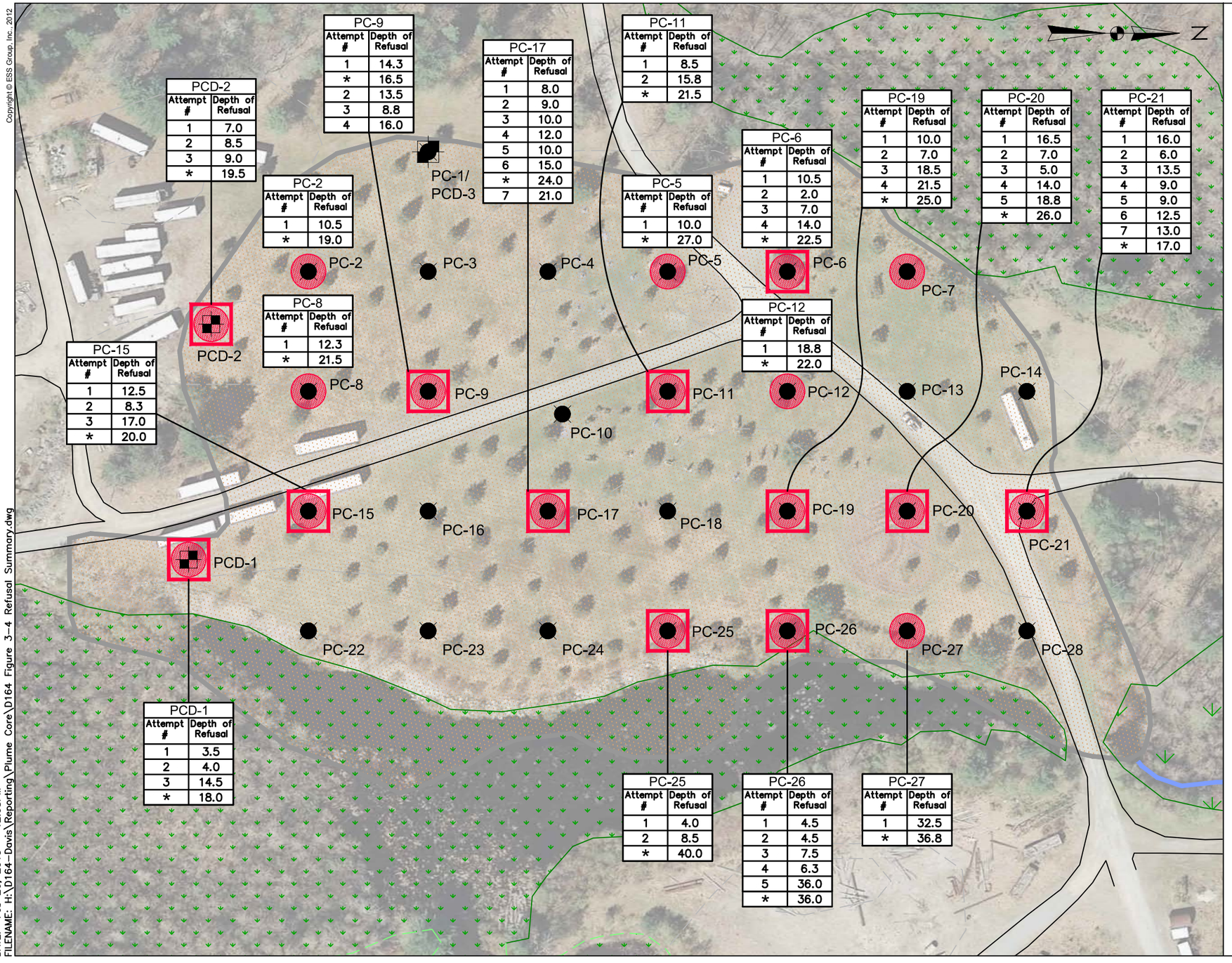

PCD-2	
Attempt #	Depth of Refusal
1	7.0
2	8.5
3	9.0
*	19.5

PC-9	
Attempt #	Depth of Refusal
1	14.3
*	16.5
2	13.5
3	8.8
4	16.0

PC-17	
Attempt #	Depth of Refusal
1	8.0
2	9.0
3	10.0
4	12.0
5	10.0
6	15.0
*	24.0
7	21.0

PC-11	
Attempt #	Depth of Refusal
1	8.5
2	15.8
*	21.5

PC-19	
Attempt #	Depth of Refusal
1	10.0
2	7.0
3	18.5
4	21.5
*	25.0

PC-20	
Attempt #	Depth of Refusal
1	16.5
2	7.0
3	5.0
4	14.0
5	18.8
*	26.0

PC-21	
Attempt #	Depth of Refusal
1	16.0
2	6.0
3	13.5
4	9.0
5	9.0
6	12.5
7	13.0
*	17.0

PC-6	
Attempt #	Depth of Refusal
1	10.5
2	2.0
3	7.0
4	14.0
*	22.5

PC-5	
Attempt #	Depth of Refusal
1	10.0
*	27.0

PC-2	
Attempt #	Depth of Refusal
1	10.5
*	19.0

PC-8	
Attempt #	Depth of Refusal
1	12.3
*	21.5

PC-12	
Attempt #	Depth of Refusal
1	18.8
*	22.0

PC-15	
Attempt #	Depth of Refusal
1	12.5
2	8.3
3	17.0
*	20.0

PCD-1	
Attempt #	Depth of Refusal
1	3.5
2	4.0
3	14.5
*	18.0

PC-25	
Attempt #	Depth of Refusal
1	4.0
2	8.5
*	40.0

PC-26	
Attempt #	Depth of Refusal
1	4.5
2	4.5
3	7.5
4	6.3
5	36.0
*	36.0

PC-27	
Attempt #	Depth of Refusal
1	32.5
*	36.8

LEGEND:

- PC-6 — PLUME CORE BORING
- PCD-1 — PLUME CORE DELINEATION WELL
- BORING WITH AT LEAST 1 SHALLOW REFUSAL
- BORING WITH MULTIPLE SHALLOW REFUSALS
- APPROXIMATE LIMIT OF SATURATED UNEXCAVATED SOIL (FORMER SOURCE AREA)
- DELINEATED WETLAND AREAS (DASHED WHERE APPROXIMATE)
- * DENOTES DEEPEST REFUSAL DEPTH

NOTES:

1. BASE PLAN HAS BEEN COMPILED FROM SITE SURVEYS CONDUCTED BY MARK N. NYBERG ASSOCIATES, INC. (DECEMBER 2001; MAY 2003, REVISED AUGUST 2003 AND DECEMBER 2003; AND OCTOBER 2008), SITE SURVEY CONDUCTED BY DIPRETE ENGINEERING (NOVEMBER 2012), AND WOODWARD-CLYDE FINAL PRE-DESIGN ENGINEERING REPORT II (OCTOBER 1993).
2. ** REPLACEMENT WELLS INSTALLED IN THE GENERAL LOCATION OF WELLS DECOMMISSIONED DURING SOURCE REMEDIATION.
3. ACTUAL LOCATION OF COMPLETED BORINGS IS APPROXIMATE ONLY.

DATE: Feb 26, 2013 – 12:08PM
FILENAME: H:\D164-Davis\Reporting\Plume Core\D164 Figure 3-4 Refusal Summary.dwg

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Smithfield, Rhode Island
Project No. D164-004
Scale: 1"=80"
0 — 80 FEET
Date: October 2012

Refusal Summary Plan

Figure 3-4

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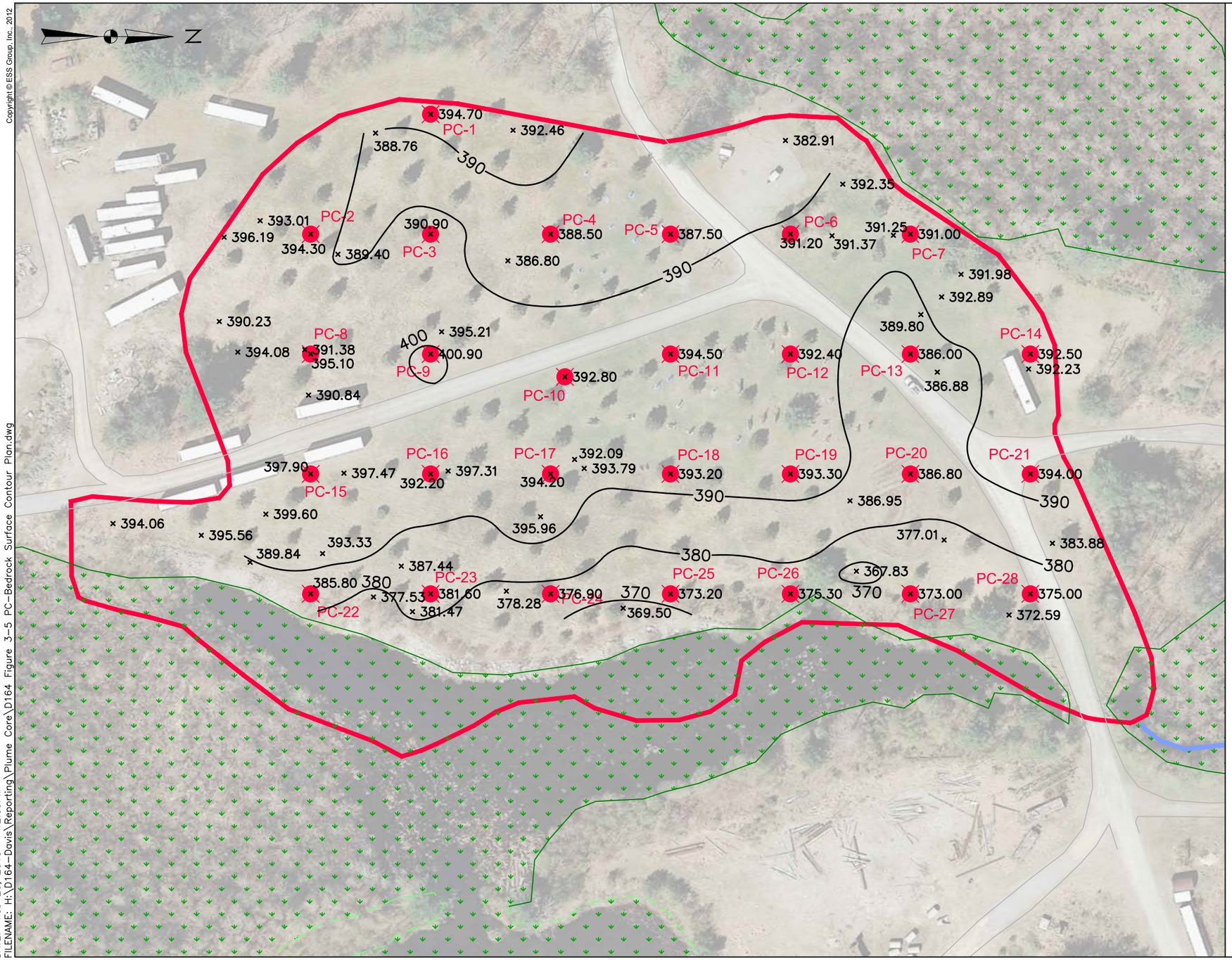

LEGEND:

PC-1	PLUME CORE BORING
	ROADS (UNPAVED)
	APPROXIMATE LIMIT OF SATURATED UNEXCAVATED SOIL (FORMER SOURCE AREA)
	DELINEATED WETLAND AREAS (DASHED WHERE APPROXIMATE)
× 393.20	BEDROCK SURFACE ELEVATION SPOT GRADE
—390—	BEDROCK SURFACE ELEVATION 10 ft CONTOUR

NOTES:

1. BASE PLAN HAS BEEN COMPILED FROM SITE SURVEYS CONDUCTED BY MARK N. NYBERG ASSOCIATES, INC. (DECEMBER 2001; MAY 2003, REVISED AUGUST 2003 AND DECEMBER 2003; AND OCTOBER 2008), SITE SURVEY CONDUCTED BY DIPRETE ENGINEERING (NOVEMBER 2012), AND WOODWARD-CLYDE FINAL PRE-DESIGN ENGINEERING REPORT II (OCTOBER 1993).
2. ** REPLACEMENT WELLS INSTALLED IN THE GENERAL LOCATION OF WELLS DECOMMISSIONED DURING SOURCE REMEDIATION.

DATE: Feb 26, 2013 – 12:09PM
FILENAME: H:\D164-Davis\Reporting\Plume Core\D164 Figure 3-5 PC-Bedrock Surface Contour Plan.dwg

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Davis Liquid Waste Superfund Site
Smithfield, Rhode Island
Project No. D164-000

Scale: 1"=80'
0 80 FEET

Revised Bedrock Surface Elevation Contour Plan

Figure 3-5

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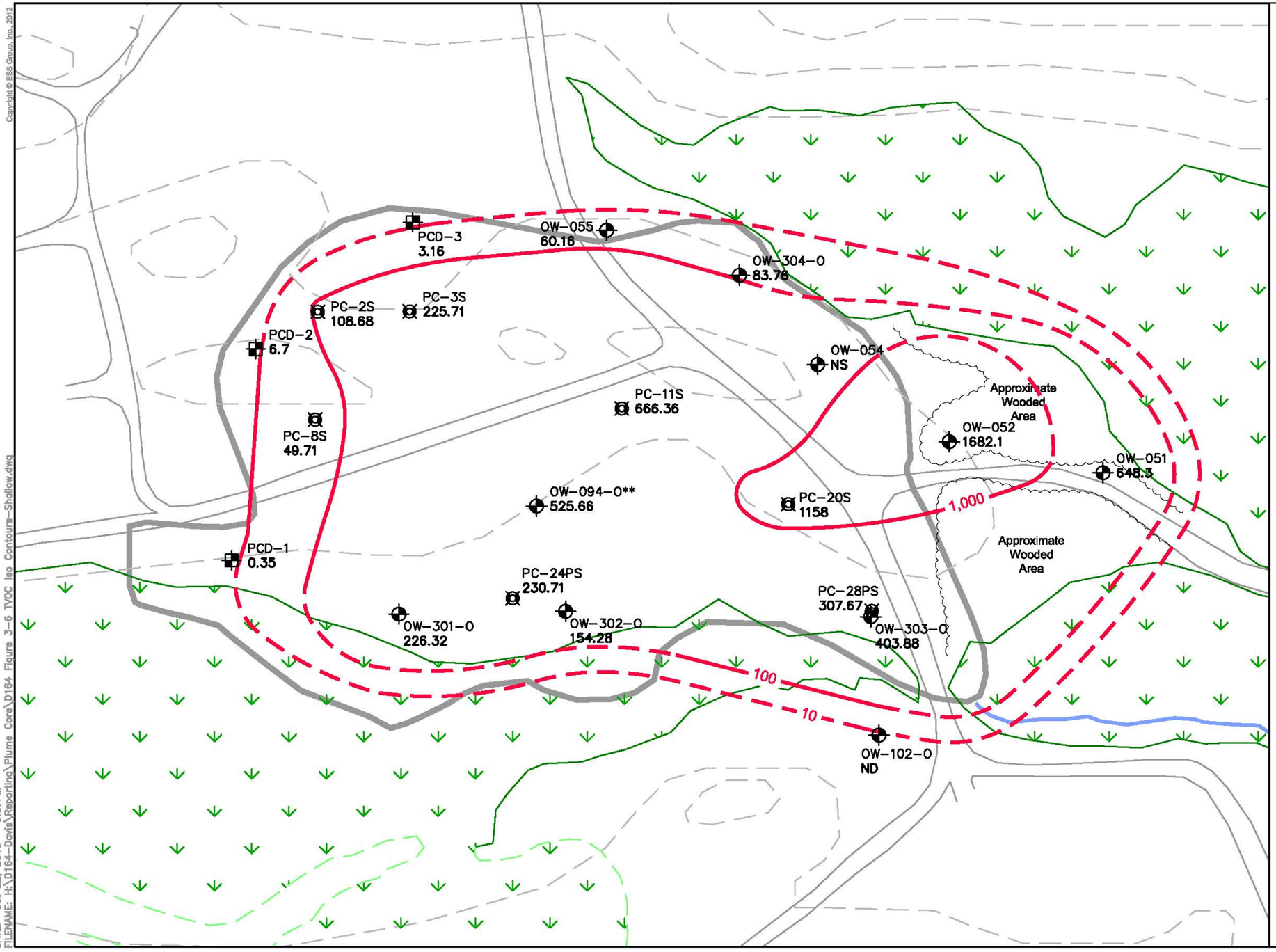

N

LEGEND:

OW-051	UNCONSOLIDATED DEPOSIT MONITORING WELL
PC-17D	PLUME CORE MONITORING WELL (S-SHALLOW, D-DEEP)
PCD-1	PLUME CORE DELINEATION WELL
	ROADS (UNPAVED)
	DELINEATED WETLAND AREAS (DASHED WHERE APPROXIMATE)
	APPROXIMATE LIMIT OF SATURATED UNEXCAVATED SOIL (FORMER SOURCE AREA)
648.3	TVOC CONCENTRATION (ug/L)
	TVOC ISOCONCENTRATION CONTOUR (ug/L) DASHED WHERE INFERRED
ND	NOT DETECTED
NS	NOT SAMPLED

NOTES:

1. BASE PLAN HAS BEEN COMPILED FROM SITE SURVEYS CONDUCTED BY MARK N. NYBERG ASSOCIATES, INC. (DECEMBER 2001; MAY 2003, REVISED AUGUST 2003 AND DECEMBER 2003; AND OCTOBER 2008), SITE SURVEY CONDUCTED BY DIPRETE ENGINEERING (NOVEMBER 2012), AND WOODWARD-CLYDE FINAL PRE-DESIGN ENGINEERING REPORT II (OCTOBER 1993).
2. ** REPLACEMENT WELLS INSTALLED IN THE GENERAL LOCATION OF WELLS DECOMMISSIONED DURING SOURCE REMEDIATION.

DATE: Oct 22, 2013 – 3:37PM
FILENAME: H:\D164-Davis\Reporting\Plume Core\D164 Figure 3-6 TVOC Iso Contours-Shallow.dwg

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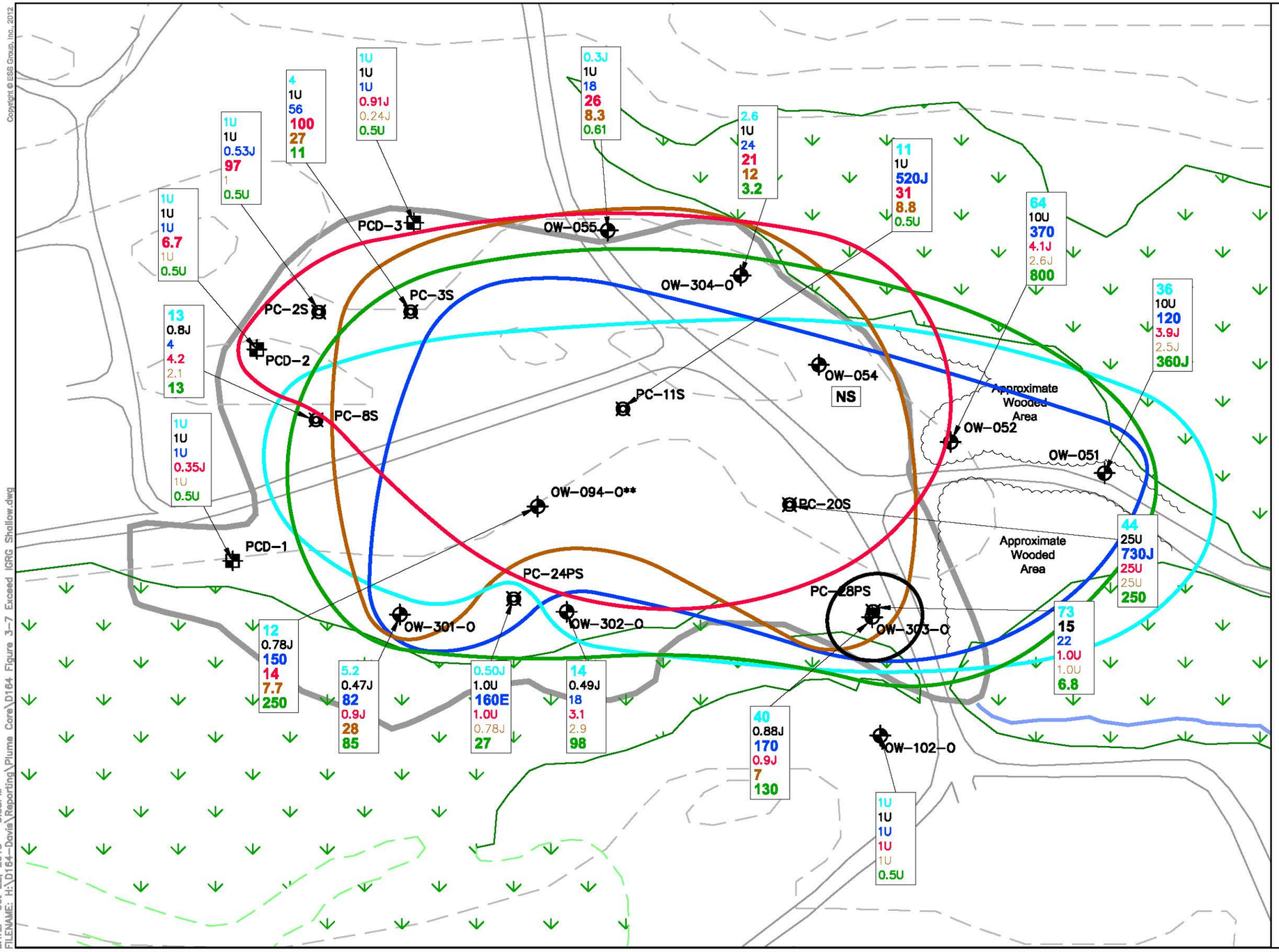
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island
Project No. D164
Scale: 1"=100'
0 100 FEET

TVOC Isoconcentration Map
Shallow Wells
Plume Core - Summer 2012

Figure 3-6



Z

LEGEND:

- OW–051 — UNCONSOLIDATED DEPOSIT MONITORING WELL
- PC-17D — PLUME CORE MONITORING WELL (S-SHALLOW, D-DEEP)
- PCD-1 — PLUME CORE DELINEATION WELL
- ROADS (UNPAVED)
- DELINEATED WETLAND AREAS (DASHED WHERE APPROXIMATE)
- APPROXIMATE LIMIT OF SATURATED UNEXCAVATED SOIL (FORMER SOURCE AREA)
- APPROXIMATE LIMIT OF GROUNDWATER CONCENTRATIONS ABOVE IGRGs (COLOR VARIES BY VOC AND EXCEEDANCES ARE **BOLDED**)
- NS — NOT SAMPLED

VOC Data Color Scheme (ug/L)

- 0.38U 1,1-Dichloroethane
- 0.41U Benzene
- 0.81U cis-1,2-Dichloroethylene
- 0.36U Tetrachloroethylene
- 0.46U Trichloroethylene
- 0.9U Vinyl Chloride

Compound	IGRG (ug/L)
1,1–Dichloroethane	6
Benzene	5
cis–1,2–Dichloroethylene	70
Tetrachloroethylene	5
Trichloroethylene	5
Vinyl Chloride	2

(EXCEEDANCES ARE **BOLDED**)

NOTES:

1. BASE PLAN HAS BEEN COMPILED FROM SITE SURVEYS CONDUCTED BY MARK N. NYBERG ASSOCIATES, INC. (DECEMBER 2001; MAY 2003, REVISED AUGUST 2003 AND DECEMBER 2003; AND OCTOBER 2008), SITE SURVEY CONDUCTED BY DIPRETE ENGINEERING (NOVEMBER 2012), AND WOODWARD-CLYDE FINAL PRE-DESIGN ENGINEERING REPORT II (OCTOBER 1993).
2. ** REPLACEMENT WELLS INSTALLED IN THE GENERAL LOCATION OF WELLS DECOMMISSIONED DURING SOURCE REMEDIATION.
3. INTERIM GROUNDWATER REMEDIATION GOALS (IGRGs), TABLE 7, RECORD OF DECISION AMENDMENT, SEPTEMBER 30, 2010.

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DATE: Oct 22, 2013 – 3:38PM
FILENAME: H:\D164–Davis\Reporting\Plume Core\D164 Figure 3–7 Exceed IGRG Shallow.dwg

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Davis Liquid Waste Superfund Site
Smithfield, Rhode Island
Project No. D164

Scale: 1"=100'
0 100 FEET

Extent of VOC Exceedances of ROD Criteria
Shallow Wells
Plume Core - Summer 2012

Figure 3-7

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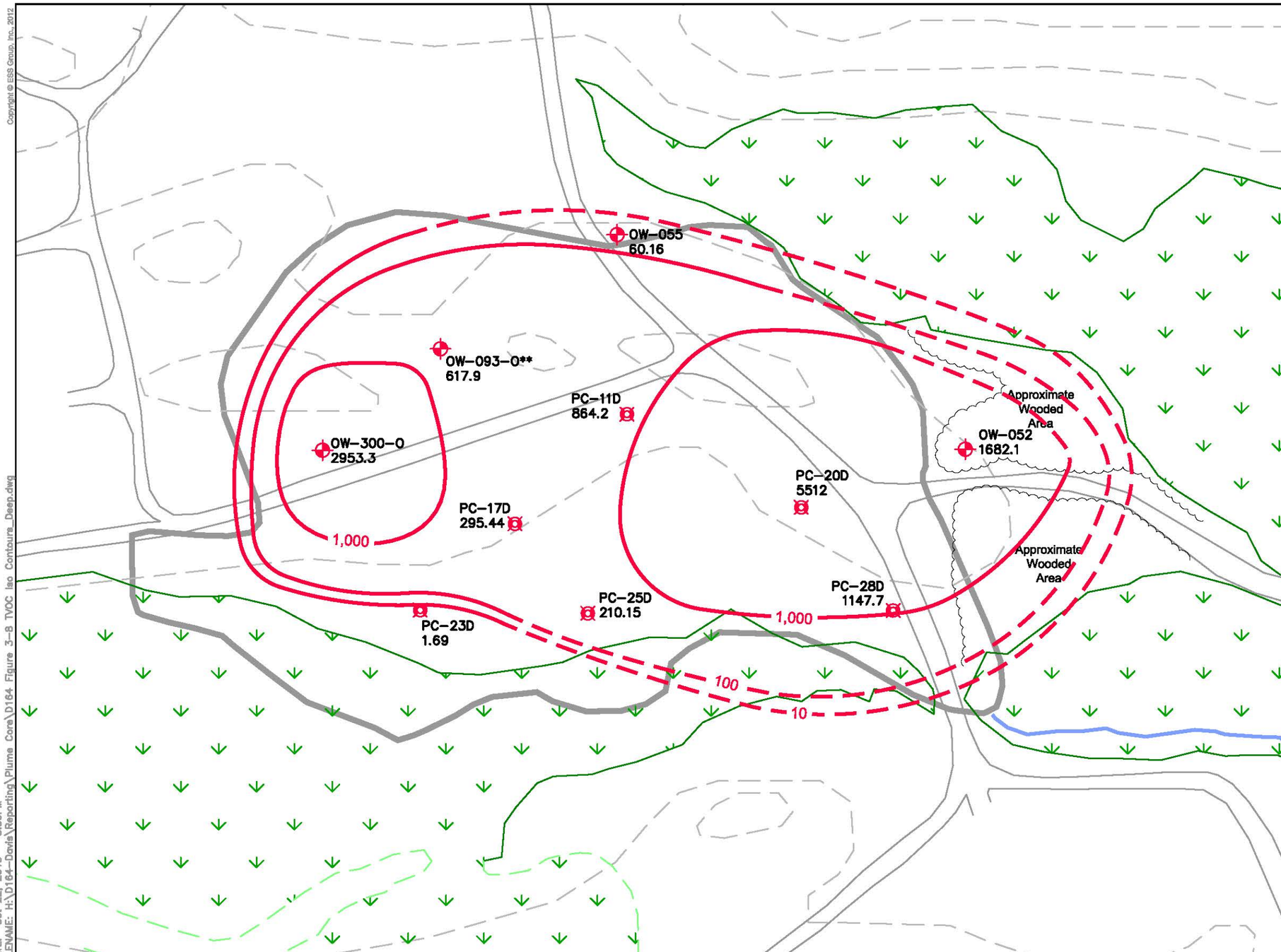

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LEGEND:

OW-051	UNCONSOLIDATED DEPOSIT MONITORING WELL
PC-17D	PLUME CORE MONITORING WELL (S-SHALLOW, D-DEEP)
	ROADS (UNPAVED)
	DELINEATED WETLAND AREAS (DASHED WHERE APPROXIMATE)
	APPROXIMATE LIMIT OF SATURATED UNEXCAVATED SOIL (FORMER SOURCE AREA)
1682.1	TVOC CONCENTRATION (ug/L)
	TVOC ISOCONCENTRATION CONTOUR (ug/L) DASHED WHERE INFERRED

NOTES:

1. BASE PLAN HAS BEEN COMPILED FROM SITE SURVEYS CONDUCTED BY MARK N. NYBERG ASSOCIATES, INC. (DECEMBER 2001; MAY 2003, REVISED AUGUST 2003 AND DECEMBER 2003; AND OCTOBER 2008), SITE SURVEY CONDUCTED BY DIPRETE ENGINEERING (NOVEMBER 2012), AND WOODWARD-CLYDE FINAL PRE-DESIGN ENGINEERING REPORT II (OCTOBER 1993).
2. ** REPLACEMENT WELLS INSTALLED IN THE GENERAL LOCATION OF WELLS DECOMMISSIONED DURING SOURCE REMEDIATION.

DATE: Oct 22, 2013 – 3:39PM
FILENAME: H:\D164-Davis\Reporting\Plume Core\D164 Figure 3-8 TVOC Iso Contours_Deep.dwg

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Davis Liquid Waste Superfund Site
Smithfield, Rhode Island
Project No. D164
Scale: 1"=100'
0 100 FEET

TVOC Isoconcentration Map
Deep Wells
Plume Core - Summer 2012

Figure 3-8

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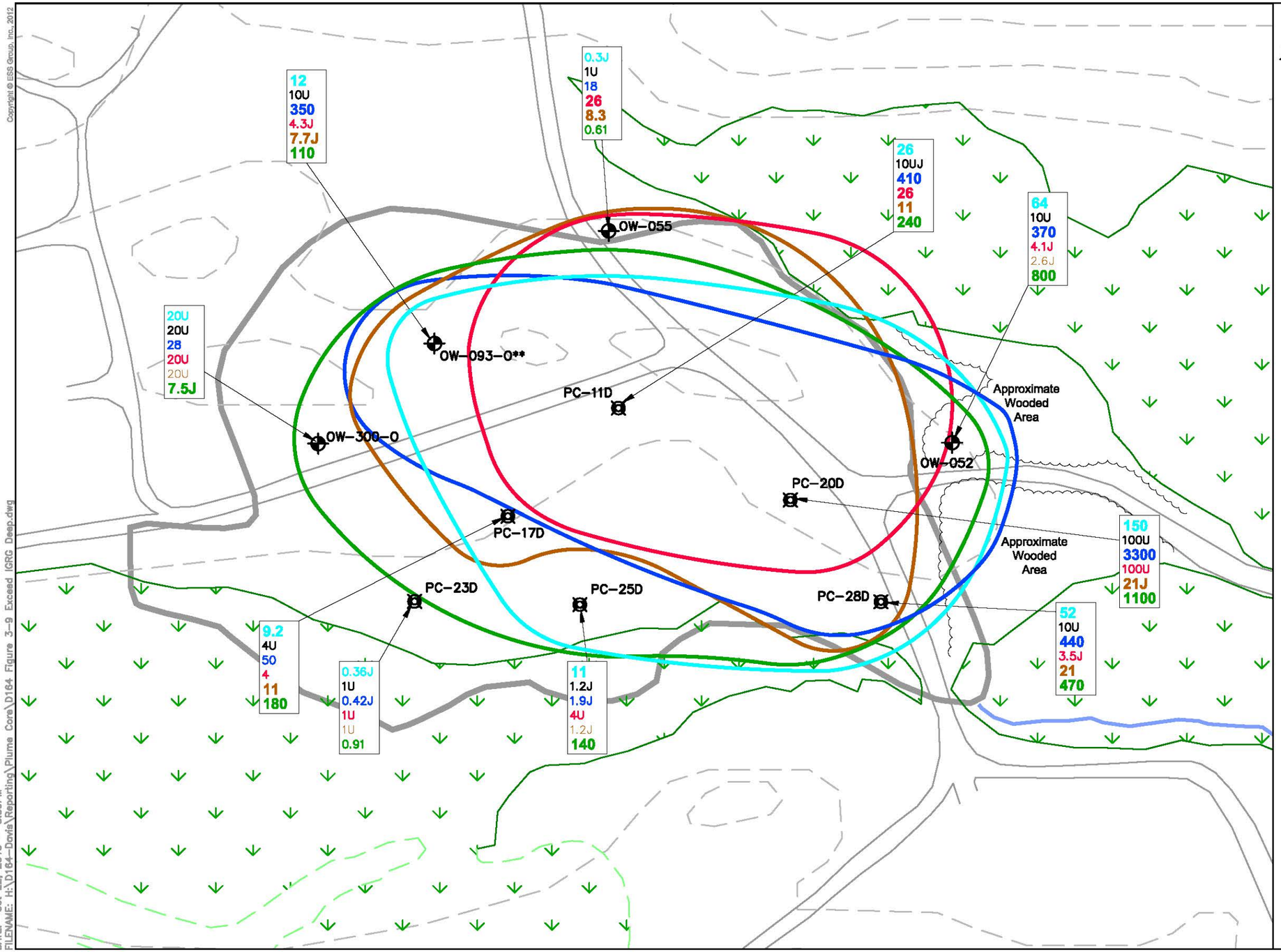

N

LEGEND:

OW-051 — UNCONSOLIDATED DEPOSIT MONITORING WELL

PC-20D — PLUME CORE MONITORING WELL (S-SHALLOW, D-DEEP)

ROADS (UNPAVED)

DELINEATED WETLAND AREAS (DASHED WHERE APPROXIMATE)

POND (APPROXIMATE)

APPROXIMATE LIMIT OF SATURATED UNEXCAVATED SOIL (FORMER SOURCE AREA)

APPROXIMATE LIMIT OF GROUNDWATER CONCENTRATIONS ABOVE IGRGs (COLOR VARIES BY VOC AND EXCEEDANCES ARE **BOLDED**)

VOC Data Color Scheme (ug/L)

0.38U	1,1-Dichloroethane
0.41U	Benzene
0.81U	cis-1,2-Dichloroethylene
0.36U	Tetrachloroethylene
0.46U	Trichloroethylene
0.9U	Vinyl Chloride

Compound	IGRG (ug/L)
1,1-Dichloroethane	6
Benzene	5
cis-1,2-Dichloroethylene	70
Tetrachloroethylene	5
Trichloroethylene	5
Vinyl Chloride	2

(EXCEEDANCES ARE **BOLDED**)

NOTES:

1. BASE PLAN HAS BEEN COMPILED FROM SITE SURVEYS CONDUCTED BY MARK N. NYBERG ASSOCIATES, INC. (DECEMBER 2001; MAY 2003, REVISED AUGUST 2003 AND DECEMBER 2003; AND OCTOBER 2008), SITE SURVEY CONDUCTED BY DIPRETE ENGINEERING (NOVEMBER 2012), AND WOODWARD-CLYDE FINAL PRE-DESIGN ENGINEERING REPORT II (OCTOBER 1993).
2. ** REPLACEMENT WELLS INSTALLED IN THE GENERAL LOCATION OF WELLS DECOMMISSIONED DURING SOURCE REMEDIATION.
3. INTERIM GROUNDWATER REMEDIATION GOALS (IGRGs), TABLE 7, RECORD OF DECISION AMENDMENT, SEPTEMBER 30, 2010.

DATE: Oct 22, 2013 – 3:39PM
FILENAME: H:\D164-Davis\Reporting\Plume Core\D164 Figure 3-9 Exceed IGRG Deep.dwg

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Davis Liquid Waste Superfund Site
Smithfield, Rhode Island
Project No. D164

Scale: 1"=100'
0 — 100 FEET

Extent of VOC Exceedances of ROD Criteria
Deep Wells
Plume Core - Summer 2012

Figure 3-9

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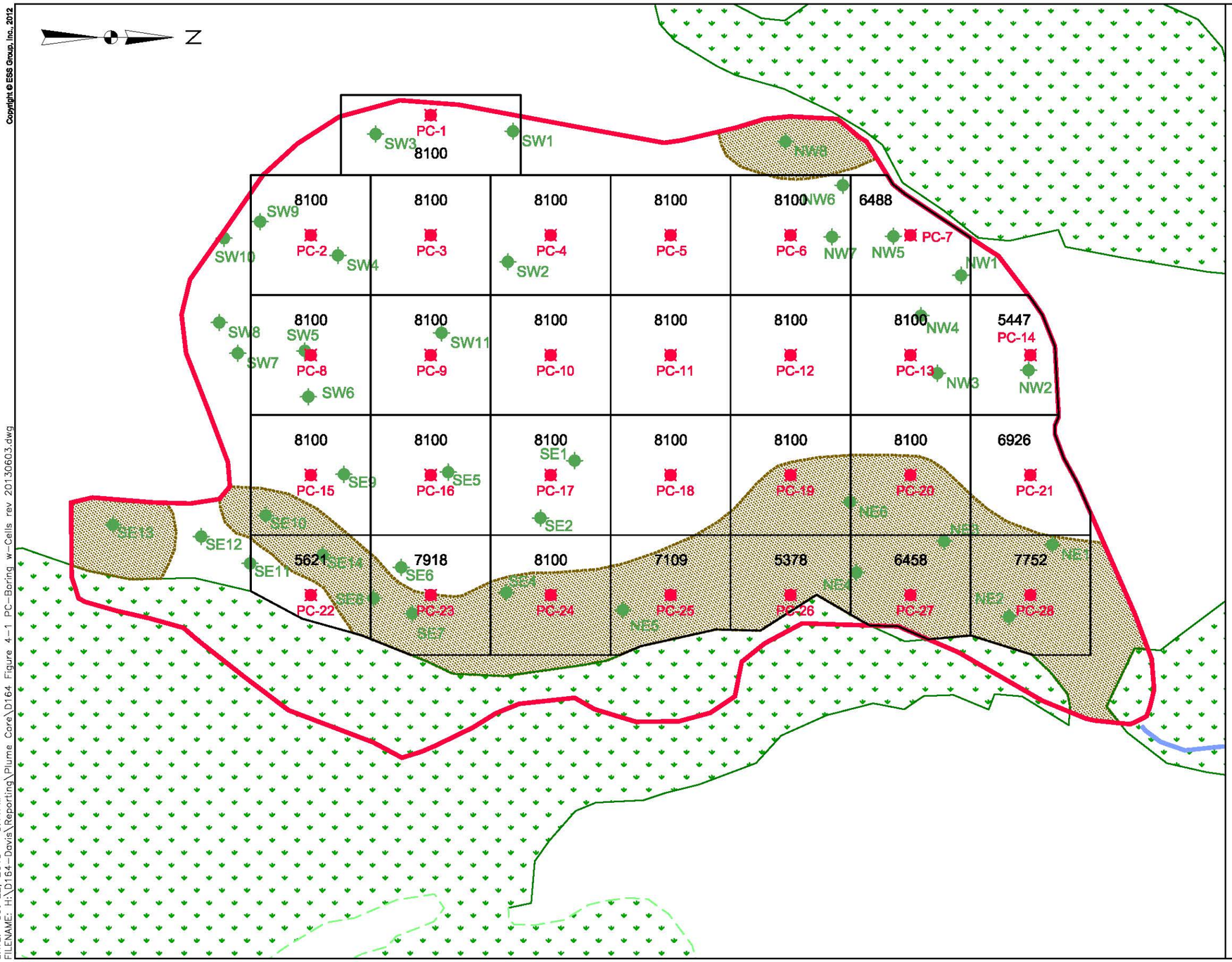

LEGEND:

PC-1 — PLUME CORE BORING (2012)

APPROXIMATE LIMIT OF SATURATED UNEXCAVATED SOIL (FORMER SOURCE AREA)

NE1 — DELINEATED WETLAND AREAS (DASHED WHERE APPROXIMATE)

APPROXIMATE AREA OF ORGANIC PEAT AND SILT

8100 — AREA (S.F.)

PC-13 — PLUME CORE BORING 2012

BOUNDARIES OF MASS ESTIMATION CELLS AND CALCULATED AREA FOR CELL.

NOTES:

1. BASE PLAN HAS BEEN COMPILED FROM SITE SURVEYS CONDUCTED BY MARK N. NYBERG ASSOCIATES, INC. (DECEMBER 2001; MAY 2003, REVISED AUGUST 2003 AND DECEMBER 2003; AND OCTOBER 2008), SITE SURVEY CONDUCTED BY DIPRETE ENGINEERING (NOVEMBER 2012), AND WOODWARD-CLYDE FINAL PRE-DESIGN ENGINEERING REPORT II (OCTOBER 1993).
2. ** REPLACEMENT WELLS INSTALLED IN THE GENERAL LOCATION OF WELLS DECOMMISSIONED DURING SOURCE REMEDIATION.

DATE: Oct 22, 2013 – 3:41PM
FILENAME: H:\D164-Davis\Reporting\Plume Core\D164 Figure 4-1 PC-Boring w-Cells rev 20130603.dwg

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Project No. D164-000

Scale: 1"=80'
0 — 80 FEET

Residual Mass Calculation
Grid Cells and Areas

Figure 4-1

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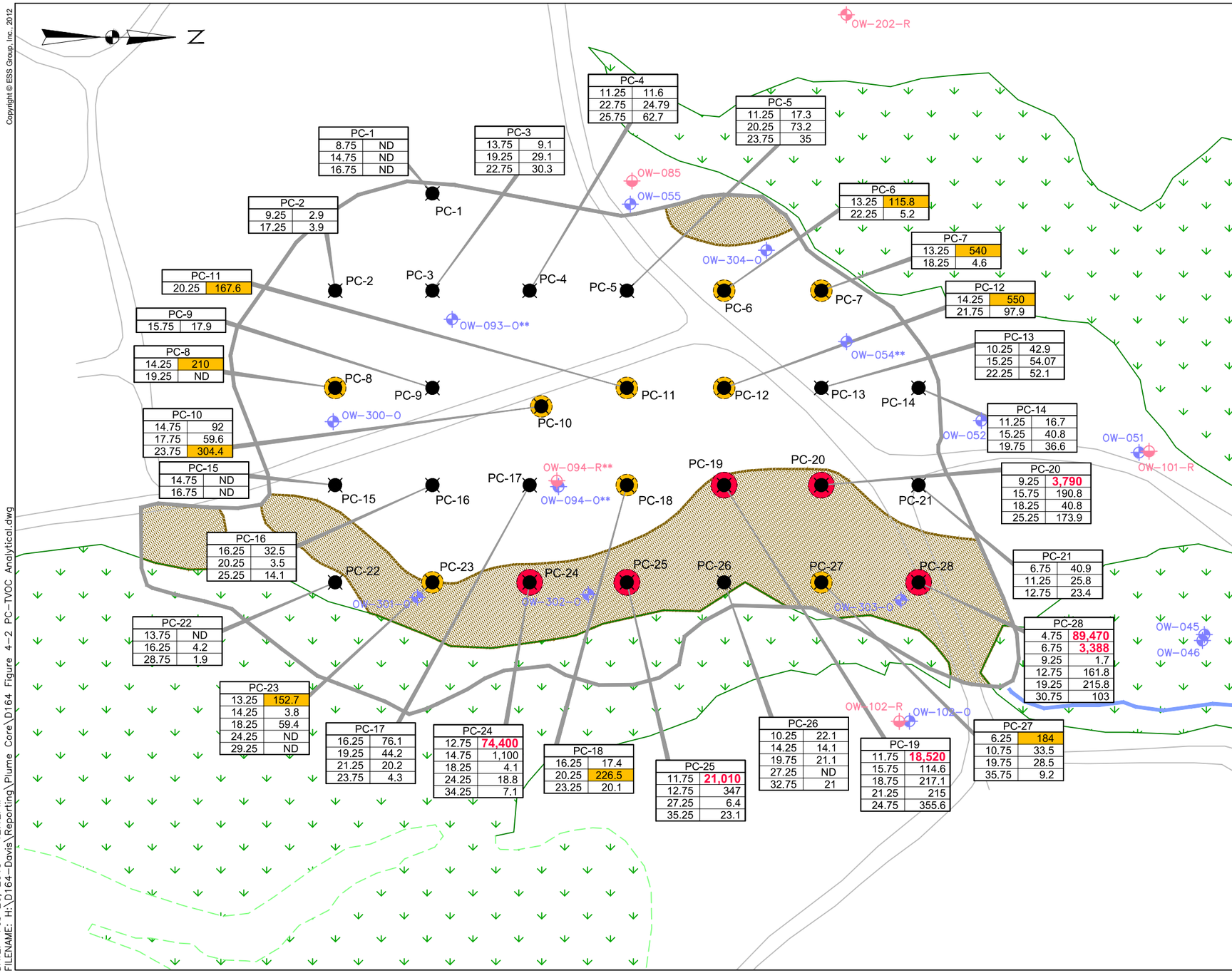

PC-1	
8.75	ND
14.75	ND
16.75	ND

PC-2	
9.25	2.9
17.25	3.9

PC-3	
13.75	9.1
19.25	29.1
22.75	30.3

PC-4	
11.25	11.6
22.75	24.79
25.75	62.7

PC-5	
11.25	17.3
20.25	73.2
23.75	35

PC-6	
13.25	115.8
22.25	5.2

PC-7	
13.25	540
18.25	4.6

PC-8	
14.25	210
19.25	ND

PC-9	
15.75	17.9

PC-10	
14.75	92
17.75	59.6
23.75	304.4

PC-11	
20.25	167.6

PC-12	
14.25	550
21.75	97.9

PC-13	
10.25	42.9
15.25	54.07
22.25	52.1

PC-14	
11.25	16.7
15.25	40.8
19.75	36.6

PC-15	
14.75	ND
16.75	ND

PC-16	
16.25	32.5
20.25	3.5
25.25	14.1

PC-17	
16.25	76.1
19.25	44.2
21.25	20.2
23.75	4.3

PC-18	
16.25	17.4
20.25	226.5
23.25	20.1

PC-19	
11.75	18,520
15.75	114.6
18.75	217.1
21.25	215
24.75	355.6

PC-20	
9.25	3,790
15.75	190.8
18.25	40.8
25.25	173.9

PC-21	
6.75	40.9
11.25	25.8
12.75	23.4

PC-22	
13.75	ND
16.25	4.2
28.75	1.9

PC-23	
13.25	152.7
14.25	3.8
18.25	59.4
24.25	ND
29.25	ND

PC-24	
12.75	74,400
14.75	1,100
18.25	4.1
24.25	18.8
34.25	7.1

PC-25	
11.75	21,010
12.75	347
27.25	6.4
35.25	23.1

PC-26	
10.25	22.1
14.25	14.1
19.75	21.1
27.25	ND
32.75	21

PC-27	
6.25	184
10.75	33.5
19.75	28.5
35.75	9.2

PC-28	
4.75	89,470
6.75	3,388
9.25	1.7
12.75	161.8
19.25	215.8
30.75	103

LEGEND:

- OW-051 — UNCONSOLIDATED DEPOSIT MONITORING WELL
- OW-101-R — BEDROCK MONITORING WELL
- PC-1 — PLUME CORE BORING (2012)
- ROADS (UNPAVED)
- APPROXIMATE LIMIT OF SATURATED UNEXCAVATED SOIL (FORMER SOURCE AREA)
- DELINEATED WETLAND AREAS (DASHED WHERE APPROXIMATE)
- APPROXIMATE AREA OF ORGANIC PEAT AND SILT
- HIGHEST TVOC RESULTS ≥100 ug/kg and <1000 ug/kg
- HIGHEST TVOC RESULTS ≥1000 ug/kg

PC-1	
8.75	ND
14.75	ND
16.75	ND

SAMPLE ID

SAMPLE DEPTH BGS (FT) — HIGHEST TVOC RESULT (ug/kg)

NOTES:

1. BASE PLAN HAS BEEN COMPILED FROM SITE SURVEYS CONDUCTED BY MARK N. NYBERG ASSOCIATES, INC. (DECEMBER 2001; MAY 2003, REVISED AUGUST 2003 AND DECEMBER 2003; AND OCTOBER 2008), SITE SURVEY CONDUCTED BY DIPRETE ENGINEERING (NOVEMBER 2012), AND WOODWARD-CLYDE FINAL PRE-DESIGN ENGINEERING REPORT II (OCTOBER 1993).
2. ** REPLACEMENT WELLS INSTALLED IN THE GENERAL LOCATION OF WELLS DECOMMISSIONED DURING SOURCE REMEDIATION.

DATE: Feb 26, 2013 – 12:12PM
FILENAME: H:\D164-Davis\Reporting\Plume Core\D164 Figure 4-2 PC-TVOC Analytical.dwg

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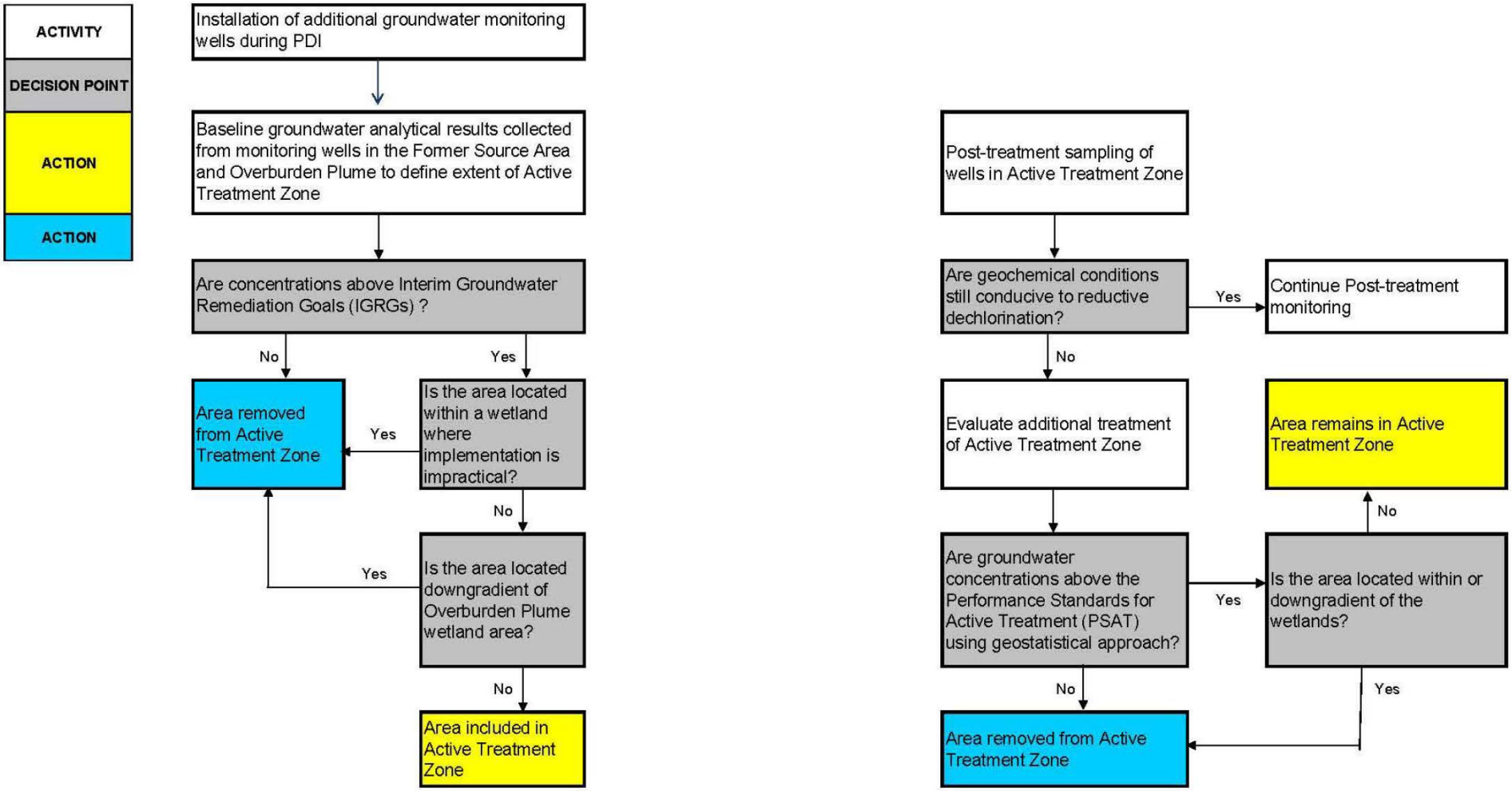
Smithfield, Rhode Island
Project No. D164-002

Scale: 1"=80'
0 — 80 FEET

Summary of TVOC Analytical Results

Figure 4-2

PRELIMINARY DECISION MATRIX
Development of Active Treatment Zone
Davis Liquid Waste Site
April 11, 2011



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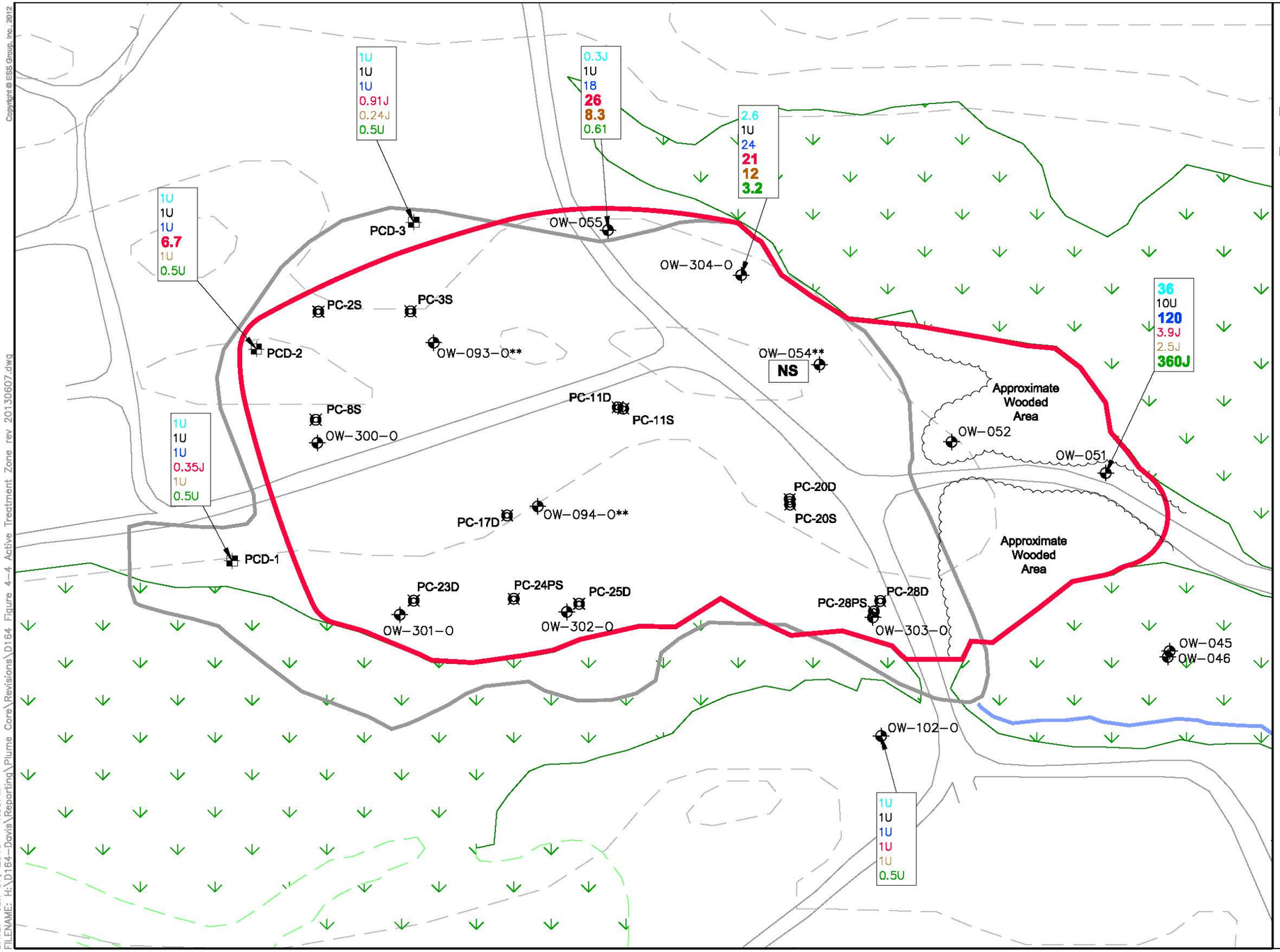
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Source: Attachment F, Statement of Work

Preliminary Decision Matrix
Development of Active Treatment Zone

Figure
4-3



Z

LEGEND:

- OW-051 — UNCONSOLIDATED DEPOSIT MONITORING WELL VOCs (ug/L)
- PC-17D — PLUME CORE MONITORING WELL (S-SHALLOW, D-DEEP)
- PCD-1 — PLUME CORE DELINEATION WELL
- ROADS (UNPAVED)
- DELINEATED WETLAND AREAS (DASHED WHERE APPROXIMATE)
- POND (APPROXIMATE)
- APPROXIMATE LIMIT OF SATURATED UNEXCAVATED SOIL (FORMER SOURCE AREA)
- INITIAL ACTIVE TREATMENT ZONE
- NS — WELL NOT SAMPLED DURING SUMMER 2012 SITE-WIDE MONITORING EVENT

VOC Data Color Scheme (ug/L)

- 1U — 1,1-Dichloroethane
- 1U — Benzene
- 1U — cis-1,2-Dichloroethylene
- 1U — Tetrachloroethylene
- 1U — Trichloroethylene
- 0.5U — Vinyl Chloride

Compound	IGRG (ug/L)
1,1-Dichloroethane	6
Benzene	5
cis-1,2-Dichloroethylene	70
Tetrachloroethylene	5
Trichloroethylene	5
Vinyl Chloride	2

(EXCEEDANCES ARE **BOLDED**)

NOTES:

1. BASE PLAN HAS BEEN COMPILED FROM SITE SURVEY CONDUCTED BY MARK N. NYBERG ASSOCIATES, INC. (DECEMBER 2001, MAY 2003 AND NOVEMBER 2008) AND WOODWARD-CLYDE FINAL PRE-DESIGN ENGINEERING REPORT II (OCTOBER 1993).
2. OW-054, OW-093-O, AND OW-094-O ARE REPLACEMENT WELLS INSTALLED IN THE GENERAL LOCATION OF WELLS DECOMMISSIONED DURING SOURCE REMEDIATION.
3. INTERIM GROUNDWATER REMEDIATION GOALS (IGRGs), TABLE 7, RECORD OF DECISION AMENDMENT, SEPTEMBER 30, 2010.

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DATE: Jun 07, 2013 – 1:55PM
FILENAME: H:\D164-Davis\Reporting\Plume Core\Revisions\D164 Figure 4-4 Active Treatment Zone rev 20130607.dwg

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Smithfield, Rhode Island
Project No. D164

Scale: 1"=100'
0 100 FEET

Delineation of Initial Active Treatment Zone

Figure 4-4

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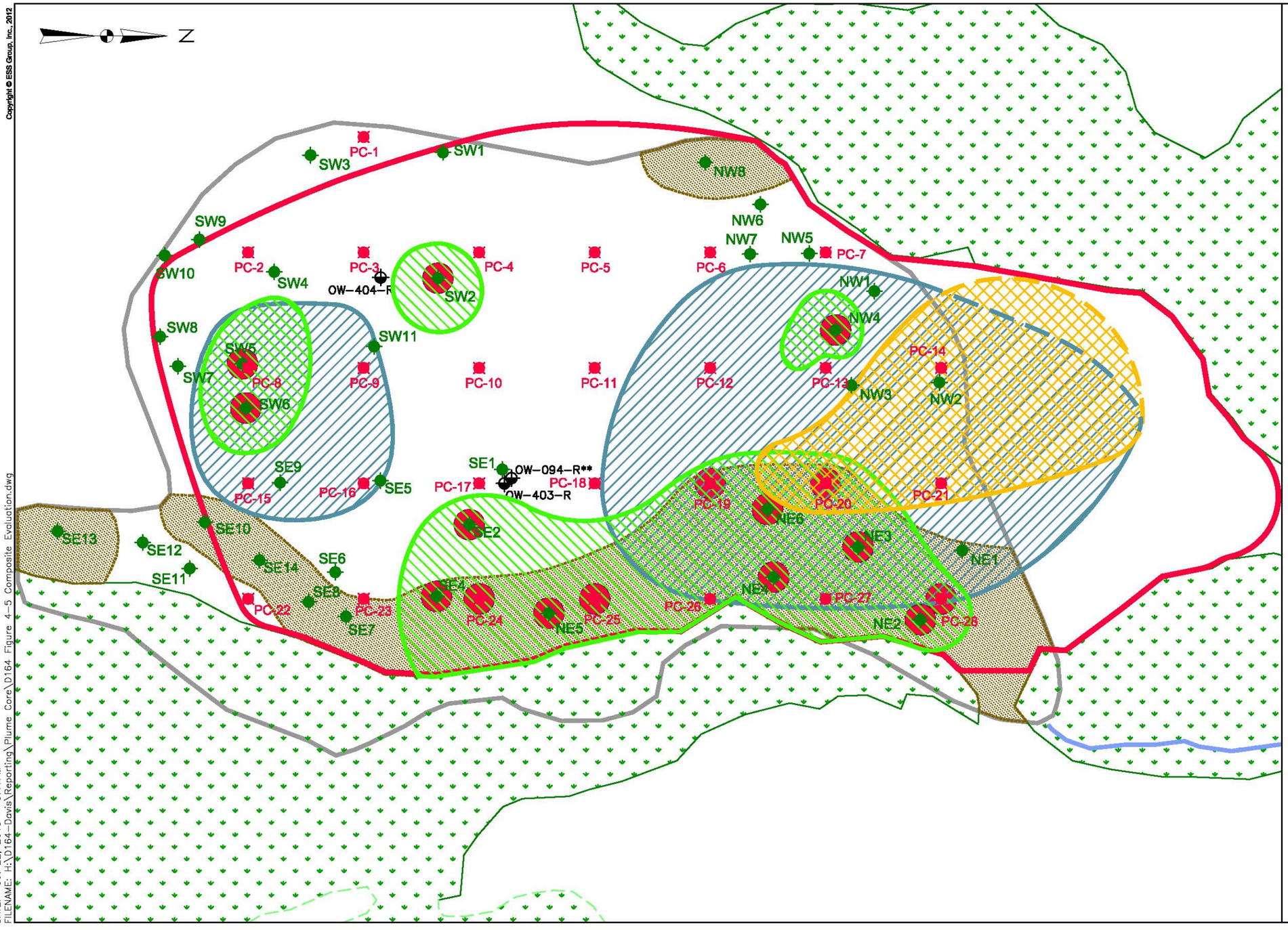

LEGEND:

- PC-1 — PLUME CORE BORING (2012)
- NE1 — PHASE 4 BORING (2008)
- OW-094-R** — BEDROCK MONITORING WELL
- APPROXIMATE LIMIT OF SATURATED UNEXCAVATED SOIL (FORMER SOURCE AREA)
- INITIAL ACTIVE TREATMENT ZONE
- HIGHEST TVOC RESULTS ≥1000 ug/kg
- GROUNDWATER TVOC ≥1000 ug/L (SHALLOW PLUME CORE WELLS)
- GROUNDWATER TVOC ≥1000 ug/L (DEEP PLUME CORE WELLS)
- SOIL TVOC CONCENTRATIONS ≥1000 ug/kg (2008 AND 2012)
- DELINEATED WETLAND AREAS (DASHED WHERE APPROXIMATE)
- APPROXIMATE AREA OF ORGANIC PEAT AND SILT

NOTES:

1. BASE PLAN HAS BEEN COMPILED FROM SITE SURVEYS CONDUCTED BY MARK N. NYBERG ASSOCIATES, INC. (DECEMBER 2001; MAY 2003, REVISED AUGUST 2003 AND DECEMBER 2003; AND OCTOBER 2008), SITE SURVEY CONDUCTED BY DIPRETE ENGINEERING (NOVEMBER 2012), AND WOODWARD-CLYDE FINAL PRE-DESIGN ENGINEERING REPORT II (OCTOBER 1993).
2. ** REPLACEMENT WELLS INSTALLED IN THE GENERAL LOCATION OF WELLS DECOMMISSIONED DURING SOURCE REMEDIATION.

DATE: Oct 22, 2013 – 3:41PM
FILENAME: H:\D164-Davis\Reporting\Plume Core\D164 Figure 4-5 Composite Evaluation.dwg

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Davis Liquid Waste Superfund Site
Smithfield, Rhode Island
Project No. D164-000

Scale: 1"=100'
0 100 FEET

Composite Evaluation of Initial Active Treatment Zone

Figure 4-5

Appendix A

Soil Boring Logs

BORING AND WELL CONSTRUCTION LOG

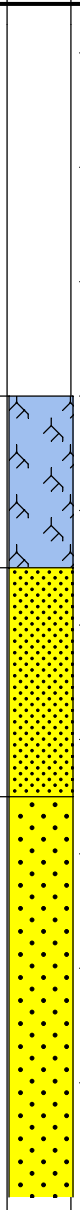
Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-18-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Macro-Core Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-1 / PCD-3

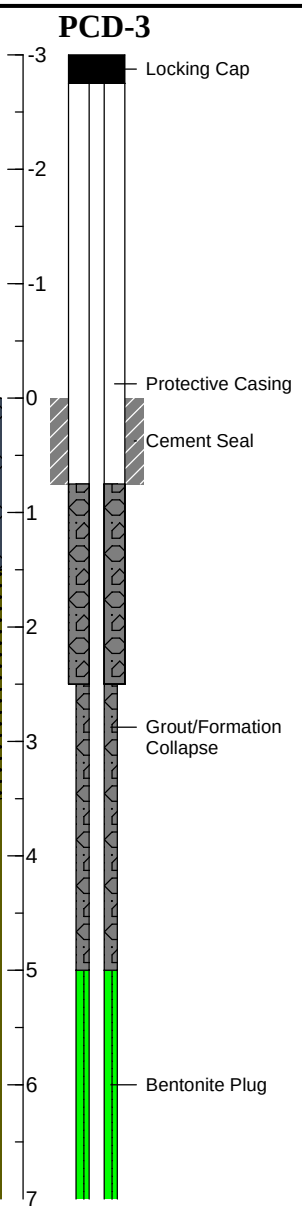
Approx. Depth to Water (ft):	7.0'
Well Diameter (inches):	1.5" ID
Well Screen Slot Size:	0.010 "
Measuring Point:	PVC
Measuring Point Elevation:	TBD
Approx. Ground Surface Elevation:	411.7

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
0				3.2/5.0		0.0	TS	0	Damp, brown, loose, LOAM (FINE AND MEDIUM SAND, little to some silt).
	0.5-2.0 (2.0)						TB		
						0.0			
									Damp to moist, brown, loose, FINE SAND, little silt and medium sand, trace brick fragments.
						0.0	CF		
						0.0			
						0.0			Moist to wet, light brown to yellowish-orange, MEDIUM SAND, some coarse sand, little fine sand.
5				2.8/5.0		0.0		-5	
						0.0			

Graphical Log



Well Construction



LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

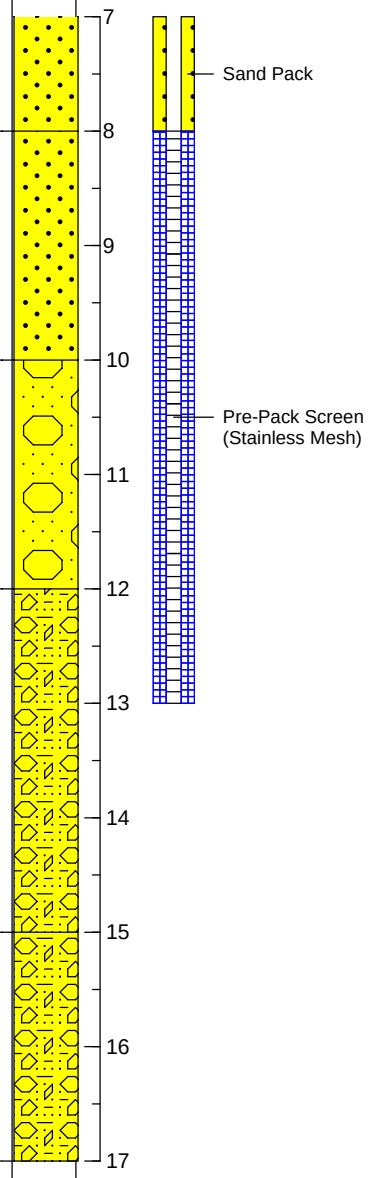
Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals)

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site	Boring/Well No:	**PC-1 / PCD-3**
Client Name:	Davis Site Group	Approx. Depth to Water (ft):	7.0'
Date(s):	5-18-2012	Well Diameter (inches):	1.5" ID
Drilling Company:	Maher Services, Inc.	Well Screen Slot Size:	0.010 "
Drilling Method:	Macro-Core Direct Push	Measuring Point:	PVC
Sampling Method:	Acetate Liner	Measuring Point Elevation:	TBD
ESS Observer:	Alvarez	Approx. Ground Surface Elevation:	411.7

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
						0.0	PC		
	8.0-10.0 (8.5-9.0)					0.0			Wet, rusty-brown to yellowish-orange, COARSE SAND, trace fine and medium sand. Lens of well-rounded fine and coarse gravel at 8.0' bgs.
						0.0			
10				2.8/5.0		0.0		-10	Wet, grey, COARSE SAND, little fine gravel.
						0.0			
						0.0			Wet, grey, angular, MEDIUM GRAVEL, some silt and fine/medium sand.
						0.0			
	14.0-16.0 (14.5-15.0)					0.0			
15				1.7/2.0		0.0		-15	Wet, grey, FINE SAND AND FINE GRAVEL. Refusal at 17.0' with bedrock projected at 21.7' bgs.
						0.0			
	(16.5-17.0)								

Graphical Log / Well Construction



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals)

BORING AND WELL CONSTRUCTION LOG

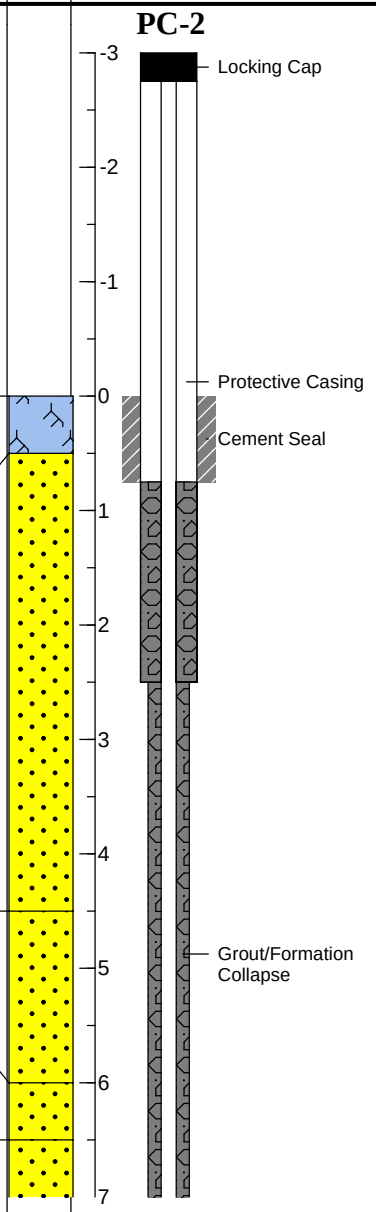
Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-21-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-2

Approx. Depth to Water (ft):	8.0'
Well Diameter (inches):	1.5" ID
Well Screen Slot Size:	0.010"
Measuring Point:	PVC
Measuring Point Elevation:	TBD
Approx. Ground Surface Elevation:	413.33

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
0				3.4/4.9		0.0	TS	0	Dry, dark brown, loose, LOAM (FINE AND MEDIUM SAND, little to some silt).
	0.5-2.0 (0.5-1.0) PCB-1						TB		Dry to damp, light to dark brown, medium dense, FINE AND MEDIUM SAND, little fine gravel, trace silt.
						0.0			
						0.0			
						0.0			
							CF		
						0.0			
5				2.3/4.9		0.0		-5	Damp, light brown to yellowish-orange, loose, MEDIUM SAND, little fine gravel, trace coarse sand.
						0.0			Damp, dark brown, loose, MEDIUM SAND, little fine gravel, trace coarse sand.
									Damp to moist, light brown, MEDIUM SAND, little silt and coarse sand, trace fine gravel.

Graphical Log



LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
PCB-1 is a field duplicate of (0.5-1.0) for VOCs.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals)

BORING AND WELL CONSTRUCTION LOG

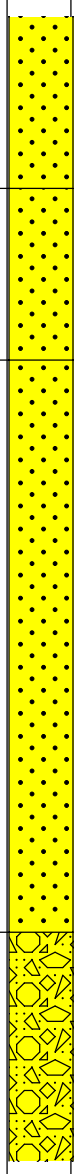
Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-21-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-2

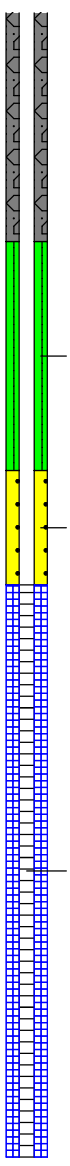
Approx. Depth to Water (ft):	8.0'
Well Diameter (inches):	1.5" ID
Well Screen Slot Size:	0.010"
Measuring Point:	PVC
Measuring Point Elevation:	TBD
Approx. Ground Surface Elevation:	413.33

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
						0.0			
						0.0			
							PC		Wet, light grey, loose to medium dense, MEDIUM SAND, little fine and coarse sand, trace silt.
	9.0-11.0 (9.0-9.5) MS/MSD					0.0			
10				1.5/4.9		0.0		-10	Wet, grey to light brown, medium dense, COARSE SAND, some medium sand, little silt and fine gravel.
						0.0			
						0.0			
						0.0			
						0.0			
15				1.6/4.0		0.0		-15	Wet, light brown, dense, FINE GRAVEL, some coarse sand, little fine/medium sand and coarse gravel, trace silt (TILL). Refusal at 19.0' with projected bedrock at 22.6' bgs.
						0.0			

Graphical Log



Well Construction



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
PCB-1 is a field duplicate of (0.5-1.0) for VOCs.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals)

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-21-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: **PC-2**
Approx. Depth to Water (ft): 8.0'
Well Diameter (inches): 1.5" ID
Well Screen Slot Size: 0.010"
Measuring Point: PVC
Measuring Point Elevation: TBD
Approx. Ground Surface Elevation: 413.33

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description: Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing	Graphical Log	Well Construction
	17.0-19.0 (17.0-17.5)					0.0					17 18 19

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

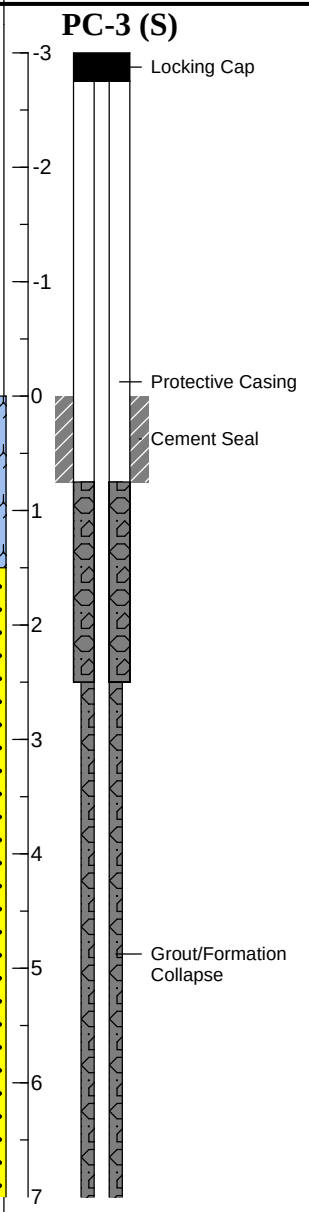
Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
PCB-1 is a field duplicate of (0.5-1.0) for VOCs.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals)

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site	Boring/Well No:	**PC-3 / PC-3 (S)**
Client Name:	Davis Site Group	Approx. Depth to Water (ft):	9.75'
Date(s):	5-21-2012	Well Diameter (inches):	1.5" ID
Drilling Company:	Maher Services, Inc.	Well Screen Slot Size:	0.010"
Drilling Method:	Dual-Tube Direct Push	Measuring Point:	PVC
Sampling Method:	Acetate Liner	Measuring Point Elevation:	TBD
ESS Observer:	Alvarez	Approx. Ground Surface Elevation:	414.60

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log
0				3.3/4.9		0.3	TS	0	Damp, brown, loose, LOAM (FINE AND MEDIUM SAND, little to some silt).	
	0.5-2.0 (0.5-1.0)						TB			
						0.1				
									Damp, dark brown, MEDIUM SAND, some fine sand and fine gravel, trace silt and glass fragments.	
						0.2				
						0.1				
						0.3	CF			
5				3.9/4.9		0.4		-5		
						0.2				

Well Construction



LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals)

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-21-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

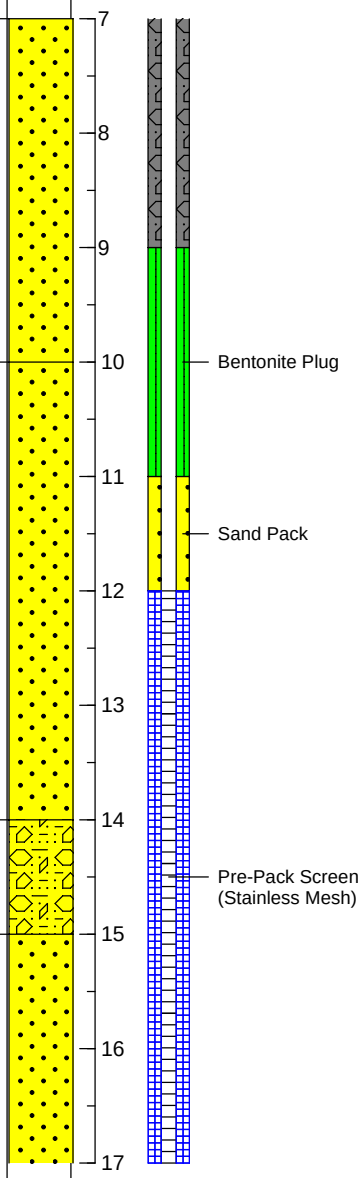
Boring/Well No: PC-3 / PC-3 (S)

Approx. Depth to Water (ft):	9.75'
Well Diameter (inches):	1.5" ID
Well Screen Slot Size:	0.010"
Measuring Point:	PVC
Measuring Point Elevation:	TBD
Approx. Ground Surface Elevation:	414.60

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
						0.2			Damp to wet, yellowish-orange, MEDIUM SAND, some fine gravel, trace coarse sand.
						0.1			
						0.2			
10				2.9/4.9		0.1	PC	-10	Wet, light brown, loose to medium dense, FINE AND MEDIUM SAND, little coarse sand.
						0.1			
	12.0-14.0 (13.5-14.0)					0.1			
						0.1			
						0.5			Wet, grey, COARSE SAND AND FINE GRAVEL, some medium sand, trace silt.
15				2.0/4.9		0.0		-15	Wet, light grey, COARSE SAND, some medium sand and fine gravel.
						0.0			

Graphical Log

Well Construction



LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals)

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-21-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: **PC-3 / PC-3 (S)**
Approx. Depth to Water (ft): 9.75'
Well Diameter (inches): 1.5" ID
Well Screen Slot Size: 0.010"
Measuring Point: PVC
Measuring Point Elevation: TBD
Approx. Ground Surface Elevation: 414.60

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
						0.0					17
						0.2					18
	(19.0-19.5)					0.8			Wet, light brown, SILT AND MEDIUM SAND, some fine and coarse sand.		19
20				2.2/3.7		0.8		-20	Wet, light brown, COARSE SAND, some medium sand and fine gravel, trace fine sand.		20
						0.2			Refusal at 23.7' with projected bedrock surface at 26.6'.		21
						0.2					
	21.5-23.5 (22.5-23.0)					0.2					22
						0.9					
						0.5					23

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals)

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-18-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Macro-Core Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-4

Approx. Depth to Water (ft):	9.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	415.5

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.7/5.0		0.0	TS	0	Damp, brown, loose, LOAM (FINE SAND AND SILT).		0
	0.5-2.0 (1.5-2.0)						TB		Damp, light to dark brown, FINE AND MEDIUM SAND, some silt, little fine gravel.		1
						0.0					
						0.0					2
						0.0					3
						0.0	CF		Damp to dry, light brown, FINE AND MEDIUM SAND, some silt.		4
5				3.5/5.0		0.0		-5			5
						0.0			Dry to damp, yellowish-brown, FINE SAND, little fine gravel (angular).		6
						0.0					7
						0.0					8
						0.0			Wet, yellowish-brown, FINE SAND, little fine gravel (angular).		9
10								-10			10

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals)

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-18-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Macro-Core Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-4

Approx. Depth to Water (ft):	9.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	415.5

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10				1.5/5.0		0.0		-10			10
	11.0-13.0 (11.0-11.5)					0.0	PC				11
						0.0					12
						NM					13
						NM					14
									Damp to wet, dark grey, FINE SAND AND MEDIUM GRAVEL.		
15				4.6/5.0		0.1		-15	Wet, brown-grey, MEDIUM AND COARSE SAND, little fine sand.		15
						0.0					16
						0.0					17
									Wet, COARSE SAND AND FINE GRAVEL (sub-angular), trace fine and medium sand.		18
						0.0					19
						0.0					
20								-20			20

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals)

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-18-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Macro-Core Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-4

Approx. Depth to Water (ft):	9.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	415.5

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
20				4.5/5.0		0.0		-20			20
						0.0					21
						0.0					22
	(22.5-23.0)										
						0.0					23
						0.0					24
25	25.0-26.7 (25.5-26.0)			0.8/1.7		1.7		-25	Wet, dark grey, FINE SAND.		25
						0.6			Damp, dark grey, FINE SAND AND SILT, little fine gravel. Refusal at 26.7' with projected bedrock surface at 28.6'.		26

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals)

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-18-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Macro-Core Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-5

Approx. Depth to Water (ft):	7.5'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	414.47

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.5/5.0		0.0	TS	0	Damp, dark brown, loose, LOAM (FINE SAND AND SILT).		0
	0.5-2.0 (1.0-1.5)						TB				
						0.0			Damp, light to dark brown, dense, FINE AND MEDIUM SAND, trace coarse sand and fine gravel.		1
						0.0	CF		Damp, loose, light brown, MEDIUM SAND AND FINE GRAVEL, little fine sand.		2
						0.0					3
						0.0					4
5				2.5/5.0		0.0		-5	Damp to moist, light brown, MEDIUM SAND AND FINE GRAVEL, little cobble, trace fine gravel.		5
						0.0					6
						0.0			Moist to wet, yellowish-orange, MEDIUM SAND, some coarse sand.		7
						NM					8
						NM					9
10								-10			10

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-18-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Macro-Core Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-5

Approx. Depth to Water (ft):	7.5'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	414.47

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10				2.5/5.0		0.0	PC	-10	Wet, light brown, COARSE SAND, some medium sand, trace fine gravel.		10
	11.0-13.0 (11.0-11.5)					0.0					11
						0.0			Wet, COARSE SAND AND FINE GRAVEL, some medium sand, trace fine sand.		12
						0.0					13
						0.0					14
15				4.4/5.0		0.0		-15	Wet, grey, FINE GRAVEL (sub-rounded), some coarse sand.		15
						0.0					16
						0.0					17
						0.0			Wet, grey-black, FINE AND COARSE GRAVEL (crushed cobble), trace silt and fine sand. Gravel is angular.		18
						0.0					19
20								-20			20

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-18-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Macro-Core Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: PC-5

Approx. Depth to Water (ft): 7.5'
Well Diameter (inches): N/A
Well Screen Slot Size: N/A
Measuring Point: N/A
Measuring Point Elevation: N/A
Approx. Ground Surface Elevation: 414.47

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
20	(20.0-20.5)			4.2/5.0		0.2		-20	Wet, dark grey, FINE GRAVEL (angular), some coarse sand.		20
						0.0					21
						0.0					22
	23.0-25.0 (23.5-24.0)					0.0					23
						0.0			Wet, light grey, medium dense, FINE SAND, trace silt.		24
25				0.7/2.0				-25	Wet, light grey/brown, FINE SAND, trace silt. Very hard refusal at 27.0' with projected bedrock surface at 26.50' bgs.		25
											26
											27

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-31-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-6

Approx. Depth to Water (ft):	9.0
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	413.65

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.0/4.9		2.2	TS	0	Dry, brown, loose, LOAM (FINE SAND AND SILT, some medium sand).		0
	(0.5-1.0)						CF		Dry, light brown to brown, loose to medium dense, FINE AND MEDIUM SAND, little silt, trace fine gravel.		1
						0.4					
						0.4			Dry, light brown, loose, FINE GRAVEL, trace fine and medium sand.		2
						0.5			Dry, light brown, FINE AND MEDIUM SAND, some fine gravel.		3
						0.4					4
5				1.2/4.9		0.4		-5	Moist, light brown, FINE AND MEDIUM SAND, some fine gravel.		5
											6
									Damp to moist, dense, FINE SAND AND FINE GRAVEL, some medium sand.		7
											8
							PC		Moist to wet, loose, olive-brown to grey, FINE SAND, some medium sand, little to some fine gravel, trace to little silt.		9
10								-10			10

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-31-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-6

Approx. Depth to Water (ft):	9.0
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	413.65

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10				1.9/4.9		1.3		-10			10
											11
	12.0-14.0 (13.0-13.5)					15.3					12
											13
						2.1			Wet, grey, loose, MEDIUM AND COARSE SAND, trace cobbles.		14
15				2.6/4.9		0.5		-15			15
						0.4					16
						0.4					17
						0.5					18
						0.5			Wet, grey, COARSE SAND, trace to little fine and medium sand, trace fine gravel. Very hard refusal at 22.5' with projected bedrock		19
20								-20			20

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-31-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: **PC-6**
Approx. Depth to Water (ft): 9.0
Well Diameter (inches): N/A
Well Screen Slot Size: N/A
Measuring Point: N/A
Measuring Point Elevation: N/A
Approx. Ground Surface Elevation: 413.65

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description: Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing	Graphical Log	Well Construction
20	20.0-22.5 MS/MSD (22.0-22.5)			2.1/3.5		0.4		-20	surface at 23.2' bgs.		20
						0.4					21
											22

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-31-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: PC-7

Approx. Depth to Water (ft): 7.0'
Well Diameter (inches): N/A
Well Screen Slot Size: N/A
Measuring Point: N/A
Measuring Point Elevation: N/A
Approx. Ground Surface Elevation: 409.5

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				1.6/4.9		0.4	TS	0	Dry, dark brown, loose, FINE AND MEDIUM SAND, little to some silt, trace coarse sand and gravel.		0
							CF				1
						0.2					2
											3
						0.2			Dry, light brown, loose, MEDIUM SAND, some fine gravel, little fine sand.		4
						0.2					
5				0.6/4.9		0.1	PC	-5			5
											6
									Wet, brown-grey, loose, FINE GRAVEL, little coarse sand.		7
											8
											9
10								-10			10

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-31-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-7

Approx. Depth to Water (ft):	7.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	409.5

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10				2.1/4.9		1.4		-10	Wet, dark grey, loose, FINE GRAVEL, some fine and coarse sand, trace to little silt and medium sand.		10
											11
						5.4					12
	13.0-15.0 (13.0-13.5)								Wet, black, loose, stained, FINE GRAVEL, some fine and coarse sand, trace to little silt and medium sand.		13
						1.3					
									Wet, brown-grey, loose, COARSE SAND, little medium sand.		14
15				2.5/3.5		0.8		-15			15
	16.0-18.5 (18.0-18.5)					0.3					16
									Wet, brown-grey, loose, FINE GRAVEL AND COARSE SAND.		17
						0.3			Wet, dark grey, loose, FINE GRAVEL AND COARSE SAND, some to little silt.		
									Refusal at 18.5' with projected bedrock surface at 18.0' bgs.		18

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

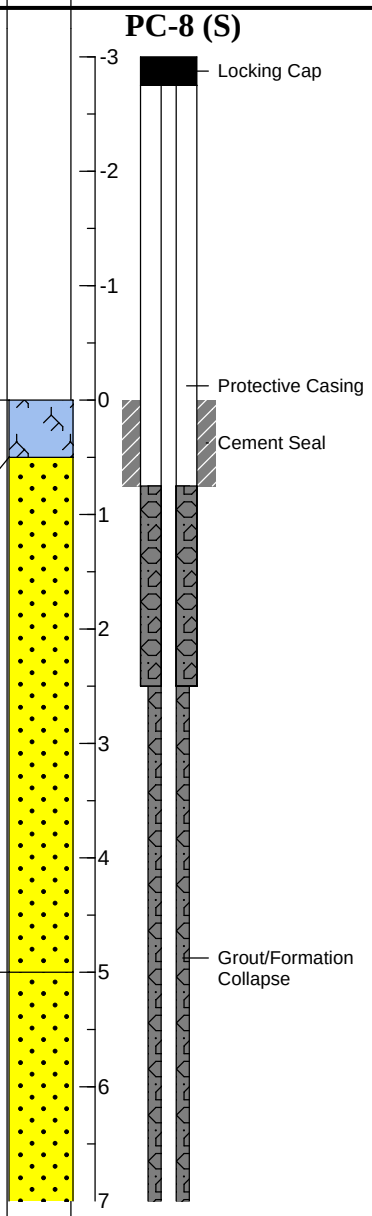
Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site	Boring/Well No:	**PC-8 / PC-8 (S)**
Client Name:	Davis Site Group	Approx. Depth to Water (ft):	9.75'
Date(s):	5-22-2012	Well Diameter (inches):	1.5" ID
Drilling Company:	Maher Services, Inc.	Well Screen Slot Size:	0.010"
Drilling Method:	Dual-Tube Direct Push	Measuring Point:	PVC
Sampling Method:	Acetate Liner	Measuring Point Elevation:	TBD
ESS Observer:	Alvarez	Approx. Ground Surface Elevation:	416.58

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
0				2.9/4.9		1.0	TS	0	Damp, brown, LOAM (FINE AND MEDIUM SAND, little to some silt).
	0.5-2.0 TB-1 (0.5-1.0)						TB		Damp to moist, light brown, FINE AND MEDIUM SAND, little fine gravel, trace silt.
						0.0			
						0.0			
						0.1			
						0.1	CF		
5				1.3/4.9		0.1		-5	Wet, light brown, FINE AND MEDIUM SAND, little fine gravel, trace silt.
						0.0			

Graphical Log



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Negative Results for Shake Test and Oil-Red-O at 14.0'-15.0' bgs.
TB-1 is a field duplicate of (0.5-2.0) for Full Suite.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-22-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

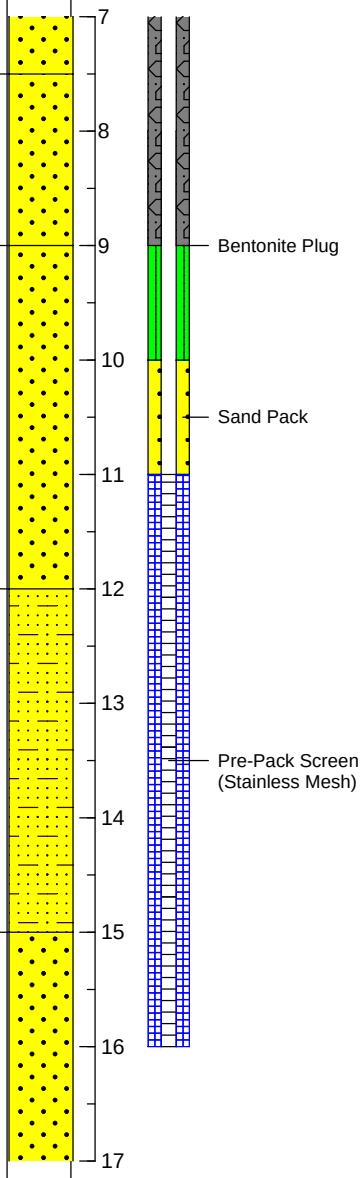
Boring/Well No: PC-8 / PC-8 (S)

Approx. Depth to Water (ft):	9.75'
Well Diameter (inches):	1.5" ID
Well Screen Slot Size:	0.010"
Measuring Point:	PVC
Measuring Point Elevation:	TBD
Approx. Ground Surface Elevation:	416.58

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
						0.0			
						0.0			Damp, light brown, medium dense, MEDIUM SAND, little fine gravel, trace fine and coarse sand.
						0.0			Wet, light brown, medium dense, MEDIUM SAND, little fine gravel, trace fine and coarse sand. Cobbles at 10.0' bgs.
10				2.0/4.9		0.0	PC	-10	
						0.3			
						1.9			Wet, dark brown to metallic-grey/blue, medium dense, FINE SAND AND SILT, some medium sand, little fine gravel, trace coarse sand. Odor present on stained soil.
						3.7			
	14.0-16.0 (14.0-14.5)					287.6			
15				3.3/4.9		38.5		-15	Wet, grey to dark grey, loose to medium dense, MEDIUM AND COARSE SAND, some fine sand, little fine gravel, trace silt.
						13.7			Very hard refusal at 21.5' with projected bedrock surface at 25.1' bgs.

Graphical Log

Well Construction



LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Negative Results for Shake Test and Oil-Red-O at 14.0'-15.0' bgs.
TB-1 is a field duplicate of (0.5-2.0) for Full Suite.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-22-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: **PC-8 / PC-8 (S)**
Approx. Depth to Water (ft): 9.75'
Well Diameter (inches): 1.5" ID
Well Screen Slot Size: 0.010"
Measuring Point: PVC
Measuring Point Elevation: TBD
Approx. Ground Surface Elevation: 416.58

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description: Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing	Graphical Log	Well Construction
						2.6					17
						0.4					18
	19.0-21.0 MS/MSD (19.0-19.5)					0.5					19
20				0.5/1.5		0.1		-20			20
											21

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Negative Results for Shake Test and Oil-Red-O at 14.0'-15.0' bgs.
TB-1 is a field duplicate of (0.5-2.0) for Full Suite.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-22/6-5-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-9

Approx. Depth to Water (ft):	9.5"
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	417.43

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.6/4.9		0.0	TS	0	Dry, brown, LOAM (FINE SAND AND SILT).		0
	0.5-2.0 (0.5-1.0)						TB		Damp, light brown, medium dense to dense, MEDIUM SAND AND FINE GRAVEL, little coarse sand, trace silt.		1
						0.0					
						0.2					2
						0.5					3
						0.4					4
5				2.6/4.9		0.4	CF	-5			5
						0.4					6
						0.5					7
						0.2			Damp, light brown to yellowish-orange, medium dense, MEDIUM SAND, some fine sand and fine gravel, trace silt.		8
						0.6					9
10								-10			10

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-22/6-5-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-9

Approx. Depth to Water (ft):	9.5"
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	417.43

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description	Graphical Log	Well Construction
10				0.9/4.9		0.2		-10	Wet, brown, loose, MEDIUM AND COARSE SAND, some fine and coarse gravel. Tire fragment at 12.0'.		10, 11, 12, 13
							PC				
	14.0-16.0 (15.5-16.0)								Wet, brown, loose, MEDIUM AND COARSE SAND, some fine and coarse gravel. Very hard refusal (gneissic-textured chips) at 16.5' with projected bedrock surface at 21.5' bgs.		14
15				0.5/1.5				-15			15, 16

Materials Description

Soils: moisture, density[1], color, size, major and minor constituents[2]

Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-23-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-10

Approx. Depth to Water (ft):	11.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	417.43

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description	Graphical Log	Well Construction
0				3.3/4.9		0.0	TS	0	Damp, dark brown, loose, LOAM (FINE SAND AND SILT).		0
	0.5-2.0 (1.0-1.5)						TB		Damp to moist, medium dense to dense, MEDIUM SAND, some fine and coarse sand, trace to little fine gravel, trace silt.		1
						0.1					
						0.0					2
						0.0	CF				3
						0.1					4
5				1.9/4.9		0.1		-5			5
						0.2			Damp to moist, dense, MEDIUM AND COARSE SAND, some fine gravel, little fine sand and silt.		6
						0.2					7
						0.1					8
						0.0					9
10								-10			10

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).
Treatability Sample:
PC-10-S&G (13.0-18.0)

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-23-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: PC-10

Approx. Depth to Water (ft): 11.0'
Well Diameter (inches): N/A
Well Screen Slot Size: N/A
Measuring Point: N/A
Measuring Point Elevation: N/A
Approx. Ground Surface Elevation: 417.43

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10				1.4/4.9		0.5		-10	Moist to wet, brownish-grey, loose to medium dense, MEDIUM SAND AND FINE GRAVEL, some fine sand and silt, trace coarse sand. Three layers of polyethylene sheeting were cut-through at 15.0' bgs.		10
						1.5	PC				11
						1.6					12
	14.0-16.0 (14.5-15.0)					61.5					13
15				3.7/4.9		24.7		-15	Wet, grey, loose to medium dense, FINE AND MEDIUM SAND, some silt and fine gravel, little coarse sand.		14
						1.7					15
						1.1					16
	(17.5-18.0)					1.8					17
						2.1			Wet, light grey to grey, FINE AND MEDIUM SAND, some coarse sand, trace fine gravel.		18
20								-20			19
											20

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).
Treatability Sample:
PC-10-S&G (13.0-18.0)

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-23-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: **PC-10**
Approx. Depth to Water (ft): 11.0'
Well Diameter (inches): N/A
Well Screen Slot Size: N/A
Measuring Point: N/A
Measuring Point Elevation: N/A
Approx. Ground Surface Elevation: 417.43

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
20				2.5/4.0		2.7		-20			20
						2.7					21
	22.0-24.0 (23.5-24.0)					2.5					22
						3.7			Dry, angular, rock chips in cutting shoe (mineralogy typical of underlying bedrock). Very hard refusal at 24.0' with projected bedrock surface at 27.2' bgs.		23
											24

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).
Treatability Sample:
PC-10-S&G (13.0-18.0)

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-25-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Macro-Core Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

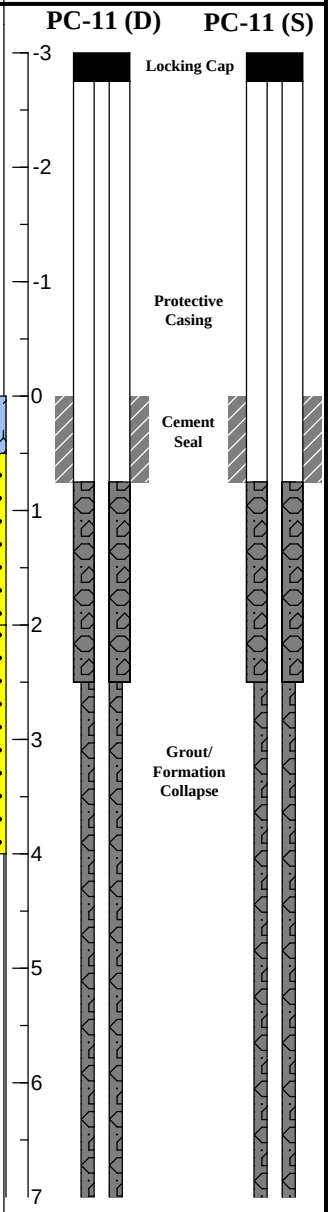
Boring/Well No: PC-11/ PC-11 (S / D)

Approx. Depth to Water (ft):	7.0'
Well Diameter (inches):	1.5" ID
Well Screen Slot Size:	0.010"
Measuring Point:	PVC
Measuring Point Elevation:	TBD
Approx. Ground Surface Elevation:	416.03

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
0				4.0/4.9		0.0	TS	0	Damp, dark brown, loose, LOAM (FINE AND MEDIUM SAND, little to some silt).
	0.5-2.0 (1.5-2.0)					0.1	TB		Damp, dark brown to greyish-brown, loose, FINE AND MEDIUM SAND, some fine gravel, little coarse sand.
						0.4			Damp, brown, loose to medium dense, FINE AND MEDIUM SAND, some fine gravel, little coarse sand.
						0.6			
						0.7	CF		Damp to moist, brownish-grey, loose to medium dense, FINE AND MEDIUM SAND, some fine gravel, little coarse sand.
5	5.0-10.0 (6.0-6.5)			1.0/4.9		0.3		-5	
						0.1			

Graphical Log

Well Construction



LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals)

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-25-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Macro-Core Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

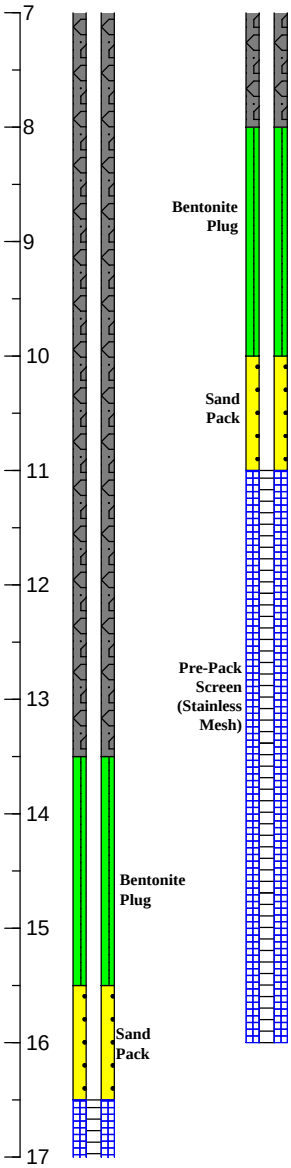
Boring/Well No: PC-11/ PC-11 (S / D)

Approx. Depth to Water (ft):	7.0'
Well Diameter (inches):	1.5" ID
Well Screen Slot Size:	0.010"
Measuring Point:	PVC
Measuring Point Elevation:	TBD
Approx. Ground Surface Elevation:	416.03

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
									Dry, grey, loose, angular, FRACTURED GRAVEL AND COBBLES.
						1.8			Damp to moist, brown-grey, loose to medium dense, FINE AND MEDIUM SAND, some fine gravel, trace silt.
10				0.75/4.9		0.2		-10	Wet, grey-brown, GRAVEL, trace coarse sand, trace cobbles @15.0'.
							PC		
									Wet, grey to dark grey, FINE AND MEDIUM SAND, some fine gravel and coarse sand, little silt.
15				2.6/4.9		0.0		-15	
						0.0			

Graphical Log

Well Construction



LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals)

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-25-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Macro-Core Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: PC-11/ PC-11 (S / D)

Approx. Depth to Water (ft): 7.0'
Well Diameter (inches): 1.5" ID
Well Screen Slot Size: 0.010"
Measuring Point: PVC
Measuring Point Elevation: TBD
Approx. Ground Surface Elevation: 416.03

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description: Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing	Graphical Log	Well Construction
						0.0					17
						0.3					18
	19.0-21.0 (20.0-20.5)					0.3					19 Pre-Pack Screen (Stainless Mesh)
20				0.8/1.5		0.7		-20	Wet, dark grey, MEDIUM AND COARSE SAND, trace fine gravel. Refusal at 21.5' with projected bedrock surface at 24.6' bgs.		20
											21

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals)

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-25-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-12

Approx. Depth to Water (ft):	9.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	414.40

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description	Graphical Log	Well Construction
0				3.9/4.9		0.3	TS	0	Damp, dark brown, loose, LOAM (FINE SAND AND SILT).		0
	0.5-2.0/TB-2 (1.5-2.0)						TB		Damp, brown, loose to medium dense, FINE AND MEDIUM SAND, little fine gravel, trace to little silt, trace coarse sand.		1
						0.4					
						0.4					2
							CF				
						0.6			Dry to damp, light brown, MEDIUM SAND, some fine gravel, little fine and coarse sand. Intermittent dry, shattered cobbles.		3
						0.4					4
5				1.8/4.9		0.2		-5			5
											6
											7
						0.3					8
									Dry, shattered, cobbles.		9
10							PC	-10			10

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
TB-2 is a field duplicate of (0.5-2.0) for Full Suite.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals)/

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-25-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-12

Approx. Depth to Water (ft):	9.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	414.40

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10				1.8/4.9		6.1		-10	Wet, shattered cobbles.		10
									Wet, COARSE SAND AND FINE GRAVEL.		11
	12.0-15.0 (14.0-14.5)								Wet, dark grey, loose, FINE AND MEDIUM SAND, some fine gravel (rounded to sub-angular, trace silt. Stained soil layers (black) with odor.		12
						90.4					13
						4.8					14
15				1.2/4.9		1.3		-15	Wet, dark grey, FINE AND MEDIUM SAND, some coarse sand, little fine and coarse gravel. Very hard refusal at 22.0' with projected bedrock surface at 24.0' bgs.		15
						1.0					16
						1.0					17
											18
						0.5					19
20								-20			20

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
TB-2 is a field duplicate of (0.5-2.0) for Full Suite.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals)/

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-25-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: PC-12

Approx. Depth to Water (ft): 9.0'
Well Diameter (inches): N/A
Well Screen Slot Size: N/A
Measuring Point: N/A
Measuring Point Elevation: N/A
Approx. Ground Surface Elevation: 414.40

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
20	20.0-22.0 (21.5-22.0)			0.4/2.0		0.1		-20			20
						0.1					21
											22

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
TB-2 is a field duplicate of (0.5-2.0) for Full Suite.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals)/

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-31/6-4-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-13

Approx. Depth to Water (ft):	7.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	413.01

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				4.0/4.9		0.6	TS	0	Damp, dark brown, loose, LOAM (FINE SAND AND SILT).		0
							CF		Dry, brown to dark brown, loose to medium dense, FINE AND MEDIUM SAND, some silt, trace coarse sand and fine gravel.		1
						0.8					
	(2.0-2.5)					6.3					2
						1.3			Dry, light brown to yellowish-orange, medium dense, FINE SAND, some silt and medium sand, trace to little coarse sand, trace fine gravel.		3
						0.8					4
5				1.4/4.9		0.3		-5			5
											6
									Wet, dark brown, loose, FINE GRAVEL, little to trace fine sand and silt.		7
											8
							PC				9
10								-10			10

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-31/6-4-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-13

Approx. Depth to Water (ft):	7.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	413.01

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10	10.0-12.0 (10.0-10.5)			1.3/4.9		1.8		-10			10
									Wet, grey, loose to medium dense, FINE AND MEDIUM SAND, trace silt.		11
									Wet, grey, loose, FINE GRAVEL, some fine sand, little to some medium and coarse sand, trace to little silt.		12
											13
											14
									Wet, grey, loose, FINE SAND, some silt and medium sand.		
15	(15.0-15.5)			2.0/4.9		1.5		-15			15
											16
									Wet, grey, loose, COARSE SAND, little silt, fine sand and fine gravel.		
						1.4					17
											18
						1.4					19
20								-20			20

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-31/6-4-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: PC-13

Approx. Depth to Water (ft): 7.0'
Well Diameter (inches): N/A
Well Screen Slot Size: N/A
Measuring Point: N/A
Measuring Point Elevation: N/A
Approx. Ground Surface Elevation: 413.01

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
20	22.0-25.0 (22.0-22..5)			1.0/4.9		2.6		-20			20, 21, 22
									Wet, grey, loose, MEDIUM AND COARSE SAND, some fine sand, little silt.		23, 24
25				0.5/2.0				-25	Wet, grey to dark grey, COBBLES, similar gneissic texture and minerology to bedrock. Refusal at 27.0' with projected bedrock surface at 24.0' bgs.		25, 26, 27

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-31/6-4-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: PC-14

Approx. Depth to Water (ft): 6.5'
Well Diameter (inches): N/A
Well Screen Slot Size: N/A
Measuring Point: N/A
Measuring Point Elevation: N/A
Approx. Ground Surface Elevation: 412.5

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description	Graphical Log	Well Construction
0				3.0/4.9		0.0	TS	0	Damp, dark brown, loose to medium dense, FINE SAND AND SILT, trace to liittle coarse sand, trace fine gravel and tire fragments.		0
							CF				
						0.0					1
						0.0					2
						0.0					3
						0.0			Damp, brown, loose to medium dense, FINE SAND AND SILT, trace to liittle coarse sand, trace fine gravel.		4
5				0.5/4.9		0.0		-5	Damp to wet, light brown, FINE SAND AND FINE GRAVEL, trace silt and tire fragments.		5
											6
											7
							PC		Wet, grey, loose, FINE AND MEDIUM SAND, some fine gravel, trace silt, little to some coarse sand.		8
											9
10								-10			10

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
PCB-5 is a field duplicate of (11.0-11.5) for VOCs.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-31/6-4-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-14

Approx. Depth to Water (ft):	6.5'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	412.5

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10	10.0-12.0 (11.0-11.5) (PCB-5)			2.3/4.9		0.2		-10			10
						0.1					11, 12, 13
15	(15.0-15.5)			1.6/4.9		0.7		-15			14, 15
						0.2			Wet, dark grey, loose, COARSE SAND, some fine gravel.		16
						0.2			Wet, olive-brown, loose, FINE AND MEDIUM SAND. Refusal at 20.0' with projected bedrock surface at 20.5' bgs.		17
	18.0-20.0 (19.5-20.0)					0.4					18
						0.4					19
20								-20			20

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
PCB-5 is a field duplicate of (11.0-11.5) for VOCs.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-22-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-15

Approx. Depth to Water (ft):	5.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	417.88

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.9/4.9		0.0	TS	0	Dry to damp, dark brown, LOAM.		0
	0.5-2.0 (0.5-1.0)						TB		Damp, light brown to brown, medium dense, MEDIUM SAND AND FINE GRAVEL, some fine and coarse sand, trace silt.		1
						0.0					
						0.0					2
	3.0-5.0 (4.0-4.5)					0.1					3
						1.2					4
5				2.0/4.9		1.0		-5	Moist, light brown to brown, medium dense, MEDIUM SAND AND FINE GRAVEL, some fine and coarse sand, trace silt.		5
											6
						0.8	CF				7
											8
						0.8					9
10								-10			10

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Negative results for both Shake and Oil-Red-O Tests at intervals (10.0-15.0) and (15.0-16.0) bgs.

Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-22-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-15

Approx. Depth to Water (ft):	5.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	417.88

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10				1.5/4.9		565.0		-10			10
											11
											12
											13
							PC				
	14.0-17.0 (14.5-15.0) (16.5-17.0)								Moist, stained, COBBLES, shattered with trace soil as a matrix. Odor present (14.0-15.0) bgs.		14
15				1.5/4.9		115.5		-15	Damp to moist, grey to light brown,medium dense, FINE SAND, some silt, little fine gravel. Refusal at 20.0' with projected bedrock surface at 21.0' bgs.		15
						11.1					16
											17
											18
											19
20								-20			20

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Negative results for both Shake and Oil-Red-O Tests at intervals (10.0-15.0) and (15.0-16.0) bgs.

Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-23-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-16

Approx. Depth to Water (ft):	9.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	418.70

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				2.7/4.9		0.0	TS	0	Damp, brown, LOAM.		0
	0.5-2.0 (0.5-1.0)						TB		Damp, brown, loose to medium dense, MEDIUM SAND, some fine sand, little fine gravel (sub-angular) and silt.		1
						0.0					
						0.0					2
	3.0-5.0 (4.0-4.5)					0.0					3
						0.0					4
5				2.1/4.9		0.0		-5	Moist, light brown to brown, medium dense, MEDIUM SAND, some fine sand, little fine gravel (subangular) and silt.		5
						0.0					6
						0.0	CF		Damp to moist, light brown, loose, COARSE SAND AND FINE GRAVEL,gravel is angular, some fine and medium sand.		7
						0.0					8
						0.0					9
10								-10			10

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-23-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-16

Approx. Depth to Water (ft):	9.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	418.70

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10				2.2/4.9		0.0		-10	Moist to wet, light brown, loose to medium dense, MEDIUM SAND, little fine gravel (subangular) and coarse sand.		10
						0.0					11
						0.0					12
						0.0					13
						0.0	PC				14
	14.5-18.0 (16.0-16.5)										
15				2.3/4.9		0.0		-15	Wet, light brown, loose, FINE SAND, some medium and coarse sand, little silt, trace fine gravel.		15
						0.0					16
						0.0					17
						0.0			Wet, grey, loose to medium dense, FINE SAND AND SILT, some medium sand, trace fine gravel.		18
						0.0					19
20								-20			20

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-23-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: PC-16

Approx. Depth to Water (ft): 9.0'
Well Diameter (inches): N/A
Well Screen Slot Size: N/A
Measuring Point: N/A
Measuring Point Elevation: N/A
Approx. Ground Surface Elevation: 418.70

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
20	(20.0-20.5)			2.8/4.9		0.0		-20			20
						0.0					21
						0.0					22
						0.0					23
	23.5-26.0 (25.0-25.5)					0.0					24
25				0.5/1.5		0.0		-25	Wet, grey, loose, MEDIUM AND FINE SAND, some silt, little fine gravel. Refusal at 26.5' with projected bedrock surface at 21.5' bgs.		25
											26

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

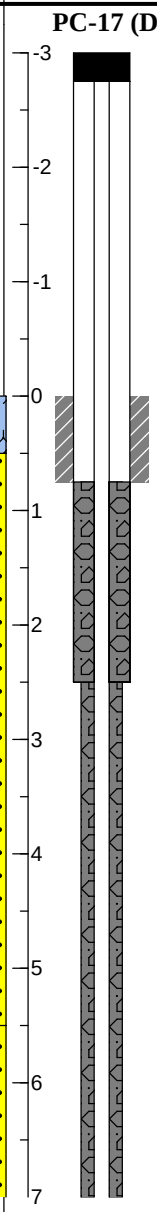
Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-23/6-4-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: PC-17 (D)

Approx. Depth to Water (ft): 6.0'
Well Diameter (inches): N/A
Well Screen Slot Size: N/A
Measuring Point: N/A
Measuring Point Elevation: N/A
Approx. Ground Surface Elevation: 418.15

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log
0				3.3/4.9		0.6	TS	0	Damp, brown, LOAM.	
	0.5-2.0 (0.5-1.0)					0.0	TB		Damp to moist, brown, medium dense, MEDIUM AND COARSE SAND, some fine gravel, trace to little silt.	
						0.6				
	3.0-5.0 (3.0-3.5)					0.0				
						0.0				
5				1.8/4.9		0.0		-5		
						0.0			Wet, brown, loose to medium dense, MEDIUM AND COARSE SAND, some fine gravel, little silt.	

Well Construction



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
PCB-6 is a field duplicate of (21.0-21.5) for VOCs.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-23/6-4-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-17 (D)

Approx. Depth to Water (ft):	6.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	418.15

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description	Graphical Log	Well Construction
						0.0	CF				7
						0.0			Wet, COBBLES, very difficult drilling advancement.		8
						0.1					9
10				0.7/4.9		0.2		-10	Wet, dark brown, loose, FINE GRAVEL, little fine sand.		10
											11
											12
						0.8					13
							PC				14
	14.0-17.0 (16.0-16.5)										Bentonite Plug
15				1.4/4.9		0.5		-15	Wet, dark brown, loose, FINE SAND, some medium sand, trace silt.		15
											16
											Sand Pack
											17

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
PCB-6 is a field duplicate of (21.0-21.5) for VOCs.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-23/6-4-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-17 (D)

Approx. Depth to Water (ft):	6.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	418.15

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
						0.2			Wet, loose, shattered quartzite, COBBLE.		17
									Wet, dark brown, loose, FINE GRAVEL, some fine sand, trace silt.		18
	(19.0-19.5)										19
20				2.1/4.0		0.3		-20			20
									Wet, brown, loose to medium dense, FINE AND MEDIUM SAND, some silt.		21
	21.0-24.0 (21.0-21.5) (PCB-6)					0.2					
						0.1					22
						0.2			Wet, dark brown to black, SILT AND FINE SAND, some fine gravel (mafic gneiss with similar mineralogy to bedrock). Refusal at 24.0' with projected bedrock surface at 24.5' bgs.		23
	(23.5-24.0)										24

Pre-Pack Screen (Stainless Mesh)

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
PCB-6 is a field duplicate of (21.0-21.5) for VOCs.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-29-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-18

Approx. Depth to Water (ft):	6.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	416.65

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.6/4.9		0.1	TS	0	Damp, brown, loose, LOAM.		0
	0.5-2.0 (0.5-1.0)						TB		Damp to moist, brown to greyish-brown, loose to medium dense, FINE SAND, some silt and medium sand, little coarse sand and fine gravel.		1
						0.1					
						0.1					2
	3.0-5.0 MS/MSD (3.0-3.5)					0.1					3
						0.1					4
5				2.7/4.9		0.1		-5	Moist to wet, brown to yellowish-orange, FINE AND MEDIUM SAND, some fine gravel, little to some silt, trace coarse sand.		5
						0.1					6
							CF				7
						0.1					
						0.0					8
						0.2			Damp, FINE GRAVEL, trace fine sand.		9
10								-10			10

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-29-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-18

Approx. Depth to Water (ft):	6.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	416.65

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10				2.0/4.9				-10			10
						0.6	PC				11
											12
									Wet, grey, subangular, FINE GRAVEL, some silt and fine sand, trace coarse sand.		13
	14.0-17.0 (16.0-16.5)										14
15				2.1/4.9		0.4		-15	Wet, grey, loose to medium dense, FINE AND MEDIUM SAND, some fine gravel, little to some coarse sand, trace to little silt.		15
						1.4					16
						0.5					17
						0.5					18
											19
20								-20			20

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-29-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: PC-18

Approx. Depth to Water (ft): 6.0'
Well Diameter (inches): N/A
Well Screen Slot Size: N/A
Measuring Point: N/A
Measuring Point Elevation: N/A
Approx. Ground Surface Elevation: 416.65

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
20	20.0-22.0 (20.0-20.5)			2.4/4.9		2.8		-20	Wet, black, loose, MEDIUM AND COARSE SAND, some to little fine sand.		20
											21
						0.9			Wet, grey to yellowish-brown, FINE SAND AND SILT, some medium and coarse sand, little fine gravel, trace clay.		22
	(23.0-23.5)								Refusal at 23.5' with projected bedrock surface at 26.3' bgs.		23

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-29/6-5-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: PC-19

Approx. Depth to Water (ft): 8.0'
Well Diameter (inches): N/A
Well Screen Slot Size: N/A
Measuring Point: N/A
Measuring Point Elevation: N/A
Approx. Ground Surface Elevation: 414.79

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				4.2/4.9		0.1	TS	0	Damp, light brown to brown, loose, LOAM.		0
	0.5-2.0 (1.5-2.0)						TB		Dry to damp, light brown, loose, FINE AND MEDIUM SAND, little fine gravel, trace to little silt.		1
						0.3					
						0.2					2
						1.1					3
						2.3					4
5				4.5/4.9		5.1	CF	-5			5
	(5.5-6.0)										6
						0.5			Moist, light brown to yellowish-orange, loose, MEDIUM SAND, some fine gravel, little to some fine sand.		
						0.6					7
						0.2			Wet, light brown to yellowish-orange, loose, MEDIUM SAND, some fine gravel, little to some fine sand.		8
						0.1					9
10								-10			10

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
PCB-3 is a field duplicate of (11.5-12.0) for VOCs.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-29/6-5-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-19

Approx. Depth to Water (ft):	8.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	414.79

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10				2.5/4.9		3.4	PC	-10			10
	11.0-14.0 (11.5-12.0) (PCB-3)										11
									Wet, dark brown, SILT, some fine sand, some Peat structure.		12
						1.7					
									Wet, light brown, FINE SAND AND SILT, some medium sand.		13
	(15.5-16.0) MS/MSD										14
15				3.6/4.9		0.7		-15	Wet, light grey, FINE SAND AND SILT.		15
						1.1					16
						2.2			Wet, light grey to grey, FINE AND MEDIUM SAND, trace fine gravel.		17
						4.8					18
	(18.5-19.0) MS/MSD										19
						2.7			Wet, grey to yellowish-orange, FINE AND MEDIUM SAND. Refusal at 21.5' with projected bedrock surface at 26.5' bgs.		
20								-20			20

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
PCB-3 is a field duplicate of (11.5-12.0) for VOCs.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-29/6-5-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: PC-19

Approx. Depth to Water (ft): 8.0'
Well Diameter (inches): N/A
Well Screen Slot Size: N/A
Measuring Point: N/A
Measuring Point Elevation: N/A
Approx. Ground Surface Elevation: 414.79

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description: Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing	Graphical Log	Well Construction
20				0.2/1.5		2.9		-20			20
	(21.0-21.5)					4.3					21
						3					22
	23.0-25.0 (24.5-25.0)					2.6					23
						5					24
25								-25			25

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

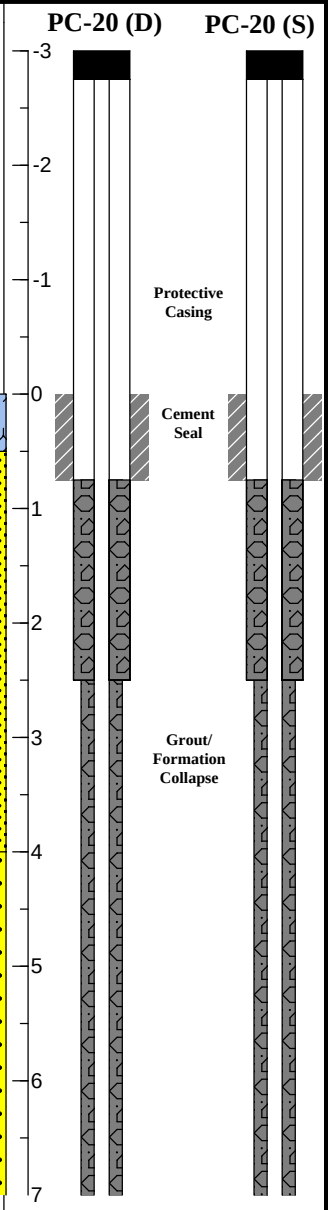
Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
PCB-3 is a field duplicate of (11.5-12.0) for VOCs.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-29/6-4-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: **PC-20/ PC-20 (S / D)**
Approx. Depth to Water (ft): 10.0'
Well Diameter (inches): 1.5" ID
Well Screen Slot Size: 0.010"
Measuring Point: PVC
Measuring Point Elevation: TBD
Approx. Ground Surface Elevation: 412.76

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.4/4.9		0.0	TS	0	Dry, dark brown, loose, LOAM.		
	0.5-2.0 (0.5-1.0)						TB		Damp, light brown to brown, FINE SAND, some silt and medium sand, little to some fine gravel, trace tire fragments.		
						0.1					
						0.1					
							CF				
						0.1					
						0.0			Damp to moist, light grey, MEDIUM SAND, some fine sand, little to some fine gravel.		
5				2.3/4.9		0.0		-5			



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

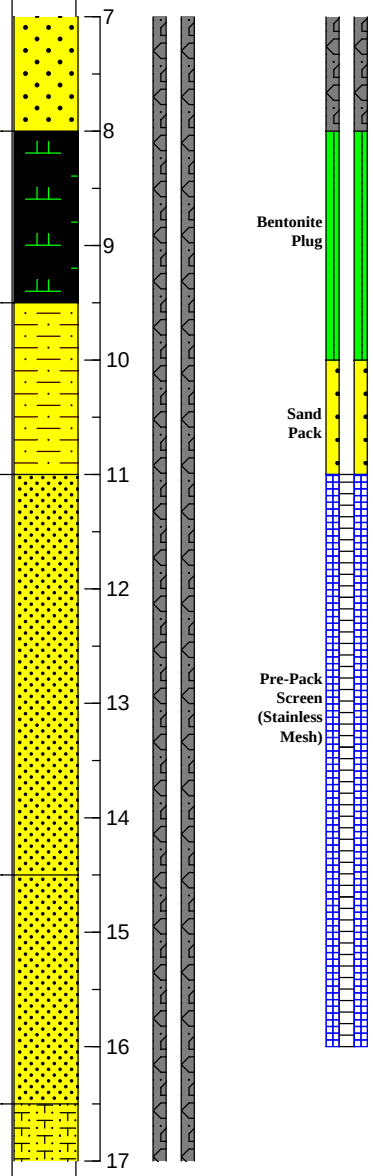
BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-29/6-4-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: **PC-20/ PC-20 (S / D)**
Approx. Depth to Water (ft): 10.0'
Well Diameter (inches): 1.5" ID
Well Screen Slot Size: 0.010"
Measuring Point: PVC
Measuring Point Elevation: TBD
Approx. Ground Surface Elevation: 412.76

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
						0.0	PC		Damp to moist, dark brown, PEAT AND SILT, no root structures, trace clay.
	(9.0-9.5)								
10				3.1/4.9		0.0		-10	Damp, grey, loose, SILT, some clay, trace fine sand.
						1.0			Wet, dark brown, loose, FINE AND MEDIUM SAND, little to some silt, little coarse sand and fine gravel.
	14.0-16.0 (15.5-16.0)					2.2			
15				3.6/4.9		4.5		-15	Wet, light brown, FINE AND MEDIUM SAND, little silt and fine gravel, trace coarse sand.
						3.9			Wet, grey, FINE SAND AND SILT, some fine gravel.

Graphical Log / Well Construction



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

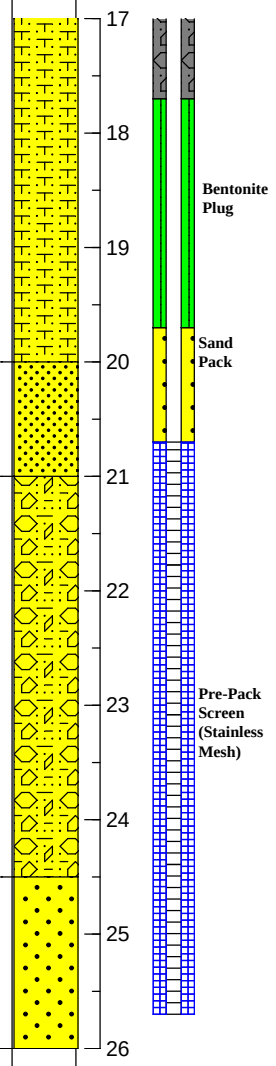
BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-29/6-4-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: **PC-20/ PC-20 (S / D)**
Approx. Depth to Water (ft): 10.0'
Well Diameter (inches): 1.5" ID
Well Screen Slot Size: 0.010"
Measuring Point: PVC
Measuring Point Elevation: TBD
Approx. Ground Surface Elevation: 412.76

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
						4.4			
	(18.0-18.5)					4.1			
						2.4			
20				2.6/4.9		4.3		-20	Wet, grey, FINE SAND.
						2.1			Wet, grey, loose, COARSE SAND AND FINE GRAVEL, trace to little fine and medium sand, trace silt.
						2.4			
						3.2			
	24.0-25.5 (25.0-25.5)					6.4			
25				0.7/1.0				-25	Wet, grey, MEDIUM AND COARSE SAND, trace fine gravel. Refusal at 26.0' with projected bedrock surface at 29.4' bgs.

Graphical Log / Well Construction



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-30/6-7-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: PC-21

Approx. Depth to Water (ft): 8.0'
Well Diameter (inches): N/A
Well Screen Slot Size: N/A
Measuring Point: N/A
Measuring Point Elevation: N/A
Approx. Ground Surface Elevation: 411.0

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				2.5/4.9		0.0	TS	0	Dry, loose, brown, LOAM.		0
							CF				
						0.0			Dry, light brown, loose to medium dense, FINE AND MEDIUM SAND, some silt, trace to little fine gravel.		1
						0.0					2
						0.0					3
						0.0			Dry, light grey, loose, FINE SAND, some fine gravel, little to some medium sand.		4
5				2.2/4.9		0.0		-5			5
									Wet, light grey to grey, loose, FINE GRAVEL, some silt and medium sand.		6
	(6.5-7.0) MS/MSD					0.0	PC		Wet, brown, loose, MEDIUM AND COARSE SAND, some silt and fine gravel, trace to little fine sand.		7
						0.0					8
						0.0					9
10								-10			10

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
PCB-7 is a field duplicate of (11.0-13.0) for Full Suite.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-30/6-7-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-21

Approx. Depth to Water (ft):	8.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	411.0

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10				1.5/4.9		0.5		-10			10
	11.0-13.0 PCB-7 (11.0-11.5) (12.5-13.0)					0.7			Wet, loose, FINE GRAVEL, some shattered, angular cobble. No fine grain matrix.		11, 12, 13
									Wet, dark grey, loose, MEDIUM SAND AND FINE GRAVEL, some coarse sand, little silt.		14
15				0.0/2.0				-15	No recovery, very hard surface. Refusal at 17.0' with projected bedrock surface at 24.5' bgs. Eight attempts were made with depths of refusal ranging from 6.0 to 17.0' bgs.		15, 16, 17

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
PCB-7 is a field duplicate of (11.0-13.0) for Full Suite.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-23-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-22

Approx. Depth to Water (ft):	9.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	414.8

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				4.1/4.9		0.0	TS	0	Dry, brown, loose, LOAM (FINE AND MEDIUM SAND, some to little silt).		0
							CF		Damp, light brown to brown, medium dense to dense, FINE SAND AND SILT, some coarse sand and fine gravel, little medium sand.		1
	(1.0-1.5)					0.0					
						0.0					2
						0.0					3
						0.0			Damp, yellowish-orange, medium dense to dense, FINE AND MEDIUM SAND, some silt and coarse sand, little to some fine gravel.		4
5				1.8/4.9		0.0		-5			5
						0.0					6
						0.0					7
						0.0					8
						0.0					9
10								-10			10

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-23-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-22

Approx. Depth to Water (ft):	9.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	414.8

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10				4.1/4.9		0.0	PC	-10	Wet, light brown to yellowish-orange, loose to medium dense, FINE SAND AND SILT, some medium sand, trace clay.		10
						0.0					11
						0.1					12
						0.0			Wet, light grey, FINE AND MEDIUM SAND, some silt, trace coarse sand and dense clay.		13
	(13.5-14.0)										
						0.0			Wet, yellowish-orange to light grey, loose to medium dense, MEDIUM SAND, some fine and coarse sand, trace fine gravel.		14
15				3.5/4.9		0.0		-15	Wet, light brown to grey, MEDIUM AND COARSE SAND, some fine sand, little silt and fine gravel.		15
	16.0-18.0 (16.0-16.5)					0.0					16
						0.0					17
						0.0					18
						0.0					19
20								-20			20

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-23-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-22

Approx. Depth to Water (ft):	9.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	414.8

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
20				2.2/4.9		0.0		-20			20
						0.0			wet, grey, loose, FINE SAND, some medium sand.		21
						0.0			Wet, grey, loose, COARSE SAND, some fine gravel, little medium sand, trace fine sand and silt.		22
						0.0			Refusal at 29.0' with projected bedrock surface at 27.8' bgs.		23
						0.0					24
25				3.9/4.0		0.0		-25			25
						0.0					26
	27.0-29.0 (28.5-29.0)					0.0					27
						0.0					28
											29

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

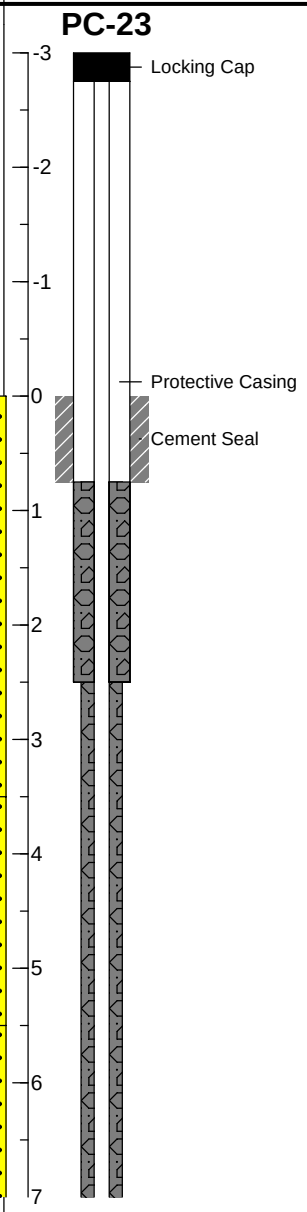
Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-24-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: PC-23

Approx. Depth to Water (ft): 10.0'
Well Diameter (inches): 1.5" ID
Well Screen Slot Size: 0.010"
Measuring Point: PVC
Measuring Point Elevation: TBD
Approx. Ground Surface Elevation: 416.08

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log
0				3.7/4.9		0.0	TS	0	Damp, brown, loose to medium dense, FINE AND MEDIUM SAND, some silt and fine gravel, little coarse sand.	
	0.5-2.0 (0.5-1.0)						TB			
						0.0				
						0.0				
							CF			
						0.0				
						0.2			Damp to moist, brown, medium dense, FINE AND MEDIUM SAND, some silt and fine gravel, little coarse sand.	
5				2.0/4.9		0.1		-5		
						0.0			Moist, brown, medium dense, FINE AND MEDIUM SAND, some silt and fine gravel, little coarse sand.	

Well Construction



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
PCB-2 is a field duplicate of (14.0-14.5) for VOCs.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

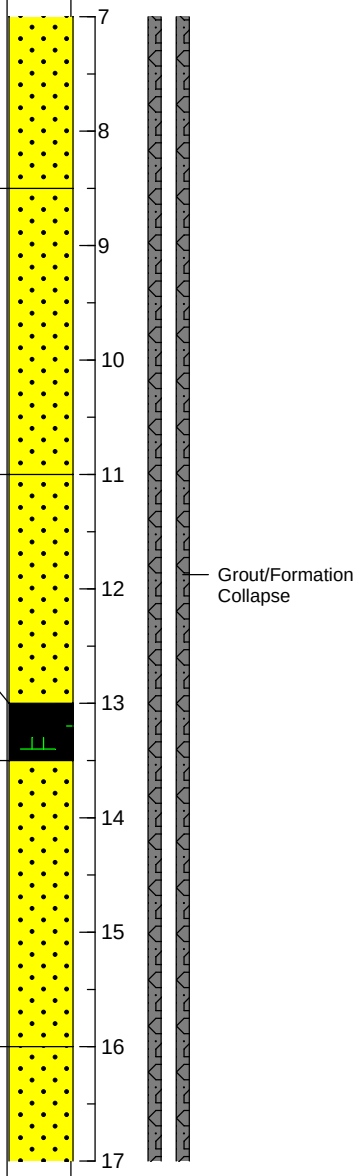
Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-24-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-23

Approx. Depth to Water (ft):	10.0'
Well Diameter (inches):	1.5" ID
Well Screen Slot Size:	0.010"
Measuring Point:	PVC
Measuring Point Elevation:	TBD
Approx. Ground Surface Elevation:	416.08

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
						0.1			
						0.3			
						0.0			Wet, brown, medium dense, FINE AND MEDIUM SAND, some silt and fine gravel, little coarse sand.
10				2.9/4.9		0.1		-10	
						0.0	PC		Wet, light brown to grey, loose, MEDIUM SAND, some fine and coarse sand, little silt, trace fine gravel and brick fragments.
						0.0			
	(13.0-13.5)					0.2			Moist, dark brown, medium stiff, PEAT, interbedded wiith rusty laminae.
	14.0-16.0 (14.0-14.5) (PCB-2)					0.1			Wet, grey, loose, MEDIUM AND COARSE SAND, little fine gravel, trace to little silt.
15				4.9/4.9		0.0		-15	
	(18.0-18.5) MS/MSD					0.0			Wet, grey, loose, FINE AND MEDIUM SAND, some silt, trace clay.

Graphical Log / Well Construction



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
PCB-2 is a field duplicate of (14.0-14.5) for VOCs.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

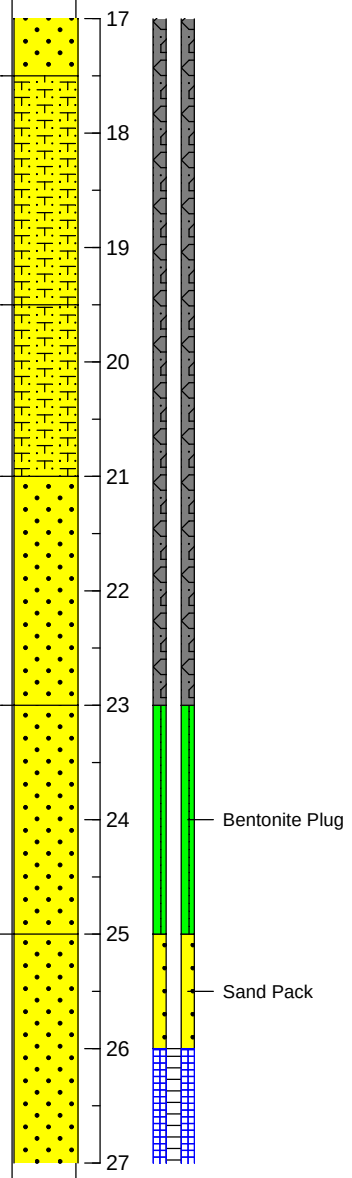
Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-24-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-23

Approx. Depth to Water (ft):	10.0'
Well Diameter (inches):	1.5" ID
Well Screen Slot Size:	0.010"
Measuring Point:	PVC
Measuring Point Elevation:	TBD
Approx. Ground Surface Elevation:	416.08

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
						0.0			
						0.0			Wet, grey, loose to medium dense, FINE SAND AND SILT, some medium sand, trace to little clay.
						0.0			
20				2.5/4.9		0.0		-20	Wet, yellowish-orange, loose to medium dense, FINE SAND AND SILT
						0.0			Wet, light brown, loose, FINE AND MEDIUM SAND, some coarse sand, little to trace silt.
						0.0			
						0.0			Wet, light brown to grey, loose, MEDIUM AND COARSE SAND, little fine gravel, trace fine sand.
	(24.0-24.5)					0.0			
25				2.6/4.9		0.0		-25	Wet, grey, loose, MEDIUM AND COARSE SAND, some fine sand, little to trace fine gravel.
						0.0			

Graphical Log / Well Construction



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
PCB-2 is a field duplicate of (14.0-14.5) for VOCs.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-24-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-23

Approx. Depth to Water (ft):	10.0'
Well Diameter (inches):	1.5" ID
Well Screen Slot Size:	0.010"
Measuring Point:	PVC
Measuring Point Elevation:	TBD
Approx. Ground Surface Elevation:	416.08

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
						0.0					27
	28.0-31.0 (29.0-29.5)					0.0					28
						0.0			Wet, grey, loose, COARSE SAND, some fine and medium sand, little fine gravel.		29
30				2.9/4.5		0.0		-30			30
											31
						0.0					32
									Wet, grey, loose, FINE AND MEDIUM GRAVEL. Refusal at 34.5' with projected bedrock surface at 33.5' bgs.		33
											34

Pre-Pack Screen (Stainless Mesh)

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
PCB-2 is a field duplicate of (14.0-14.5) for VOCs.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-30-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-24 /PC-24 P/S

Approx. Depth to Water (ft):	10.0'
Well Diameter (inches):	1.5" ID
Well Screen Slot Size:	0.010"
Measuring Point:	PVC
Measuring Point Elevation:	TBD
Approx. Ground Surface Elevation:	415.35

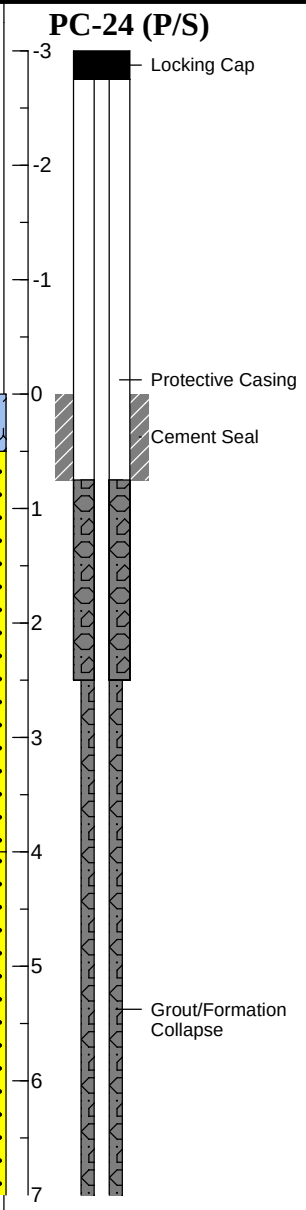
Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description	Graphical Log
0				3.8/4.9		0.0	TS	0	Damp, brown, loose, LOAM (FINE AND MEDIUM SAND, little to some silt).	
	0.5-2.0 (0.5-1.0)						TB		Dry to damp, loose, FINE AND MEDIUM SAND, some silt and fine gravel, little to some coarse sand.	
						0.0				
						0.0				
						0.0	CF			
						0.0			Moist, loose, FINE AND MEDIUM SAND, some silt and fine gravel, little to some coarse sand.	
5				1.9/4.9		0.0		-5		
						0.0				

Materials Description

Soils: moisture, density[1], color, size, major and minor constituents[2]

Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing

Well Construction



LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).
Treatability Samples:
PC-24-PEAT (12.0-13.5)
PC-24-SILT (13.5-16.0)

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site	Boring/Well No:	**PC-24 /PC-24 P/S**
Client Name:	Davis Site Group	Approx. Depth to Water (ft):	10.0'
Date(s):	5-30-2012	Well Diameter (inches):	1.5" ID
Drilling Company:	Maher Services, Inc.	Well Screen Slot Size:	0.010"
Drilling Method:	Dual-Tube Direct Push	Measuring Point:	PVC
Sampling Method:	Acetate Liner	Measuring Point Elevation:	TBD
ESS Observer:	Alvarez	Approx. Ground Surface Elevation:	415.35

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
						0.0			Damp to moist, brown, loose to medium dense, FINE AND MEDIUM SAND, some silt and fine gravel, little coarse sand.		7, 8
									Dry, loose, angular, shattered, COBBLES.		9
10				3.2/4.9		0.0		-10	Wet, grey, loose, FINE AND MEDIUM SAND, some silt and coarse sand.		10, 11
						0.0	PC				
						14.7			Damp, dark brown, fibrous, PEAT, some silt, trace clay lense at 12.5-13.0'.		12, 13
	12.5-15.5 (12.5-13.0) (14.5-15.0)					5.0					
						4.4			Wet, grey, SILT AND FINE SAND, trace medium sand.		14
15				4.8/4.9		2.3		-15			15
						1.2			Wet, grey, loose, SILT, some fine sand, trace clay.		16, 17

Well Construction: Bentonite Plug; Sand Pack; PVC Screen

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).
Treatability Samples:
PC-24-PEAT (12.0-13.5)
PC-24-SILT (13.5-16.0)

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-30-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-24 /PC-24 P/S

Approx. Depth to Water (ft):	10.0'
Well Diameter (inches):	1.5" ID
Well Screen Slot Size:	0.010"
Measuring Point:	PVC
Measuring Point Elevation:	TBD
Approx. Ground Surface Elevation:	415.35

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
						1.7			Wet, grey, loose to medium dense, SILT, trace fine sand.		17
									Wet, yellowish-orange, loose to medium dense, SILT, trace fine sand.		18
	(18.0-18.5)					0.0			Wet, yellowish-orange, MEDIUM AND COARSE SAND, some fine sand.		
						0.0			Wet, light grey to brown, FINE AND MEDIUM SAND, some coarse sand.		19
20				3.4/4.9		0.0		-20	Wet, light grey to grey, MEDIUM SAND, some fine and coarse sand.		20
						0.0					21
						0.0					22
						0.0					23
	(24.0-24.5)					0.0			Wet, light grey, FINE SAND.		24
25				2.6/4.9		0.0		-25	Wet, light grey, MEDIUM AND COARSE SAND.		25
						0.0			Wet, light grey, FINE AND MEDIUM SAND, some coarse sand.		26
											27

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).
Treatability Samples:
PC-24-PEAT (12.0-13.5)
PC-24-SILT (13.5-16.0)

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-30-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: **PC-24 /PC-24 P/S**
Approx. Depth to Water (ft): 10.0'
Well Diameter (inches): 1.5" ID
Well Screen Slot Size: 0.010"
Measuring Point: PVC
Measuring Point Elevation: TBD
Approx. Ground Surface Elevation: 415.35

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
						0.0					27
						0.0					28
						0.0					29
									Wet, FINE GRAVEL, trace fractured cobbles.		
30				0.9/4.9		0.0		-30	Wet, grey-black, MEDIUM AND COARSE SAND, some fine gravel.		30
											31
											32
											33
	34.0-38.0 (34.0-34.5)								Wet, fractured, COBBLES.		34
35				1.9/3.8		0.0		-35	Wet, dark grey, COARSE SAND, some to little fine gravel, trace fine sand.		35
						0.0			Refusal at 38.5' with projected bedrock surface at 39.5' bgs.		36
											37

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).
Treatability Samples:
PC-24-PEAT (12.0-13.5)
PC-24-SILT (13.5-16.0)

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-30-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: **PC-24 /PC-24 P/S**
Approx. Depth to Water (ft): 10.0'
Well Diameter (inches): 1.5" ID
Well Screen Slot Size: 0.010"
Measuring Point: PVC
Measuring Point Elevation: TBD
Approx. Ground Surface Elevation: 415.35

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description: Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing	Graphical Log	Well Construction
						0.0					37 38

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).
Treatability Samples:
PC-24-PEAT (12.0-13.5)
PC-24-SILT (13.5-16.0)

BORING AND WELL CONSTRUCTION LOG

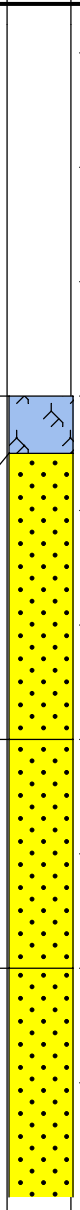
Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-24-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-25

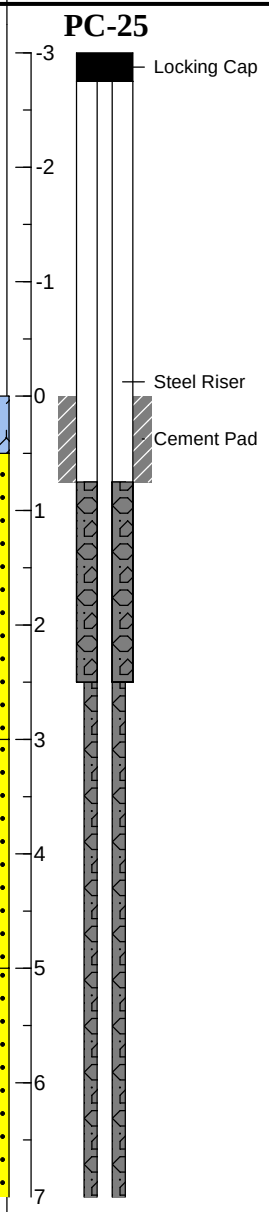
Approx. Depth to Water (ft):	9.5'
Well Diameter (inches):	1.5" ID
Well Screen Slot Size:	0.010"
Measuring Point:	PVC
Measuring Point Elevation:	TBD
Approx. Ground Surface Elevation:	413.20

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
0				4.0/4.9		0.1	TS	0	Damp, dark brown, loose, LOAM (FINE SAND, some silt).
	0.5-2.0 (1.5-2.0)						TB		Moist, brown to dark brown, loose, FINE AND MEDIUM SAND, little to some fine gravel and coarse sand, some silt.
						0.1			
						0.2	CF		
						0.3			Damp to moist, dark brown, loose, MEDIUM SAND, some fine sand and fine gravel, little silt.
						0.2			
5				1.5/4.9		0.1		-5	Moist to wet, brown to grey, loose, FINE AND MEDIUM SAND, little to some coarse sand and fine gravel, lttle to trace silt.

Graphical Log



Well Construction



LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site	Boring/Well No:	**PC-25**
Client Name:	Davis Site Group	Approx. Depth to Water (ft):	9.5'
Date(s):	5-24-2012	Well Diameter (inches):	1.5" ID
Drilling Company:	Maher Services, Inc.	Well Screen Slot Size:	0.010"
Drilling Method:	Dual-Tube Direct Push	Measuring Point:	PVC
Sampling Method:	Acetate Liner	Measuring Point Elevation:	TBD
ESS Observer:	Alvarez	Approx. Ground Surface Elevation:	413.20

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
						0.0					7
											8
							PC				9
10				3.7/4.9		3.1		-10			10
	11.0-13.0 (11.5-12.0) (12.5-13.0)					1.3			Damp, dark brown to black, PEAT, some root fragments.		11
						1.1			Damp to moist, loose to medium dense, SILT AND CLAY, trace fine sand.		12
						0.4					13
						0.2			Moist to wet, grey, loose, FINE AND MEDIUM SAND, little coarse sand, trace silt.		14
15				2.2/4.9		0.4		-15	Wet, light brown, loose, FINE AND MEDIUM SAND, little coarse sand, trace fine gravel.		15
											16
											17

Grout/Formation Collapse

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-24-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-25

Approx. Depth to Water (ft):	9.5'
Well Diameter (inches):	1.5" ID
Well Screen Slot Size:	0.010"
Measuring Point:	PVC
Measuring Point Elevation:	TBD
Approx. Ground Surface Elevation:	413.20

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
						0.3					17, 18, 19
									Wet, light brown to yellowish-orange, loose, FINE SAND, some to little medium sand, trace silt.		
20				2.6/4.9		0.5		-20			20, 21, 22
						0.2					23, 24
25				2.4/4.9		0.3		-25	Wet, light brown, loose, FINE SAND.		25, 26, 27

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-24-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-25

Approx. Depth to Water (ft):	9.5'
Well Diameter (inches):	1.5" ID
Well Screen Slot Size:	0.010"
Measuring Point:	PVC
Measuring Point Elevation:	TBD
Approx. Ground Surface Elevation:	413.20

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description
	(27.0-27.5)								
						0.4			
									Wet, light brown to grey, MEDIUM SAND, some fine and coarse sand, trace to little fine gravel.
30				1.2/4.9		0.4		-30	
						0.5			
									Wet, light brown to grey, loose, FINE AND MEDIUM SAND, some fine gravel, little coarse sand. Refusal at 40.0' with projected bedrock surface at 42.0' bgs.
	34.0-36.0 (35.0-35.5)								
35				2.4/4.9		0.3		-35	

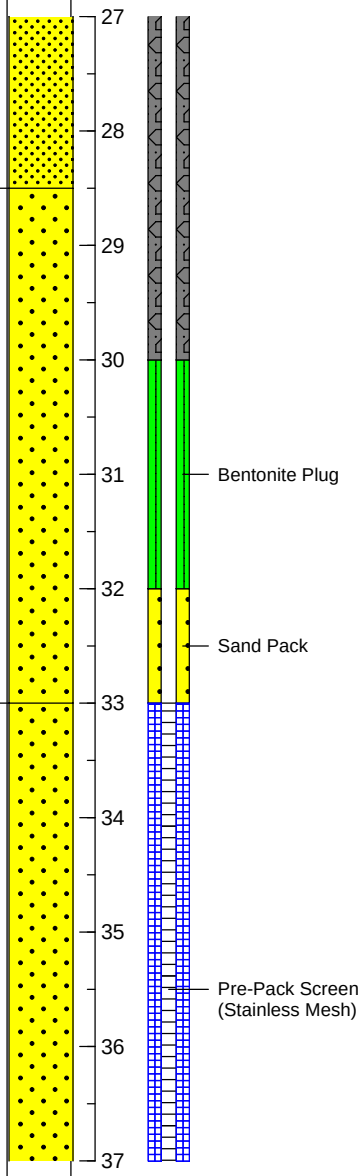
Materials Description

Soils: moisture, density[1], color, size, major and minor constituents[2]

Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing

Graphical Log

Well Construction



LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-24-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: **PC-25**
Approx. Depth to Water (ft): 9.5'
Well Diameter (inches): 1.5" ID
Well Screen Slot Size: 0.010"
Measuring Point: PVC
Measuring Point Elevation: TBD
Approx. Ground Surface Elevation: 413.20

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description: Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing	Graphical Log	Well Construction
40								-40			37 38 39 40

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-30/6-6-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-26

Approx. Depth to Water (ft):	7.2'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	411.29

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.9/4.9		0.3	TS	0	Damp, dark brown, loose, LOAM.		0
	0.5-2.0 (0.5-1.0)						TB		Damp, brown, loose to medium dense, FINE SAND AND SILT, some medium sand, little coarse sand, trace to little fine gravel.		1
						0.2	CF				2
						0.3					3
						1.2					4
						0.6			Damp, dark brown to dark grey, loose to medium dense, FINE SAND AND SILT, little medium sand and fine gravel.		5
5				2.0/4.9		0.3		-5			6
							PC				7
						0.0			Wet, layered, WOOD. Numerous thicknesses and grain orientations. Some bark. Likely stacked stumps, or wood-pile.		8
											9
10								-10	Wet, dark brown, loose, FINE SAND, some fine		10

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-30/6-6-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-26

Approx. Depth to Water (ft):	7.2'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	411.29

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description	Graphical Log	Well Construction
10	(10.0-10.5)			4.2/4.9		0.0		-10	gravel. Rubber coated, 1/2", steel-wrapped electrical wire (ROMEX) present.		10
						0.0			Wet, grey, loose to medium dense, FINE SAND, some medium sand, little to some silt, trace coarse sand.		11
						0.0					12
						0.0			Wet, brownish-yellow, loose to medium dense, FINE SAND, some medium sand, little to some silt, trace coarse sand.		13
						0.0			Wet, grey-brown, loose, FINE SAND.		14
	14.0-18.0 MS/MSD (14.0-14.5)					0.0					
15				4.0/4.9		0.0		-15			15
						0.0					16
						0.1					17
						0.3			Wet, grey, loose, COARSE AND MEDIUM SAND, little fine sand.		18
						0.6					19
	(19.5-20.0)										
20								-20			20

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-30/6-6-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: PC-26

Approx. Depth to Water (ft): 7.2'
Well Diameter (inches): N/A
Well Screen Slot Size: N/A
Measuring Point: N/A
Measuring Point Elevation: N/A
Approx. Ground Surface Elevation: 411.29

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
20				2.5/4.9		0.5		-20			20
											21
											22
						0.9			Wet, gret to light brown, MEDIUM SAND, some coarse sand, trace silt.		23
											24
25				1.2/4.9		0.0		-25			25
									Wet, dark grey, COARSE SAND, some fine gravel.		26
	(27.0-27.5)										27
						0.0					28
											29
30								-30			30

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-30/6-6-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: PC-26

Approx. Depth to Water (ft): 7.2'
Well Diameter (inches): N/A
Well Screen Slot Size: N/A
Measuring Point: N/A
Measuring Point Elevation: N/A
Approx. Ground Surface Elevation: 411.29

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
30				0.7/4.9		0.4		-30	Wet, dark grey, MEDIUM SAND, little fine gravel, trace coarse sand.		30
											31
	32.0-35.0 (32.5-33.0)								Wet, dark grey, FINE SAND, little to some fine gravel, little silt.		32
											33
									Wet, dark grey, FINE GRAVEL, some fine and coarse sand, little silt. Wet, gneissic/schistic textured chips found in core head.		34
35				0.6/1.0				-35	Very hard surface at refusal (36.0') with projected bedrock surface at 41.9' bgs.		35
											36

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-30-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-27

Approx. Depth to Water (ft):	7.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	409.75

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.8/4.9		0.5	TS	0	Dry, brown, loose, LOAM (FINE AND MEDIUM SAND, some to little silt).		0
							CF		Dry to damp, light brown, FINE AND MEDIUM SAND, some silt and fine gravel, little coarse sand.		1
						0.3					
						0.2			Damp, dark brown, loose to medium dense, FINE SAND AND SILT, some medium sand and fine gravel.		2
						0.7					3
						0.3					4
5				3.1/4.9		0.2	PC	-5			5
	6.0-8.0 (6.0-6.5)					0.0			Damp to moist, dark brown, fibrous, PEAT, some fine sand and silt as a lense at 6.5-7.0'.		6
						0.0			Wet, grey, loose, FINE AND MEDIUM SAND, little silt, trace coarse sand.		7
						0.0					8
						0.0					9
10								-10			10

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-30-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-27

Approx. Depth to Water (ft):	7.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	409.75

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10				4.9/4.9		0.0		-10	Wet, grey, very loose, FINE SAND, some silt.		10
	(10.5-11.0)										11
						0.1			Wet, grey, loose, COARSE SAND, some medium sand, trace fine sand.		12
						0.3					13
						0.2			Wet, light brown, loose, FINE SAND, some silt.		14
						0.4					
15				3.0/4.9		0.5		-15	Wet, light brown, loose, COARSE SAND, some medium sand, little to trace fine gravel.		15
											16
											17
						0.3					18
									Wet, yellowish-orange, loose, MEDIUM AND COARSE SAND, some fine sand and silt, trace to little fine gravel.		19
	(19.5-20.0)										
20								-20			20

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-30-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-27

Approx. Depth to Water (ft):	7.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	409.75

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
20				3.1/4.9		0.0		-20			20
											21
											22
						0.0					
									Wet, yellowish-orange, loose, FINE GRAVEL, some coarse sand, trace to little silt and fine sand.		23
											24
25				0.6/4.9		0.0		-25			25
											26
											27
											28
											29
30								-30			30

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-30-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-27

Approx. Depth to Water (ft):	7.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	409.75

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description	Graphical Log	Well Construction
30				1.9/4.9		0.2		-30	Wet, loose, FINE GRAVEL, some coarse sand and angular cobble fragments.		30, 31, 32
	34.0-36.0 (35.5-36.0)								Wet, dark grey, SILT AND FINE GRAVEL, some fine and coarse sand, little medium sand. Refusal at 36.8' with projected bedrock surface at 39.6' bgs.		33, 34
35				0.9/1.8		0.4		-35			35, 36

Materials Description

Soils: moisture, density[1], color, size, major and minor constituents[2]

Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).

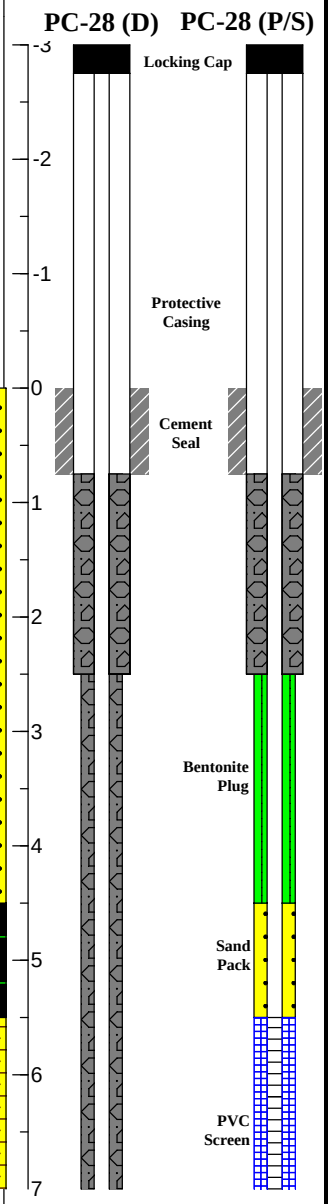
BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-30/6-7-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-28/ PC-28(D)/(P/S)

Approx. Depth to Water (ft):	4.0'
Well Diameter (inches):	2.0" ID
Well Screen Slot Size:	0.010"
Measuring Point:	PVC
Measuring Point Elevation:	TBD
Approx. Ground Surface Elevation:	409.0

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.3/4.9		0.1	TS	0	Dry to damp, loose, yellowish-orange, MEDIUM SAND, some fine gravel, little to some coarse sand.		
							CF				
						0.1					
						0.5					
						0.2					
						30.3					
	(4.5-5.0)						PC		Damp, dark brown, PEAT, slight odor.		
5	5.0-7.0 (6.5-7.0)			4.2/4.9		11.1		-5			
						0.6			Moist, olive-brown, SILT, some fine sand, trace medium sand and clay.		



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
PCB-4 is a field duplicate of ((27.0-34.0) for Full Suite.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).
Treatability Samples:
PEAT (4.5-5.5), SILT (5.5-8.5), S&G (10.0-15.0)

BORING AND WELL CONSTRUCTION LOG

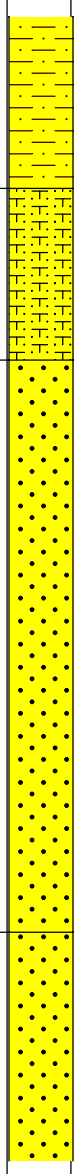
Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-30/6-7-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: PC-28/ PC-28(D)/(P/S)

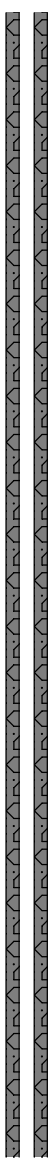
Approx. Depth to Water (ft): 4.0'
Well Diameter (inches): 2.0" ID
Well Screen Slot Size: 0.010"
Measuring Point: PVC
Measuring Point Elevation: TBD
Approx. Ground Surface Elevation: 409.0

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
						1.2			
						0.2			Wet, grey, loose, FINE SAND AND SILT, some medium sand, trace coarse sand.
	(9.0-9.5)					0.2			
10				2.7/4.9		1.3		-10	Wet, yellowish-orange, FINE AND MEDIUM SAND, some coarse sand, trace silt and fine gravel.
	(12.5-13.0)					1.0			
15				3.6/4.9		2.2		-15	Wet, yellowish-orange, FINE AND MEDIUM SAND, trace coarse sand.

Graphical Log



Well Construction



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
PCB-4 is a field duplicate of ((27.0-34.0) for Full Suite.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).
Treatability Samples:
PEAT (4.5-5.5), SILT (5.5-8.5), S&G (10.0-15.0)

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-30/6-7-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-28/ PC-28(D)/(P/S)

Approx. Depth to Water (ft):	4.0'
Well Diameter (inches):	2.0" ID
Well Screen Slot Size:	0.010"
Measuring Point:	PVC
Measuring Point Elevation:	TBD
Approx. Ground Surface Elevation:	409.0

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
						2.1					17, 18
	(19.0-19.5)										19
20				3.5/4.9		3.8		-20			20, 21, 22
						3.3					23
									Wet, loose, COARSE SAND AND FINE GRAVEL, some medium sand.		24
25				2.1/4.9		1.0		-25			25
									Wet, loose, yellowish-orange, FINE AND MEDIUM SAND, trace coarse sand and silt.		26, 27

Grout/ Formation Collapse

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
PCB-4 is a field duplicate of ((27.0-34.0) for Full Suite.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).
Treatability Samples:
PEAT (4.5-5.5), SILT (5.5-8.5), S&G (10.0-15.0)

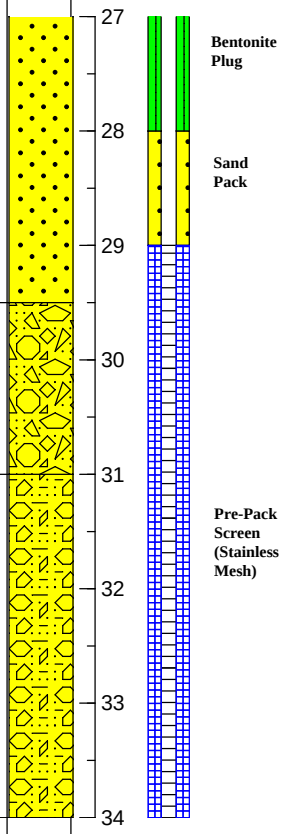
BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-30/6-7-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: PC-28/ PC-28(D)/(P/S)

Approx. Depth to Water (ft): 4.0'
Well Diameter (inches): 2.0" ID
Well Screen Slot Size: 0.010"
Measuring Point: PVC
Measuring Point Elevation: TBD
Approx. Ground Surface Elevation: 409.0

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
	27.0-34.0 PCB-4 (30.5-31.0)					1.4					27
											28
											29
30				0.6/4.0		2.5		-30	Wet, yellowish-orange, loose, FINE GRAVEL, some fine and medium sand.		30
									Wet, yellowish-orange, MEDIUM SAND AND FINE GRAVEL. Refusal at 34.0' with projected bedrock surface at 31.0' bgs.		31
											32
											33
											34



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
PCB-4 is a field duplicate of ((27.0-34.0) for Full Suite.
Samples designated with a parentheses (ie. X.x - X.x) were analyzed for VOCs.
Those samples with no parentheses were collected for the Full Suite Analyses (SVOCs, Pesticides, PCBs, and Total Metals).
Treatability Samples:
PEAT (4.5-5.5), SILT (5.5-8.5), S&G (10.0-15.0)

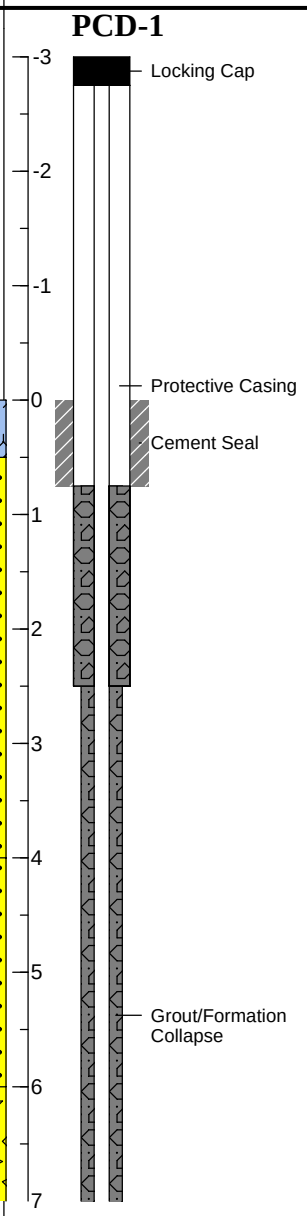
BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-22/23-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PCD-1

Approx. Depth to Water (ft):	10.2'
Well Diameter (inches):	1.5" ID
Well Screen Slot Size:	0.010"
Measuring Point:	PVC
Measuring Point Elevation:	TBD
Approx. Ground Surface Elevation:	TBD

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.2/4.9		0.0		0	Dry, brown, LOAM (FINE AND MEDIUM SAND, some silt).		
						0.0			Damp to moist, light brown, medium dense, FINE AND MEDIUM SAND, some fine gravel, lttle silt.		
						0.0					
						0.0					
						0.0			Dry to damp, yellowish-orange, MEDIUM SAND, some fine sand and fine gravel, little silt, trace coarse sand.		
5				1.1/4.9		0.0		-5			
									Dry, shattered, schistose, COBBLES.		



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
No samples were collected due to the lack of any elevated headspace readings.

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-22/23-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: PCD-1

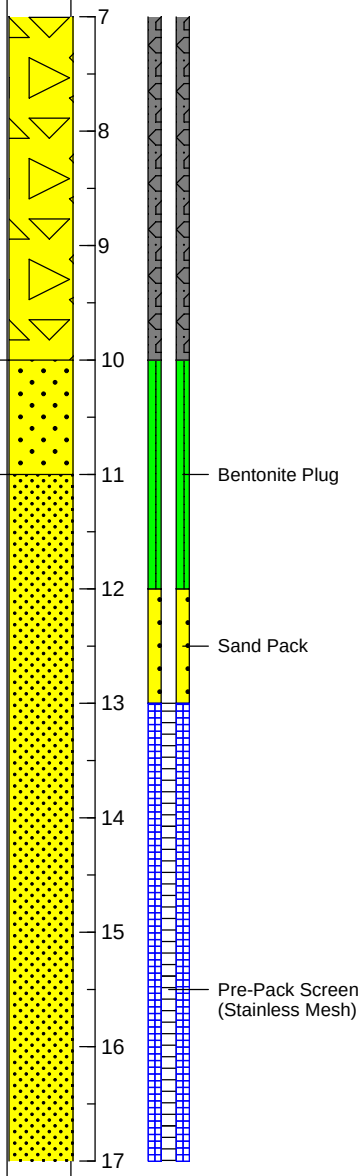
Approx. Depth to Water (ft): 10.2'
Well Diameter (inches): 1.5" ID
Well Screen Slot Size: 0.010"
Measuring Point: PVC
Measuring Point Elevation: TBD
Approx. Ground Surface Elevation: TBD

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description	Graphical Log	Well Construction
10				3.2/4.9		0.0		-10	Wet, yellowish-orange, medium dense, MEDIUM SAND, some fine sand and fine gravel, little silt, trace coarse sand.		
						0.0			Wet, grey, loose to medium dense, FINE SAND, some medium sand.		
						0.0			Refusal at 18.0' bgs with a very hard surface.		
						0.0					
						0.0					
15				1.2/3.0		0.0		-15			
						0.0					

Materials Description

Soils: moisture, density[1], color, size, major and minor constituents[2]

Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
No samples were collected due to the lack of any elevated headspace readings.

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-22/23-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: **PCD-1**
Approx. Depth to Water (ft): 10.2'
Well Diameter (inches): 1.5" ID
Well Screen Slot Size: 0.010"
Measuring Point: PVC
Measuring Point Elevation: TBD
Approx. Ground Surface Elevation: TBD

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description: Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing	Graphical Log	Well Construction
						0.0					17 – 18

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
No samples were collected due to the lack of any elevated headspace readings.

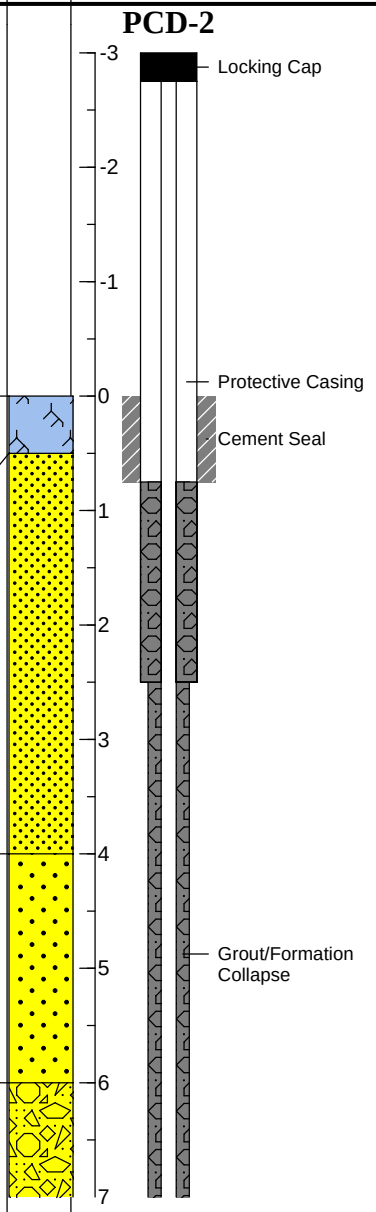
BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	5-21/6-4-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PCD-2

Approx. Depth to Water (ft):	10.0'
Well Diameter (inches):	1.5" ID
Well Screen Slot Size:	0.010"
Measuring Point:	PVC
Measuring Point Elevation:	NM
Approx. Ground Surface Elevation:	NM

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.0/4.9		0.5		0	Dry, brown, LOAM (FINE SAND AND SILT, some medium sand).		
									Dry to damp, brown, loose to medium dense, FINE SAND, some silt and medium sand, trace fine gravel.		
						0.1					
						0.3			Damp, light brown, MEDIUM SAND, little fine gravel.		
5				1.0/4.9		0.2		-5			
									Wet, grey, loose, FINE GRAVEL, trace coarse sand.		



LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
No samples were collected due to the lack of any elevated headspace readings.

BORING AND WELL CONSTRUCTION LOG

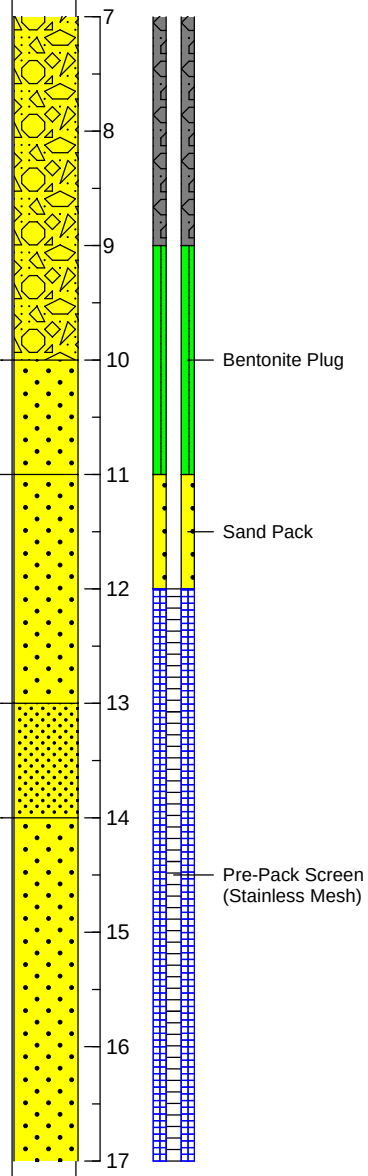
Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-21/6-4-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: PCD-2

Approx. Depth to Water (ft): 10.0'
Well Diameter (inches): 1.5" ID
Well Screen Slot Size: 0.010"
Measuring Point: PVC
Measuring Point Elevation: NM
Approx. Ground Surface Elevation: NM

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
10				3.1/4.9		0.0		-10	Wet, grey to reddish-brown, MEDIUM SAND, some fine sand and fine gravel.
						0.0			Wet, rusty-red, loose, COARSE SAND, some fine sand.
						0.1			
						0.2			Wet, rusty-red, loose, FINE SAND, trace to little medium sand.
						0.2			Damp, light brown, MEDIUM AND COARSE SAND.
15				2.0/4.5		0.0		-15	

Graphical Log / Well Construction



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
No samples were collected due to the lack of any elevated headspace readings.

BORING AND WELL CONSTRUCTION LOG

Site: Davis Liquid Waste Superfund Site
Client Name: Davis Site Group
Date(s): 5-21/6-4-2012
Drilling Company: Maher Services, Inc.
Drilling Method: Dual-Tube Direct Push
Sampling Method: Acetate Liner
ESS Observer: Alvarez

Boring/Well No: **PCD-2**
Approx. Depth to Water (ft): 10.0'
Well Diameter (inches): 1.5" ID
Well Screen Slot Size: 0.010"
Measuring Point: PVC
Measuring Point Elevation: NM
Approx. Ground Surface Elevation: NM

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description Soils: moisture, density[1], color, size, major and minor constituents[2] Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing	Graphical Log	Well Construction
						0.0					17
									Wet, light brown, dense, FINE AND MEDIUM SAND, some fine gravel. Vary hard surface with refusal at 19.0' bgs.		18
						0.0					19

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:
TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
No samples were collected due to the lack of any elevated headspace readings.

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	6-12-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-BG

Approx. Depth to Water (ft):	7.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	NM

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.8/4.9		0.0		0	Dry, yellowish-orange, loose, FINE AND MEDIUM SAND, little fine gravel, trace to little silt.		0
						0.0					1
						0.0					2
						0.0			Dry, grey, shattered, COBBLES.		3
						0.0			Damp to moist, light grey, MEDIUM SAND, some coarse sand, little fine gravel.		4
5				3.1/4.9		0.0		-5			5
						0.0			Wet, light brown, loose, FINE SAND, trace medium sand.		6
						0.0					7
						0.0					8
						0.0			Wet, brown, loose, COARSE SAND mottled with rusty-red beds, some fine and medium sand.		9
10								-10			10

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
This boring was advanced to evaluate background conditions east of the FSA/Plume Core.
Samples collected were analyzed solely for Treatability Parameters.

BORING AND WELL CONSTRUCTION LOG

Site:	Davis Liquid Waste Superfund Site
Client Name:	Davis Site Group
Date(s):	6-12-2012
Drilling Company:	Maher Services, Inc.
Drilling Method:	Dual-Tube Direct Push
Sampling Method:	Acetate Liner
ESS Observer:	Alvarez

Boring/Well No: PC-BG

Approx. Depth to Water (ft):	7.0'
Well Diameter (inches):	N/A
Well Screen Slot Size:	N/A
Measuring Point:	N/A
Measuring Point Elevation:	N/A
Approx. Ground Surface Elevation:	NM

Depth bgs (ft.)	Sample or Run Designation	Treatability Interval	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FSA Interval	Depth (feet)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10				4.2/4.9		0.0		-10			10
						0.0					11
						0.0			Wet, light brown, loose, FINE SAND, trace to little medium sand.		12
						0.0					13
						0.0			Wet, brown, loose, MEDIUM AND COARSE SAND, trace fine gravel.		14
15				1.2/2.0		0.0		-15	Wet, brown, loose, COARSE SAND.		15
						0.0					16
											17

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

FSA Interval:

TS: Top Soil TB: Treated Backfill
CF: Clean Fill PC: Plume Core

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

Notes:
PID: Rae Systems MiniRae 3000 with 11.7 ev lamp.
This boring was advanced to evaluate background conditions east of the FSA/Plume Core.
Samples collected were analyzed solely for Treatability Parameters.

Appendix B

Well Development Forms (Provided on CD)

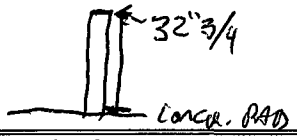
GROUNDWATER MONITORING WELL DEVELOPMENT FORM

ESS Group, Inc.
www.essgroup.com

Client: Davis Silk Trust
Site: Davis Liquid Superfund
Job #: D164
Date:

Well ID: PCD-1
Well Diameter: 1.5"
Measuring Point: PVC
ESS Personnel: Alvarez

Development Method: Check-Valve Surge / 1/2" Peristaltic Pump
Distance from Top of PVC to Top of Casing:
Distance from Ground Surface to Top of Casing: 32.75"



Pre-development Measurements	
Time:	1410
Depth to Water (ft):	13.12
Depth to bottom (ft):	20.69
Depth to product (ft):	NP
Product thickness(ft):	NA

Length of Water Column: 7.57'
Well Volume: .70 gal

Post-development Measurements	
Time:	1430
Depth to Water(ft):	13.65
Depth to bottom (ft):	20.85
Depth to product (ft):	NP
Product thickness (ft):	N/A

Groundwater Monitoring Results

Time	Volume Purged (gals)	Temperature (°F)	pH (s.u.)	Turbidity (NTU)	Conductivity (mS)	Notes
1410	0.0	NM	NM	NM	NM	No Odor
1420	~4.0	|	|	|	|	Fair - Good Recharge
1430	6.0					
						* Needs Lock

Comments: 0'-13' - RISER } BGS
13'-18' - Pre-Pack Screen (Geoprobe, Inc.)
4.5 GAL OF H_2O ADDED FOR WELL ~~PURGE~~

Notes: Recharge Conditions, Color, Odor, Sediment Content & Color, Volume DI Water Added, Well Access Conditions (lock required?), etc.
Well Volume Factors (gallons/foot of water in well): 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653), 6-inch (1.47)
Determine well volume by multiplying length of water column by well volume factor

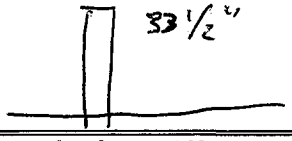
GROUNDWATER MONITORING WELL DEVELOPMENT FORM

ESS Group, Inc.
www.essgroup.com

Client: Davis Site Trust
Site: Davis Liquid Superfund
Job #: D164
Date:

Well ID: PCD-2
Well Diameter: 1.5"
Measuring Point: PVC
ESS Personnel: Alvarez

Development Method: Check-Valve Surge / 1/2" Peristaltic Pump
Distance from Top of PVC to Top of Casing: 2.0"
Distance from Ground Surface to Top of Casing: 35.5"



Pre-development Measurements	
Time:	1310
Depth to Water (ft):	9.52
Depth to bottom (ft):	20.09
Depth to product (ft):	NP
Product thickness(ft):	NA

Length of Water Column:
Well Volume:

Post-development Measurements	
Time:	1330
Depth to Water(ft):	9.52
Depth to bottom (ft):	20.09
Depth to product (ft):	NP
Product thickness (ft):	NA

Groundwater Monitoring Results

Time	Volume Purged (gals)	Temperature (°F)	pH (s.u.)	Turbidity (NTU)	Conductivity (mS)	Notes
1310	0					Rusty-Red (orange)
1320	~ 7.0 gal					Purge Color
1325	8.0 gal					
						Good Recharge
						No sheen
						Slight odor
						* Lock Req'd

Comments: 0'-12'-RISER
12'-17'-Pre-Pack Screen (Geoprobe Inc.) } BGS

* NO Water used during installation

Notes: Recharge Conditions, Color, Odor, Sediment Content & Color, Volume DI Water Added, Well Access Conditions (lock required?), etc.
Well Volume Factors (gallons/foot of water in well): 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653), 6-inch (1.47)
Determine well volume by multiplying length of water column by well volume factor

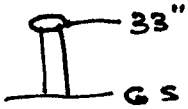
GROUNDWATER MONITORING WELL DEVELOPMENT FORM

ESS Group, Inc.
www.essgroup.com

Client: Davis Site Trust
Site: Davis Liquid Superfund
Job # D164
Date:

Well ID: PCD-3
Well Diameter: 1.5"
Measuring Point: PVC
ESS Personnel: Alvarez

Development Method: Check-Valve Surge / 1½" Peristaltic Pump
Distance from Top of PVC to Top of Casing:
Distance from Ground Surface to Top of Casing: 33"



- PVC offset

Pre-development Measurements	
Time:	1030
Depth to Water (ft):	9.7"
Depth to bottom (ft):	15.80"
Depth to product (ft):	NP
Product thickness(ft):	N/A

Length of Water Column: 6.1'
Well Volume: .56 gal

Post-development Measurements	
Time:	1130
Depth to Water(ft):	9.91'
Depth to bottom (ft):	15.80'
Depth to product (ft):	N/P
Product thickness (ft):	N/A

Groundwater Monitoring Results

Time	Volume Purged (gals)	Temperature (°F)	pH (s.u.)	Turbidity (NTU)	Conductivity (mS)	Notes
1032	0.0	NM	NM	NM	NM	*-Adjusted pump RATE
1052	2.5*	|	|	|	|	Fair Recharge
1112	7.5					Slight Organic Odor
1117	10.0					Little Initial Color/Sediment
1125	12.5					
		10.80				
						Need Lock
			(AS-BUILT)			
	Pre-Pack		Below PVC			
	Screen					
		15.80'				

Comments:
0'- 8' - RISER
8'- 13' - Pre-Pack Screen (Geoprobe Inc.) } BGS

Notes: Recharge Conditions, Color, Odor, Sediment Content & Color, Volume DI Water Added, Well Access Conditions (lock required?), etc.
Well Volume Factors (gallons/foot of water in well): 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653), 6-inch (1.47)
Determine well volume by multiplying length of water column by well volume factor

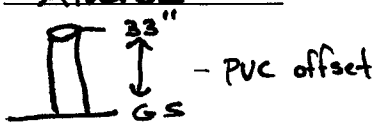
GROUNDWATER MONITORING WELL DEVELOPMENT FORM

ESS Group, Inc.
www.essgroup.com

Client: Davis Site Trust
Site: Davis Liquid Superfund
Job # D164
Date:

Well ID: PC-2
Well Diameter: 1.5"
Measuring Point: PVC
ESS Personnel: Alvarez

Development Method: Check-Valve Surge/1/2" Peristaltic Pump
Distance from Top of PVC to Top of Casing:
Distance from Ground Surface to Top of Casing:



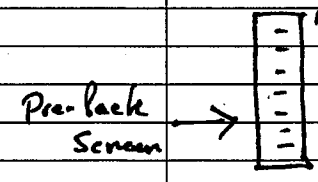
Pre-development Measurements	
Time:	0950
Depth to Water (ft):	11.13'
Depth to bottom (ft):	19.85'
Depth to product (ft):	NP
Product thickness(ft):	N/A

Length of Water Column: 8.22'
Well Volume: .80 gal

Post-development Measurements	
Time:	1025
Depth to Water(ft):	11.33'
Depth to bottom (ft):	19.91'
Depth to product (ft):	NM
Product thickness (ft):	N/A

Groundwater Monitoring Results

Time	Volume Purged (gals)	Temperature (°F)	pH (s.u.)	Turbidity (NTU)	Conductivity (mS)	Notes
951	0.0	11.3	5.78	NM	73.9	
0957	2.5	11.3	5.77	NM	105.6	Excellent Recharge
1002	5.0	11.3	5.77	NM	NM	No ODOR
1006	7.5	NM	NM	NM	NM	No sheen
1011	10.0	NM	NM	NM	NM	Soil is Light Brown
1016	12.5	NM				
1021	15.0	NM				END Pumping
						NEEDS LOCK



Comments: 0'-12' - RISER
12'-17' - Pre-Pack Screen (Geoprobe Inc.) } BGS

*-(2) Wells were designed, however only the shallow was installed.

Notes: Recharge Conditions, Color, Odor, Sediment Content & Color, Volume DI Water Added, Well Access Conditions (lock required?), etc.
Well Volume Factors (gallons/foot of water in well): 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653), 6-inch (1.47)
Determine well volume by multiplying length of water column by well volume factor

GROUNDWATER MONITORING WELL DEVELOPMENT FORM

ESS Group, Inc.
www.essgroup.com

Client: Davis Site Trust
Site: Davis Liquid Superfund
Job # D164
Date:

Well ID: PC-3
Well Diameter: 1.5"
Measuring Point: PVC
ESS Personnel: Alvarez

Development Method: Check-Valve Surge / Peristaltic Pump ½"
Distance from Top of PVC to Top of Casing:
Distance from Ground Surface to Top of Casing: 32"

Pre-development Measurements	
Time:	1135
Depth to Water (ft):	12.93'
Depth to bottom (ft):	20.44'
Depth to product (ft):	NP
Product thickness(ft):	N/A

Length of Water Column: 7.51'
Well Volume: .69 gal

Post-development Measurements	
Time:	1217
Depth to Water(ft):	12.90'
Depth to bottom (ft):	20.50'
Depth to product (ft):	NP
Product thickness (ft):	N/A

Groundwater Monitoring Results

Time	Volume Purged (gals)	Temperature (°F)	pH (s.u.)	Turbidity (NTU)	Conductivity (mS)	Notes
1137	0.0	NM	NM	NM	NM	No odor
1147	5.0	|	|	|	|	Brown sediment
1157	10.0					Good to Excellent
1215	15.0					Recharge
						No sheen
		15.50				
	Pre-Pack Screen	(AS-BUILT Below PVC)				* Lock Req'd
		20.50				

Comments: 0'-12'- RISER
12'-17'- Pre-Pack Screen (Geoprobe Inc.) } BGS

Notes: Recharge Conditions, Color, Odor, Sediment Content & Color, Volume DI Water Added, Well Access Conditions (lock required?), etc.
Well Volume Factors (gallons/foot of water in well): 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653), 6-inch (1.47)
Determine well volume by multiplying length of water column by well volume factor

GROUNDWATER MONITORING WELL DEVELOPMENT FORM

ESS Group, Inc.
www.essgroup.com

Client: Davis Site Trust
Site: Davis Liquid Superfund
Job # D164
Date:

Well ID: PC-8 (S)
Well Diameter: 1.5"
Measuring Point: PVC
ESS Personnel: Alvarez

Development Method: Check-Valve Surge / 1/2" Peristaltic Pump
Distance from Top of PVC to Top of Casing:
Distance from Ground Surface to Top of Casing: 33"

Pre-development Measurements	
Time:	1250
Depth to Water (ft):	14.86'
Depth to bottom (ft):	19.12'
Depth to product (ft):	NP
Product thickness(ft):	N/A

Length of Water Column: 4.26
Well Volume: .40 gal

Post-development Measurements	
Time:	1400
Depth to Water(ft):	16.80
Depth to bottom (ft):	19.25
Depth to product (ft):	N/A
Product thickness (ft):	N/A

Groundwater Monitoring Results

Time	Volume Purged (gals)	Temperature (°F)	pH (s.u.)	Turbidity (NTU)	Conductivity (mS)	Notes
1250	0.0	NM	NM	NM	NM	Odor Present
1310	2.5	|	|	|	|	Sheen Present (slight)
1320	5.0	|	|	|	|	Color-Dark Grey
1330	7.5	|	|	|	|	Fair to Poor Recharge
1340	10.0	|	|	|	|	
1350	12.5	|	|	|	|	ODOR PRESENT
1400	15.0	|	|	|	|	CLEAR WATER
						* Needs
						Lock

Comments: 0'-11'- RISER
BGS {11'-16'- Pre-Pack Screen (Geoprobe Inc.)

Notes: Recharge Conditions, Color, Odor, Sediment Content & Color, Volume DI Water Added, Well Access Conditions (lock required?), etc.
Well Volume Factors (gallons/foot of water in well): 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653), 6-inch (1.47)
Determine well volume by multiplying length of water column by well volume factor

GROUNDWATER MONITORING WELL DEVELOPMENT FORM

ESS Group, Inc.
www.essgroup.com

Client: Davis Site Trust
Site: Davis Liquid Superfund
Job # D164
Date:

Well ID: PC-11 (S)
Well Diameter: 1.5"
Measuring Point: PVC
ESS Personnel: Alvarez

Development Method: Check-Valve Surge / 1/2" Peristaltic Pump
Distance from Top of PVC to Top of Casing: 30.95
Distance from Ground Surface to Top of Casing: 32.85

Pre-development Measurements	
Time:	~~0930~~ 1130
Depth to Water (ft):	~~20.15~~ 14.19
Depth to bottom (ft):	~~30.95~~ 18.85
Depth to product (ft):	NP
Product thickness(ft):	N/A

Length of Water Column:
Well Volume:

Post-development Measurements	
Time:	
Depth to Water(ft):	14.15
Depth to bottom (ft):	18.80
Depth to product (ft):	NP
Product thickness (ft):	N/A

Groundwater Monitoring Results

Time	Volume Purged (gals)	Temperature (°F)	pH (s.u.)	Turbidity (NTU)	Conductivity (mS)	Notes
1130		NM	NM	NM	NM	Very Slight Odor
1150	4.0 g					Light Brown Sediment
1200	10.0 g					No Sheen
						* Lock Req'd

Comments: * Shallow Screen Install *
0'-11' - RISER
11'-16' - Pre-Pack Screen (Geoprobe Inc.) } BGS

* 8.5 gallons used during installation

Notes: Recharge Conditions, Color, Odor, Sediment Content & Color, Volume DI Water Added, Well Access Conditions (lock required?), etc.
Well Volume Factors (gallons/foot of water in well): 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653), 6-inch (1.47)
Determine well volume by multiplying length of water column by well volume factor

GROUNDWATER MONITORING WELL DEVELOPMENT FORM

ESS Group, Inc.
www.essgroup.com

Client: Davis Site Trust
Site: Davis Liquid Superfund
Job #: D164
Date:

Well ID: PC-11 (D)
Well Diameter: 1.5"
Measuring Point: PVC
ESS Personnel: Alvarez

Development Method: Check-Valve Surge / 1/2" Peristaltic Pump
Distance from Top of PVC to Top of Casing:
Distance from Ground Surface to Top of Casing:

Pre-development Measurements	
Time:	1138
Depth to Water (ft):	14.4
Depth to bottom (ft):	24.55
Depth to product (ft):	NP
Product thickness(ft):	N/A

Length of Water Column:
Well Volume:

Post-development Measurements	
Time:	
Depth to Water(ft):	15.20
Depth to bottom (ft):	~~24.41~~ 24.41
Depth to product (ft):	NP
Product thickness (ft):	N/A

Groundwater Monitoring Results

Time	Volume Purged (gals)	Temperature (°F)	pH (s.u.)	Turbidity (NTU)	Conductivity (mS)	Notes
1130	0.0	NM	NM	NM	NM	GREY Silt
1158	5.0	|	|	|	|	~~[illegible]~~
1200	10.0					ODOR
1205	12.0					FAIR RECHARGE
						NO sheen
						* Lock Req'd

Comments: * DEEP Screen Install *
0'-16.5' - Riser
16.5'-21.5' - Pre-Pack Screen (Geoprobe Inc.)

* 10.0 gallons used during installation

Notes: Recharge Conditions, Color, Odor, Sediment Content & Color, Volume DI Water Added, Well Access Conditions (lock required?), etc.
Well Volume Factors (gallons/foot of water in well): 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653), 6-inch (1.47)
Determine well volume by multiplying length of water column by well volume factor

GROUNDWATER MONITORING WELL DEVELOPMENT FORM

ESS Group, Inc.
www.essgroup.com

Client: Davis Silk Trust
Site: Davis Liquid
Job #
Date:

Well ID: PC-17(D)
Well Diameter: 2.0"
Measuring Point: P.V.C.
ESS Personnel: Alvarez

Development Method: Check Valve Surge / 1/2" Peristaltic
Distance from Top of PVC to Top of Casing: NM
Distance from Ground Surface to Top of Casing: NM

Pre-development Measurements	
Time:	
Depth to Water (ft):	17.04
Depth to bottom (ft):	21.91
Depth to product (ft):	NP
Product thickness(ft):	NP

Length of Water Column:
Well Volume:

Post-development Measurements	
Time:	
Depth to Water(ft):	17.11
Depth to bottom (ft):	21.89
Depth to product (ft):	N/A
Product thickness (ft):	N/A

Groundwater Monitoring Results

Time	Volume Purged (gals)	Temperature (°F)	pH (s.u.)	Turbidity (NTU)	Conductivity (mS)	Notes
0940	0					17.04 DTW
0955	5.0					17.32 DTW
1015	10.0					17.29 DTW
1025	15.0					17.29 DTW
1035	20.0					17.30 DTW
1045	25.0					17.25 DTW
1055	30.0					17.24 DTW
1109	35.0					17.24
1131	47.0					17.24 DTW

Comments: Added 16" PVC stickup riser to bring up to meet Prot. Casing.

Excellent recharge, no sheen, very slight odor, grey-brown sediment

Notes: Recharge Conditions, Color, Odor, Sediment Content & Color, Volume DI Water Added, Well Access Conditions (lock required?), etc.
Well Volume Factors (gallons/foot of water in well): 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653), 6-inch (1.47)
Determine well volume by multiplying length of water column by well volume factor

GROUNDWATER MONITORING WELL DEVELOPMENT FORM

ESS Group, Inc.
www.essgroup.com

Client: Davis Site Trust
Site: Davis Liquid Superfund
Job #: D164
Date:

Well ID: PC-20 (S)
Well Diameter: 1.5"
Measuring Point: PVC
ESS Personnel: Alvarez

Development Method: Check-Valve Surge / 1/2" Peristaltic Pump
Distance from Top of PVC to Top of Casing: NM
Distance from Ground Surface to Top of Casing: NM

Pre-development Measurements	
Time:	1030
Depth to Water (ft):	~~10.58~~ 11.61
Depth to bottom (ft):	~~18.50~~ 19.34
Depth to product (ft):	NP
Product thickness(ft):	N/A

Length of Water Column:
Well Volume:

Post-development Measurements	
Time:	
Depth to Water(ft):	
Depth to bottom (ft):	
Depth to product (ft):	
Product thickness (ft):	

Groundwater Monitoring Results

Time	Volume Purged (gals)	Temperature (°F)	pH (s.u.)	Turbidity (NTU)	Conductivity (mS)	Notes
1035	2.0 gal	NM	NM	NM	NM	GREY FINES
1043	5.0	|	|	|	|	NO ODOR
1051	10.0					NO SHEEN
1058	14.5					~~Fair~~ Recharge
						Good
						* Lock
						Req'd

Comments: * Shallow SCREEN INSTALL *
0'-11' - RISER
11'-16' - Pre-Pack Screen (Geoprobe Inc.) } BGS

* 9.0 gallons used during installation.

Notes: Recharge Conditions, Color, Odor, Sediment Content & Color, Volume DI Water Added, Well Access Conditions (lock required?), etc.
Well Volume Factors (gallons/foot of water in well): 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653), 6-inch (1.47)
Determine well volume by multiplying length of water column by well volume factor

GROUNDWATER MONITORING WELL DEVELOPMENT FORM

ESS Group, Inc.
www.essgroup.com

Client: Davis Site Trust
Site: Davis Liquid Superfund
Job #: D169
Date:

Well ID: PC-20 (D)
Well Diameter: 1.5"
Measuring Point: PVC
ESS Personnel: Alvarez

Development Method: Check-Valve Surge / ½" Peristaltic Pump
Distance from Top of PVC to Top of Casing: NM
Distance from Ground Surface to Top of Casing: NM

Pre-development Measurements	
Time:	1025
Depth to Water (ft):	11.59
Depth to bottom (ft):	28.50
Depth to product (ft):	NP
Product thickness(ft):	N/A

Length of Water Column:
Well Volume:

Post-development Measurements	
Time:	1059
Depth to Water(ft):	11.58
Depth to bottom (ft):	28.48
Depth to product (ft):	NP
Product thickness (ft):	NM

Groundwater Monitoring Results

Time	Volume Purged (gals)	Temperature (°F)	pH (s.u.)	Turbidity (NTU)	Conductivity (mS)	Notes
1025	0.0	NM	NM	NM	NM	GREY SILTS
1032	5.0	|	|	|	|	No ODOR
1040	10.0					No Sheen
1048	15.0					Good to Excellent
1052	20.0					Recharge
						* Lock Req'd

Comments: *DEEP SCREEN INSTALL*
0'-20.7'-RISER
20.7'-25.7'-Pre-Pack Screen (Geoprobe, Inc.) } BGS

* 12.0 gallons used during installation

Notes: Recharge Conditions, Color, Odor, Sediment Content & Color, Volume DI Water Added, Well Access Conditions (lock required?), etc.
Well Volume Factors (gallons/foot of water in well): 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653), 6-inch (1.47)
Determine well volume by multiplying length of water column by well volume factor

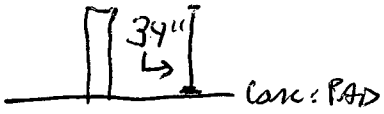
GROUNDWATER MONITORING WELL DEVELOPMENT FORM

ESS Group, Inc.
www.essgroup.com

Client: Davis Site Trust
Site: Davis Liquid Superfund
Job # D164
Date: 6/12/12

Well ID: PC-23
Well Diameter: 1.5"
Measuring Point: PVC
ESS Personnel: Alvarez

Development Method: Check-Valve Surge / 1/2" Peristaltic Pump
Distance from Top of PVC to Top of Casing:
Distance from Ground Surface to Top of Casing: 34"



Pre-development Measurements	
Time:	1440
Depth to Water (ft):	14.42
Depth to bottom (ft):	33.95
Depth to product (ft):	NP
Product thickness(ft):	NA

Length of Water Column: 19.53
Well Volume: 1.8 gal

Post-development Measurements	
Time:	1510
Depth to Water(ft):	14.41
Depth to bottom (ft):	33.95
Depth to product (ft):	NP
Product thickness (ft):	N/A

Groundwater Monitoring Results

Time	Volume Purged (gals)	Temperature (°F)	pH (s.u.)	Turbidity (NTU)	Conductivity (mS)	Notes
1445	0.0	NM	NM	NM	NM	Heavy Silt
1455	5.0	↓	↓	↓	↓	No Odor
1505	10.0	↓	↓	↓	↓	Good Recharge
1515	15.0	↓	↓	↓	↓	
						* Needs Lock

Comments:
0'-26' – RISER
26'-31' – Pre-Pack Screen (Geoprobe Inc.) } BGS

Notes: Recharge Conditions, Color, Odor, Sediment Content & Color, Volume DI Water Added, Well Access Conditions (lock required?), etc.
Well Volume Factors (gallons/foot of water in well): 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653), 6-inch (1.47)
Determine well volume by multiplying length of water column by well volume factor

GROUNDWATER MONITORING WELL DEVELOPMENT FORM

ESS Group, Inc.
www.essgroup.com

Client: Davis Site Trust
Site: Davis Liquid Superfund
Job #: D164
Date: 6/12/12

Well ID: PC-25
Well Diameter: 1.5"
Measuring Point: PVC
ESS Personnel: Alvarez

Development Method: Check-Valve Surge / ½" Peristaltic Pump
Distance from Top of PVC to Top of Casing:
Distance from Ground Surface to Top of Casing: 33.5"

33.5" — Conc PAD

Pre-development Measurements	
Time:	15:30
Depth to Water (ft):	11.85
Depth to bottom (ft):	40.93
Depth to product (ft):	NP
Product thickness(ft):	N/A

Length of Water Column: 29.08
Well Volume: 2.7 gal

Post-development Measurements	
Time:	1555
Depth to Water(ft):	12.85
Depth to bottom (ft):	40.98
Depth to product (ft):	NP
Product thickness (ft):	NA

Groundwater Monitoring Results

Time	Volume Purged (gals)	Temperature (°F)	pH (s.u.)	Turbidity (NTU)	Conductivity (mS)	Notes
1535	0.0	NM	NM	NM	NM	~~[illegible]~~ (LF)
1545	5.0	↓	↓	↓	↓	HEAVILY SILT
1555	10.0					EXCELLENT RECHARGE
						SLIGHT ODOR
						* Needs Lock

Comments: 0' - 33' - RISER
33' - 38' - Pre-Pack Screen (Geoprobe, Inc.) ? BGS

6 GAL ~~[illegible]~~ ADDED DURING WASH ~~[illegible]~~

Notes: Recharge Conditions, Color, Odor, Sediment Content & Color, Volume DI Water Added, Well Access Conditions (lock required?), etc.
Well Volume Factors (gallons/foot of water in well): 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653), 6-inch (1.47)
Determine well volume by multiplying length of water column by well volume factor

GROUNDWATER MONITORING WELL DEVELOPMENT FORM

ESS Group, Inc.
www.essgroup.com

Client: Davis Site Trust
Site: Davis Liquid Superfund
Job #: D164
Date:

Well ID: PC-24-P/S
Well Diameter: 2.0"
Measuring Point: PVC
ESS Personnel: Alvarez

Development Method: Check-Valve Surge / ½" Peristaltic Pump
Distance from Top of PVC to Top of Casing:
Distance from Ground Surface to Top of Casing:

Pre-development Measurements	
Time:	1300
Depth to Water (ft):	13.06
Depth to bottom (ft):	18.01
Depth to product (ft):	NP
Product thickness(ft):	N/A

Length of Water Column:
Well Volume:

Post-development Measurements	
Time:	1325
Depth to Water(ft):	16.10
Depth to bottom (ft):	17.99
Depth to product (ft):	NP
Product thickness (ft):	N/A

Groundwater Monitoring Results

Time	Volume Purged (gals)	Temperature (°F)	pH (s.u.)	Turbidity (NTU)	Conductivity (mS)	Notes
1300	0	NM	NM	NM	NM	Dark Brown-Grey
1320	5.0	|	|	|	|	No odor
1325	8.0					No sheen
						Poor Recharge
						* Lock
						Req'd

Comments: * CAUTION * * SHORT SCREEN (2.0') *

[DO NOT OVERPUMP / SURGE]

0.0'-13.0' - RISER } BGS
13.0'-15.0' - SCREEN

* No water used for install

Notes: Recharge Conditions, Color, Odor, Sediment Content & Color, Volume DI Water Added, Well Access Conditions (lock required?), etc.
Well Volume Factors (gallons/foot of water in well): 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653), 6-inch (1.47)
Determine well volume by multiplying length of water column by well volume factor

GROUNDWATER MONITORING WELL DEVELOPMENT FORM

ESS Group, Inc.
www.essgroup.com

Client: Davis Site Trust
Site: Davis Liquid Superfund
Job #: D164
Date:

Well ID: PC-28
Well Diameter: 1.5"
Measuring Point: PVC
ESS Personnel: Alvarez

Development Method: Check-Valve Surge / 1/2" Peristaltic Pump
Distance from Top of PVC to Top of Casing: ~~36.2785~~ 2.5'
Distance from Ground Surface to Top of Casing: ~~34.2285~~ 36.5"

Pre-development Measurements	
Time:	930
Depth to Water (ft):	7.15
Depth to bottom (ft):	36.93
Depth to product (ft):	NP
Product thickness(ft):	N/A

Length of Water Column:
Well Volume:

Post-development Measurements	
Time:	1015
Depth to Water(ft):	7.15
Depth to bottom (ft):	37.08
Depth to product (ft):	NP
Product thickness (ft):	NA

Groundwater Monitoring Results

Time	Volume Purged (gals)	Temperature (°F)	pH (s.u.)	Turbidity (NTU)	Conductivity (mS)	Notes
0940	0.0					Brown Silt
950	5.0	NM	NM	NM	NM	No odor
958	10.0					Excellent
1006	15.0					Recharge
1014	20.0					
						* Lock Req'd

Comments: 0'-29' - RISER
29'-34' - Pre-Pack Screen (Geoprobe Inc.) 3 BGS

* 16 gallons used during installation

Notes: Recharge Conditions, Color, Odor, Sediment Content & Color, Volume DI Water Added, Well Access Conditions (lock required?), etc.
Well Volume Factors (gallons/foot of water in well): 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653), 6-inch (1.47)
Determine well volume by multiplying length of water column by well volume factor

GROUNDWATER MONITORING WELL DEVELOPMENT FORM

ESS Group, Inc.
www.essgroup.com

Client: Davis Site Trust
Site: Davis Liquid Superfund
Job # D164
Date:

Well ID: PC-28-P/S
Well Diameter: 2"
Measuring Point: PVC
ESS Personnel: Alvarez

Development Method: Check-Valve Surge/1/2" Peristaltic Pump 31.75
Distance from Top of PVC to Top of Casing: 4.75
Distance from Ground Surface to Top of Casing: 36"

Pre-development Measurements	
Time:	940
Depth to Water (ft):	7.50
Depth to bottom (ft):	10.7
Depth to product (ft):	NP
Product thickness(ft):	N/A

Length of Water Column:
Well Volume:

Post-development Measurements	
Time:	
Depth to Water(ft):	
Depth to bottom (ft):	
Depth to product (ft):	
Product thickness (ft):	

Groundwater Monitoring Results

Time	Volume Purged (gals)	Temperature (°F)	pH (s.u.)	Turbidity (NTU)	Conductivity (mS)	Notes
941	0.0					Drk Brown Sediment
948	0.75	NM	NM	NM	NM	No sheen
955	1.0					No odor
						Poor Recharge to Fair
		8.7' (AS BUILT 10.7'				*Lock Required

Comments: * PEAT/SILT SCREEN INSTALL *
0'-5.5' - RISER } BGS
5.5-7.5' - SCREEN }

* CAUTION * DO NOT OVERPUMP/SURGE

* NO WATER USED DURING Installation

Notes: Recharge Conditions, Color, Odor, Sediment Content & Color, Volume DI Water Added, Well Access Conditions (lock required?), etc.
Well Volume Factors (gallons/foot of water in well): 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653), 6-inch (1.47)
Determine well volume by multiplying length of water column by well volume factor

Appendix C

Laboratory Analytical Reports (Provided on CD)

See Volume II for Appendix C

Appendix D

Data Validation Reports (Provided on CD)

environmental chemistry consultants

DATA VALIDATION REPORT
EPA Region I Tier II-Type for VOCs, TCL SVOCs, TCL Pesticides, TCL PCBs, & TAL Metals

Client: ESS Group, Inc., East Providence, Rhode Island

Site: Davis Liquid Waste Superfund Site, Smithfield, Rhode Island
Soil Sampling - 2012

Laboratory: TestAmerica Westfield, Westfield, Massachusetts

Lab Project/SDG #: 360-40656-1

Number of Samples: 12 soil samples + 1 Trip Blank for project-specific list of 52 Volatile Organic Compounds (VOCs)
9 soil samples for Target Compound List (TCL) Semivolatile Organic Compounds (SVOCs), TCL Pesticides, TCL Polychlorinated Biphenyls (PCBs), Target Analyte List (TAL) Metals and Percent Solids

Data Reviewers: Nancy C. Rothman, Ph.D., New Environmental Horizons, Inc.
Susan D. Chapnick, M.S., New Environmental Horizons, Inc.

Date: September 14, 2012

EPA Tier II-type Data Validation Review was performed on the data included in this SDG with the following intentions: 1) to determine if the data were generated and reported in accordance with the following documents: *Remedial Design Work Plan and Pre-Design Investigation Plan* (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996 and updates including Part II, III, and IV (Volatile/Semivolatile, Pesticide/PCB, and Inorganic Data Validation Functional Guidelines); EPA *Region I Tiered Organic and Inorganic Data Validation Guidelines*, July 1993, and USEPA SW846 Method 8260C, 8270D, 8081B, 8082A, 6010C, and 7471A 2) to determine if the data met the project data quality objectives for acceptable accuracy, precision, sensitivity; and technical usability; and 3) to update the project database with validated results and appropriate data validation qualifiers.

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The Data Validation Report consists of three parts:

- This Data Validation Report letter summarizing the actions taken;
- The spreadsheet of validated sample results with validation qualifiers based on actions taken; and
- The Data Validation Checklists to document the Tier II-type validations. These Checklists are an integral part of the validation report as they contain comprehensive details of all QC reviewed, the acceptance criteria used, professional judgment and actions taken.

I. Sample Descriptions and Analytical Parameters

The sample IDs, date of sampling, matrix, and sample type (e.g. Field Sample, Field Duplicate, etc., as applicable) and the analytical parameters reviewed are listed below in Table 1.

Table 1. Sample Descriptions and Analytical Parameters

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-FS-TB-PC-4-1.5-2.0	5/18/12	Soil	VOCs	Field Sample
SB-FS-TB-PC-4-0.5-2.0	5/18/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-4-11.0-11.5	5/18/12	Soil	VOCs	Field Sample
SB-FS-PC-4-11.0-13.0	5/18/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-4-22.5-23.0	5/18/12	Soil	VOCs	Field Sample
SB-FS-PC-4-25.5-26.0	5/18/12	Soil	VOCs	Field Sample
SB-FS-PC-4-25-26.7	5/18/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-TB-PC-1-2.0	5/18/12	Soil	VOCs	Field Sample
SB-FS-TB-PC-1-0.5-2.0	5/18/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-1-14.5-15.0	5/18/12	Soil	VOCs	Field Sample
SB-FS-PC-1-8.5-9.0	5/18/12	Soil	VOCs	Field Sample

Table 1. Sample Descriptions and Analytical Parameters (continued)

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-FS-PC-1-8.0-10.0	5/18/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-1-14.0-16.0	5/18/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-1-16.5-17.0	5/18/12	Soil	VOCs	Field Sample
SB-FS-TB-PC-5-1.0-1.5	5/18/12	Soil	VOCs	Field Sample
SB-FS-TB-PC-5-0.5-2.0	5/18/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-5-11.0-13.0	5/18/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-5-11.0-11.5	5/18/12	Soil	VOCs	Field Sample
SB-FS-PC-5-20.0-20.5	5/18/12	Soil	VOCs	Field Sample
SB-FS-PC-5-23.0-25.0	5/18/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-5-23.5-24.0	5/18/12	Soil	VOCs & Percent Solids	Field Sample
TB-051812-2	5/18/12	Water	VOCs	Trip Blank

Analytical method references:

Volatiles: 52 project-specific VOCs by USEPA SW846 Method 8260C that includes the TCL plus diethyl ether and tetrahydrofuran and minus 1,4-dioxane (not required for soils; note 1,4-dioxane was reported in the TB).

Semivolatiles: TCL SVOCs by USEPA SW846 Method 8270D

Pesticides: TCL Pesticides by USEPA SW846 Method 8081B

PCBs: TCL PCB Aroclors by USEPA SW846 Method 8082A

Metals: TAL Metals by USEPA SW846 Method 6010C (ICP-AES), which includes 22 Metals, plus Mercury by USEPA SW846 Method 7471A Cold Vapor Atomic Absorption (CVAA)

Percent Moisture / Percent Solids were performed and reported for all samples to convert results to dry-weight units.

II. Quality Control Reviewed during Data Validation

The following QC elements, as applicable to the analytical methods, were reviewed during the Tier II-type validation of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals:

- Data package completeness and reporting protocols
- Sample receipt, holding times and preservation criteria
- Blank results including Method Blanks, Equipment Blanks, & Trip blanks
- Laboratory Control Sample (LCS) recoveries / LCS Duplicate Recoveries
- Standard Reference Material (SRM) Recoveries, if applicable
- Surrogate Recoveries
- Matrix Spike (MS) / Matrix Spike Duplicate (MSD) Recoveries
- MS/MSD, LCS/LCSD, and sample/Field Duplicate (FD) Relative Percent Differences (RPDs)
- Sample result reporting (including compound lists, reporting limits, and units)
- Calibration criteria (including tune criteria, initial calibration and continuing calibration verification)
- Internal Standard (IS) Recoveries
- Retention Time windows
- Other method-specific QC if applicable and reported in Summary QC
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

III. Data Validation Report Summary

During the Tier II-type data validation review of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals, no data were rejected. Several results were negated (U) or estimated (J or UJ) due to QC issues. Table 2 summarizes the actions taken during this data validation review. NEH generated a validated data spreadsheet based on the electronic project database file (EDD) received from ESS for this SDG. All results were considered usable for project decisions compared to the Davis RDWP QAPP requirements with the understanding of the potential uncertainty (bias) in the qualified results presented in Table 2.

The remainder of this report documents "exceptions" to method or QAPP criteria or clarifications of data reported. QC elements not discussed below met all QAPP criteria. The full documentation of all QC elements reviewed during the Tier II-type validations are presented in the attached Data Validation Checklists. Data users should also reference the full Tier III-type data validation performed on soil samples included in SDG 360-40815-1 for additional information on general reporting issues and calculation verification from review of raw data (which is not performed in a Tier II-type validation).

Exceptions from Davis QAPP or Method QC Criteria

- All SVOC samples were initially extracted and analyzed within holding time; however, the sensitivity of the results did not meet QAPP requirements. The lab re-extracted the SVOCs outside of holding time to report results from a low-level SVOC analysis. The low-level results were accepted for reporting during validation as estimated (J or UJ) results due to holding time exceedance with a potential low bias, as listed in Table 2.

- The method blanks for VOCs reported results above the Reporting Limit (RL) for methylene chloride. A comparison of the level in the blanks with the levels reported for this compound in the associated samples resulted in the following actions:
  - Methylene chloride was negated (U) in all VOC samples, as shown in Table 2, and the results raised to the sample specific RL or to the level found in the sample, whichever was higher.
- Exceedances of Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) recoveries or RPD were as follows:
  - VOCs – Acetone and 2-butanone showed recoveries outside of criteria. Actions taken to estimate (UJ) affected sample results due to VOC LCS/LCSD exceedances are listed in Table 2.
  - SVOC – 2,4-dinitrophenol, 2,4-dinitrotoluene, 2,4,6-trichlorophenol, 2,6-dinitrotoluene, 2-chloronaphthalene, 2-nitroaniline, 3-nitroaniline, 4-nitroaniline, 4-chloroaniline, 4-chlorophenyl phenyl ether, acenaphthene, acenaphthylene, carbazole, dibenzofuran, diethyl phthalate, dimethyl phthalate, fluorene and hexachlorocyclopentadiene showed recoveries and/or precision outside of criteria in various samples. Actions taken to estimate (UJ) affected sample results due to SVOC LCS/LCSD exceedances are listed in Table 2.
- Matrix Spike (MS) and Matrix Spike Duplicate (MSD) analyses for VOCs, SVOCs, Pesticides, and PCBs were performed as batch QC on samples not included in this SDG. Therefore, MS/MSD results were not reviewed as they would not affect the samples herein. No site sample in this SDG was identified for MS and Matrix Duplicate (MD) analyses for Metals; therefore, MS/MD analyses were not performed.
- A Field Duplicate (FD) pair was not included in this SDG.
- Various initial and continuing calibrations reported results that were outside of criteria for VOCs and SVOCs. Actions to estimate (UJ) results and the potential bias are listed in Table 2.
- For PCBs, samples SB-FS-TB-PC-5-0.5-2.0, SB-FS-TB-PC-4-0.5-2.0, and SB-FS-TB-PC-1-0.5-2.0 show complex mixtures in the chromatogram; however, none were matched to a specific Aroclor pattern.

Sensitivity & Reporting

- The laboratory flagged all results for VOCs and SVOCs that were less than the RL (supported by the low-level standard in the calibration curve) as "J". The "J" qualifier was maintained during validation to indicate that these results were estimated due to uncertainty in quantitation below the calibration range. Affected samples/analytes are listed in Table 2.
- All non-detects for VOCs, SVOCs, and PCBs were below the Project Action Limit (PAL) given in QAPP Tables 4-1C, 4-2C and 4-4B for soils except for 1,2-dibromo-3-chloropropane and ethylene dibromide, as expected, due to method limitations. Therefore, sensitivity data quality objectives (DQOs) were met for these analyses.
- The laboratory reported results for all 21 target Pesticides required, except technical-chlordane was reported instead of alpha-chlordane. The technical-chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. All RLs for Pesticides were less than or equal to the PALs given in QAPP Table 4-3B and therefore met sensitivity requirements with the exception of toxaphene (due to raising the RL during validation). No PAL was defined for technical-chlordane in the site QAPP. The data user will need to evaluate usability of the non-detected toxaphene results with elevated RLs for project uses.
- All non-detects for Metals were below the PALs given in QAPP Table 4-5C for soil. Therefore, sensitivity DQOs were met for Metals.

- Data users are cautioned that the detected Metals results for selenium reported from ICP-AES Method 6010C may be false positives based on professional judgment knowledge of positive interference for selenium on ICP-AES in some matrices. Since the reported selenium results were orders-of-magnitude below the PAL and since all QC criteria were met, no action was taken other than to note this issue.

Table 2. Summary of Data Validation Actions

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
All Pesticide samples	Chlordane (technical) Toxaphene	U		Raised RL
All VOC samples	Methyl acetate	UJ	L	Low Calibration verification
All VOC samples	2-Butanone (MEK) Acetone	UJ	L	Low LCS/LCSD recoveries
All VOC samples	Methylene Chloride	U		Negated due to Blank Action
SB-FS-PC-4-11.0-11.5	1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene	J	I	Result uncertain below the calibration range
SB-FS-PC-4-22.5-23.0	1,2-Dichlorobenzene	J	I	Result uncertain below the calibration range
SB-FS-PC-5-20.0-20.5	Carbon disulfide	J	I	Result uncertain below the calibration range
SB-FS-PC-5-23.5-24.0	1,2-Dichlorobenzene	J	I	Result uncertain below the calibration range
SB-FS-TB-PC-1-2.0	1,2,4-Trichlorobenzene	J	I	Result uncertain below the calibration range
SB-FS-TB-PC-4-1.5-2.0	Trichloroethene	J	I	Result uncertain below the calibration range
SB-FS-PC-5-23.0-25.0	2,4-Dinitrotoluene 2,6-Dinitrotoluene 2-Chloronaphthalene 2-Nitroaniline 4-Chlorophenyl phenyl ether Acenaphthene Acenaphthylene Dibenzofuran Diethyl phthalate Dimethyl phthalate Fluorene Hexachlorocyclopentadiene	UJ	I	HT Exceedance + LCS/LCSD imprecision
SB-FS-PC-5-23.0-25.0	2,4,6-Trichlorophenol 3-Nitroaniline 4-Nitroaniline	UJ	I	HT Exceedance + High LCS recovery + LCS/LCSD imprecision
SB-FS-PC-5-23.0-25.0	4-Chloroaniline	UJ	I	HT Exceedance + Low LCS recovery + LCS/LCSD imprecision
SB-FS-PC-5-23.0-25.0	Carbazole	UJ	I	HT Exceedance + High LCS/LCSD recoveries + LCS/LCSD imprecision

Table 2. Summary of Data Validation Actions - *continued*

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
SB-FS-PC-5-23.0-25.0	4,6-Dinitro-2-methylphenol 2,4-Dinitrophenol	UJ	I	HT Exceedance + Initial Calibration outside criteria
SB-FS-PC-1-14.0-16.0 SB-FS-PC-1-8.0-10.0 SB-FS-PC-4-11.0-13.0 SB-FS-PC-4-25-26.7 SB-FS-PC-5-11.0-13.0 SB-FS-TB-PC-1-0.5-2.0 SB-FS-TB-PC-4-0.5-2.0 SB-FS-TB-PC-5-0.5-2.0	2,4-Dinitrophenol	UJ	I	HT Exceedance + LCS/LCSD imprecision + Initial Calibration outside criteria
All SVOC soils	Pentachlorophenol	UJ	L	HT Exceedance + Low Calibration verification
SB-FS-TB-PC-1-0.5-2.0 SB-FS-TB-PC-4-0.5-2.0	Benzaldehyde	J	I	HT Exceedance + Result uncertain below the calibration range
SB-FS-TB-PC-4-0.5-2.0 SB-FS-TB-PC-5-0.5-2.0	1,2,4,5-Tetrachlorobenzene	J	I	HT Exceedance + Result uncertain below the calibration range
All SVOC soils	All remaining analytes not listed above	J / UJ	L	HT Exceedance

Qualifiers: U = Analyte is non-detect at the "LIMIT2" value in the EDD, which is the sample-specific reporting limit (RL); UJ = Non-detect is estimated; J = Result is estimated; R = Result is rejected and is unusable for project decisions.

Bias: L = Low; H = High; I = Indeterminate

Acronyms used in Table 2:
HT = Holding Time
LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample Duplicate
RL = Reporting Limit

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Volatile Tier II-type Data Review Checklist

Lab Project: 360-40656-1

Lab: TestAmerica Westfield
Date Sampled: 5/18/12
Method of Analysis: 8260C - EI only (no SIM)

No. Samples: 12 + 1 TB
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 70-130%	LCS/LCSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	MS/MSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√		NA	NA		√		NA	
No			Estimate (UJ) 2 results in all soils			Estimate (UJ) 1 result in all soils		Accept 7 "J" results for reporting		Negate (U) 12 results due to Blank Action

% solids OK? Y
Other Issues: No

Comments:

Method 8260C used for reporting of project-specific list of VOCs. TB sample results were reviewed for potential blank actions (see below); however, full data review of this field QC sample was not performed as these results are not directly used for project decisions.

Samples were received intact at TestAmerica on the day of collection at 4±2°C - there were no COC issues noted by the lab. The COC listed a sample date of 5/8/12 for sample SB-FS-PC-1-8.0-10.0, however, it was sampled on 5/18/12. All other samples list the correct sampling date of 5/18/12. Samples were properly preserved and there was no headspace noted in the samples at the time of analysis.

Samples were all analyzed by 5/24/12 - HT met for all samples, No Action required.

Surrogates : All 3 VOC surrogates were recovered within 70-130% in all samples and QC - no Action required

LCS/LCSD : LCS/LCSD 360-91199/1-A & 2-A. Lab spiked all 53 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable except: 2-butanone and acetone (LCS/LCSD rec. low).

**Action: Acetone and 2-butanone estimated (UJ) with possible low bias in all soil samples due to low LCS/LCSD recoveries.*

Date: ***8/30/12***

Data Reviewer: ***Deborah A. Loring***

Lab Project: 360-40656-1

Lab: TestAmerica Westfield

Blank Action: Blanks Reviewed: MB: MB 360-91199/3-A
TB: TB-051812-2

Note: TB data were used to evaluate potential for contamination during shipment and handling of samples - these results were not "validated" in terms of reviewing calibration and instrument QC criteria; unless non-compliances were noted in the lab narrative.

Blank ID	Contaminant / Level	Matrix Related?	Action Level / Action	Sample and Reported Result		Corrected Result
MB 360-91199/3-A	Methylene Chloride 17.8 J µg/kg	Y	178 µg/kg	SB-FS-PC-1-14.5-15.0	9.4 B	9.4 U
				SB-FS-PC-1-16.5-17.0	6 JB	7.6 U
				SB-FS-PC-1-8.5-9.0	11 JB	13 U
				SB-FS-PC-4-11.0-11.5	15 B	15 U
				SB-FS-PC-4-22.5-23.0	8.1 JB	8.7 U
				SB-FS-PC-4-25.5-26.0	7.9 B	7.9 U
				SB-FS-PC-5-11.0-11.5	6.1 JB	9.9 U
				SB-FS-PC-5-20.0-20.5	7.9 JB	12 U
				SB-FS-PC-5-23.5-24.0	7.1 JB	11 U
				SB-FS-TB-PC-1-2.0	11 B	11 U
				SB-FS-TB-PC-4-1.5-2.0	7.6 JB	8.7 U
				SB-FS-TB-PC-5-1.0-1.5	6.5 JB	11 U
TB-051812-2	None	Y		No Blank Action required		

MS/MSD: MS/MSD analyses were not performed in this SDG.

FD pair: An FD was not submitted with this SDG.

Tunes: Instrument HP#1 GC/MS . 3/23/12 16:40, 5/24/12 13:00 All tune abundances were acceptable and all samples and standards were analyzed within 12 hours of BFB tune.

ICAL : HP#1 3/23/12 6-9 level ICAL for all Targets + several non-target compounds. All calibrations met QAPP criteria for Target Compounds (ICAL from 0.5, 1 or 5 up to 160 µg/L. %RSD $\leq$ 20% or r2 $\geq$ 0.99 and all RRFs $\geq$ 0.05 . Valid ICAL - No Action required.

Date: ***8/30/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40656-1

Additional Notes:

CCAL: HP#1 05/24/2012 13:23 %D (or %Drift) ≤ ± 20% for all target compounds and RRF ≥ 0.05 except Dichlorodifluoromethane (+ 29.4%) and methyl acetate (-21.6%). A positive %D indicates increased sensitivity to detection of compound on day of CCAL as compared to sensitivity during ICAL. Since dichlorodifluoromethane was non-detect in associated samples, no action required for enhanced sensitivity.

Action: Estimate (UJ) methyl acetate with low bias due to reduced sensitivity in the CCAL in all soil samples.

IS: All 4 IS Areas and RTs were in criteria for EI and SIM analyses - No Action required.

Lab reported results for m- Xylene & p-Xylene (reported as a single entry due to coelution) and o-Xylene in addition to Xylenes, total, as requested in the QAPP. All 52 project-specific VOCs were reported so with the added Xylenes, a total of 54 VOC results reported per sample. Note that bromodichloromethane, as listed in Table 4-1C, is called dichlorobromomethane in EDD and data and Dibromochloromethane, as listed in Table 4-1C, is called chlorodibromomethane in EDD and data.

7 results were reported at levels < RL and were flagged "J" by the lab. These 7 "J" results were accepted for reporting with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

All RLs were at or below the PQLs and PALs required in the QAPP Table 4-1C for all samples 1,2-dibromo-3-chloropropane and ethylene dibromide, as expected, due to method limitations.

Narrative did not raise any issues not already addressed.

Date: ***8/30/12***

Data Reviewer: ***Deborah A. Loring***

8260C and Project Action Summary:

Preservation:	Waters - headspace present or received at > 10°C, J det / J NDs or R ND Soils/Sediment - EnCore extrusion and sample preservation unacceptable or received at > 10°C, J det / J NDs or R ND Waters - pH < 2; 14d <HT≤ 28d; J det/ J NDs; HT >28d, J det/R ND Soils/Sediment - 14d <HT< 28d; J det/ J NDs; HT >28d, J det/R ND
Surrogates:	Surr. %Rec > 130%, J det/Accept ND; 10% ≤ %Rec < 70%, J det/J NDs;
LCS	%Rec<10%, J det/ R NDs; 10% <%Rec<70, J det/ J NDs; %Rec >130, J det/Accept NDs. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. LCS must contain all targets.
Tunes:	Samples analyzed within 12-hrs and criteria met per Method 8260C. If out, use professional judgment.
ICAL:	minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs. If avg. RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
CCAL:	%D (or %Drift) > - 20% , J det/J ND; %D (or %Drift) > +20%, J det/Accept ND. If RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
Blanks:	Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for acetone, 2-butanone, and methylene chloride which are 10 x value in blank.
MS/MSD:	%Rec<10%, J det/ R NDs; 10% <%Rec<70%, J det/ J NDs; %Rec >130%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. MS/MSD must contain all targets.
FD:	Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data
IS:	20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs
QLs:	Verify RLs met RLs and PALs given in QAPP; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.
TICs:	Not required
% solids:	If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs
Narrative:	If there are any issues raised in narrative not previously addressed, take appropriate action
Reference:	*Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8260C

Date: ***8/30/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Semivolatile Tier II-type Data Review Checklist

Lab Project: 360-40656

Lab: TestAmerica Westfield
Date Sampled: 5/18/12
Method of Analysis: 8270D

No. Samples: 9
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates w: 30-130%BN 15-110% Acid s: 30-130%	LCS 40-140%BN 30-130%Acid	MS/MSD 40-140%BN 30-130%Acid w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes		√		NA	NA		√		NA	-
No	Estimate (J, UJ) all results		Estimate (UJ) 18 results in 1 sample and 1 result (UJ) in 8 samples			Estimate (UJ) 2 results in all samples		Accept 4 "J" results for reporting		

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on the day of collection at 4±2°C - there were no COC issues noted by the lab.

All samples were all initially extracted on 5/30/12, however, they were not extracted using the low level method. Samples were re-extracted on 6/7/12 (TB-PC-5-23.0-25.0, 40656-20) and 6/12/12 (all other samples) using the low level method. Both sets of data were presented. The data accepted for reporting was the data that was generated outside of holding time, as the medium level method's reporting limits did not meet the project sensitivity objectives. Extraction holding times were exceeded by 6 days for sample TB-PC-5-23.0-25.0, 40656-20 and by 11 days for all other samples. Re-extracted samples were analyzed by 7/3/12. Analytical holding times were met.

Action: Estimate (J, UJ) all sample results due to holding time exceedance.

Surrogates : All 3BN and 3 Acid Surrogates were recovered within QAPP Criteria in all samples and QC except for 2-fluorophenol recovered high compared to criteria in one of the method blanks and LCS (MB 360-91670/1-A and LCS 360-91670/2-A). Since all other surrogates in these samples were recovered within criteria, and the field samples were unaffected, no action required.

Date: ***9/4/12***

Data Reviewer: ***Deborah A. Loring***

Lab Project: 360-40656

Lab: TestAmerica Westfield

Blank Action: Blanks Reviewed: MB: MB 360-91670/1-A, MB 360-91816/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
360-91670/1-A	di-n-Butylphthalate 138 J µg/kg	Y		1380 µg/kg		All associated samples were ND - No Action required	
360-91816/1-A	di-n-Butylphthalate 228 J µg/L	Y		2280 µg/kg		All associated samples were ND - No Action required	

LCS/LCSD : LCS 360-91670/2-A & LCSD 360-91363/3-A. Lab spiked 62 target analytes in the LCS. The laboratory did not include 1,1'-biphenyl, 2,3,4,6-tetrachlorophenol, atrazine and benzaldehyde, and caprolactam. The associated sample was re-extracted and re-analyzed twice, and these compounds were reported from the second analysis, for which these compounds were included in the LCS. All spiked target compounds reported acceptable %Rec and LCS/LCSD RPD except 4-chloroaniline (LCS low RPD high); 2,4-dinitrophenol , 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2-chloronaphthalene, 2-nitroaniline, 4-chlorophenyl phenyl ether, acenaphthene, acenaphthylene, dibenzofuran, diethyl phthalate, dimethyl phthalate, fluorene and hexachlorocyclopentadiene (RPD high); 3-nitroaniline, 4-nitroaniline, and 2,4,6-trichlorophenol (LCS high, RPD high); carbazole (LCS/LCSD high, RPD high), and di-n-butylphthalate (LCS high). No action required for di-n-butylphthalate for high recovery as the compound was not detected in the associated sample.

Action: Estimate (UJ) 2,4-dinitrophenol , 2,4-dinitrotoluene, 2,4,6-trichlorophenol, 2,6-dinitrotoluene, 2-chloronaphthalene, 2-nitroaniline, 3-nitroaniline, 4-nitroaniline, 4-chloroaniline, 4-chlorophenyl phenyl ether, acenaphthene, acenaphthylene, carbazole, dibenzofuran, diethyl phthalate, dimethyl phthalate, fluorene and hexachlorocyclopentadiene with indeterminate bias due to LCS recoveries and/or high RPD in sample SB-FS-PC-5-23.0-25.0 (40656-20).

LCS/LCSD : LCS 360-91816/2-A & LCSD 360-91816/3-A. Lab spiked all 67 target analytes requested in LCS. All spiked target compounds reported acceptable %Rec and LCS/LCSD RPD except: 2,4-dinitrophenol (RPD high), 4-nitrophenol (LCS high) and di-n-butylphthalate (LCS/LCSD high). No action required for 4-nitrophenol and di-n-butylphthalate for high recovery as the compound was not detected in the associated samples.

**ACTION: 2,4-dinitrophenol estimated (UJ) with indeterminate bias due to LCS/LCSD imprecision in all soil samples except sample SB-FS-PC-5-23.0-25.0 (40656-20).*

MS/MSD: MS/MSD analyses were not performed in this SDG.

FD pair: An FD was not submitted with this SDG.

Date: ***9/4/12***

Data Reviewer: ***Deborah A. Loring***

Additional Notes:

Tunes: Instrument B 6/11/12, 6/13/12, 6/25/12, 6/26/12, 7/2/12 . All abundances were acceptable and all samples were analyzed within 12 hours of tune - No Action required

ICAL : 6/11/12 Inst. B, 8- to 10- level ICAL performed from 0.2 to 25 µg/mL (for full 10-level) for all Targets + several non-target compounds. Form VI flagged several results as not meeting minimum RRF criteria; however, lab used CLP criteria and not QAPP criteria. %RSD ≤ 20% or r2 ≥ 0.99 for all and all RRFs ≥ 0.05 except: 2,4-dinitrophenol % RSD = 46.0% and 4,6-dinitro-2-methylphenol %RSD = 39.0%

**ACTION: 2,4-Dinitrophenol and 4,6-dinitro-2-methylphenol estimated (UJ) with indeterminate bias in associated sample (SB-FS-PC-5-23.0-25.0 [40656-20]) due to high RSD.*

CCALs : Inst. B 6/13/12 - %D or %Drift ≤ ± 20% and RRF ≥ 0.05 for all target compounds except: carbazole (+43.4%), 3-nitroaniline (+48.7%) 4-nitroaniline (+29.3%), hexachlorocyclopentadiene (+28.7%), and 4-chloroaniline (22.5%) A positive %D indicates increased sensitivity to detection of compound on day of CCAL as compared to sensitivity during ICAL whereas negative %D indicates loss in instrument sensitivity. Since all compounds with positive %D were non-detect in all samples, no action required.

ICAL: 6/25/12 Inst. B, 8- to 10- level ICAL performed from 0.2 to 25 µg/mL (for full 10-level) for all Targets + several non-target compounds. Form VI flagged several results as not meeting minimum RRF criteria; however, lab used CLP criteria and not QAPP criteria. %RSD < 20% or r2 > 0.99 for all and all RRFs > 0.05 except: 2,4-Dinitrophenol %RSD = 36.0%.

**ACTION: 2,4-Dinitrophenol estimated (UJ) with indeterminate bias in associated samples (all samples except SB-FS-PC-5-23.0-25.0 - 40656-20) due to high RSD.*

CCALs: Inst. B 6/26/2012 2:12:00 PM %D or %Drift ≤ ± 20% and RRF ≥ 0.05 for all target compounds except: pentachlorophenol (-31.4%), Di-n-octyl phthalate (+21.3%). A positive %D indicates increased sensitivity to detection of compound on day of CCAL as compared to sensitivity during ICAL whereas negative %D indicates loss in instrument sensitivity. Since the compound with positive %D were non-detect in the associated samples, no action required.

**ACTION: pentachlorophenol estimated (UJ) with low bias in the associated samples (SB-FS-TB-PC-4-0.5-2.0, SB-FS-PC-4-11.0-13.0, SB-FS-PC-4-25-26.7 [40656-2, -4 & -7]).*

CCALs: Inst. B 07/02/2012 15:27/26/2012 2:12:00 PM %D or %Drift ≤ ± 20% and RRF ≥ 0.05 for all target compounds except: pentachlorophenol (-35.1%).

**ACTION: pentachlorophenol estimated (UJ) with low bias in the associated samples (SB-FS-TB-PC-1-0.5-2.0, SB-FS-PC-1-8.0-10.0, SB-FS-PC-1-14.0-16.0 , SB-FS-TB-PC-5-0.5-2.0, SB-FS-PC-5-11.0-13.0, SB-FS-PC-5-23.0-25.0 [40656-9, -12, -13, -16 & -17]).*

IS: All 6 IS Areas and RTs were in criteria for all analyses.

Date: ***9/4/12***

Data Reviewer: ***Deborah A. Loring***

Lab Project: 360-40656

Lab: TestAmerica Westfield

Additional Notes:

Lab reported results for all 67 target SVOCs required. The lab reported 3&4-methylphenol rather than 4-methylphenol as the two co-elute. All RLs reported were less than or equal to the PQLs given in QAPP Table 4-2C.

4 results were reported at levels < RL and were flagged "J" by the lab. These 4 "J" results were accepted for reporting with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

All non-detects were reported at levels below the PALs given in Table 4-2C for all samples.

Narrative did not raise any issues not already addressed.

Date: ***9/4/12***

Data Reviewer: ***Deborah A. Loring***

8270D and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: waters: BN 30 - 130%, acids 15-110%; solids: all surrogates 30-130%
2 BN or 2 Acids Recovery > Criteria, J det/Accept ND; 10% ≤ 2 or more surrogates < Criteria, J det/J NDs;
Recovery < 10%, J det/R NDs. Action taken on Acid and/or BN analytes based on Surrogates out.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs.

Tunes: Samples analyzed within 12-hrs and criteria met per Table 3 or Method 8270C. If out, use professional judgment.

ICAL: minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs; min. RRF < 0.05, J det/UJ NDs.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank

Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for phthalates which are 10 x value in blank.

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs- Unspiked Sample only. RPD > Limit, J det/UJ NDs.
MS/MSD must contain all targets.

FD: Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data

IS: 20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs

QLs: Verify RLs met QAPP QLs ; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

TICs: Not required

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8270D

Date: ***9/4/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
PCB Tier II-type Data Review Checklist

Lab Project # 360-40656

Lab: TestAmerica Westfield
Date Sampled: 5/18/12
Method of Analysis: 8082A

No. Samples: 9
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 40-140% RPD ≤ 30%	FD w:RPD≤30% s:RPD≤50%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)	Other (pattern match, etc.)
Yes	√	√	√	NA	NA	√	√	NA	----
No									

% solids OK? NA
Other Issues: No

Comments:

Samples were received intact at TestAmerica on the day of collection at 4±2°C - there were no COC issues noted by the lab.

Samples were extracted on 5/25/12 - HT met for extraction. All extracts were analyzed by 5/29/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - No Action required. Note, lab used in-house criteria for recovery of surrogates but here, QAPP criteria used to judge data acceptance.

LCS/LCSD: LCS 360-91248/2-A & LCSD 360-91248/3-A. Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec for AR1016 & AR1260 in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD: MS/MSD analyses were not performed in this SDG.

Date: ***9/5/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40656

Blank Action: Blanks Reviewed: MB:MB 360-91248/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91248/1-A	None					No Blank Action required	

Additional Notes:

FD pair: An FD was not submitted with this SDG.

ICAL: Instrument M 4/13/12 6-level calibration from 50 to 2000 µg/L for Ar 1016/1260 and at a single point calibration at 1000 µg/L for Ar-1221/1254, Ar-1232, Ar-1242, Ar-1248, Ar-1262, Ar-1268. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), linear regression performed for Ar-1016 & 1260 and r2 > 0.99 for all compounds. Valid ICAL - no action required.

CCALs : CCV 360-91269/1 on 05/29/2012 17:48 (Opening CCV for single components): All %D ≤ ± 10% on both GC columns for all Aroclor peaks except Col 1 Ar-1016-3 (+26.2%), Ar-1016-5 (-28.4%) Average %D OK, Ar-1260-1 (-23.9%), Ar-1260-3 (-22.3%), Ar-1260-4 (-26.5%), Ar-1260-5 (-28.1%) (Average = -23.5%); Col 2 all OK. CCV 360-91269/15 on 05/29/2012 23:10 all %D ≤ ±20% on both GC columns for all Aroclor peaks. No action required for Col 1 Ar-1016 as average %D was within limits. No action required for Col 1 Ar-1260 as Col 2 was within limits, and no Aroclors were detected in the samples.

Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. Since Form X used to express LCS and MS results only, since all samples were non-detect for all PCBs, no action required.

All RLs reported were less than or equal to the PALs given in QAPP Table 4-C. While the "base RL" for all samples met the PQL, when adjusted for % solids five samples had RLs of 110 µg/kg compared to the listed PQL of 100 µg/kg.

Lab reported the lowest of the two column values for Aroclor 1016 & 1260 in the LCS/LCSD samples. For both samples, GC Col. 1 and 2 precision was acceptable.

Date: ***9/5/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40656

Additional Notes:

All chromatograms for all samples visually inspected and appear to have been reported correctly. Samples SB-FS-TB-PC-5-0.5-2.0, SB-FS-TB-PC-4-0.5-2.0, and SB-FS-TB-PC-1-0.5-2.0 show complex mixtures, however, none were matched to a specific Aroclor pattern.

Narrative did not raise any issues not already addressed.

Date: *9/5/12*
Data Reviewer: *Deborah A. Loring*

Lab Project # 360-40656

Lab: TestAmerica Westfield

8082A and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs- Unspiked Sample only. RPD > 30% solids, J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multi-components), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multi-components) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8082A

Date: ***9/5/12***
Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Pesticide Tier II-type Data Review Checklist

Lab Project # 360-40656

Lab: TestAmerica Westfield
Date Sampled: 5/18/12
Method of Analysis: 8081B

No. Samples: 9
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 30-150% w: RPD≤20% sr:RPD≤30%	FD w:RPD≤30% s:RPD≤50%	RCM (Resolve. > 60%)	PEMs Brkdwn< 15% %D ≤ ± 15%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)
Yes	√	√	√	NA	NA	√	√	√	√	NA
No										

% solids OK? Y

Other Issues: No

Technical chlordane was reported instead of alpha-chlordane. Low-level initial calibration for Toxaphene and Technical chlordane did not support the lab-reported RL - action taken to raise RL for Toxaphene and Technical chlordane (see page 2).

Comments:

Samples were received intact at TestAmerica on the day of collection at 4±2°C - there were no COC issues noted by the lab.

Samples were extracted on 5/25/12 and analyzed by 5/30/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - No Action required as there were no target analytes detected in the sample. Note, lab used in-house criteria for recovery of surrogates but here, QAPP criteria used to judge data acceptance.

LCS/LCSD: 360-91248/4-A & 5-A. Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD : MS/MSD analyses were not performed in this SDG.

FD pair: An FD was not submitted with this SDG.

Resolution Check : RCM not analyzed per se; however, CCALs reviewed and all peaks appear to be adequately resolved - No Action required

Date: ***9/5/12***
Data Reviewer: ***Deborah A. Loring***

New Environmental Horizons, Inc.

Lab: TestAmerica Westfield

Lab Project # 360-40656

Blank Action:

Blanks Reviewed: MB: MB 360-91248/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91248/1-A	None					No Blank Action required	

Additional Notes:

PEM DDT and Endrin Breakdown evaluations: PEMs 360-91344/105/30/2012 12:33, PEM 360-91344/1 05/30/2012 12:33, PEM 360-91344/17 05/30/2012 18:44, and PEM 360-91344/17 05/30/2012 18:44 - %Breakdown for DDT and Endrin ≤ 15% + Combined Breakdown was ≤ 30% on each GC Column. No Action required.

ICAL: Instrument H 5/14/12 7-level from 1 to 100 µg/L for single-component Pesticides (some extras not required for project) + surrogates and 3-level from 500 to 2,500 µg/L for Toxaphene and Technical Chlordane. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), %RSD ≤ 20% or r2 ≥ 0.99 for all compounds. Several compounds used regression analysis for calibration on both columns. Valid ICAL - no action required.

CCALs : CCVRT 360-91344/2 on 05/30/2012 12:54 (Opening CCV for single-components), CCVRT 360-91344/4 on 05/30/2012 13:37 (Toxaphene), and CCVRT 360-91344/3 on 05/30/2012 13:15 (Technical chlordane) - all %D ≤ ±20% on both GC columns for all Pesticides; and CCVRT 3CCV 360-91344/18 on 05/30/2012 19:06 (Closing CCV) all %D ≤ ±20% on both GC columns for all Pesticides except Endrin (+32.1%) and DDD (+27.7%)on GC Column 1 and d-BHC (+21.2%), DDE (+25.6%), DDD (+22.5%), Endosulfan II (+29.5%) Endrin aldehyde (+33.5%) on GC Column 2. A positive %D indicates increased sensitivity to detection during CCAL as compared to sensitivity during ICAL; therefore, since all samples were non-detect for these compounds, no action for enhanced sensitivity in closing CCVs on days of analysis (i.e., non-detect accurate as reported).

Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. Since Form X used to express LCS results only, since all samples were non-detect for all Pesticides, no action required.

The narrative did not raise any issues not already addressed.

Lab reported results for all 21 target Pesticides required, except technical chlordane was reported instead of alpha-chlordane. The technical chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. The resulting RL was slightly above the PAL for Toxaphene in all samples. All other RLs reported were less than or equal to the PQLs and PALs given in QAPP Table 4-3B. No PAL was defined for Technical chlordane in the site QAPP.

Date: ***9/5/12***
Data Reviewer: ***Deborah A. Loring***

8081B and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

RCM: RCM < 60% resolution, J detects based on technical judgment

PEM: 4,4'-DDT breakdown > 15%, J detected DDT, DDE, DDD; R ND 4,4'-DDT and accept ND DDE & DDD
Endrin breakdown > 15%, J detected Endrin, Endrin Aldehyde & Endrin Ketone; R ND Endrin and accept ND Endrin Aldehyde & Endrin Ketone
4,4'-DDT and Endrin > 30%, accept NDs of breakdown products and J detects for 4,4'-DDT and Endrin; J detects of breakdown products and reject (R) non-detects for 4,4'-DDT and Endrin.
%D> ± 20%, J det/J ND on a per column basis. % Resolution < 90.0% qualify data based on professional judgment.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<30%, J det/ J NDs; %Rec >150%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters (or 30% solids), J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multicomponents), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multicomponents) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8081B

Date: ***9/5/12***
Data Reviewer: ***Deborah A. Loring***

RDWP - Davis Liquid Waste Superfund Site
EPA Region I Tier II-type DV Checklist - Metals

Lab: TestAmerica-Westfield, Westfield, MA
Date Sampled: 5/18/12
Analysis: Metals by EPA SW-846 Method 6010C & 7471A

Lab Project # 360-40656-1
No. Samples: 9
Matrix: Soil

QC Met Criteria?		HT and Preserve	RL QAPP PALs	Tune 6020 criteria	Calibration ICV/CCV 90-110%R	CRI RL Check 70-130%R	EB MB < RL	LCS/LCSD SRM limits RPD ≤ 30%	ICSA/AB 80-120% R	MS / MSD 75-125% R	MD RPD ≤ 20%	FD RPD ≤ 30%	IS 6020 70-130% R	Serial Dilution ± 15% D
Yes		√	√	NA	√	√	√	√	√	NA	NA	NA	NA	NA
No														

Soils for Target Analyte List (TAL) of 23 Metals: Mercury by CVAA SW846 Method 7471A; and Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, & Zinc by ICP-AES Method 6010C.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data for Tier II level in accordance with the Davis QAPP (ESS 2012) & EPA Region 1 present in the data package? ***Yes.***

2. Were all result forms for all samples listed on the chain-of-custody present in data package? ***Yes***.

Chain-of-Custody (COC): 9 soil samples received for Total TAL Metals - received at lab on 5/18/12 (same day as sample collection) and intact. Documentation acceptable.

Preservation: Samples received at 2.6°C on ice. Acceptable preservation for soils.

Holding Time (HT): ICP-AES 6010C analysis 5/22/12 & 5/25/12; CVAA 7471A analysis 5/23/12 & 5/30/12. Acceptable HT.

Calibration Criteria: ICV/CCV and CRI (RL check standard supporting the level of the RL reported) met acceptance criteria for all Metals. Note CRI not required by Davis QAPP but reviewed as additional support of the lab RLs (criteria set at 70-130%). Tune criteria not applicable for Method 6010C. ICSA/AB met recovery criteria for all ICP metals.

Date: *9/10/12*
Data Reviewer: *Susan D. Chapnick*

New Environmental Horizons, Inc.

Lab: TestAmerica Lab Project #: 360-40656-1

Blanks: No EB included with samples in this SDG. Method blank (MB) & instrument blanks (ICB/CCB) were non-detected for all metals except for Calcium in both method blanks; detected at 13.3 and 17.8 mg/Kg. No action required for calcium since all soil sample results were > 5x the blank levels. Lab also qualified several results as "B" on the Form 1 results for detection in an associated blank; however, no action required since these "B" qualifications were based on "J" data (results < RL that were in method blank based on raw data) and all "J" data for Metals were considered non-detected, consistent with ESS Davis QAPP. All "B" flags were removed during validation for the final qualification of data.

LCS/LCSD: Lab performed both LCS and LCS duplicate (LCSD), though LCSD not required in Davis QAPP. LCS/LCSD met acceptance criteria for all Metals for accuracy (based on soil SRM control limits listed by lab on Form 7, consistent with QAPP criteria for this media) and precision (RPD <30% lab criteria).

MS/MD: No site-sample MS/MD was identified to be performed in this SDG.

Serial Dilution: No serial dilution on a site sample was performed in this SDG.

IS: IS not applicable for Method 6010C.

Sensitivity: All RLs for non-detects met Davis QAPP Table 4-5C for Soil requirements for sensitivity (RL) based on being lower than the PALs (even though some, for example antimony, were > PQLs they were still lower than the PALs). Therefore, sensitivity met project DQOs.

Professional Judgment - Other: Data users are cautioned that the detected Metals results for selenium reported from ICP-AES Method 6010C (ranging from 0.91 mg/Kg to 1.6 mg/Kg) may be false positives based on professional judgment knowledge of positive interference for selenium on ICP-AES in some matrices. Since the reported selenium results were orders-of-magnitude below the PAL and since all QC criteria were met, no action was taken other than to note this issue.

Lab: TestAmerica Lab Project #: 360-40656-1

FD pair samples: No FD was collected with this set of samples.

FD Precision:

Analyte	Sample	Qual	FD	Qual	Precision RPD* %	Action	Comment
Aluminum					#DIV/0!	none	
Antimony					#DIV/0!	none	
Arsenic					#DIV/0!	none	
Barium					#DIV/0!	none	
Beryllium					#DIV/0!	none	
Cadmium					#DIV/0!	none	
Calcium					#DIV/0!	none	
Chromium					#DIV/0!	none	
Cobalt					#DIV/0!	none	
Copper					#DIV/0!	none	
Iron					#DIV/0!	none	
Lead					#DIV/0!	none	
Magnesium					#DIV/0!	none	
Manganese					#DIV/0!	none	
Mercury					#DIV/0!	none	
Nickel					#DIV/0!	none	
Potassium					#DIV/0!	none	
Selenium					#DIV/0!	none	
Silver					#DIV/0!	none	
Sodium					#DIV/0!	none	
Thallium					#DIV/0!	none	
Vanadium					#DIV/0!	none	
Zinc					#DIV/0!	none	

Laboratory Narrative: No further issues noted.

Date: *9/10/12*
Data Reviewer: *Susan D. Chapnick*

QC & DV Action Criteria for Davis Superfund Site Metals [based on Davis QAPP 2012 & EPA Region I DV guidance]:

Pres./HT:	HT exceedance: J detects; Non-detects: R or UJ based on professional judgment. pH >2 use professional judgment to J detects; UJ non-detects.
Blanks:	Method Blanks and instrument blanks: Metals < RL unless all sample results are > 10 blank level. Detected results < matrix-matched blank level report as "U" (non-detected at level found). Equipment Blank: EB > RL for any metals; qualify associated detected results < 5x EB level as "EB" - potential high bias based on EB contamination.
Tune:	Mass calibration (amu) > QC limit: J/UJ. Mass resolution/peak width (amu) > QC limit: J/UJ. %RSD > QC limit: J/UJ. See EPA SW-846 Method 6020A for Tune criteria. Tune not performed: R all associated data.
ICV/CCV:	Recoveries < 90%: J / UJ; recoveries > 110%: J detects; if severe exceedance <75%: R non-detects; > 160%: R detects.
CRI:	Low-level standard at the level of the RL: % recovery <70%: J / UJ; >130%: J detects.
LCS:	Aqueous: %Recoveries < 80%: J / UJ. %Recoveries > 120%: J detects. %Recoveries < 50%, may R non-detects & J detects but use professional judgment to accept results if MS is in-control indicating acceptable accuracy in sample matrix. Solids: SRM control limits are criteria; J/UJ outside these limits; use professional judgment for severe exceedances of control limits.
ICSA/AB:	Recoveries > 120% or < 80%: J / UJ unless extremely low for ICSAB at <50%: R non-detects / J detects.
MS:	%Recoveries < 75%: J / UJ. %Recoveries > 125%: J detects. %Recoveries < 30%, may R non-detects & J detects but use professional judgment if sample concentration > 2x spike level.
MD:	Groundwater/Surface Water: Results >5xRL: RPD >20%: J/UJ associated results in batch. Results < 5xRL: difference > ±RL, J/UJ associated results. Soil/Sed: Results >5xRL: RPD >35%: J/UJ associated results in batch. Results < 5xRL: difference > ±2xRL, J / UJ associated results.
FD:	Groundwater/Surface Water: Results > 5xRL: RPD > 30%: J/UJ FD results only. Results < 5xRL: difference > ±2xRL,, J/UJ FD results only. Soil/Sed: Results >5xRL: RPD > 50%: J/UJ FD results only. Results <5xRL: use professional judgment.
IS:	Recoveries < 70%: J / UJ; recoveries > 130%: J detects; use professional judgment for severe exceedances.
Serial Dil:	Results > 50xRL: % Difference > 15%: J detects. EPA guidance UJ non-detects; however, use professional judgment on whether it is a suppression or enhancement to qualify associated non-detects.

Qualifiers: U = analyte is non-detect at the sample-specific Reporting Limit (RL) (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.

References: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island;* prepared by ESS Group, Inc., March 23, 2012 (Davis QAPP); Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996, including Part IV – Inorganic Data Validation Functional Guidelines, November 2008; Region I T*iered Organic and Inorganic Data Validation Guidelines* , July 1, 1993 draft; & USEPA SW846 Methods 6010C, 6020, & 7470A/7471A.

Date: *9/10/12*
Data Reviewer: *Susan D. Chapnick*

environmental chemistry consultants

DATA VALIDATION REPORT
EPA Region I Tier II-Type for VOCs, TCL SVOCs, TCL Pesticides, TCL PCBs, & TAL Metals

Client: ESS Group, Inc., East Providence, Rhode Island

Site: Davis Liquid Waste Superfund Site, Smithfield, Rhode Island
Soil Sampling - 2012

Laboratory: TestAmerica Westfield, Westfield, Massachusetts

Lab Project/SDG #: 360-40689-1

Number of Samples: 8 soil samples + 1 Trip Blank for project-specific list of 52 Volatile Organic Compounds (VOCs)
6 soil samples for Target Compound List (TCL) Semivolatile Organic Compounds (SVOCs), TCL Pesticides, TCL Polychlorinated Biphenyls (PCBs), Target Analyte List (TAL) Metals and Percent Solids

Data Reviewers: Nancy C. Rothman, Ph.D., New Environmental Horizons, Inc.
Susan D. Chapnick, M.S., New Environmental Horizons, Inc.

Date: September 14, 2012

EPA Tier II-type Data Validation Review was performed on the data included in this SDG with the following intentions: 1) to determine if the data were generated and reported in accordance with the following documents: *Remedial Design Work Plan and Pre-Design Investigation Plan* (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996 and updates including Part II, III, and IV (Volatile/Semivolatile, Pesticide/PCB, and Inorganic Data Validation Functional Guidelines); EPA *Region I Tiered Organic and Inorganic Data Validation Guidelines*, July 1993, and USEPA SW846 Method 8260C, 8270D, 8081B, 8082A, 6010C, and 7471A 2) to determine if the data met the project data quality objectives for acceptable accuracy, precision, sensitivity; and technical usability; and 3) to update the project database with validated results and appropriate data validation qualifiers.

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The Data Validation Report consists of three parts:

- This Data Validation Report letter summarizing the actions taken;
- The spreadsheet of validated sample results with validation qualifiers based on actions taken; and
- The Data Validation Checklists to document the Tier II-type validations. These Checklists are an integral part of the validation report as they contain comprehensive details of all QC reviewed, the acceptance criteria used, professional judgment and actions taken.

I. Sample Descriptions and Analytical Parameters

The sample IDs, date of sampling, matrix, and sample type (e.g. Field Sample, Field Duplicate, etc., as applicable) and the analytical parameters reviewed are listed below in Table 1.

Table 1. Sample Descriptions and Analytical Parameters

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-FS-TB-PC-3-0.5-1.0	5/21/12	Soil	VOCs	Field Sample
SB-FS-TB-PC-3-0.5-2.0	5/21/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-3-19.0-19.5	5/21/12	Soil	VOCs	Field Sample
SB-FS-PC-3-12.0-14.0	5/21/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-3-13.5-14.0	5/21/12	Soil	VOCs	Field Sample
SB-FS-PC-3-21.5-23.5	5/21/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-3-22.5-23.0	5/21/12	Soil	VOCs	Field Sample
SB-FS-TB-PC-2-0.5-2.0	5/21/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-TB-PC-2-0.5-1.0	5/21/12	Soil	VOCs	Field Sample
SB-FS-PCB-1	5/21/12	Soil	VOCs	Field Duplicate of SB-FS-TB-PC-2-0.5-1.0
SB-FS-PC-2-9.0-9.5	5/21/12	Soil	VOCs	Field Sample [used for VOC MS/MSD]

Table 1. Sample Descriptions and Analytical Parameters - *continued*

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-FS-PC-2-9.0-11.0	5/21/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-2-17.0-19.0	5/21/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-2-17.0-17.5	5/21/12	Soil	VOCs	Field Sample
TB-051812-2	5/22/12	Water	VOCs	Trip Blank

Analytical method references:

Volatiles: 52 project-specific VOCs by USEPA SW846 Method 8260C that includes the TCL plus diethyl ether and tetrahydrofuran. and minus 1,4-dioxane (not required for soils; note 1,4-dioxane was reported in the TB).

Semivolatiles: TCL SVOCs by USEPA SW846 Method 8270D

Pesticides: TCL Pesticides by USEPA SW846 Method 8081B

PCBs: TCL PCB Aroclors by USEPA SW846 Method 8082A

Metals: TAL Metals by USEPA SW846 Method 6010C (ICP-AES), which includes 22 Metals, plus Mercury by USEPA SW846 Method 7471A Cold Vapor Atomic Absorption (CVAA)

Percent Moisture / Percent Solids were performed and reported for all samples to convert results to dry-weight units.

II. Quality Control Reviewed during Data Validation

The following QC elements, as applicable to the analytical methods, were reviewed during the Tier II-type validation of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals:

- Data package completeness and reporting protocols
- Sample receipt, holding times and preservation criteria
- Blank results including Method Blanks, Equipment Blanks, & Trip blanks
- Laboratory Control Sample (LCS) recoveries / LCS Duplicate Recoveries
- Standard Reference Material (SRM) Recoveries, if applicable
- Surrogate Recoveries
- Matrix Spike (MS) / Matrix Spike Duplicate (MSD) Recoveries
- MS/MSD, LCS/LCSD, and sample/Field Duplicate (FD) Relative Percent Differences (RPDs)
- Sample result reporting (including compound lists, reporting limits, and units)
- Calibration criteria (including tune criteria, initial calibration and continuing calibration verification)
- Internal Standard (IS) Recoveries

- Retention Time windows
- Other method-specific QC if applicable and reported in Summary QC
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

III. Data Validation Report Summary

During the Tier II-type data validation review of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals, no data were rejected. Several results were negated (U) or estimated (J or UJ) due to QC issues. Table 2 summarizes the actions taken during this data validation review. NEH generated a validated data spreadsheet based on the electronic project database file (EDD) received from ESS for this SDG. All results were considered usable for project decisions compared to the Davis RDWP QAPP requirements with the understanding of the potential uncertainty (bias) in the qualified results presented in Table 2.

The remainder of this report documents "exceptions" to method or QAPP criteria or clarifications of data reported. QC elements not discussed below met all QAPP criteria. The full documentation of all QC elements reviewed during the Tier II-type validations are presented in the attached Data Validation Checklists. Data users should also reference the full Tier III-type data validation performed on soil samples included in SDG 360-40815-1 for additional information on general reporting issues and calculation verification from review of raw data (which is not performed in a Tier II-type validation).

Exceptions from Davis QAPP or Method QC Criteria

- All SVOC samples were initially extracted and analyzed within holding time; however, the sensitivity of the results did not meet QAPP requirements. The lab re-extracted the SVOCs outside of holding time to report results from a low-level SVOC analysis. The low-level results were accepted for reporting during validation as estimated (J or UJ) results due to holding time exceedance with a potential low bias, as listed in Table 2.
- The method blanks for VOCs reported results above the Reporting Limit (RL) for methylene chloride. A comparison of the level in the blanks with the levels reported for this compound in the associated samples resulted in the following actions:
  - Methylene chloride was negated (U) in all VOC samples, as shown in Table 2, and the results raised to the sample specific RL or to the level found in the sample, whichever was higher.
- Exceedances of Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) recoveries or RPD were as follows:
  - <u>VOCs</u> – Acetone and 2-butanone showed recoveries outside of criteria. Actions taken to estimate (UJ) affected sample results due to VOC LCS/LCSD exceedances are listed in Table 2.
  - <u>SVOC</u> – 2,4-dinitrophenol showed precision outside of criteria. Actions taken to estimate (UJ) affected sample results due to SVOC LCS/LCSD exceedances are listed in Table 2.
- A Matrix Spike (MS) and Matrix Spike Duplicate (MSD) were performed for VOCs on sample SB-FS-PC-2-9.0-9.5. Exceedances of the MS/MSD recoveries or RPD are as follows:
  - 2-butanone, acetone, and 2-hexanone showed recoveries outside of criteria. Actions taken to estimate (UJ) affected sample results due to VOC MS/MSD exceedances are listed in Table 2.
- Matrix Spike (MS) and Matrix Spike Duplicate (MSD) analyses for SVOCs, Pesticides, and PCBs were performed as batch QC on samples not included in this SDG. Therefore, MS/MSD

results were not reviewed as they would not affect the samples herein. No site sample in this SDG was identified for MS and Matrix Duplicate (MD) analyses for Metals; therefore, MS/MD analyses were not performed.

- There was one Field Duplicate (FD) pair included in this SDG for VOC analysis only: SB-FS-TB-PC-2-0.5-1.0 and SB-FS-PCB-1. The FD results indicate acceptable overall precision and representativeness in the site soil matrix at the FD location except for tetrachloroethene, which is estimated (J) as listed in Table 2.
- Various initial and continuing calibrations reported results that were outside of criteria for VOCs and SVOCs. Actions to estimate (UJ) results and the potential bias are listed in Table 2.
- For PCBs, samples SB-FS-TB-PC-3-0.5-2.0 and SB-FS-TB-PC-2-0.5-2.0 show complex mixtures in the chromatogram; however, none were matched to a specific Aroclor pattern.

Sensitivity & Reporting

- The laboratory flagged all results for VOCs and SVOCs that were less than the RL (supported by the low-level standard in the calibration curve) as "J". The "J" qualifier was maintained during validation to indicate that these results were estimated due to uncertainty in quantitation below the calibration range. Affected samples/analytes are listed in Table 2.
- All non-detects for VOCs, SVOCs, and PCBs were below the Project Action Limit (PAL) given in QAPP Tables 4-1C, 4-2C and 4-4B except for 1,2-dibromo-3-chloropropane and ethylene dibromide, as expected, due to method limitations. Therefore, sensitivity data quality objectives (DQOs) were met for these analyses.
- The laboratory reported results for all 21 target Pesticides required, except technical-chlordane was reported instead of alpha-chlordane. The technical-chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. All RLs for Pesticides reported were less than or equal to the PALs given in QAPP Table 4-3B and therefore met sensitivity requirements with the exception of toxaphene (due to raising the RL during validation). No PAL was defined for technical-chlordane in the site QAPP. The data user will need to evaluate usability of the non-detected toxaphene results with elevated RLs for project uses.
- All non-detects for Metals were below the PALs given in QAPP Table 4-5C for soil. Therefore, sensitivity DQOs were met for Metals.
- Data users are cautioned that the detected Metals results for selenium reported from ICP-AES Method 6010C may be false positives based on professional judgment knowledge of positive interference for selenium on ICP-AES in some matrices. Since the reported selenium results were orders-of-magnitude below the PAL and since all QC criteria were met, no action was taken other than to note this issue.

Table 2. Summary of Data Validation Actions

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
All 6 Pesticide soil samples	Chlordane (technical) Toxaphene	U		Raised RL
SB-FS-PCB-1 SB-FS-TB-PC-2-0.5-1.0	Tetrachloroethene	J	I	FD imprecision
SB-FS-PC-2-17.0-17.5 SB-FS-PC-3-13.5-14.0 SB-FS-PC-3-19.0-19.5 SB-FS-TB-PC-2-0.5-1.0 SB-FS-TB-PC-3-0.5-1.0	2-Hexanone 4-Methyl-2-pentanone (MIBK) Methyl acetate	UJ	L	Low Calibration verification
SB-FS-PC-2-9.0-9.5	2-Hexanone	UJ	L	Low MS recovery + Low Calibration verification
SB-FS-PC-2-9.0-9.5	4-Methyl-2-pentanone (MIBK) Methyl acetate	UJ	L	Low Calibration verification
SB-FS-PC-3-22.5-23.0	2-Hexanone 4-Methyl-2-pentanone (MIBK)	UJ	L	Low Calibration verification
SB-FS-PC-3-22.5-23.0	Methyl acetate	UJ	L	Low LCS/LCSD recoveries + Low Calibration verification
SB-FS-PCB-1	2-Hexanone 4-Methyl-2-pentanone (MIBK)	UJ	L	Low LCS/LCSD recoveries + Low Calibration verification
SB-FS-PCB-1	Methyl acetate	UJ	L	Low Calibration verification
SB-FS-PC-2-17.0-17.5 SB-FS-PC-3-13.5-14.0 SB-FS-PC-3-19.0-19.5 SB-FS-PC-3-22.5-23.0 SB-FS-PCB-1 SB-FS-TB-PC-2-0.5-1.0 SB-FS-TB-PC-3-0.5-1.0	2-Butanone (MEK)	UJ	L	Low LCS/LCSD recoveries
SB-FS-PC-2-9.0-9.5	2-Butanone (MEK)	UJ	L	Low LCS/LCSD recoveries + Low MS/MSD recoveries
SB-FS-PC-2-17.0-17.5 SB-FS-PC-3-13.5-14.0 SB-FS-PC-3-19.0-19.5 SB-FS-PC-3-22.5-23.0 SB-FS-PCB-1 SB-FS-TB-PC-2-0.5-1.0 SB-FS-TB-PC-3-0.5-1.0	Acetone	UJ	L	Low LCS/LCSD recoveries + Low Calibration verification
SB-FS-PC-2-9.0-9.5	Acetone	UJ	L	Low LCS/LCSD recoveries + Low MS/MSD recoveries + Low Calibration verification
All 8 VOC soil samples	Methylene Chloride	U		Negated due to Blank Action
SB-FS-PC-3-19.0-19.5	cis-1,2-Dichloroethene	J	I	Result uncertain below the calibration range
SB-FS-PC-3-22.5-23.0	1,2-Dichlorobenzene	J	I	Result uncertain below the calibration range

Table 2. Summary of Data Validation Actions - *continued*

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
SB-FS-TB-PC-3-0.5-1.0	Tetrachloroethene	J	I	Result uncertain below the calibration range
SB-FS-PC-3-12.0-14.0	1,2,4,5-Tetrachlorobenzene Bis(2-ethylhexyl) phthalate Fluoranthene Pyrene	J	I	HT Exceedance + Result uncertain below the calibration range
All 6 SVOC soil samples	2,4-Dinitrophenol	UJ	I	HT Exceedance + LCS/LCSD imprecision + Initial Calibration outside criteria
All 6 SVOC soil samples	Pentachlorophenol	UJ	L	HT Exceedance + Low Calibration verification
SB-FS-PC-3-21.5-23.5	Benzo[a]pyrene Benzo[b]fluoranthene Benzo[g,h,i]perylene Benzo[k]fluoranthene Dibenz(a,h)anthracene Di-n-octyl phthalate Indeno[1,2,3-cd]pyrene	UJ	I	HT Exceedance + Low IS recovery
All 6 SVOC soil samples	All remaining SVOC analytes not listed above	J / UJ	L	HT Exceedance
All 6 Metal soil samples	Mercury	UJ	I	LCS/LCSD imprecision

Qualifiers: U = Analyte is non-detect at the "LIMIT2" value in the EDD, which is the sample-specific reporting limit (RL); UJ = Non-detect is estimated; J = Result is estimated; R = Result is rejected and is unusable for project decisions.

Bias: L = Low; H = High; I = Indeterminate

Acronyms used in Table 2:

FD = Field Duplicate
HT = Holding Time
LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample Duplicate
MD = Matrix Duplicate
MS = Matrix Spike
MSD = Matrix Spike Duplicate
RL = Reporting Limit

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Volatile Tier II-type Data Review Checklist

Lab Project: 360-40689-1

Lab: TestAmerica Westfield
Date Sampled: 5/21/12
Method of Analysis: 8260C - EI only (no SIM)

No. Samples: 7 + 1 TB + 1 FD
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 70-130%	LCS/LCSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	MS/MSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√					√		NA	
No			Estimate (UJ) 2 results in all soils	Estimate (UJ) 3 results in SB-FS-PC-2-9.0-9.5	Estimate (J) 1 result in SB-FS-TB-PC-2-0.5-1.0 and FD SB-FS-PCB-1	Estimate (UJ) 4 result in all soils		Accept 3 "J" results for reporting		Negate (U) 8 results due to Blank Action

% solids OK? Y
Other Issues: No

Comments:

Method 8260C used for reporting of project-specific list of VOCs. TB sample results were reviewed for potential blank actions (see below); however, full data review of this field QC sample was not performed as these results are not directly used for project decisions.

Samples were received intact at TestAmerica on 5/22/12, the day after collection at 4±2°C - there were no COC issues noted by the lab. Samples were properly preserved.

Samples were all analyzed by 5/30/12 - HT met for all samples, No Action required.

Surrogates : All 3 VOC surrogates were recovered within 70-130% in all samples and QC - no Action required

LCS/LCSD: LCS/LCSD LCS 360-91306/1-A & 2-A. Lab spiked all 53 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable except: 2-butanone and acetone (LCS/LCSD rec. low).

**Action: 2-butanone and acetone estimated (UJ) with possible low bias in all soil samples due to low LCS/LCSD recoveries.*

Date: ***9/6/12***

Data Reviewer: ***Deborah A. Loring***

New Environmental Horizons, Inc.

Lab: TestAmerica Westfield

Lab Project: 360-40689-1

Blank Action: Blanks Reviewed: MB: MB 360-91306/3-A
TB: TB-052212-1

Blank ID	Contaminant / Level	Matrix Related?	Action Level / Action	Sample and Reported Result		Corrected Result
MB 360-91199/3-A	Methylene Chloride 14.6 J µg/kg	Y	146 µg/kg	SB-FS-PC-2-17.0-17.5	17 B	17 U
				SB-FS-PC-2-9.0-9.5	16 B	16 U
				SB-FS-PC-3-13.5-14.0	44 B	44 U
				SB-FS-PC-3-19.0-19.5	34 B	34 U
				SB-FS-PC-3-22.5-23.0	40 B	40 U
				SB-FS-PCB-1	15 B	15 U
				SB-FS-TB-PC-2-0.5-1.0	23 B	23 U
				SB-FS-TB-PC-3-0.5-1.0	33 B	33 U
TB-052212-1	None	N		No Blank Action required		

MS/MSD: MS/MSD analyses were performed on sample SB-FS-PC-2-9.0-9.5. MS/MSD %Rec and RPDs for all compounds acceptable except: 2-butanone and acetone (MS/MSD rec. low); and 2-hexanone (MS rec. low).

**ACTION: 2-butanone, acetone, and 2-hexanone estimated (UJ) with low bias in sample SB-FS-PC-2-9.0-9.5 due to low MS and/or MSD recoveries.*

FD pair: SB-FS-TB-PC-2-0.5-1.0 / SB-FS-PCB-1. A comparison of detected results shown below.

Field Duplicate Evaluation_ Sample IDs: Sample = SB-FS-TB-PC-2-0.5-1.0 FD = SB-FS-PCB-1

Analyte Name	DF= 1 RL (µg/Kg)	Sample µg/Kg	Q	Sample Result Level	FD µg/Kg	Q	FD Result Level	RPD	Action
Tetrachloroethene	2.2	2.8		< 2 X RL	5.5		> 2 X RL	65	J

**ACTION: Tetrachloroethene estimated (J) due in sample SB-FS-TB-PC-2-0.5-1.0 and FD SB-FS-PCB-1 due to FD imprecision.*

Date: ***9/6/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40689-1

Additional Notes:

Tunes: Instrument HP#1 GC/MS . 3/23/12 16:40, 05/29/2012 17:19. All tune abundances were acceptable and all samples and standards were analyzed within 12 hours of BFB tune.

ICAL : HP#1 3/23/12 6-9 level ICAL for all Targets + several non-target compounds. All calibrations met QAPP criteria for Target Compounds (ICAL from 0.5, 1 or 5 up to 160 µg/L. %RSD ≤ 20% or r2 ≥ 0.99 and all RRFs ≥ 0.05 . Valid ICAL - No Action required.

CCAL: HP#1 05/23/2012 14:10 %D (or %Drift) ≤ ± 20% for all target compounds and RRF ≥ 0.05 except 1,1,2-Trichloro-1,2,2-trifluoroethane (+ 20.9%), acetone (-23.5%), methyl acetate (-20.6%), 4-methyl-2-pentanone (-24.5%), and 2-hexanone (-24.1%). A positive %D indicates increased sensitivity to detection of compound on day of CCAL as compared to sensitivity during ICAL. Since 1,1,2-Trichloro-1,2,2-trifluoroethane was non-detect in associated samples, no action required for enhanced sensitivity.

Action: Estimate (UJ) acetone, methyl acetate, 4-methyl-2-pentanone, and 2-hexanone with low bias due to reduced sensitivity in the CCAL in all soil samples.

IS: All 4 IS Areas and RTs were in criteria - No Action required.

Lab reported results for m- Xylene & p-Xylene (reported as a single entry due to coelution) and o-Xylene in addition to Xylenes, total, as requested in the QAPP. All 53 project-specific VOCs were reported so with the added Xylenes, a total of 55 VOC results reported per sample. Note that bromodichloromethane, as listed in Table 4-1C, is called dichlorobromomethane in EDD and data and Dibromochloromethane, as listed in Table 4-1C, is called chlorodibromomethane in EDD and data.

3 results were reported at levels < RL and were flagged "J" by the lab. These 3 "J" results were accepted for reporting with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

All RLs were at or below the PQLs and PALs required in the QAPP Table 4-1C for all samples except 1,2-dibromo-3-chloropropane and ethylene dibromide, as expected, due to method limitations.

Narrative did not raise any issues not already addressed.

Date: ***9/6/12***

Data Reviewer: ***Deborah A. Loring***

8260C and Project Action Summary:

Preservation:	Waters - headspace present or received at > 10°C, J det / J NDs or R ND Soils/Sediment - EnCore extrusion and sample preservation unacceptable or received at > 10°C, J det / J NDs or R ND Waters - pH < 2; 14d <HT≤ 28d; J det/ J NDs; HT >28d, J det/R ND Soils/Sediment - 14d <HT< 28d; J det/ J NDs; HT >28d, J det/R ND
Surrogates:	Surr. %Rec > 130%, J det/Accept ND; 10% ≤ %Rec < 70%, J det/J NDs;
LCS	%Rec<10%, J det/ R NDs; 10% <%Rec<70, J det/ J NDs; %Rec >130, J det/Accept NDs. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. LCS must contain all targets.
Tunes:	Samples analyzed within 12-hrs and criteria met per Method 8260C. If out, use professional judgment.
ICAL:	minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs. If avg. RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
CCAL:	%D (or %Drift) > - 20% , J det/J ND; %D (or %Drift) > +20%, J det/Accept ND. If RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
Blanks:	Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for acetone, 2-butanone, and methylene chloride which are 10 x value in blank.
MS/MSD:	%Rec<10%, J det/ R NDs; 10% <%Rec<70%, J det/ J NDs; %Rec >130%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. MS/MSD must contain all targets.
FD:	Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data
IS:	20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs
QLs:	Verify RLs met RLs and PALs given in QAPP; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.
TICs:	Not required
% solids:	If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs
Narrative:	If there are any issues raised in narrative not previously addressed, take appropriate action
Reference:	*Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8260C

Date: ***9/6/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Semivolatile Tier II-type Data Review Checklist

Lab Project: 360-40689

Lab: TestAmerica Westfield
Date Sampled: 5/21/12
Method of Analysis: 8270D

No. Samples: 6
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates w: 30-130%BN 15-110% Acid s: 30-130%	LCS 40-140%BN 30-130%Acid	MS/MSD 40-140%BN 30-130%Acid w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes		√		NA	NA				NA	-
No	Estimate (J, UJ) all results		Estimate (UJ) 1 result in all samples			Estimate (UJ) 1 result in all samples	Estimate (UJ) 7 results in sample SB-FS-PC-3-21.5-23.5	Accept 4 "J" results for reporting		

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 5/22/12, the day after collection at 4±2°C - there were no COC issues noted by the lab.

All samples were all initially extracted on 6/1/12, however, they were not extracted using the low level method. Samples were re-extracted on 6/12/12 using the low level method. Both sets of data were presented. The data accepted for reporting was the data that was generated outside of holding time, as the medium level method's reporting limits did not meet the project sensitivity objectives. Extraction holding times were exceeded by 8 days for all samples. Re-extracted samples were analyzed by 6/26/12. Analytical holding times were met.

**ACTION: Estimate (J, UJ) all sample results due to holding time exceedance.*

Surrogates : All 3BN and 3 Acid Surrogates were recovered within QAPP Criteria in all field and QC samples. No action required.

LCS/LCSD : LCS 360-91816/2-A & 3-A. Lab spiked all 67 target analytes requested in LCS. All spiked target compounds reported acceptable %Rec and LCS/LCSD RPD except 2,4-dinitrophenol, (RPD high); and 4-nitrophenol and di-n-butylphthalate (LCS rec. high). No action required for 4-nitrophenol and di-n-butylphthalate for high recovery as the compound was not detected in the associated samples.

**ACTION: 2,4-dinitrophenol estimated (UJ) with indeterminate bias due to LCS/LCSD imprecision in all soil samples.*

Date: ***9/6/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40689

Blank Action:

Blanks Reviewed: MB: MB 360-91816/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91816/1-A	di-n-Butylphthalate 228 J µg/kg	Y		2280 µg/kg		All associated samples were ND - No Action required	

MS/MSD: MS/MSD analyses were not performed in this SDG.

FD pair: An FD was not submitted with this SDG.

Tunes: Instrument B 6/25/12, 6/26/12. All abundances were acceptable and all samples were analyzed within 12 hours of tune - No Action required

ICAL: 6/25/12 Inst. B, 8- to 10- level ICAL performed from 0.2 to 25 µg/mL (for full 10-level) for all Targets + several non-target compounds. Form VI flagged several results as not meeting minimum RRF criteria; however, lab used CLP criteria and not QAPP criteria. %RSD $\leq$ 20% or r2 $\geq$ 0.99 for all and all RRFs $\geq$ 0.05 except: 2,4-Dinitrophenol %RSD = 36.0%.

**ACTION: 2,4-Dinitrophenol estimated (UJ) with indeterminate bias in all samples due to high RSD.*

CCALs: Inst. B 6/26/2012 2:12:00 PM %D or %Drift $\leq \pm$ 20% and RRF $\geq$ 0.05 for all target compounds except: pentachlorophenol (-31.4%), Di-n-octyl phthalate (+21.3%). A positive %D indicates increased sensitivity to detection of compound on day of CCAL as compared to sensitivity during ICAL whereas negative %D indicates loss in instrument sensitivity. Since the compound with positive %D were non-detect in the associated samples, no action required.

**ACTION: pentachlorophenol estimated (UJ) with low bias in all samples.*

IS: All 6 IS Areas and RTs were in criteria for all analyses except Perylene-d12 was biased low in sample SB-FS-PC-3-21.5-23.5.

**ACTION: Estimate (UJ) all compounds quantified using perylene-d12 with indeterminate bias in sample SB-FS-PC-3-21.5-23.5 (di-n-octyl phthalate, benzo[b]fluoranthene , benzo[k]fluoranthene, benzo[a]pyrene, dibenz(a,h)anthracene, indeno[1,2,3-cd]pyrene, and benzo[g,h,i]perylene).*

Date: ***9/6/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40689

Additional Notes:

Lab reported results for all 67 target SVOCs required. The lab reported 3&4-methylphenol rather than 4-methylphenol as the two co-elute. All RLs reported were less than or equal to the PQLs given in QAPP Table 4-2C except di-n-butylphthalate and bis-2-ethylhexylphthalate in all samples.

4 results were reported at levels < RL and were flagged "J" by the lab. These 4 "J" results were accepted for reporting with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

All non-detects were reported at levels below the PALs given in Table 4-2C for all samples.

Narrative did not raise any issues not already addressed.

Date: ***9/6/12***

Data Reviewer: ***Deborah A. Loring***

8270D and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: waters: BN 30 - 130%, acids 15-110%; solids: all surrogates 30-130%
2 BN or 2 Acids Recovery > Criteria, J det/Accept ND; 10% ≤ 2 or more surrogates < Criteria, J det/J NDs;
Recovery < 10%, J det/R NDs. Action taken on Acid and/or BN analytes based on Surrogates out.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs.

Tunes: Samples analyzed within 12-hrs and criteria met per Table 3 or Method 8270C. If out, use professional judgment.

ICAL: minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs; min. RRF < 0.05, J det/UJ NDs.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank

Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for phthalates which are 10 x value in blank.

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs- Unspiked Sample only. RPD > Limit, J det/UJ NDs.
MS/MSD must contain all targets.

FD: Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data

IS: 20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs

QLs: Verify RLs met QAPP QLs ; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

TICs: Not required

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8270D

Date: ***9/6/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
PCB Tier II-type Data Review Checklist

Lab Project # 360-40689

Lab: TestAmerica Westfield
Date Sampled: 5/21/12
Method of Analysis: 8082A

No. Samples: 6
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 40-140% RPD ≤ 30%	FD w:RPD≤30% s:RPD≤50%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)	Other (pattern match, etc.)
Yes	√	√	√	NA	NA	√	√	NA	----
No									

% solids OK? NA
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 5/22/12, the day after collection at 4±2°C - there were no COC issues noted by the lab.

Samples were extracted on 5/25/12 - HT met for extraction. All extracts were analyzed by 5/30/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - No Action required. Note, lab used in-house criteria for recovery of surrogates;, QAPP criteria used to determine data acceptance.

LCS/LCSD: LCS 360-91248/2-A & LCSD 360-91248/3-A. Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec for AR1016 & AR1260 in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD: MS/MSD analyses were not performed in this SDG.

Date: ***9/7/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40689

Blank Action: Blanks Reviewed: MB: MB 360-91248/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91248/1-A	None					No Blank Action required	

Additional Notes:

FD pair: An FD was not submitted with this SDG.

ICAL: Instrument M 4/13/12 6-level calibration from 50 to 2000 µg/L for Ar 1016/1260 and a single point calibration at 1000 µg/L for Ar-1221/1254, Ar-1232, Ar-1242, Ar-1248, Ar-1262, Ar-1268. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), linear regression performed for Ar-1016 & 1260 on both columns, and r2 > 0.99. Valid ICAL - no action required.

CCALs : CCV 360-91269/1 on 05/29/2012 17:48 (Opening CCV): All %D ≤ ± 20% on both GC columns for all Aroclor peaks except Col 1 Ar-1016-3 (+26.2%), Ar-1016-5 (-28.4%) Average %D OK, Ar-1260-1 (-23.9%), Ar-1260-3 (-22.3%), Ar-1260-4 (-26.5%), Ar-1260-5 (-28.1%) (Average = -23.5%); Col 2 all OK. No action required for Col 1 Ar-1016 as average %D was within limits. No action required for Col 1 Ar-1260 as Col 2 was within limits, and no Aroclors were detected in the samples. CCV 360-91269/15 on 05/29/2012 23:10 and CCV 360-91269/26 05/30/2012 @ 03:11 - all %D ≤ ±20% on both GC columns for all Aroclor peaks. No action required.

Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. Since Form X used to express LCS and MS results only, since all samples were non-detect for all PCBs, no action required.

All RLs reported were less than or equal to the PQLs given in QAPP Table 4-C, except for all Aroclors in samples SB-FS-PC-2-9.0-11.0, SB-FS-PC-3-12.0-14.0, SB-FS-PC-3-21.5-23.5, and SB-FS-TB-PC-3-0.5-2.0 (RLs ranged from 110-120 µg/kg vs. 100 µg/kg, due to % solids).

All RLs reported were less than or equal to the PALs given in QAPP Table 4-C.

Lab reported the lowest of the two column values for Aroclor 1016 & 1260 in the LCS/LCSD samples. For both samples, GC Col. 1 and 2 precision was acceptable.

Date: ***9/7/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40689

Additional Notes:

All chromatograms for all samples visually inspected and appear to have been reported correctly. Samples SB-FS-TB-PC-3-0.5-2.0 and SB-FS-TB-PC-2-0.5-2.0 show complex mixtures, however, none were matched to a specific Aroclor pattern.

Narrative did not raise any issues not already addressed.

Date: *9/7/12*
Data Reviewer: *Deborah A. Loring*

Lab Project # 360-40689

Lab: TestAmerica Westfield

8082A and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs- Unspiked Sample only. RPD > 30% solids, J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multi-components), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multi-components) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8082A

Date: ***9/7/12***
Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Pesticide Tier II-type Data Review Checklist

Lab Project # 360-40689

Lab: TestAmerica Westfield
Date Sampled: 5/21/12
Method of Analysis: 8081B

No. Samples: 6
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 30-150% w: RPD≤20% sr:RPD≤30%	FD w:RPD≤30% s:RPD≤50%	RCM (Resolve. > 60%)	PEMs Brkdwn< 15% %D ≤ ± 15%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)
Yes	√	√	√	NA	NA	√	√	√	√	NA
No										

% solids OK? Y

Other Issues: No

Technical chlordane was reported instead of alpha-chlordane. Low-level initial calibration for Toxaphene and Technical chlordane did not support the lab-reported RL - action taken to raise RL for Toxaphene and Technical chlordane (see page 3).

Comments:

Samples were received intact at TestAmerica on 5/22/12, the day after collection at 4±2°C - there were no COC issues noted by the lab.

Samples were extracted on 5/25/12 and analyzed by 5/31/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - No Action required. Note, lab used in-house criteria for recovery of surrogates; QAPP criteria used to determine data acceptance.

LCS/LCSD: 360-91248/4-A & 5-A. Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD : MS/MSD analyses were not performed in this SDG.

FD pair: An FD was not submitted with this SDG.

Resolution Check : RCM not analyzed per se; however, CCALs reviewed and all peaks appear to be adequately resolved - No Action required

Date: ***9/7/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40689

Blank Action: Blanks Reviewed: MB: MB 360-91248/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91248/1-A	None					No Blank Action required	

Additional Notes:

PEM DDT and Endrin Breakdown evaluations: PEMs 360-91344/1 05/30/2012 12:33, PEM 360-91344/17 05/30/2012 18:44, and PEM 360-91399/1 05/31/2012 11:36 - %Breakdown for DDT and Endrin ≤ 15% + Combined Breakdown was ≤ 30% on each GC Column. No Action required.

ICAL: Instrument H 5/14/12 7-level from 1 to 100 µg/L for single-component Pesticides (some extras not required for project) + surrogates and 3-level from 500 to 2,500 µg/L for Toxaphene and Technical Chlordane. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), %RSD ≤ 20% or r2 ≥ 0.99 for all compounds. Several compounds used regression analysis for calibration on Columns 1 & 2. Valid ICAL - no action required.

CCALs : CCVRT 360-91344/2 on 05/30/2012 12:54 (Opening CCV for single-components), CCVRT 360-91344/4 on 05/30/2012 13:37 (Toxaphene), and CCVRT 360-91344/3 on 05/30/2012 13:15 (Technical chlordane) - all %D ≤ ±20% on both GC columns for all Pesticides. CCVRT 360-91344/18 on 05/30/2012 19:06 (Closing CCV) - all %D ≤ ±20% on both GC columns for all Pesticides except Endrin (+32.1%) and DDD (+27.7%)on GC Column 1 and d-BHC (+21.2%), DDE (+25.6%), DDD (+22.5%), Endosulfan II (+29.5%) Endrin aldehyde (+33.5%) on GC Column 2. CCVRT 360-91399/2A 05/31/2012 @ 11:57, and CCVRT 360-91399/3 05/31/2012 @ 12:19 (technical chlordane) and CCVRT 360-91399/4 and 5/31/2012 12:40 (toxaphene) - all %D ≤ ±20% on both GC columns for all Pesticides except Endrin (+22.9%), and DDD (+21.8%) on GC Column 1 and DDD (20.6%), Endosulfan II (40.0%), and Endrin aldehyde (31.0%) and technical chlordane (24.4%), on GC Column 2. CCV 360-91399/15 05/31/2012 @ 16:36 (Closing CCV) - all %D ≤ ±20% on both GC columns for all Pesticides except DDE (+21.6%) and DDD (+29.3%) on GC Column 1 and Endrin aldehyde (+28.3%) on GC Column 2. A positive %D indicates increased sensitivity to detection during CCAL as compared to sensitivity during ICAL; therefore, since all samples were non-detect for these compounds, no action for enhanced sensitivity in CCVs (i.e. non-detects accurate as reported).

Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. Since Form X used to express LCS results only, since all samples were non-detect for all Pesticides, no action required.

The narrative did not raise any issues not already addressed.

All RLs reported were less than or equal to the PQLs given in QAPP Table 4-3B except dieldrin, aldrin and toxaphene in samples SB-FS-PC-2-9.0-11.0, SB-FS-PC-3-12.0-14.0, SB-FS-PC-3-21.5-23.5, and sample SB-FS-TB-PC-3-0.5-2.0. No PQL was defined for Technical chlordane in the QAPP.

Date: ***9/7/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40689

Additional Notes:

Lab reported results for all 21 target Pesticides required, except technical chlordane was reported instead of alpha-chlordane. The technical chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. The resulting RL was slightly above the PAL for Toxaphene in all samples. All other RLs reported were less than or equal to the PALs given in QAPP Table 4-3B. No PAL was defined for Technical chlordane in the site QAPP.

Date: ***9/7/12***
Data Reviewer: ***Deborah A. Loring***

8081B and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

RCM: RCM < 60% resolution, J detects based on technical judgment

PEM: 4,4'-DDT breakdown > 15%, J detected DDT, DDE, DDD; R ND 4,4'-DDT and accept ND DDE & DDD
Endrin breakdown > 15%, J detected Endrin, Endrin Aldehyde & Endrin Ketone; R ND Endrin and accept ND Endrin Aldehyde & Endrin Ketone
4,4'-DDT and Endrin > 30%, accept NDs of breakdown products and J detects for 4,4'-DDT and Endrin; J detects of breakdown products and reject (R) non-detects for 4,4'-DDT and Endrin.
%D> ± 20%, J det/J ND on a per column basis. % Resolution < 90.0% qualify data based on professional judgment.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<30%, J det/ J NDs; %Rec >150%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters (or 30% solids), J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multicomponents), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multicomponents) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8081B

Date: ***9/7/12***
Data Reviewer: ***Deborah A. Loring***

RDWP - Davis Liquid Waste Superfund Site
EPA Region I Tier II-type DV Checklist - Metals

Lab: TestAmerica-Westfield, Westfield, MA
Date Sampled: 5/21/12
Analysis: Metals by EPA SW-846 Method 6010C & 7471A

Lab Project # 360-40689-1
No. Samples: 6
Matrix: Soil

QC Met Criteria?		HT and Preserve	RL QAPP PALs	Tune 6020 criteria	Calibration ICV/CCV 90-110%R	CRI RL Check 70-130%R	EB MB < RL	LCS/LCSD SRM limits RPD ≤ 30%	ICSA/AB 80-120% R	MS / MSD 75-125% R	MD RPD ≤ 20%	FD RPD ≤ 30%	IS 6020 70-130% R	Serial Dilution ± 15% D
Yes		√	√	NA	√	√	√		√	NA	NA	NA	NA	NA
No								Estimate (UJ) 6 mercury results						

Soils for Target Analyte List (TAL) of 23 Metals: Mercury by CVAA SW846 Method 7471A; and Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, & Zinc by ICP-AES Method 6010C.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data for Tier II level in accordance with the Davis QAPP (ESS 2012) & EPA Region 1 present in the data package? ***Yes.***

2. Were all result forms for all samples listed on the chain-of-custody present in data package? ***Yes***.

Chain-of-Custody (COC): 6 soil samples received for Total TAL Metals - received at lab on 5/22/12 (1 day after sample collection) and intact. Documentation acceptable.

Preservation: Samples received at 3.5°C on ice. Acceptable preservation for soils.

Holding Time (HT): ICP-AES 6010C analysis 5/25/12; CVAA 7471A analysis 5/30/12. Acceptable HT.

Calibration Criteria: ICV/CCV and CRI (RL check standard supporting the level of the RL reported) met acceptance criteria for all Metals. Note CRI not required by Davis QAPP but reviewed as additional support of the lab RLs (criteria set at 70-130%). Tune criteria not applicable for Method 6010C. ICSA/AB met recovery criteria for all ICP metals.

Date: *9/11/12*
Data Reviewer: *Susan D. Chapnick*

New Environmental Horizons, Inc.

Lab: TestAmerica Lab Project #: 360-40689-1

Blanks: No EB included with samples in this SDG. Method blank (MB) & instrument blanks (ICB/CCB) were non-detected for all metals except for Calcium in the method blank detected at 17.8 mg/Kg. No action required for calcium since all soil sample results were > 5x the blank levels. Lab qualified all Calcium results as "B" on the Form 1 results for detection in an associated blank; however, since no action was required, the "B" flags were removed during validation for the final qualification of data.

LCS/LCSD: Lab performed both LCS and LCS duplicate (LCSD), though LCSD not required in Davis QAPP. LCS/LCSD met acceptance criteria for all Metals for accuracy (based on soil SRM control limits listed by lab on Form 7, consistent with QAPP criteria for this media) and precision (RPD <30% lab criteria), except for mercury precision exceedance at RPD = 42%.

**ACTION: Estimate (UJ) all 6 mercury results due to LCS/LCSD imprecision with indeterminate bias.*

MS/MD: No site-sample MS/MD was identified to be performed in this SDG.

Serial Dilution: No serial dilution on a site sample was performed in this SDG.

IS: IS not applicable for Method 6010C.

Sensitivity: All RLs for non-detects met Davis QAPP Table 4-5C for Soil requirements for sensitivity (RL) based on being lower than the PALs (even though some, for example antimony, were > PQLs they were still lower than the PALs). Therefore, sensitivity met project DQOs.

Professional Judgment - Other: Data users are cautioned that the detected Metals results for selenium reported from ICP-AES Method 6010C (ranging from 0.91 mg/Kg to 2.3 mg/Kg) may be false positives based on professional judgment knowledge of positive interference for selenium on ICP-AES in some matrices. Since the reported selenium results were orders-of-magnitude below the PAL and since all QC criteria were met, no action was taken other than to note this issue.

Lab: TestAmerica Lab Project #: 360-40689-1

FD pair samples: No FD was collected with this set of samples.

FD Precision:

Analyte	Sample	Qual	FD	Qual	Precision RPD* %	Action	Comment
Aluminum					#DIV/0!	none	
Antimony					#DIV/0!	none	
Arsenic					#DIV/0!	none	
Barium					#DIV/0!	none	
Beryllium					#DIV/0!	none	
Cadmium					#DIV/0!	none	
Calcium					#DIV/0!	none	
Chromium					#DIV/0!	none	
Cobalt					#DIV/0!	none	
Copper					#DIV/0!	none	
Iron					#DIV/0!	none	
Lead					#DIV/0!	none	
Magnesium					#DIV/0!	none	
Manganese					#DIV/0!	none	
Mercury					#DIV/0!	none	
Nickel					#DIV/0!	none	
Potassium					#DIV/0!	none	
Selenium					#DIV/0!	none	
Silver					#DIV/0!	none	
Sodium					#DIV/0!	none	
Thallium					#DIV/0!	none	
Vanadium					#DIV/0!	none	
Zinc					#DIV/0!	none	

Laboratory Narrative: No further issues noted.

Date: *9/11/12*
Data Reviewer: *Susan D. Chapnick*

QC & DV Action Criteria for Davis Superfund Site Metals [based on Davis QAPP 2012 & EPA Region I DV guidance]:

Pres./HT:	HT exceedance: J detects; Non-detects: R or UJ based on professional judgment. pH >2 use professional judgment to J detects; UJ non-detects.
Blanks:	Method Blanks and instrument blanks: Metals < RL unless all sample results are > 10 blank level. Detected results < matrix-matched blank level report as "U" (non-detected at level found). Equipment Blank: EB > RL for any metals; qualify associated detected results < 5x EB level as "EB" - potential high bias based on EB contamination.
Tune:	Mass calibration (amu) > QC limit: J/UJ. Mass resolution/peak width (amu) > QC limit: J/UJ. %RSD > QC limit: J/UJ. See EPA SW-846 Method 6020A for Tune criteria. Tune not performed: R all associated data.
ICV/CCV:	Recoveries < 90%: J / UJ; recoveries > 110%: J detects; if severe exceedance <75%: R non-detects; > 160%: R detects.
CRI:	Low-level standard at the level of the RL: % recovery <70%: J / UJ; >130%: J detects.
LCS:	Aqueous: %Recoveries < 80%: J / UJ. %Recoveries > 120%: J detects. %Recoveries < 50%, may R non-detects & J detects but use professional judgment to accept results if MS is in-control indicating acceptable accuracy in sample matrix. Solids: SRM control limits are criteria; J/UJ outside these limits; use professional judgment for severe exceedances of control limits.
ICSA/AB:	Recoveries > 120% or < 80%: J / UJ unless extremely low for ICSAB at <50%: R non-detects / J detects.
MS:	%Recoveries < 75%: J / UJ. %Recoveries > 125%: J detects. %Recoveries < 30%, may R non-detects & J detects but use professional judgment if sample concentration > 2x spike level.
MD:	Groundwater/Surface Water: Results >5xRL: RPD >20%: J/UJ associated results in batch. Results < 5xRL: difference > ±RL, J/UJ associated results. Soil/Sed: Results >5xRL: RPD >35%: J/UJ associated results in batch. Results < 5xRL: difference > ±2xRL, J / UJ associated results.
FD:	Groundwater/Surface Water: Results > 5xRL: RPD > 30%: J/UJ FD results only. Results < 5xRL: difference > ±2xRL,, J/UJ FD results only. Soil/Sed: Results >5xRL: RPD > 50%: J/UJ FD results only. Results <5xRL: use professional judgment.
IS:	Recoveries < 70%: J / UJ; recoveries > 130%: J detects; use professional judgment for severe exceedances.
Serial Dil:	Results > 50xRL: % Difference > 15%: J detects. EPA guidance UJ non-detects; however, use professional judgment on whether it is a suppression or enhancement to qualify associated non-detects.

Qualifiers: U = analyte is non-detect at the sample-specific Reporting Limit (RL) (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.

References: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island;* prepared by ESS Group, Inc., March 23, 2012 (Davis QAPP); Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996, including Part IV – Inorganic Data Validation Functional Guidelines, November 2008; Region I T*iered Organic and Inorganic Data Validation Guidelines* , July 1, 1993 draft; & USEPA SW846 Methods 6010C, 6020, & 7470A/7471A.

Date: ***9/11/12***
Data Reviewer: ***Susan D. Chapnick***

environmental chemistry consultants

DATA VALIDATION REPORT
EPA Region I Tier II-Type for VOCs, TCL SVOCs, TCL Pesticides, TCL PCBs, & TAL Metals

Client: ESS Group, Inc., East Providence, Rhode Island

Site: Davis Liquid Waste Superfund Site, Smithfield, Rhode Island
Soil Sampling - 2012

Laboratory: TestAmerica Westfield, Westfield, Massachusetts

Lab Project/SDG #: 360-40711-1

Number of Samples: 8 soil samples + 1 Trip Blank for project-specific list of 52 Volatile Organic Compounds (VOCs)
8 soil samples for Target Compound List (TCL) Semivolatile Organic Compounds (SVOCs), TCL Pesticides, TCL Polychlorinated Biphenyls (PCBs), Target Analyte List (TAL) Metals and Percent Solids

Data Reviewers: Nancy C. Rothman, Ph.D., New Environmental Horizons, Inc.
Susan D. Chapnick, M.S., New Environmental Horizons, Inc.

Date: October 21, 2012

EPA Tier II-type Data Validation Review was performed on the data included in this SDG with the following intentions: 1) to determine if the data were generated and reported in accordance with the following documents: *Remedial Design Work Plan and Pre-Design Investigation Plan* (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996 and updates including Part II, III, and IV (Volatile/Semivolatile, Pesticide/PCB, and Inorganic Data Validation Functional Guidelines); EPA *Region I Tiered Organic and Inorganic Data Validation Guidelines*, July 1993, and USEPA SW846 Method 8260C, 8270D, 8081B, 8082A, 6010C, and 7471A 2) to determine if the data met the project data quality objectives for acceptable accuracy, precision, sensitivity; and technical usability; and 3) to update the project database with validated results and appropriate data validation qualifiers.

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The Data Validation Report consists of three parts:

- This Data Validation Report letter summarizing the actions taken;
- The spreadsheet of validated sample results with validation qualifiers based on actions taken; and
- The Data Validation Checklists to document the Tier II-type validations. These Checklists are an integral part of the validation report as they contain comprehensive details of all QC reviewed, the acceptance criteria used, professional judgment and actions taken.

I. Sample Descriptions and Analytical Parameters

The sample IDs, date of sampling, matrix, and sample type (e.g. Field Sample, Field Duplicate, etc., as applicable) and the analytical parameters reviewed are listed below in Table 1.

Table 1. Sample Descriptions and Analytical Parameters

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-FS-TB-PC-15-0.5-2.0	5/22/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-TB-PC-15-0.5-1.0	5/22/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-TB-PC-15-3.0-5.0	5/22/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-TB-PC-15-4.0-4.5	5/22/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-15-14.5-15.0	5/22/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-15-14.0-17.0	5/22/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-PC-15-16.5-17.0	5/22/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-TB-PC-9-0.5-1.0	5/22/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-TB-PC-9-0.5-2.0	5/22/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-TB-PC-8-0.5-2.0	5/22/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-TB-PC-8-0.5-1.0	5/22/12	Soil	VOCs & Percent Solids	Field Sample

Table 1. Sample Descriptions and Analytical Parameters (continued)

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-TB-1	5/22/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Duplicate of SB-FS-TB-PC-8-0.5-2.0
SB-FS-PC-8-14.0-16.0	5/22/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-PC-8-14.0-14.5	5/22/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-8-19.0-21.0	5/22/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample [used for MS/MSD for SVOCs, Pesticides, PCBs, & Metals]
SB-FS-PC-8-19.0-19.5	5/22/12	Soil	VOCs & Percent Solids	Field Sample
TB-052312-1	5/22/12	Water	VOCs	Trip Blank

Analytical method references:

Volatiles: 52 project-specific VOCs by USEPA SW846 Method 8260C that includes the TCL plus diethyl ether and tetrahydrofuran and minus 1,4-dioxane (not required for soils; note 1,4-dioxane was reported in the TB).

Semivolatiles: TCL SVOCs by USEPA SW846 Method 8270D

Pesticides: TCL Pesticides by USEPA SW846 Method 8081B

PCBs: TCL PCB Aroclors by USEPA SW846 Method 8082A

Metals: TAL Metals by USEPA SW846 Method 6010C (ICP-AES), which includes 22 Metals, plus Mercury by USEPA SW846 Method 7471A Cold Vapor Atomic Absorption (CVAA)

Percent Moisture / Percent Solids were performed and reported for all samples to convert results to dry-weight units.

II. Quality Control Reviewed during Data Validation

The following QC elements, as applicable to the analytical methods, were reviewed during the Tier II-type validation of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals:

- Data package completeness and reporting protocols
- Sample receipt, holding times and preservation criteria
- Blank results including Method Blanks, Equipment Blanks, & Trip blanks
- Laboratory Control Sample (LCS) recoveries / LCS Duplicate Recoveries

- Standard Reference Material (SRM) Recoveries, if applicable
- Surrogate Recoveries
- Matrix Spike (MS) / Matrix Spike Duplicate (MSD) Recoveries
- MS/MSD, LCS/LCSD, and sample/Field Duplicate (FD) Relative Percent Differences (RPDs)
- Sample result reporting (including compound lists, reporting limits, and units)
- Calibration criteria (including tune criteria, initial calibration and continuing calibration verification)
- Internal Standard (IS) Recoveries
- Retention Time windows
- Other method-specific QC if applicable and reported in Summary QC
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

III. Data Validation Report Summary

During the Tier II-type data validation review of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals, no data were rejected. Several results were negated (U) or estimated (J or UJ) due to QC issues. Table 2 summarizes the actions taken during this data validation review. NEH generated a validated data spreadsheet based on the electronic project database file (EDD) received from ESS for this SDG. All results were considered usable for project decisions compared to the Davis RDWP QAPP requirements with the understanding of the potential uncertainty (bias) in the qualified results presented in Table 2.

The remainder of this report documents "exceptions" to method or QAPP criteria or clarifications of data reported. QC elements not discussed below met all QAPP criteria. The full documentation of all QC elements reviewed during the Tier II-type validations are presented in the attached Data Validation Checklists. Data users should also reference the full Tier III-type data validation performed on soil samples included in SDG 360-40815-1 for additional information on general reporting issues and calculation verification from review of raw data (which is not performed in a Tier II-type validation).

Exceptions from Davis QAPP or Method QC Criteria

- The initial SVOC analysis did not include all compounds requested. A re-extraction and re-analysis was performed outside of holding time for 5 compounds. Results for these compounds were estimated (UJ) as indicated in Table 2.
- The method blank for VOCs and SVOCs reported results below the Reporting Limit (RL) for methylene chloride and di-n-butylphthalate, respectively. A comparison of the levels in the blank with the levels reported for this compound in the associated samples resulted in the following actions:
  - Methylene chloride was negated (U) in all VOC samples, as shown in Table 2, and the results raised to the sample specific RL or the level in the blank, whichever was higher.
- Exceedances of Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) recoveries or relative percent difference (RPD) were as follows:
  - <u>VOCs</u> – 2-butanone, acetone, and chloroethane showed LCS/LCSD recoveries outside of criteria. Actions taken to estimate (UJ) affected sample results due to VOC LCS/LCSD exceedances are listed in Table 2.

  - Metals – the RPD for mercury was outside criteria in the LSC/LCSD. All mercury results were estimated (J or UJ) with indeterminate bias due to LCS/LCSD imprecision, as listed in Table 2.
- Matrix Spike (MS)/Matrix Spike Duplicate (MSD) analyses were performed on sample SB-FS-PC-8-19.0-21.0 for SVOCs, Pesticides, PCBs, and Metals. Exceedances of the MS/MSD recoveries or RPD are as follows:
  - 2,4-Dinitrophenol and hexachlorocyclopentadiene showed recoveries and RPDs outside of criteria. Actions taken to estimate (UJ) affected sample results due to SVOC MS/MSD exceedances are listed in Table 2.
  - Antimony showed low MS and MSD recoveries. All antimony results were estimated (J or UJ) with potential low bias as listed in Table 2.
- No MS/MSD analyses were performed for VOCs.
- There was one Field Duplicate (FD) pair included in this SDG for SVOCs, Pesticides, PCB Aroclors, and Metals: SB-FS-TB-PC-8-0.5-2.0 and SB-TB-1. The FD results indicate acceptable overall precision and representativeness in the site soil matrix at the FD location for all SVOCs, PCBs, Metals, and Pesticides except for Heptachlor, which was estimated (J) due to FD imprecision with indeterminate bias, as listed in Table 2.
- A Field Duplicate (FD) pair was not included in this SDG for VOCs.
- Various initial and continuing calibrations reported results that were outside of criteria for SVOCs. Actions to estimate (UJ) affected results and the potential bias are listed in Table 2.
- Multiple internal standards were high in the SVOC analysis of samples SB-FS-TB-PC-15-3.0-5.0 and SB-FS-PC-8-19.0-21.0; affected compounds were estimated (UJ) as listed in Table 2.
- Heptachlor detected in sample SB-TB-1 showed dual column precision outside of acceptance limits and was estimated (J) as listed in Table 2.
- For PCBs, samples SB-FS-TB-PC-15-0.5-2.0, SB-FS-TB-PC-15-3.0-5.0, SB-FS-TB-PC-9-0.5-2.0, SB-FS-TB-PC-8-0.5-2.0, SB-TB-1, and SB-FS-PC-8-14.0-16.0 show complex mixtures in the chromatogram; however, none were matched to a specific Aroclor pattern.

Sensitivity & Reporting

- The laboratory flagged all results for VOCs and SVOCs that were less than the RL (supported by the low-level standard in the calibration curve) as "J". The "J" qualifier was maintained during validation to indicate that these results were estimated due to uncertainty in quantitation below the calibration range. Affected samples/analytes are listed in Table 2.
- All non-detects for VOCs, SVOCs, and PCBs were below the Project Action Limit (PAL) given in QAPP Tables 4-1C, 4-2C and 4-4B for soils except for:
  - All samples: 1,2-dibromo-3-chloropropane and ethylene dibromide, as expected, due to method limitations.
  - SB-FS-PC-15-14.5-15.0 & SB-FS-PC-8-14.0-14.5: 1,1,2-trichloroethane, 1,2-dichloroethane, 1,2-dichloropropane, tetrachloroethene and vinyl chloride
  - SB-FS-PC-8-14.0-16.0 & SB-TB-1: Hexachlorobenzene
- The laboratory reported results for all 21 target Pesticides required, except technical-chlordane was reported instead of alpha-chlordane. The technical-chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. All RLs for Pesticides were less than or equal to the PALs given in QAPP Table 4-3B and therefore met sensitivity requirements with the exception of toxaphene (due to raising the RL during validation). No PAL was defined for technical-chlordane in the site QAPP. The data user will need to evaluate usability of the non-detected toxaphene results with elevated RLs for project uses.

- All non-detects for Metals were below the PALs given in QAPP Table 4-5C for soil. Therefore, sensitivity DQOs were met for Metals.
- Data users are cautioned that the detected Metals results for selenium reported from ICP-AES Method 6010C may be false positives based on professional judgment knowledge of positive interference for selenium on ICP-AES in some matrices. Since the reported selenium results were orders-of-magnitude below the PAL and since all QC criteria were met, no action was taken other than to note this issue.
- The laboratory flagged several additional results as outside control limits for Metals for various QC; however, in all cases these results met DV criteria and no action was required (see the Metals DV Checklist for details).

Table 2. Summary of Data Validation Actions

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
All Metals samples	Antimony	J / UJ	L	Low MS/MSD recoveries
All Metals samples	Mercury	J / UJ	I	LCS/LCSD imprecision
All Pesticides samples	Chlordane (technical) Toxaphene	U		DV Raised RL
SB-TB-1	Heptachlor	J	I	Dual column imprecision
SB-FS-PC-15-14.5-15.0 SB-FS-PC-8-14.0-14.5	2-Butanone (MEK) Acetone Chloroethane	UJ	L	Low LCS/LCSD recoveries
SB-FS-PC-15-16.5-17.0 SB-FS-PC-8-19.0-19.5 SB-FS-TB-PC-15-0.5-1.0 SB-FS-TB-PC-15-4.0-4.5 SB-FS-TB-PC-8-0.5-1.0 SB-FS-TB-PC-9-0.5-1.0	2-Butanone (MEK) Acetone	UJ	L	Low LCS/LCSD recoveries
All VOC samples	Methylene Chloride	U		Negated due to Blank Action
SB-FS-TB-PC-15-4.0-4.5	1,2,3-Trichlorobenzene	J	I	Result uncertain below the calibration range
SB-FS-TB-PC-15-3.0-5.0	3,3'-Dichlorobenzidine Benzo[a]anthracene Benzo[a]pyrene Benzo[b]fluoranthene Benzo[g,h,i]perylene Benzo[k]fluoranthene Bis(2-ethylhexyl) phthalate Butyl benzyl phthalate Chrysene Dibenz(a,h)anthracene Di-n-octyl phthalate Indeno[1,2,3-cd]pyrene Pyrene	UJ	I	High IS recovery

Table 2. Summary of Data Validation Actions (continued)

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
SB-FS-PC-8-19.0-21.0	3,3'-Dichlorobenzidine 4-Bromophenyl phenyl ether Anthracene Benzo[a]anthracene Benzo[a]pyrene Benzo[b]fluoranthene Benzo[g,h,i]perylene Benzo[k]fluoranthene Bis(2-ethylhexyl) phthalate Butyl benzyl phthalate Carbazole Chrysene Dibenz(a,h)anthracene Di-n-butyl phthalate Di-n-octyl phthalate Fluoranthene Hexachlorobenzene Indeno[1,2,3-cd]pyrene N-Nitrosodiphenylamine Pentachlorophenol Phenanthrene Pyrene	UJ	I	High IS recovery
All SVOC samples	1,1'-Biphenyl 2,3,4,6-Tetrachlorophenol Atrazine Benzaldehyde Caprolactam	UJ	L	HT Exceedance
SB-FS-PC-15-14.0-17.0 SB-FS-PC-8-14.0-16.0 SB-FS-TB-PC-15-0.5-2.0 SB-FS-TB-PC-15-3.0-5.0 SB-FS-TB-PC-8-0.5-2.0 SB-FS-TB-PC-9-0.5-2.0 SB-TB-1	2,4-Dinitrophenol	UJ	L	Initial Calibration outside criteria + Low Calibration verification
SB-FS-PC-8-19.0-21.0	2,4-Dinitrophenol	UJ	I	Low MS recovery + MS/MSD imprecision + Initial Calibration outside criteria + Low Calibration verification
All SVOC samples	4,6-Dinitro-2-methylphenol	UJ	L	Low Calibration verification
SB-FS-PC-8-19.0-21.0	Hexachlorocyclopentadiene	UJ	I	Low MS recovery + MS/MSD imprecision
SB-FS-PC-15-14.0-17.0	Phenanthrene	J	I	Result uncertain below the calibration range

Table 2. Summary of Data Validation Actions (continued)

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
SB-FS-TB-PC-8-0.5-2.0	1,2,4,5-Tetrachlorobenzene	J	I	Result uncertain below the calibration range
SB-TB-1	Di-n-octyl phthalate	J	I	Result uncertain below the calibration range
SB-FS-PC-8-14.0-16.0	2-Methylnaphthalene Benzo[g,h,i]perylene Benzo[k]fluoranthene Bis(2-ethylhexyl) phthalate Indeno[1,2,3-cd]pyrene Naphthalene	J	I	Result uncertain below the calibration range
SB-FS-TB-PC-15-0.5-2.0	Benzo[a]anthracene Benzo[a]pyrene Benzo[b]fluoranthene Butyl benzyl phthalate Chrysene Fluoranthene Indeno[1,2,3-cd]pyrene Phenanthrene Pyrene	J	I	Result uncertain below the calibration range

Qualifiers: U = Analyte is non-detect at the "LIMIT2" value in the EDD, which is the sample-specific reporting limit (RL); UJ = Non-detect is estimated; J = Result is estimated; R = Result is rejected and is unusable for project decisions.

Bias: L = Low; H = High; I = Indeterminate

Acronyms used in Table 2:

HT = Holding Time
LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample Duplicate
MS = Matrix Spike
MSD = Matrix Spike Duplicate
RL = Reporting Limit

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Volatile Tier II-type Data Review Checklist

Lab Project: 360-40711-1

Lab: TestAmerica Westfield
Date Sampled: 5/22/12
Method of Analysis: 8260C - EI only (no SIM)

No. Samples: 8 + 1 TB
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 70-130%	LCS/LCSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	MS/MSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√		NA	NA	√	√		NA	
No			Estimate (UJ) 18 results					Accept 1 "J" result		Negate (U) 8 results due to Blank Action

% solids OK? Y
Other Issues: No

Comments:

Method 8260C used for reporting of project-specific list of VOCs. TB sample results were reviewed for potential blank actions (see below); however, full data review of this field QC sample was not performed as these results are not directly used for project decisions.

Samples were received intact at TestAmerica on 5/23/12, the day after collection at 4±2°C . The lab noted in the checklist that the cooler was received outside of temperature specifications, however, the cooler was received at 6.2°C (since the requirement is 2 - 6 °C, 6.2°C would be considered within specifications). Samples were properly preserved. No action required.

Samples were all analyzed by 5/30/12 - HT met for all samples, No Action required.

Surrogates : All 3 VOC surrogates were recovered within 70-130% in all samples and QC - no Action required

Date: ***10/16/12***

Data Reviewer: ***Deborah A. Loring***

Lab Project: 360-40711-1

Lab: TestAmerica Westfield

Blank Action: Blanks Reviewed: MB: Water - MB 360-91207/6 Soil - MB 360-91204/3-A, MB 360-91306/4-A, MB91351/3-A
TB: TB052312-1

Blank ID	Contaminant / Level	Matrix Related?	Action Level / Action	Sample and Reported Result		Corrected Result
MB 360-91207/6	None Detected	Y		No Blank Action required		
MB 360-91204/3-A	2-hexanone 1130 J µg/kg	Y	5650 µg/kg	Associated samples ND - No Blank Action required		
	Methylene chloride 266 J µg/kg	Y	2660 µg/kg	SB-FS-PC-15-14.5-15.0	210 J	490 U
				SB-FS-PC-8-14.0-14.5	300 J	600 U
MB 360-91306/3-A	Methylene Chloride 14.6 J µg/kg	Y	146 µg/kg	SB-FS-PC-15-16.5-17.0	27	27 U
				SB-FS-PC-8-19.0-19.5	19	19 U
				SB-FS-TB-PC-15-0.5-1.0	18	18 U
				SB-FS-TB-PC-9-0.5-1.0	28	28 U
				SB-FS-TB-PC-8-0.5-1.0	21	21 U
MB 360-91351/3-A	Methylene Chloride 5.12 J µg/kg	Y	51.2 µg/kg	SB-FS-TB-PC-15-4.0-4.5	11	11 U
TB-052312-1	None Detected	N		No Blank Action required		

LCS/LCSD: LCS 360-91204/1-A & 2-A. Lab spiked all 53 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable except: 2-butanone, acetone, chloroethane (LCS/LCSD rec. low), dichlorodifluoromethane (LCSD rec. low). Professional judgment used to accept dichlorodifluoromethane results without qualification as LCS and RPD are within limits.

**Action: 2-butanone, acetone, and chloroethane estimated (UJ) with possible low bias in associated soil samples due to low LCS/LCSD recoveries (40711-5 & -14).*

LCS/LCSD: LCS/LCSD LCS 360-91306/1-A & 2-A. Lab spiked all 53 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable except: 2-butanone and acetone (LCS/LCSD rec. low).

**Action: 2-butanone and acetone estimated (UJ) with possible low bias in associated soil samples due to low LCS/LCSD recoveries (40711-2, -7, -8, -11 and -16).*

Date: ***10/16/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40711-1

Additional Notes:

LCS/LCSD: LCS/LCSD LCS 360-91351/1-A & 2-A. Lab spiked all 53 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable except: 2-butanone and acetone (LCS/LCSD rec. low).

**Action: 2-butanone and acetone estimated (UJ) with possible low bias in associated soil samples due to low LCS/LCSD recoveries (40711-4).*

MS/MSD: MS/MSD analyses were not performed with this SDG.

FD pair: An FD was not submitted with this SDG.

Tunes: Instrument HP#1 GC/MS. 3/23/12 16:40, 05/24/2012 20:17 05/29/2012 15:48, 05/30/12 15:01 All tune abundances were acceptable and all samples and standards were analyzed within 12 hours of BFB tune.

ICAL : HP#1 3/23/12 6-9 level ICAL for all Targets + several non-target compounds. All calibrations met QAPP criteria for Target Compounds (ICAL from 0.5, 1 or 5 up to 160 µg/L. %RSD $\leq$ 20% or r2 $\geq$ 0.99 and all RRFs $\geq$ 0.05 . Valid ICAL - No Action required.

CCAL: HP#1 05/24/2012 20:40 & 05/29/2012 15:48 %D (or %Drift) $\leq \pm$ 20% for all target compounds and RRF $\geq$ 0.05. No action required.

CCAL: HP#1 05/30/2012 15:24 %D (or %Drift) $\leq \pm$ 20% for all target compounds and RRF $\geq$ 0.05 except 1,1,2-Trichloro-1,2,2-trifluoroethane (%D=+20.8%). As 1,1,2-Trichloro-1,2,2-trifluoroethane shows increased sensitivity on day of analysis, and it was not detected in the associated sample, no action required.

IS: All 4 IS Areas and RTs were in criteria - No Action required.

Lab reported results for m- Xylene & p-Xylene (reported as a single entry due to coelution) and o-Xylene in addition to Xylenes, total, as requested in the QAPP. All 52 project-specific VOCs were reported so with the added Xylenes, a total of 54 VOC results reported per sample. Note that bromodichloromethane, as listed in Table 4-1C, is called dichlorobromomethane in EDD and data and Dibromochloromethane, as listed in Table 4-1C, is called chlorodibromomethane in EDD and data.

1 result was reported at levels < RL and were flagged "J" by the lab (not including the results negated due to blank action). This "J" result was accepted for reporting with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

Date: ***10/16/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40711-1

Additional Notes:

All RLs were at or below the PQLs and PALs required in the QAPP Table 4-1C for all samples except PQLs were exceeded in samples SB-FS-PC-15-14.5-15.0 & SB-FS-PC-8-14.0-14.5, as their results were derived from the medium level analysis; PALs were exceeded for 1,2-dibromo-3-chloropropane and ethylene dibromide in all samples as expected, due to method limitations, and the following compounds in samples SB-FS-PC-15-14.5-15.0 & SB-FS-PC-8-14.0-14.5: 1,1,2-trichloroethane, 1,2-dichloroethane, 1,2-dichloropropane, tetrachloroethene and vinyl chloride.

Narrative noted that medium level extracts for samples SB-FS-PC-15-14.5-15.0 & SB-FS-PC-8-14.0-14.5 were run due to the presence of non-target compounds in the samples.

Date: ***10/16/12***

Data Reviewer: ***Deborah A. Loring***

8260C and Project Action Summary:

Preservation:	Waters - headspace present or received at > 10°C, J det / J NDs or R ND Soils/Sediment - EnCore extrusion and sample preservation unacceptable or received at > 10°C, J det / J NDs or R ND Waters - pH < 2; 14d <HT≤ 28d; J det/ J NDs; HT >28d, J det/R ND Soils/Sediment - 14d <HT< 28d; J det/ J NDs; HT >28d, J det/R ND
Surrogates:	Surr. %Rec > 130%, J det/Accept ND; 10% ≤ %Rec < 70%, J det/J NDs;
LCS	%Rec<10%, J det/ R NDs; 10% <%Rec<70, J det/ J NDs; %Rec >130, J det/Accept NDs. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. LCS must contain all targets.
Tunes:	Samples analyzed within 12-hrs and criteria met per Method 8260C. If out, use professional judgment.
ICAL:	minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs. If avg. RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
CCAL:	%D (or %Drift) > - 20% , J det/J ND; %D (or %Drift) > +20%, J det/Accept ND. If RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
Blanks:	Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for acetone, 2-butanone, and methylene chloride which are 10 x value in blank.
MS/MSD:	%Rec<10%, J det/ R NDs; 10% <%Rec<70%, J det/ J NDs; %Rec >130%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. MS/MSD must contain all targets.
FD:	Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data
IS:	20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs
QLs:	Verify RLs met RLs and PALs given in QAPP; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.
TICs:	Not required
% solids:	If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs
Narrative:	If there are any issues raised in narrative not previously addressed, take appropriate action
Reference:	*Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8260C

Date: ***10/16/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Semivolatile Tier II-type Data Review Checklist

Lab Project: 360-40711

Lab: TestAmerica Westfield
Date Sampled: 5/22/12
Method of Analysis: 8270D

No. Samples: 7 + 1 FD
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates w: 30-130%BN 15-110% Acid s: 30-130%	LCS 40-140%BN 30-130%Acid	MS/MSD 40-140%BN 30-130%Acid w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes		√	√		√	√			NA	
No	Estimate (UJ) 5 results in all samples			Estimate (UJ) 2 results in SB-FS-PC-8-19.0-21.0			Estimate (UJ) 35 results	Accept 18 "J" results		

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 5/23/12, the day after collection at 4±2°C . The lab noted in the checklist that the cooler was received outside of temperature specifications, however, the cooler was received at 6.2°C (since the requirement is 2 - 6 °C, 6.2°C would be considered within specifications). Samples were properly preserved. No action required.

All samples were all initially extracted on 6/5/12 and analyzed by 6/6/12, however, several compounds were not included in the associated QC samples: 1,1'-Biphenyl, 2,3,4,6-Tetrachlorophenol, Atrazine, Benzaldehyde, and Caprolactam. The samples were re-extracted on 6/11/12 and 6/12/12 and analyzed by /26/12 for these compounds. Both sets of data were presented. Extraction holding times for these compounds were exceeded by 5 days for 3 samples and 6 days for 5 samples. Analytical holding times were met.

***ACTION: Estimate (UJ) 1,1'-Biphenyl, 2,3,4,6-Tetrachlorophenol, Atrazine, Benzaldehyde, and Caprolactam results in all samples due to holding time exceedance.*

Surrogates : All 3BN and 3 Acid Surrogates were recovered within QAPP Criteria in all field and QC samples. No action required.

LCS/LCSD : LCS 360-91565/2-A & 3-A. Lab spiked all 67 target analytes requested in LCS. All spiked target compounds reported acceptable %Rec and LCS/LCSD RPD - no action required.

LCS/LCSD : LCS 360-91783/2-A & 3-A & LCS 360-91816/2-A & 3-A. Lab spiked all 5 target analytes reported from these batches. All spiked target compounds reported acceptable %Rec and LCS/LCSD RPD - no action required.

Date: ***10/17/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40711

Blank Action:

Blanks Reviewed: MB: MB 360-91565/1-A, MB 360-91783/1-A, MB 360-91816/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?	Action Level / Action	Sample and Reported Result	Corrected Result
MB 360-91565/1-A	di-n-butylphthalate 130 J µg/kg	Y	1300 µg/kg	Associated samples ND - No Blank Action required	
MB 360-91783/1-A	None Detected	Y		No Blank Action required	
MB 360-91816/1-A	None Detected	Y		No Blank Action required	

MS/MSD: MS/MSD analyses were performed on sample SB-FS-PC-8-19.0-21.0. Lab spiked all 67 target analytes requested in LCS. All spiked target compounds reported acceptable %Rec and MS/MSD RPD except 2,4-dinitrophenol and hexachlorocyclopentadiene (MSD rec. low, RPD high)

***ACTION: Estimate (UJ) 2,4-dinitrophenol and hexachlorocyclopentadiene with indeterminate bias in sample SB-FS-PC-8-19.0-21.0.*

FD pair: SB-FS-TB-PC-8-0.5-2.0 / SB-TB-1. A comparison of detected results shown below.

Field Duplicate Evaluation_ Sample IDs: Sample = SB-FS-TB-PC-8-0.5-2.0 FD = SB-TB-1

Analyte Name	DF= 1 RL (µg/Kg)	Sample µg/Kg	Q	Sample Result Level	FD µg/Kg	Q	FD Result Level	RPD	Action
1,2,4,5-Tetrachlorobenzene	36	32	J	< 2 X RL	ND			NA	None
Di-n-octyl phthalate	11	ND			88	J	< 2 X RL	NA	None

FD: Note the sample was analyzed at no dilution and the FD extract was run at a 5-fold dilution. Both showed an unresolved complex mixture. FD precision is considered acceptable for all analytes.

Tunes: Instrument B 5/23/12 10:50 (ICAL), 06/06/2012 09:12. All abundances were acceptable and all samples were analyzed within 12 hours of tune - no action required.

Date: ***10/17/12***

Data Reviewer: ***Deborah A. Loring***

Additional Notes:

ICAL: 5/23/12 Inst. B, 8- to 10- level ICAL performed from 0.2 to 25 µg/mL (for full 10-level) for all Targets + several non-target compounds. Form VI flagged several results as not meeting minimum RRF criteria; however, lab used CLP criteria and not QAPP criteria. %RSD ≤ 20% or r2 ≥ 0.99 for all and all RRFs ≥ 0.05 except 2,4-dinitrophenol RRF < 0.05

***ACTION: Estimate (UJ) 2,4-Dinitrophenol with low bias in all samples.*

CCALs: Inst. B 06/06/2012 09:43 %D or %Drift ≤ ± 20% and RRF ≥ 0.05 for all target compounds except: 4,6-dinitro-2-methylphenol and 2,4-dinitrophenol RRF < 0.05.

***ACTION: Estimate (UJ) 4,6-dinitro-2-methylphenol and 2,4-dinitrophenol with low bias in all samples.*

Tunes: Instrument B 6/25/12, 6/26/12. All abundances were acceptable and all samples were analyzed within 12 hours of tune - No Action required

ICAL: 6/25/12 Inst. B, Evaluated for 5 affected compounds only: 8- to 10- level ICAL performed from 0.2 to 25 µg/mL (for full 10-level) for all Targets + several non-target compounds. Form VI flagged several results as not meeting minimum RRF criteria; however, lab used CLP criteria and not QAPP criteria. %RSD ≤ 20% or r2 ≥ 0.99 for all and all RRFs ≥ 0.05.

CCALs: Inst. B 6/26/2012 2:12:00 PM %D or %Drift ≤ ± 20% and RRF ≥ 0.05 for all five target compounds - no action required.

IS: All 6 IS Areas and RTs were in criteria for all analyses except Chrysene-d12 and Perylene-d12 were high in samples SB-FS-TB-PC-15-3.0-5.0 (360-40711-3) and Phenanthrene-d10, chrysene-d12 and perylene-d12 were high in sample SB-FS-PC-8-19.0-21.0 (360-40711-15). This was confirmed on re-injection.

***ACTION: Estimate the following compounds associated with Chrysene-d12 and Perylene-d12 in samples SB-FS-TB-PC-15-3.0-5.0 (360-40711-3) and SB-FS-PC-8-19.0-21.0 (360-40711-15): 3,3'-Dichlorobenzidine, Benzo[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[g,h,i]perylene, Benzo[k]fluoranthene, Butyl benzyl phthalate, Bis(2-ethylhexyl) phthalate, Chrysene, Dibenz(a,h)anthracene , Di-n-octyl phthalate, Indeno[1,2,3-cd]pyrene and Pyrene. Estimate (UJ) the following additional compounds in sample SB-FS-PC-8-19.0-21.0 (360-40711-15) associated with Phenanthrene-d10: 4-Bromophenyl phenyl ether, Anthracene, Carbazole, Di-n-butyl phthalate, Fluoranthene, Hexachlorobenzene, N-Nitrosodiphenylamine, Pentachlorophenol, and Phenanthrene.*

Lab reported results for all 67 target SVOCs required. The lab reported 3&4-methylphenol rather than 4-methylphenol as the two co-elute. All RLs reported were less than or equal to the PQLs given in QAPP Table 4-2C except di-n-butylphthalate and bis-2-ethylhexylphthalate in all samples.

18 results were reported at levels < RL and were flagged "J" by the lab. These 18 results were accepted for reporting with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

PQLs were exceeded for di-n-butylphthalate and bis(2-ethylhexyl)phthalate for all samples. PQLs were exceeded for several compounds in sample SB-TB-1 and for most compounds in sample SB-FS-PC-8-14.0-16.0 due to extract dilutions. All non-detects were reported at levels below the PALs given in Table 4-2C for all samples except for Hexachlorobenzene in samples SB-TB-1 and SB-FS-PC-8-14.0-16.0.

Date: ***10/17/12***

Data Reviewer: ***Deborah A. Loring***

8270D and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: waters: BN 30 - 130%, acids 15-110%; solids: all surrogates 30-130%
2 BN or 2 Acids Recovery > Criteria, J det/Accept ND; 10% ≤ 2 or more surrogates < Criteria, J det/J NDs;
Recovery < 10%, J det/R NDs. Action taken on Acid and/or BN analytes based on Surrogates out.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs.

Tunes: Samples analyzed within 12-hrs and criteria met per Table 3 or Method 8270C. If out, use professional judgment.

ICAL: minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs; min. RRF < 0.05, J det/UJ NDs.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank

Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for phthalates which are 10 x value in blank.

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs- Unspiked Sample only. RPD > Limit, J det/UJ NDs.
MS/MSD must contain all targets.

FD: Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data

IS: 20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs

QLs: Verify RLs met QAPP QLs ; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

TICs: Not required

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8270D

Date: ***10/17/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
PCB Tier II-type Data Review Checklist

Lab Project # 360-40711

Lab: TestAmerica Westfield
Date Sampled: 5/22/12
Method of Analysis: 8082A

No. Samples: 7 + 1 FD
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 40-140% RPD ≤ 30%	FD w:RPD≤30% s:RPD≤50%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)	Other (pattern match, etc.)
Yes	√	√	√	NA	√	√	√	√	----
No									

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 5/23/12, the day after collection at 4±2°C . The lab noted in the checklist that the cooler was received outside of temperature specifications, however, the cooler was received at 6.2°C (since the requirement is 2 - 6 °C, 6.2°C would be considered within specifications). Samples were properly preserved. No action required.

Samples were extracted on 5/25/12 and 6/4/12 - HT met for extraction. All extracts were analyzed by 6/5/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - no action required. Note, lab used in-house criteria for recovery of surrogates; QAPP criteria used to determine data acceptance.

LCS/LCSD: LCS 360-91248/2-A & 3-A and LCS 360-91509/2-A & 3-A. Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec for AR1016 & AR1260 in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD: MS/MSD analyses were performed on sample SB-FS-PC-8-19.0-21.0. All % Rec and RPDs were acceptable - no action required.

Date: ***10/17/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40711

Blank Action: Blanks Reviewed: MB: MB 360-91248/1-A, MB 360-91509/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91248/1-A	None					No Blank Action required	
MB 360-91509/1-A	None					No Blank Action required	

Additional Notes:

FD pair: SB-FS-TB-PC-8-0.5-2.0 / SB-TB-1. All PCBs were non-detect in both samples; therefore, while these results are consistent with one another, unable to quantitatively evaluate FD precision based on calculation of RPD. FD precision considered acceptable for this FD pair.

ICAL: Instrument M 4/13/12 6-level calibration from 50 to 2000 µg/L for Ar 1016/1260 and a single point calibration at 1000 µg/L for Ar-1221/1254, Ar-1232, Ar-1242, Ar-1248, Ar-1262, Ar-1268. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), linear regression performed for Ar-1016 & 1260 on both columns, and r2 > 0.99. Valid ICAL - no action required.

CCALs : CCV 360-91269/1 on 05/29/2012 17:48 (Opening CCV): All %D ≤ ± 20% on both GC columns for all Aroclor peaks except Col 1 Ar-1016-3 (+26.2%), Ar-1016-5 (-28.4%) Average %D OK, Ar-1260-1 (-23.9%), Ar-1260-3 (-22.3%), Ar-1260-4 (-26.5%), Ar-1260-5 (-28.1%) (Average = -23.5%); Col 2 all OK. No action required for Col 1 Ar-1016 as average %D was within limits. No action required for Col 1 Ar-1260 as Col 2 was within limits, and no Aroclors were detected in the samples. CCV 360-91269/15 on 05/29/2012 23:10 and CCV 360-91269/26 05/30/2012 @ 03:11 - all %D ≤ ±20% on both GC columns for all Aroclor peaks. No action required.

CCALs : CCV 360-91544/1 on 06/05/2012 14:34 (Opening CCV): All %D ≤ ± 20% on both GC columns for all Aroclor peaks except Column 1 - 1 Ar-1016-3 (-31.9%), Ar-1016-4 (-24.5%), Ar-1016-5 (-22.3%) Average OK Ar-1260-1 (-23.3%), Ar-1260-4 (-22.8%), Ar-1260-5 (-25.2%), (Average = -20.54%); Column 2 - Ar-1260-5 (+20.3) Average OK. No action required as Column 2 was within limits for both Aroclors and no Aroclors were detected in the sample. CCV 360-91544/22 on 06/05/2012 22:52: All %D < ± 20% on both GC columns for all Aroclor peaks except Column 1 Ar-1016-3 (+54.8%), Average OK, Col 2 OK. No action required.

Lab reported the lowest of the two column values. Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. No PCBs reported in samples - no action required.

Date: ***10/17/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40711

Additional Notes:

RLs for samples SB-FS-PC-8-14.0-16.0, SB-FS-PC-8-19.0-21.0, and sample SB-FS-TB-PC-15-3.0-5.0 reported were slightly above the PQLs given in QAPP Table 4-C (RLs 110 µg/kg vs. 100 µg/kg), due to % solids.

All RLs reported were less than or equal to the PALs given in QAPP Table 4-C.

All chromatograms for all samples visually inspected and appear to have been reported correctly. SB-FS-TB-PC-15-0.5-2.0, SB-FS-TB-PC-15-3.0-5.0, SB-FS-TB-PC-9-0.5-2.0, SB-FS-TB-PC-8-0.5-2.0, SB-TB-1, and sample SB-FS-PC-8-14.0-16.0 show complex mixtures, however, none were matched to a specific Aroclor pattern.

Narrative did not raise any issues not already addressed.

Date: ***10/17/12***
Data Reviewer: ***Deborah A. Loring***

8082A and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs- Unspiked Sample only. RPD > 30% solids, J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multi-components), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multi-components) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8082A

Date: ***10/17/12***
Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Pesticide Tier II-type Data Review Checklist

Lab Project # 360-40711

Lab: TestAmerica Westfield
Date Sampled: 5/22/12
Method of Analysis: 8081B

No. Samples: 7 + 1 FD
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 30-150% w: RPD≤20% sr:RPD≤30%	FD w:RPD≤30% s:RPD≤50%	RCM (Resolve. > 60%)	PEMs Brkdwn< 15% %D ≤ ± 15%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)
Yes	√	√	√	√	√	√	√	√	√	
No										Estimate (J) 1 result

% solids OK? Y
Other Issues: No Technical chlordane was reported instead of alpha-chlordane. Low-level initial calibration for Toxaphene and Technical chlordane did not support the lab-reported RL - action taken to raise RL for Toxaphene and Technical chlordane (see page 2).

Comments:

Samples were received intact at TestAmerica on 5/23/12, the day after collection at 4±2°C . The lab noted in the checklist that the cooler was received outside of temperature specifications, however, the cooler was received at 6.2°C (since the requirement is 2 - 6 °C, 6.2°C would be considered within specifications). Samples were properly preserved. No action required.

Samples were extracted on 5/25/12 and 6/4/12 and analyzed by 6/5/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - No Action required. Note, lab used in-house criteria for recovery of surrogates; QAPP criteria used to determine data acceptance.

LCS/LCSD: LCS 360-91248/4-A & 5-A, LCS 360-91509/4-A & 5-A Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD : MS/MSD analyses were performed on sample SB-FS-PC-8-19.0-21.0. All % Rec and RPDs were within limits - no action required.

FD pair: SB-FS-TB-PC-8-0.5-2.0 / SB-TB-1. A comparison of detected results shown below.

Date: ***10/17/12***
Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Pesticide Tier II-type Data Review Checklist

Lab Project # 360-40711

Lab: TestAmerica Westfield

Blank Action: Blanks Reviewed: MB: MB 360-91248/1-A, MB 360-91509/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91248/1-A	None					No Blank Action required	
MB 360-91509/1-A	None					No Blank Action required	

Additional Notes:
Field Duplicate Evaluation_ Sample IDs: Sample = SB-FS-TB-PC-8-0.5-2.0 FD = SB-TB-1

Analyte Name	DF= 1 RL (µg/Kg)		Sample µg/Kg	Q	Sample Result Level		FD µg/Kg	Q	FD Result Level		RPD		Action
Heptachlor		10		20	J	> 2 X RL		14		< 2 X RL		35%		None

FD: FD precision is considered acceptable for all analytes.

Resolution Check : RCM not analyzed per se; however, CCALs reviewed and all peaks appear to be adequately resolved - No Action required

PEM DDT and Endrin Breakdown evaluations: PEMs 360-91344/1 05/30/2012 12:33, PEM 360-91344/17 05/30/2012 18:44, PEM 360-91399/1 05/31/2012 11:36, and PEM 360-91545/1 06/05/2012 14:38 - %Breakdown for DDT and Endrin ≤ 15% + Combined Breakdown was ≤ 30% on each GC Column. No Action required.

ICAL: Instrument H 5/14/12 7-level from 1 to 100 µg/L for single-component Pesticides (some extras not required for project) + surrogates and 3-level from 500 to 2,500 µg/L for Toxaphene and Technical Chlordane. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), %RSD ≤ 20% or r2 ≥ 0.99 for all compounds. Several compounds used regression analysis for calibration on Columns 1 & 2. Valid ICAL - no action required.

Date: ***10/17/12***
Data Reviewer: ***Deborah A. Loring***

Additional Notes:

CCALs : CCVRT 360-91344/2 on 05/30/2012 12:54 (Opening CCV for single-components), CCVRT 360-91344/4 on 05/30/2012 13:37 (Toxaphene), and CCVRT 360-91344/3 on 05/30/2012 13:15 (Technical chlordane) - all %D ≤ ±20% on both GC columns for all Pesticides. CCVRT 360-91344/18 on 05/30/2012 19:06 (Closing CCV) - all %D ≤ ±20% on both GC columns for all Pesticides except Endrin (+32.1%) and DDD (+27.7%)on GC Column 1 and d-BHC (+21.2%), DDE (+25.6%), DDD (+22.5%), Endosulfan II (+29.5%) Endrin aldehyde (+33.5%) on GC Column 2. CCVRT 360-91399/2A 05/31/2012 @ 11:57, and CCVRT 360-91399/3 05/31/2012 @ 12:19 (technical chlordane) and CCVRT 360-91399/4 and 5/31/2012 12:40 (toxaphene) - all %D ≤ ±20% on both GC columns for all Pesticides except Endrin (+22.9%), and DDD (+21.8%) on GC Column 1 and DDD (20.6%), Endosulfan II (40.0%), and Endrin aldehyde (31.0%) and technical chlordane (24.4%), on GC Column 2. CCV 360-91399/15 05/31/2012 @ 16:36 (Closing CCV) - all %D ≤ ±20% on both GC columns for all Pesticides except DDE (+21.6%) and DDD (+29.3%) on GC Column 1 and Endrin aldehyde (+28.3%) on GC Column 2. CCVRT 360-91545/2 on 06/05/2012 14:59 (Opening CCV for single-components), CCVRT 360-91545/3 on 06/05/2012 15:20 (Technical Chlordane), and CCVRT 360-91545/4 on 06/05/2012 15:42 (Toxaphene) - all %D ≤ ±20% on both GC columns for all Pesticides except DDT (+22.5%) on GC Column 1 and Technical Chlordane (+23.6%) on GC Column 2. CCV 360-91545/25 on 06/06/2012 07:31 (Closing CCV) - all %D ≤ ±20% on both GC columns for all Pesticides except beta-BHC (+33.3%), Endrin (60.2%) and Methoxychlor (+73.2%) on GC Column 1 and Endosulfan II (+29.5%) on GC Column 2. A positive %D indicates increased sensitivity to detection during CCAL as compared to sensitivity during ICAL. DDT was detected in sample SB-FS-PC-8-14.0-16.0. The DDT in this sample was reported from Column 2 which was within limits. All other compounds were non-detect in relation to the bracketing samples. No action is required for the increased sensitivity in non-detects.

Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. %D calculated in review, all within limits except Heptachlor in sample SB-TB-1 (%D=43%).

***ACTION: Estimate (J) Heptachlor in sample SB-TB-1 with indeterminate bias due to dual column imprecision.*

The narrative did not raise any issues not already addressed.

All RLs reported were less than or equal to the PQLs given in QAPP Table 4-3B except for aldrin, dieldrin in samples SB-FS-PC-8-14.0-16.0, SB-FS-PC-8-19.0-21.0, and SB-FS-TB-PC-15-3.0-5.0 and toxaphene in all samples. No PQL was defined for Technical chlordane in the QAPP.

Lab reported results for all 21 target Pesticides required, except technical chlordane was reported instead of alpha-chlordane. The technical chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. The resulting RL was above the PAL for Toxaphene in all samples. All other RLs reported were less than or equal to the PALs given in QAPP Table 4-3B. No PAL was defined for Technical chlordane in the site QAPP.

Date: ***10/17/12***
Data Reviewer: ***Deborah A. Loring***

8081B and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

RCM: RCM < 60% resolution, J detects based on technical judgment

PEM: 4,4'-DDT breakdown > 15%, J detected DDT, DDE, DDD; R ND 4,4'-DDT and accept ND DDE & DDD
Endrin breakdown > 15%, J detected Endrin, Endrin Aldehyde & Endrin Ketone; R ND Endrin and accept ND Endrin Aldehyde & Endrin Ketone
4,4'-DDT and Endrin > 30%, accept NDs of breakdown products and J detects for 4,4'-DDT and Endrin; J detects of breakdown products and reject (R) non-detects for 4,4'-DDT and Endrin.
%D> ± 20%, J det/J ND on a per column basis. % Resolution < 90.0% qualify data based on professional judgment.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<30%, J det/ J NDs; %Rec >150%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters (or 30% solids), J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multicomponents), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multicomponents) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8081B

Date: ***10/17/12***
Data Reviewer: ***Deborah A. Loring***

RDWP - Davis Liquid Waste Superfund Site
EPA Region I Tier II-type DV Checklist - Metals

Lab: TestAmerica-Westfield, Westfield, MA
Date Sampled: 5/22/12
Analysis: Metals by EPA SW-846 Method 6010C & 7471A

Lab Project # 360-40711-1
No. Samples: 8
Matrix: Soil

QC Met Criteria?		HT and Preserve	RL QAPP PALs	Tune 6020 criteria	Calibration ICV/CCV 90-110%R	CRI RL Check 70-130%R	EB MB < RL	LCS/LCSD SRM limits RPD ≤ 30%	ICSA/AB 80-120% R	MS / MSD 75-125% R	MD RPD ≤ 20%	FD RPD ≤ 30%	IS 6020 70-130% R	Serial Dilution ± 15% D
Yes		√	√	NA	√	√	√		√		√	NA	NA	√
No								Estimate (J/UJ) 8 Mercury results		Estimate (J/UJ) 8 Antimony results				

Soils for Target Analyte List (TAL) of 23 Metals: Mercury by CVAA SW846 Method 7471A; and Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, & Zinc by ICP-AES Method 6010C.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data for Tier II level in accordance with the Davis QAPP (ESS 2012) & EPA Region 1 present in the data package? ***Yes.***

2. Were all result forms for all samples listed on the chain-of-custody present in data package? ***Yes.***

Chain-of-Custody (COC): 8 soil samples received for Total TAL Metals - received at lab on 5/23/12 (1 day after sample collection) and intact. Documentation acceptable.

Preservation: Samples received at 6.2°C on ice. No action taken for 0.2°C exceedance of temperature acceptance limit since samples received on-ice. Considered acceptable preservation for soils.

Holding Time (HT): ICP-AES 6010C analysis 5/25/12 & 5/29/12; CVAA 7471A analysis 5/30/12. Acceptable HT.

Calibration Criteria: ICV/CCV and CRI (RL check standard supporting the level of the RL reported) met acceptance criteria for all Metals. Note CRI not required by Davis QAPP but reviewed as additional support of the lab RLs (criteria set at 70-130%). Tune criteria not applicable for Method 6010C. ICSA/AB met recovery criteria for all ICP metals.

Date: *10/19/12*
Data Reviewer: *Susan D. Chapnick*

New Environmental Horizons, Inc.

Lab: TestAmerica Lab Project #: 360-40711-1

Blanks: No EB included with samples in this SDG. Method blank (MB) & instrument blanks (ICB/CCB) were non-detected for all Metals except Calcium, which was detected in the MB at 17.8 mg/Kg. All sample results were > blank action level (which is 5x the blank level = 89 mg/Kg); therefore, No Blank Action required. Removed "B" flag from validated EDD as Calcium did not require any blank action.

LCS/LCSD: Lab performed both LCS and LCS duplicate (LCSD), though LCSD not required in Davis QAPP. LCS/LCSD met acceptance criteria for all Metals for accuracy (based on soil SRM control limits listed by lab on Form 7, consistent with QAPP criteria for this media) and precision (RPD <30% lab criteria) except for Mercury. LCS/LCSD RPD was 42%, whereas lab control limit is 30%.

**ACTION: Estimate (J or UJ) Mercury results in all soil samples due to imprecision observed in the LSC/LCSD; indeterminate bias.*

MS/MSD/MD: Performed on site sample SB-FS-PC-8-19.0-21.0 (360-40711-15) as requested on COC. Note that the COC has separate sample IDs for the MS and MSD; however, the lab used the standard format to report matrix QC as the parent sample ID. All recoveries and RPDs acceptable except as follows. Antimony low MS and MSD recoveries at 44% and 47%, respectively. Post-digest spikes showed acceptable recoveries for all Metals indicating that there was a matrix effect in the field sample for low MS/MSD for antimony (not caused during instrument analysis). Barium showed slightly low MSD recovery at 73%; however MS recovery was acceptable as was MS/MSD RPD so no action taken based on professional judgment. Aluminum, Iron, and Manganese showed MS and/or MSD recoveries outside control limits, but the spikes were swamped out (sample concentrations > 4x spike levels); therefore, no action required (note lab failed to note that Manganese was swamped out - they indicated it failed "F", which is incorrect).

**ACTION: Estimate (J or UJ) Antimony results in all soil samples due to low MS/MSD recoveries; potential low bias.*

Serial Dilution: Performed on site sample SB-FS-PC-8-19.0-21.0 (360-40711-15) - all % difference results were acceptable for results > 50xRL. Note lab qualified Barium (11 %D) and Manganese (14 %D) results as outside of control limits on the QC summary form; however, DV criterion is 15% so both actually met DV acceptance criterion. No Action Required.

IS: IS not applicable for Method 6010C.

Sensitivity: All RLs for non-detects met Davis QAPP Table 4-5C for Soil requirements for sensitivity (RL) based on being lower than the PALs (even though some, for example antimony, were > PQLs they were still lower than the PALs). Therefore, sensitivity met project DQOs.

Professional Judgment - Other: Data users are cautioned that the detected Metals results for Selenium reported from ICP-AES Method 6010C (ranging from 1.4 mg/Kg to 5.3 mg/Kg) may be false positives based on professional judgment knowledge of positive interference for selenium on ICP-AES in some matrices. Since the reported Selenium results were orders-of-magnitude below the PAL and since all QC criteria were met, no action was taken other than to note this issue.

Laboratory Narrative: No further issues noted.

Date: *10/19/12*
Data Reviewer: *Susan D. Chapnick*

RDWP - Davis Liquid Waste Superfund Site
EPA Region I Tier II-type DV Checklist - Metals

Lab: TestAmerica

Lab Project #: 360-40711-1

FD pair samples: SB-FS-TB-PC-8-0.5-2.0 and SB-TB-1. All FD precision met all Metals - No action required.

FD Precision: all units are mg/Kg dry-weight

Analyte	Sample SB-FS-TB-PC-8-0.5-2.0	Qual	FD SB-TB-1	Qual	Precision RPD* %	Action	Comment
Aluminum	8100		8300		2	none	
Antimony	0.69	U	0.63	U	NC	none	
Arsenic	2.1		2.1		0	none	
Barium	40		41		2	none	
Beryllium	0.41		0.41		0	none	
Cadmium	0.28	U	0.25	U	NC	none	
Calcium	1200		1200		0	none	
Chromium	6.4		7		9	none	
Cobalt	4.3		4.2		2	none	
Copper	13		13		0	none	
Iron	15000		16000		6	none	
Lead	12		12		0	none	
Magnesium	1700		1800		6	none	
Manganese	190		200		5	none	
Mercury	0.099	U	0.1	U	NC	none	
Nickel	4.2		4		5	none	
Potassium	2500		2800		11	none	
Selenium	1.4		1.7		19	none	
Silver	0.69	U	0.63	U	NC	none	
Sodium	140	U	130	U	NC	none	
Thallium	1.4	U	1.3	U	NC	none	
Vanadium	12		12		0	none	
Zinc	50		50		0	none	

Date: *10/19/12*
Data Reviewer: *Susan D. Chapnick*

QC & DV Action Criteria for Davis Superfund Site Metals [based on Davis QAPP 2012 & EPA Region I DV guidance]:

Pres./HT:	HT exceedance: J detects; Non-detects: R or UJ based on professional judgment. pH >2 use professional judgment to J detects; UJ non-detects.
Blanks:	Method Blanks and instrument blanks: Metals < RL unless all sample results are > 10 blank level. Detected results < matrix-matched blank level report as "U" (non-detected at level found). Equipment Blank: EB > RL for any metals; qualify associated detected results < 5x EB level as "EB" - potential high bias based on EB contamination.
Tune:	Mass calibration (amu) > QC limit: J/UJ. Mass resolution/peak width (amu) > QC limit: J/UJ. %RSD > QC limit: J/UJ. See EPA SW-846 Method 6020A for Tune criteria. Tune not performed: R all associated data.
ICV/CCV:	Recoveries < 90%: J / UJ; recoveries > 110%: J detects; if severe exceedance <75%: R non-detects; > 160%: R detects.
CRI:	Low-level standard at the level of the RL: % recovery <70%: J / UJ; >130%: J detects.
LCS:	Aqueous: %Recoveries < 80%: J / UJ. %Recoveries > 120%: J detects. %Recoveries < 50%, may R non-detects & J detects but use professional judgment to accept results if MS is in-control indicating acceptable accuracy in sample matrix. Solids: SRM control limits are criteria; J/UJ outside these limits; use professional judgment for severe exceedances of control limits.
ICSA/AB:	Recoveries > 120% or < 80%: J / UJ unless extremely low for ICSAB at <50%: R non-detects / J detects.
MS:	%Recoveries < 75%: J / UJ. %Recoveries > 125%: J detects. %Recoveries < 30%, may R non-detects & J detects but use professional judgment if sample concentration > 2x spike level.
MD:	Groundwater/Surface Water: Results >5xRL: RPD >20%: J/UJ associated results in batch. Results < 5xRL: difference > ±RL, J/UJ associated results. Soil/Sed: Results >5xRL: RPD >35%: J/UJ associated results in batch. Results < 5xRL: difference > ±2xRL, J / UJ associated results.
FD:	Groundwater/Surface Water: Results > 5xRL: RPD > 30%: J/UJ FD results only. Results < 5xRL: difference > ±2xRL,, J/UJ FD results only. Soil/Sed: Results >5xRL: RPD > 50%: J/UJ FD results only. Results <5xRL: use professional judgment.
IS:	Recoveries < 70%: J / UJ; recoveries > 130%: J detects; use professional judgment for severe exceedances.
Serial Dil:	Results > 50xRL: % Difference > 15%: J detects. EPA guidance UJ non-detects; however, use professional judgment on whether it is a suppression or enhancement to qualify associated non-detects.

Qualifiers: U = analyte is non-detect at the sample-specific Reporting Limit (RL) (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.

References: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island;* prepared by ESS Group, Inc., March 23, 2012 (Davis QAPP); Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996, including Part IV – Inorganic Data Validation Functional Guidelines, November 2008; Region I T*iered Organic and Inorganic Data Validation Guidelines* , July 1, 1993 draft; & USEPA SW846 Methods 6010C, 6020, & 7470A/7471A.

Date: *10/19/12*
Data Reviewer: *Susan D. Chapnick*

environmental chemistry consultants

DATA VALIDATION REPORT
EPA Region I Tier II-Type for VOCs, TCL SVOCs, TCL Pesticides, TCL PCBs, & TAL Metals

Client: ESS Group, Inc., East Providence, Rhode Island

Site: Davis Liquid Waste Superfund Site, Smithfield, Rhode Island
Soil Sampling - 2012

Laboratory: TestAmerica Westfield, Westfield, Massachusetts

Lab Project/SDG #: 360-40738-1

Number of Samples: 14 soil samples + 1 Trip Blank for project-specific list of 52 Volatile Organic Compounds (VOCs)
11 soil samples for Target Compound List (TCL) Semivolatile Organic Compounds (SVOCs), TCL Pesticides, TCL Polychlorinated Biphenyls (PCBs), Target Analyte List (TAL) Metals and Percent Solids

Data Reviewers: Nancy C. Rothman, Ph.D., New Environmental Horizons, Inc.
Susan D. Chapnick, M.S., New Environmental Horizons, Inc.

Date: September 19, 2012

EPA Tier II-type Data Validation Review was performed on the data included in this SDG with the following intentions: 1) to determine if the data were generated and reported in accordance with the following documents: *Remedial Design Work Plan and Pre-Design Investigation Plan* (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996 and updates including Part II, III, and IV (Volatile/Semivolatile, Pesticide/PCB, and Inorganic Data Validation Functional Guidelines); EPA *Region I Tiered Organic and Inorganic Data Validation Guidelines*, July 1993, and USEPA SW846 Method 8260C, 8270D, 8081B, 8082A, 6010C, and 7471A 2) to determine if the data met the project data quality objectives for acceptable accuracy, precision, sensitivity; and technical usability; and 3) to update the project database with validated results and appropriate data validation qualifiers.

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The Data Validation Report consists of three parts:

- This Data Validation Report letter summarizing the actions taken;
- The spreadsheet of validated sample results with validation qualifiers based on actions taken; and
- The Data Validation Checklists to document the Tier II-type validations. These Checklists are an integral part of the validation report as they contain comprehensive details of all QC reviewed, the acceptance criteria used, professional judgment and actions taken.

I. Sample Descriptions and Analytical Parameters

The sample IDs, date of sampling, matrix, and sample type (e.g. Field Sample, Field Duplicate, etc., as applicable) and the analytical parameters reviewed are listed below in Table 1.

Table 1. Sample Descriptions and Analytical Parameters

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-FS-PC-22-1.0-1.5	5/23/12	Soil	VOCs	Field Sample
SB-FS-PC-22-13.5-14.0	5/23/12	Soil	VOCs	Field Sample
SB-FS-PC-22-16.0-18.0	5/23/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-22-16.0-16.5	5/23/12	Soil	VOCs	Field Sample
SB-FS-PC-22-27.0-29.0	5/23/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-22-28.5-29.0	5/23/12	Soil	VOCs	Field Sample
SB-FS-TB-PC-17-0.5-1.0	5/23/12	Soil	VOCs	Field Sample
SB-FS-TB-PC-17-3.0-5.0	5/23/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-TB-PC-17-3.0-3.5	5/23/12	Soil	VOCs	Field Sample
SB-FS-TB-PC-17-0.5-2.0	5/23/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-TB-PC-10-0.5-2.0	5/23/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample

Table 1. Sample Descriptions and Analytical Parameters (continued)

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-FS-TB-PC-10-1.0-1.5	5/23/12	Soil	VOCs	Field Sample
SB-FS-PC-10-14.0-16.0	5/23/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-10-14.5-15.0	5/23/12	Soil	VOCs	Field Sample
SB-FS-PC-10-23.5-24.0	5/23/12	Soil	VOCs	Field Sample
SB-FS-PC-10-22.0-24.0	5/23/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-TB-PC-16-0.5-2.0	5/23/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-TB-PC-16-0.5-1.0	5/23/12	Soil	VOCs	Field Sample
SB-FS-TB-PC-16-3.0-5.0	5/23/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-TB-PC-16-4.0-4.5	5/23/12	Soil	VOCs	Field Sample
SB-FS-PC-16-14.5-18.0	5/23/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-16-16.0-16.5	5/23/12	Soil	VOCs	Field Sample
SB-FS-PC-16-23.5-26.0	5/23/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-16-25.0-25.5	5/23/12	Soil	VOCs	Field Sample
SB-FS-PC-16-20.0-20.5	5/23/12	Soil	VOCs	Field Sample
TB-051812-2	5/24/12	Water	VOCs	Trip Blank

Analytical method references:

Volatiles:	52 project-specific VOCs by USEPA SW846 Method 8260C that includes the TCL plus diethyl ether and tetrahydrofuran and minus 1,4-dioxane (not required for soils; note 1,4-dioxane was reported in the TB).
Semivolatiles:	TCL SVOCs by USEPA SW846 Method 8270D
Pesticides:	TCL Pesticides by USEPA SW846 Method 8081B
PCBs:	TCL PCB Aroclors by USEPA SW846 Method 8082A
Metals:	TAL Metals by USEPA SW846 Method 6010C (ICP-AES), which includes 22 Metals, plus Mercury by USEPA SW846 Method 7471A Cold Vapor Atomic Absorption (CVAA)

Percent Moisture / Percent Solids were performed and reported for all samples to convert results to dry-weight units.

II. Quality Control Reviewed during Data Validation

The following QC elements, as applicable to the analytical methods, were reviewed during the Tier II-type validation of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals:

- Data package completeness and reporting protocols
- Sample receipt, holding times and preservation criteria
- Blank results including Method Blanks, Equipment Blanks, & Trip blanks
- Laboratory Control Sample (LCS) recoveries / LCS Duplicate Recoveries
- Standard Reference Material (SRM) Recoveries, if applicable
- Surrogate Recoveries
- Matrix Spike (MS) / Matrix Spike Duplicate (MSD) Recoveries
- MS/MSD, LCS/LCSD, and sample/Field Duplicate (FD) Relative Percent Differences (RPDs)
- Sample result reporting (including compound lists, reporting limits, and units)
- Calibration criteria (including tune criteria, initial calibration and continuing calibration verification)
- Internal Standard (IS) Recoveries
- Retention Time windows
- Other method-specific QC if applicable and reported in Summary QC
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

III. Data Validation Report Summary

During the Tier II-type data validation review of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals, no data were rejected. Several results were estimated (J or UJ) due to QC issues. Table 2 summarizes the actions taken during this data validation review. NEH generated a validated data spreadsheet based on the electronic project database file (EDD) received from ESS for this SDG. All results were considered usable for project decisions compared to the Davis RDWP QAPP requirements with the understanding of the potential uncertainty (bias) in the qualified results presented in Table 2.

The remainder of this report documents "exceptions" to method or QAPP criteria or clarifications of data reported. QC elements not discussed below met all QAPP criteria. The full documentation of all QC elements reviewed during the Tier II-type validations are presented in the attached Data Validation Checklists. Data users should also reference the full Tier III-type data validation performed on soil samples included in SDG 360-40815-1 for additional information on general reporting issues and calculation verification from review of raw data (which is not performed in a Tier II-type validation).

Exceptions from Davis QAPP or Method QC Criteria

- All SVOC samples were re-extracted for the analysis of five compounds because the initial analysis was not compliant for these compounds. The re-extractions were performed outside of holding time. Actions to estimate (UJ) the results for 1,1'-biphenyl, 2,3,4,6-tetrachlorophenol, atrazine, benzaldehyde, and caprolactam and the potential bias are listed in Table 2.
- No blank actions were required based on method, instrument, and trip blank results.
- Exceedances of Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) recoveries or RPD were as follows:
  - VOCs – Acetone and 2-butanone showed recoveries outside of criteria. Actions taken to estimate (UJ) affected sample results due to VOC LCS/LCSD exceedances are listed in Table 2.
- Matrix Spike (MS) and Matrix Spike Duplicate (MSD) analyses for VOCs, SVOCs, Pesticides, and PCBs were performed as batch QC on samples not included in this SDG. Therefore, MS/MSD results were not reviewed as they would not affect the samples herein.
- MS and Matrix Duplicate (MD) analyses for Metals was performed on site sample SB-FS-PC-22-16.0-18.0 (360-40738-3), though MS/MD was not requested on the Chain-of-Custody in this SDG. All percent recoveries (accuracy) and relative percent differences (precision) were acceptable except for antimony. Actions taken to estimate (UJ) all antimony results for low MS recovery are listed in Table 2.
- A Field Duplicate (FD) pair was not included in this SDG.
- Various initial and continuing calibrations reported results that were outside of criteria for VOCs and SVOCs. Actions to estimate (UJ) results and the potential bias are listed in Table 2.
- For PCBs, samples SB-FS-TB-PC-10-0.5-2.0, SB-FS-TB-PC-16-0.5-2.0, SB-FS-TB-PC-16-3.0-5.0, and SB-FS-TB-PC-16-3.0-5.0 show complex mixtures in the chromatograms; however, none were matched to a specific Aroclor pattern.

Sensitivity & Reporting

- The laboratory flagged all results for VOCs and SVOCs that were less than the RL (supported by the low-level standard in the calibration curve) as "J". The "J" qualifier was maintained during validation to indicate that these results were estimated due to uncertainty in quantitation below the calibration range. Affected samples/analytes are listed in Table 2.
- Twenty-two SVOC results were qualified due to high internal standard recoveries in sample SB-FS-PC-22-16.0-18.0, as listed in Table 2.
- All non-detects for VOCs, SVOCs, and PCBs were below the Project Action Limit (PAL) given in QAPP Tables 4-1C, 4-2C and 4-4B for soils except for 1,2-dibromo-3-chloropropane and ethylene dibromide (as expected due to method limitations), hexachlorobenzene in sample SB-FS-TB-PC-17-0.5-2.0 (40738-10) and bis-2-chloroethylether and hexachlorobenzene in sample SB-FS-TB-PC-10-0.5-2.0 (40738-11).
- The laboratory reported results for all 21 target Pesticides required, except technical-chlordane was reported instead of alpha-chlordane. The technical-chlordane and toxaphene RLs were raised

by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. All RLs for Pesticides reported were less than or equal to the PALs given in QAPP Table 4-3B and therefore met sensitivity requirements with the exception of toxaphene (due to raising the RL during validation). No PAL was defined for technical-chlordane in the site QAPP. The data user will need to evaluate usability of the non-detected toxaphene results with elevated RLs for project uses.

- All non-detects for Metals were below the PALs given in QAPP Table 4-5C for soil. Therefore, sensitivity DQOs were met for Metals.
- Data users are cautioned that the detected Metals results for selenium reported from ICP-AES Method 6010C may be false positives based on professional judgment knowledge of positive interference for selenium on ICP-AES in some matrices. Since the reported selenium results were orders-of-magnitude below the PAL and since all QC criteria were met, no action was taken other than to note this issue.

Table 2. Summary of Data Validation Actions

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
All 11 Pesticide soil samples	Chlordane (technical) Toxaphene	U		Raised RL
SB-FS-PC-16-16.0-16.5 SB-FS-PC-16-20.0-20.5 SB-FS-PC-16-25.0-25.5	1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-Chloropropane	UJ	L	Low Calibration verification
SB-FS-PC-10-14.5-15.0 SB-FS-PC-10-23.5-24.0 SB-FS-PC-22-1.0-1.5 SB-FS-PC-22-13.5-14.0 SB-FS-PC-22-16.0-16.5 SB-FS-PC-22-28.5-29.0 SB-FS-TB-PC-10-1.0-1.5 SB-FS-TB-PC-16-0.5-1.0 SB-FS-TB-PC-16-4.0-4.5 SB-FS-TB-PC-17-0.5-1.0 SB-FS-TB-PC-17-3.0-3.5	2-Butanone (MEK) Acetone	UJ	L	Low LCS/LCSD recoveries
SB-FS-PC-16-16.0-16.5 SB-FS-PC-16-20.0-20.5 SB-FS-PC-16-25.0-25.5	Acetone	UJ	L	Low LCS/LCSD recoveries
SB-FS-PC-10-23.5-24.0	1,1-Dichloroethene Trichloroethene	J	I	Result uncertain below the calibration range
SB-FS-PC-16-25.0-25.5	Ethylbenzene	J	I	Result uncertain below the calibration range
SB-FS-PC-22-1.0-1.5	Tetrachloroethene	J	I	Result uncertain below the calibration range
SB-FS-PC-22-28.5-29.0	Carbon disulfide	J	I	Result uncertain below the calibration range

Table 2. Summary of Data Validation Actions - *continued*

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
All 11 SVOC soil samples	1,1'-Biphenyl 2,3,4,6-Tetrachlorophenol Atrazine Benzaldehyde Caprolactam	UJ	L	HT Exceedance
All 11 SVOC soil samples	2,4-Dinitrophenol	UJ	L	Initial Calibration outside criteria + Low Calibration verification
SB-FS-PC-2 2-16.0-18.0	3,3'-Dichlorobenzidine 4-Bromophenyl phenyl ether Anthracene Benzo[a]anthracene Benzo[a]pyrene Benzo[b]fluoranthene Benzo[g,h,i]perylene Benzo[k]fluoranthene Bis(2-ethylhexyl) phthalate Butyl benzyl phthalate Carbazole Chrysene Dibenz(a,h)anthracene Di-n-butyl phthalate Di-n-octyl phthalate Fluoranthene Hexachlorobenzene Indeno[1,2,3-cd]pyrene N-Nitrosodiphenylamine Pentachlorophenol Phenanthrene Pyrene	UJ	I	High IS recovery
All 11 SVOC soil samples	4,6-Dinitro-2-methylphenol	UJ	L	Low Calibration verification
SB-FS-PC-10-14.0-16.0	Bis(2-ethylhexyl) phthalate Di-n-octyl phthalate	J	I	Result uncertain below the calibration range
SB-FS-PC-10-22.0-24.0	Pyrene	J	I	Result uncertain below the calibration range
SB-FS-TB-PC-16-3.0-5.0	Benzo[a]anthracene Benzo[a]pyrene Benzo[b]fluoranthene Benzo[g,h,i]perylene Chrysene Indeno[1,2,3-cd]pyrene Phenanthrene	J	I	Result uncertain below the calibration range

Table 2. Summary of Data Validation Actions - *continued*

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
All 11 Metals soil samples	Antimony	UJ	L	Low MS recovery

Qualifiers: U = Analyte is non-detect at the "LIMIT2" value in the EDD, which is the sample-specific reporting limit (RL); UJ = Non-detect is estimated; J = Result is estimated; R = Result is rejected and is unusable for project decisions.

Bias: L = Low; H = High; I = Indeterminate

Acronyms used in Table 2:
HT = Holding Time
IS = Internal Standard
LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample Duplicate
MS = Matrix Spike

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Volatile Tier II-type Data Review Checklist

Lab Project: 360-40738-1

Lab: TestAmerica Westfield
Date Sampled: 5/24/12
Method of Analysis: 8260C - EI only (no SIM)

No. Samples: 14 + 1 TB
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 70-130%	LCS/LCSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	MS/MSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√		NA	NA		√		NA	
No			Estimate (UJ) 14 results			Estimate (UJ) 6 results		Accept 5 "J" results		

% solids OK? Y
Other Issues: No

Comments:

Method 8260C used for reporting of project-specific list of VOCs. TB sample results were reviewed for potential blank actions (see below); however, full data review of this field QC sample was not performed as these results are not directly used for project decisions.

Samples were received intact at TestAmerica on 5/24/12, the day after collection at 4±2°C - there were no COC issues noted by the lab. Samples were properly preserved.

Samples were all analyzed by 6/3/12 - HT met for all samples, No Action required.

Surrogates : All 3 VOC surrogates were recovered within 70-130% in all samples and QC - no Action required

LCS/LCSD: LCS 360-91470/1-A & 2-A. Lab spiked all 53 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable except: 2-butanone and acetone (LCS/LCSD rec. low).

**Action: 2-butanone and acetone estimated (UJ) with possible low bias in associated samples (SB-FS-PC-10-14.5-15.0, SB-FS-PC-10-23.5-24.0, SB-FS-PC-22-1.0-1.5, SB-FS-PC-22-13.5-14.0, SB-FS-PC-22-16.0-16.5, SB-FS-PC-22-28.5-29.0, SB-FS-TB-PC-10-1.0-1.5, SB-FS-TB-PC-16-0.5-1.0, SB-FS-TB-PC-16-4.0-4.5, SB-FS-TB-PC-17-0.5-1.0, SB-FS-TB-PC-17-3.0-3.5 [-14, -15, -1, -2, -4, -6, -12, -18, -20, -7, -9]) due to low LCS/LCSD recoveries*

Date: ***9/10/12***

Data Reviewer: ***Deborah A. Loring***

New Environmental Horizons, Inc.

Lab: TestAmerica Westfield

Lab Project: 360-40738-1

Blank Action: Blanks Reviewed: MB: MB 360-91470/3-A, MB 360-91471/3-A
TB: TB-052412-1

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91238/6	None	Y				No Blank Action required	
MB 360-91471/3-A	2-hexanone 15.5 J µg/kg	Y		77.5 µg/kg		ND in associated samples - No Blank Action required	
TB-052412-1	None	N				No Blank Action required	

LCS/LCSD: LCS 360-91471/1-A & 2-A. Lab spiked all 53 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable except: acetone (LCS/LCSD rec. low).

**Action: acetone estimated (UJ) with possible low bias in associated samples (SB-FS-PC-16-16.0-16.5, SB-FS-PC-16-20.0-20.5, SB-FS-PC-16-25.0-25.5 [-22, -24, -25]) due to low LCS/LCSD recoveries.*

MS/MSD: MS/MSD analyses were not performed with this SDG.

FD pair: There was no field duplicate pair submitted with this SDG.

Tunes: Instrument HP#1 GC/MS . 3/23/12 16:40, 6/2/2012 13:35, 6/2/12 23:31. All tune abundances were acceptable and all samples and standards were analyzed within 12 hours of BFB tune.

ICAL : HP#1 3/23/12 6-9 level ICAL for all Targets + several non-target compounds. All calibrations met QAPP criteria for Target Compounds (ICAL from 0.5, 1 or 5 up to 160 µg/L. %RSD $\leq$ 20% or r2 $\geq$ 0.99 and all RRFs $\geq$ 0.05 . Valid ICAL - No Action required.

CCAL: HP#1 6/2 /2012 14:10 %D (or %Drift) $\leq \pm$ 20% for all target compounds and RRF $\geq$ 0.05 except 1,1,2-Trichloro-1,2,2-trifluoroethane (+ 22.0%). A positive %D indicates increased sensitivity to detection of compound on day of CCAL as compared to sensitivity during ICAL. Since 1,1,2-Trichloro-1,2,2-trifluoroethane was non-detect in associated samples, no action required for enhanced sensitivity.

CCAL: HP#1 6/2 /2012 23:55 %D (or %Drift) $\leq \pm$ 20% for all target compounds and RRF $\geq$ 0.05 except 1,1,2,2-tetrachloroethane (-24.8%), and 1,2-dibromo-3-Chloropropane (-23.5%).

Date: ***9/10/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40738-1

Additional Notes:

Action: Estimate (UJ) 1,1,2,2-tetrachloroethane and 1,2-dibromo-3-chloropropane with low bias due to reduced sensitivity in the CCAL in associated samples: (SB-FS-PC-16-16.0-16.5, SB-FS-PC-16-20.0-20.5, SB-FS-PC-16-25.0-25.5 [-22, -24, -25]).

IS: All 4 IS Areas and RTs were in criteria - No Action required.

Lab reported results for m- Xylene & p-Xylene (reported as a single entry due to coelution) and o-Xylene in addition to Xylenes, total, as requested in the QAPP. All 53 project-specific VOCs were reported so with the added Xylenes, a total of 55 VOC results reported per sample. Note that bromodichloromethane, as listed in Table 4-1C, is called dichlorobromomethane in EDD and data and Dibromochloromethane, as listed in Table 4-1C, is called chlorodibromomethane in EDD and data.

5 results were reported at levels < RL and were flagged "J" by the lab. These 5 "J" results were accepted for reporting with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

All RLs were at or below the PQLs and PALs required in the QAPP Table 4-1C for all samples except 1,2-dibromo-3-chloropropane and ethylene dibromide, as expected, due to method limitations.

Narrative did not raise any issues not already addressed.

Date: ***9/10/12***

Data Reviewer: ***Deborah A. Loring***

8260C and Project Action Summary:

Preservation:	Waters - headspace present or received at > 10°C, J det / J NDs or R ND Soils/Sediment - EnCore extrusion and sample preservation unacceptable or received at > 10°C, J det / J NDs or R ND Waters - pH < 2; 14d <HT≤ 28d; J det/ J NDs; HT >28d, J det/R ND Soils/Sediment - 14d <HT< 28d; J det/ J NDs; HT >28d, J det/R ND
Surrogates:	Surr. %Rec > 130%, J det/Accept ND; 10% ≤ %Rec < 70%, J det/J NDs;
LCS	%Rec<10%, J det/ R NDs; 10% <%Rec<70, J det/ J NDs; %Rec >130, J det/Accept NDs. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. LCS must contain all targets.
Tunes:	Samples analyzed within 12-hrs and criteria met per Method 8260C. If out, use professional judgment.
ICAL:	minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs. If avg. RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
CCAL:	%D (or %Drift) > - 20% , J det/J ND; %D (or %Drift) > +20%, J det/Accept ND. If RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
Blanks:	Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for acetone, 2-butanone, and methylene chloride which are 10 x value in blank.
MS/MSD:	%Rec<10%, J det/ R NDs; 10% <%Rec<70%, J det/ J NDs; %Rec >130%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. MS/MSD must contain all targets.
FD:	Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data
IS:	20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs
QLs:	Verify RLs met RLs and PALs given in QAPP; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.
TICs:	Not required
% solids:	If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs
Narrative:	If there are any issues raised in narrative not previously addressed, take appropriate action
Reference:	*Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8260C

Date: ***9/10/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Semivolatile Tier II-type Data Review Checklist

Lab Project: 360-40738

Lab: TestAmerica Westfield
Date Sampled: 5/23/12
Method of Analysis: 8270D

No. Samples: 11
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates w: 30-130%BN 15-110% Acid s: 30-130%	LCS 40-140%BN 30-130%Acid	MS/MSD 40-140%BN 30-130%Acid w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes		√	√	NA	NA				NA	-
No	Estimate (UJ) 5 results in all samples					Estimate (UJ) 2 results in all samples	Estimate (UJ) 22 results in sample SB-FS-PC-22-16.0-18.0	Accept 10 "J" results		

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 5/24/12, the day after collection at 4±2°C - there were no COC issues noted by the lab.

All samples were all initially extracted on 6/5/12 and re-extracted on 06/11/12 for analysis of five compounds. Holding times for re-extractions were exceeded by 5 days (SB-FS-PC-22-16.0-18.0, SB-FS-PC-22-27.0-29.0, SB-FS-TB-PC-10-0.5-2.0, SB-FS-TB-PC-17-0.5-2.0, SB-FS-TB-PC-17-3.0-5.0, SB-FS-PC-10-14.0-16.0, SB-FS-PC-10-22.0-24.0, SB-FS-PC-16-14.5-18.0, SB-FS-PC-16-23.5-26.0, SB-FS-TB-PC-16-0.5-2.0, SB-FS-TB-PC-16-3.0-5.0 [-3, -5, -11, -10, -8, -13, -16, -21, -23, -17, 19]). Samples were analyzed by 6/26/12.

**ACTION: Estimate (J, UJ) affected sample results (1,1'-Biphenyl, 2,3,4,6-Tetrachlorophenol, Atrazine, Benzaldehyde, Caprolactam) for samples SB-FS-PC-22-16.0-18.0, SB-FS-PC-22-27.0-29.0, SB-FS-TB-PC-10-0.5-2.0, SB-FS-TB-PC-17-0.5-2.0, SB-FS-TB-PC-17-3.0-5.0, SB-FS-PC-10-14.0-16.0, SB-FS-PC-10-22.0-24.0, SB-FS-PC-16-14.5-18.0, SB-FS-PC-16-23.5-26.0, SB-FS-TB-PC-16-0.5-2.0, SB-FS-TB-PC-16-3.0-5.0 (-3, -5, -11, -10, -8, -13, -16, -21, -23, -17, 19) due to holding time exceedance.*

Surrogates : All 3BN and 3 Acid Surrogates were recovered within QAPP Criteria in all field and QC samples. No action required.

Date: ***9/11/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40738

Blank Action:

Blanks Reviewed: MB: MB 360-91565/1-A, MB 360-91783/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91565/1-A	di-n-Butylphthalate 130 J µg/kg	Y		1300 µg/kg		All associated samples were ND - No Action required	
MB 360-91783/1-A	None					No Blank Action Required	

LCS/LCSD : LCS 360-91565/2-A & 3-A. Lab spiked all 67 target analytes requested in LCS. All spiked target compounds reported acceptable %Rec and LCS/LCSD RPD. No action required.

LCS/LCSD: LCS 360-91783/2-A & 3-A. Associated samples were only evaluated for five compounds (1,1'-Biphenyl, 2,3,4,6-Tetrachlorophenol, Atrazine, Benzaldehyde, Caprolactam) . All of those compounds reported acceptable %Rec and LCS/LCSD RPD. No action required.

MS/MSD: MS/MSD analyses were not performed in this SDG.

FD pair: An FD was not submitted with this SDG.

Tunes: Instrument B 5/23/12 10:50 (ICAL), 06/06/2012 09:12, 6/11/2012. 06/11/2012 21:23, 06/25/2012 09:15, 16:05 All abundances were acceptable and all samples were analyzed within 12 hours of tune - Samples SB-FS-PC-10-22.0-24.0, SB-FS-TB-PC-16-0.5-2.0, SB-FS-TB-PC-16-3.0-5.0, SB-FS-PC-16-14.5-18.0, SB-FS-PC-16-23.5-26.0 (-16, -17, -19, -21, -23) run on 6/6/12 after the expiration of the 12 hour DFTPP tune (by approximately 1/2 - 3 hours). Professional judgment was used to accept this data without qualification. Note analyses performed on 6/11/12 were not used (reruns for samples out of DFTPP window with low surrogate recoveries & rerun of sample with IS issues, initial runs were used).

ICAL: 5/23/12 Inst. B, 8- to 10- level ICAL performed from 0.2 to 25 µg/mL (for full 10-level) for all Targets + several non-target compounds. Form VI flagged several results as not meeting minimum RRF criteria; however, lab used CLP criteria and not QAPP criteria. %RSD $\leq$ 20% or r2 $\geq$ 0.99 for all and all RRFs $\geq$ 0.05 except 2,4-dinitrophenol RRF < 0.05

***ACTION: Estimate (UJ) 2,4-Dinitrophenol in all samples.*

Date: ***9/11/12***

Data Reviewer: ***Deborah A. Loring***

Additional Notes:

CCALs: Inst. B 06/06/2012 09:43 %D or %Drift ≤ ± 20% and RRF ≥ 0.05 for all target compounds except: 4,6-dinitro-2-methylphenol and 2,4-dinitrophenol RRF < 0.05.

***ACTION: Estimate (UJ) 4,6-dinitro-2-methylphenol and 2,4-dinitrophenol in all samples.*

ICAL: 6/25/12 Inst. B, 8- to 10- level ICAL performed from 0.2 to 25 µg/mL (for full 10-level) for all Targets + several non-target compounds. Results reviewed for 5 compounds which were quantified using this curve: 1,1'-Biphenyl, 2,3,4,6-Tetrachlorophenol, Atrazine, Benzaldehyde, Caprolactam. Form VI flagged several results as not meeting minimum RRF criteria; however, lab used CLP criteria and not QAPP criteria. %RSD ≤ 20% or r2 ≥ 0.99 for all 5 compounds. No action required.

CCALs: Inst. B 06/25/2012 16:36 %D or %Drift ≤ ± 20% and RRF ≥ 0.05 for 5 target compounds. No action required.

IS: All 6 IS Areas and RTs were in criteria for all analyses except IS high for Phenanthrene-d10, Chrysene-d12 and Perylene-d12 in sample SB-FS-PC-22-16.0-18.0.

**ACTION: Estimate (UJ) 22 compounds quantified using perylene-d12 with indeterminate bias in sample SB-FS-PC-22-16.0-18.0.*

Lab reported results for all 67 target SVOCs required. The lab reported 3&4-methylphenol rather than 4-methylphenol as the two co-elute. All RLs reported were less than or equal to the PQLs given in QAPP Table 4-2C except di-n-butylphthalate and bis-2-ethylhexylphthalate in all samples and the following additional analytes in samples that were run at 2-fold dilutions: SB-FS-TB-PC-17-3.0-5.0 (40738-8 2-fold dilution)SB-FS-PC-10-14.0-16.0 (40738-13 2-fold dilution), SB-FS-TB-PC-16-0.5-2.0 (40738-17 2-fold dilution) - 2-nitroaniline, 3-nitroaniline, 4,6-dinitro-2-methylphenol, 4-nitroaniline, 4-nitrophenol, bis-2-ethylhexylphthalate and hexachlorobenzene. The majority of analytes in the following samples that were run at 5- & 1-0 fold dilutions exceeded PQLs: SB-FS-TB-PC-17-0.5-2.0 (40738-10 5-fold dilution), SB-FS-TB-PC-10-0.5-2.0 (40738-11 10-fold dilution). Undiluted extracts were not analyzed for these samples.

10 results were reported at levels < RL and were flagged "J" by the lab. These 10 "J" results were accepted for reporting with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

All non-detects were reported at levels below the PALs given in Table 4-2C for all samples except for Hexachlorobenzene in sample SB-FS-TB-PC-17-0.5-2.0 (40738-10) and bis-2-chloroethylether and hexachlorobenzene in sample SB-FS-TB-PC-10-0.5-2.0 (40738-11).

Narrative did not raise any issues not already addressed.

Date: ***9/11/12***

Data Reviewer: ***Deborah A. Loring***

8270D and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: waters: BN 30 - 130%, acids 15-110%; solids: all surrogates 30-130%
2 BN or 2 Acids Recovery > Criteria, J det/Accept ND; 10% ≤ 2 or more surrogates < Criteria, J det/J NDs;
Recovery < 10%, J det/R NDs. Action taken on Acid and/or BN analytes based on Surrogates out.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs.

Tunes: Samples analyzed within 12-hrs and criteria met per Table 3 or Method 8270C. If out, use professional judgment.

ICAL: minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs; min. RRF < 0.05, J det/UJ NDs.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank

Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for phthalates which are 10 x value in blank.

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs- Unspiked Sample only. RPD > Limit, J det/UJ NDs.
MS/MSD must contain all targets.

FD: Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data

IS: 20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs

QLs: Verify RLs met QAPP QLs ; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

TICs: Not required

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8270D

Date: ***9/11/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
PCB Tier II-type Data Review Checklist

Lab Project # 360-40738

Lab: TestAmerica Westfield
Date Sampled: 5/23/12
Method of Analysis: 8082A

No. Samples: 11
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 40-140% RPD ≤ 30%	FD w:RPD≤30% s:RPD≤50%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)	Other (pattern match, etc.)
Yes	√	√	√	NA	NA	√	√	√	----
No									

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 5/24/12, the day after collection at 4±2°C - there were no COC issues noted by the lab.

Samples were extracted on 6/4/12 - HT met for extraction. All extracts were analyzed by 6/5/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - No Action required. Note, lab used in-house criteria for recovery of surrogates;, QAPP criteria used to determine data acceptance.

LCS/LCSD: LCS/LCSD 360-91509/2-A & 3-A. Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec for AR1016 & AR1260 in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD: MS/MSD analyses were not performed in this SDG.

Date: ***9/11/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40738

Blank Action: Blanks Reviewed: MB: MB 360-91509/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91509/1-A	None					No Blank Action required	

Additional Notes:

FD pair: An FD was not submitted with this SDG.

ICAL: Instrument M 4/13/12 6-level calibration from 50 to 2000 µg/L for Ar 1016/1260 and a single point calibration at 1000 µg/L for Ar-1221/1254, Ar-1232, Ar-1242, Ar-1248, Ar-1262, Ar-1268. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), linear regression performed for Ar-1016 & 1260 on both columns, and r2 > 0.99. Valid ICAL - no action required.

CCALs : CCV 360-91544/1 on 06/05/2012 14:34 (Opening CCV): All %D ≤ ± 20% on both GC columns for all Aroclor peaks except Column 1 - 1 Ar-1016-3 (-31.9%), Ar-1016-4 (-24.5%), Ar-1016-5 (-22.3%) Average OK Ar-1260-1 (-23.3%), Ar-1260-4 (-22.8%), Ar-1260-5 (-25.2%), (Average = -20.54%); Column 2 - Ar-1260-5 (+20.3) Average OK. No action required as Column 2 was within limits for both Aroclors and no Aroclors were detected in the sample. CCV 360-91544/22 on 06/05/2012 22:52: All %D < ± 20% on both GC columns for all Aroclor peaks except Column 1 Ar-1016-3 (+54.8%), Average OK, Col 2 OK. No action required.

Lab reported the lowest of the two column values. Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. %D Checked for positively detected Aroclors and was acceptable.

All RLs reported were less than or equal to the PQLs given in QAPP Table 4-C, except for all Aroclors in samples SB-FS-PC-10-22.0-24.0, SB-FS-PC-16-14.5-18.0, SB-FS-PC-16-23.5-26.0, SB-FS-PC-22-16.0-18.0, SB-FS-PC-22-27.0-29.0, SB-FS-TB-PC-16-0.5-2.0, and SB-FS-TB-PC-17-3.0-5.0 (RLs ranged from 110-120 µg/kg vs. 100 µg/kg, due to % solids).

All RLs reported were less than or equal to the PALs given in QAPP Table 4-C.

Date: ***9/11/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40738

Additional Notes:

All chromatograms for all samples visually inspected and appear to have been reported correctly. Samples SB-FS-TB-PC-10-0.5-2.0, SB-FS-TB-PC-16-0.5-2.0, SB-FS-TB-PC-16-3.0-5.0 and SB-FS-TB-PC-16-3.0-5.0 show complex mixtures, however, none were matched to a specific Aroclor pattern.

Narrative did not raise any issues not already addressed.

Date: ***9/11/12***
Data Reviewer: ***Deborah A. Loring***

8082A and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs- Unspiked Sample only. RPD > 30% solids, J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multi-components), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multi-components) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8082A

Date: ***9/11/12***
Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Pesticide Tier II-type Data Review Checklist

Lab Project # 360-40738

Lab: TestAmerica Westfield
Date Sampled: 5/23/12
Method of Analysis: 8081B

No. Samples: 11
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 30-150% w: RPD≤20% sr:RPD≤30%	FD w:RPD≤30% s:RPD≤50%	RCM (Resolve. > 60%)	PEMs Brkdwn< 15% %D ≤ ± 15%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)
Yes	√	√	√	NA	NA	√	√	√	√	√
No										

% solids OK? Y
Other Issues: No Technical chlordane was reported instead of alpha-chlordane. Low-level initial calibration for Toxaphene and Technical chlordane did not support the lab-reported RL - action taken to raise RL for Toxaphene and Technical chlordane (see page 2).

Comments:

Samples were received intact at TestAmerica on 5/24/12, the day after collection at 4±2°C - there were no COC issues noted by the lab.

Samples were extracted on 6/4/12 and analyzed by 6/7/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - No Action required. Note, lab used in-house criteria for recovery of surrogates; QAPP criteria used to determine data acceptance.

LCS/LCSD: LCS 360-91509/4-A & 5-A. Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD : MS/MSD analyses were not performed in this SDG.

FD pair: An FD was not submitted with this SDG.

Resolution Check : RCM not analyzed per se; however, CCALs reviewed and all peaks appear to be adequately resolved - No Action required

Date: ***9/11/12***
Data Reviewer: ***Deborah A. Loring***

Lab Project # 360-40738

Lab: TestAmerica Westfield

Blank Action: Blanks Reviewed: MB: MB 360-91509/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91509/1-A	None					No Blank Action required	

Additional Notes:

PEM DDT and Endrin Breakdown evaluations: PEMs PEM 360-91545/1 06/05/2012 14:38, PEM 360-91653/16 06/07/2012 20:56, and PEM 360-91653/28 06/08/2012 01:11 - %Breakdown for DDT and Endrin ≤ 15% + Combined Breakdown was ≤ 30% on each GC Column. No Action required.

ICAL: Instrument H 5/14/12 7-level from 1 to 100 µg/L for single-component Pesticides (some extras not required for project) + surrogates and 3-level from 500 to 2,500 µg/L for Toxaphene and Technical Chlordane. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), %RSD ≤ 20% or r2 ≥ 0.99 for all compounds. Several compounds used regression analysis for calibration on Columns 1 & 2. Valid ICAL - no action required.

CCALs : CCVRT 360-91545/2 on 06/05/2012 14:59 (Opening CCV for single-components), CCVRT 360-91545/3 on 06/05/2012 15:20 (Technical Chlordane), and CCVRT 360-91545/4 on 06/05/2012 15:42 (Toxaphene) - all %D ≤ ±20% on both GC columns for all Pesticides except DDT (+22.5%) on GC Column 1 and Technical Chlordane (+23.6%) on GC Column 2. CCV 360-91545/25 on 06/06/2012 07:31 (Closing CCV) - all %D ≤ ±20% on both GC columns for all Pesticides except beta-BHC (+33.3%), Endrin (60.2%) and Methoxychlor (+73.2%) on GC Column 1 and Endosulfan II (+29.5%) on GC Column 2. A positive %D indicates increased sensitivity to detection during CCAL as compared to sensitivity during ICAL; therefore, since all samples were non-detect for these compounds, no action for enhanced sensitivity in CCVs (i.e. non-detects accurate as reported).

ICAL: Instrument H 6/7/12 7-level from 1 to 100 µg/L for single-component Pesticides (some extras not required for project) + surrogates and 3-level from 500 to 2,500 µg/L for Toxaphene and Technical Chlordane. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), %RSD ≤ 20% or r2 ≥ 0.99 for all compounds. Several compounds used regression analysis for calibration on Columns 1 & 2. Valid ICAL - no action required.

CCALs : CCVRT 360-91653/17 on 06/07/2012 21:17 (Opening CCV for single-components), CCV 360-91653/18 on 06/07/2012 21:38 (Technical Chlordane), and CCV 360-91653/19 on 06/07/2012 22:00 (Toxaphene) - all %D ≤ ±20% on both GC columns for all Pesticides except Endrin aldehyde (+23.6%) on GC Column 2. CCV 360-91653/29 on 06/06/2012 07:31 CCV 360-91653/30 on 06/08/2012 01:54 (Technical Chlordane) and CCV 360-91653/31 on 06/08/2012 02:15 (Toxaphene) - all %D ≤ ±20% on both GC columns for all Pesticides. A positive %D indicates increased sensitivity to detection during CCAL as compared to sensitivity during ICAL; therefore, since all samples were non-detect for these compounds, no action for enhanced sensitivity in CCVs (i.e. non-detects accurate as reported).

Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. %D calculated in review, all within limits; no action required.

Lab: TestAmerica Westfield

Date: ***9/11/12***
Data Reviewer: ***Deborah A. Loring***

Additional Notes:

The narrative did not raise any issues not already addressed.

All RLs reported were less than or equal to the PQLs given in QAPP Table 4-3B except dieldrin, aldrin in samples SB-FS-PC-10-22.0-24.0, SB-FS-PC-16-14.5-18.0, SB-FS-PC-16-23.5-26.0, SB-FS-PC-22-16.0-18.0, SB-FS-PC-22-27.0-29.0, SB-FS-TB-PC-16-0.5-2.0, SB-FS-TB-PC-17-3.0-5.0 and toxaphene in all samples. No PQL was defined for Technical chlordane in the QAPP.

Lab reported results for all 21 target Pesticides required, except technical chlordane was reported instead of alpha-chlordane. The technical chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. The resulting RL was slightly above the PAL for Toxaphene in all samples. All other RLs reported were less than or equal to the PALs given in QAPP Table 4-3B. No PAL was defined for Technical chlordane in the site QAPP.

Date: ***9/11/12***
Data Reviewer: ***Deborah A. Loring***

8081B and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

RCM: RCM < 60% resolution, J detects based on technical judgment

PEM: 4,4'-DDT breakdown > 15%, J detected DDT, DDE, DDD; R ND 4,4'-DDT and accept ND DDE & DDD
Endrin breakdown > 15%, J detected Endrin, Endrin Aldehyde & Endrin Ketone; R ND Endrin and accept ND Endrin Aldehyde & Endrin Ketone
4,4'-DDT and Endrin > 30%, accept NDs of breakdown products and J detects for 4,4'-DDT and Endrin; J detects of breakdown products and reject (R) non-detects for 4,4'-DDT and Endrin.
%D> ± 20%, J det/J ND on a per column basis. % Resolution < 90.0% qualify data based on professional judgment.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<30%, J det/ J NDs; %Rec >150%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters (or 30% solids), J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multicomponents), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multicomponents) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8081B

Date: ***9/11/12***
Data Reviewer: ***Deborah A. Loring***

RDWP - Davis Liquid Waste Superfund Site
EPA Region I Tier II-type DV Checklist - Metals

Lab: TestAmerica-Westfield, Westfield, MA
Date Sampled: 5/23/12
Analysis: Metals by EPA SW-846 Method 6010C & 7471A

Lab Project # 360-40738-1
No. Samples: 11
Matrix: Soil

QC Met Criteria?		HT and Preserve	RL QAPP PALs	Tune 6020 criteria	Calibration ICV/CCV 90-110%R	CRI RL Check 70-130%R	EB MB < RL	LCS/LCSD SRM limits RPD ≤ 30%	ICSA/AB 80-120% R	MS / MSD 75-125% R	MD RPD ≤ 20%	FD RPD ≤ 30%	IS 6020 70-130% R	Serial Dilution ± 15% D
Yes		√	√	NA	√	√	√	√	√		√	NA	NA	√
No										Estimate (UJ) 11 antimony results				

Soils for Target Analyte List (TAL) of 23 Metals: Mercury by CVAA SW846 Method 7471A; and Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, & Zinc by ICP-AES Method 6010C.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data for Tier II level in accordance with the Davis QAPP (ESS 2012) & EPA Region 1 present in the data package? ***Yes.***

2. Were all result forms for all samples listed on the chain-of-custody present in data package? ***Yes***.

Chain-of-Custody (COC): 11 soil samples received for Total TAL Metals - received at lab on 5/24/12 (1 day after sample collection) and intact. Documentation acceptable.

Preservation: Samples received at 2.4°C on ice. Acceptable preservation for soils.

Holding Time (HT): ICP-AES 6010C analysis 5/31/12; CVAA 7471A analysis 6/05/12. Acceptable HT.

Calibration Criteria: ICV/CCV and CRI (RL check standard supporting the level of the RL reported) met acceptance criteria for all Metals. Note CRI not required by Davis QAPP but reviewed as additional support of the lab RLs (criteria set at 70-130%). Tune criteria not applicable for Method 6010C. ICSA/AB met recovery criteria for all ICP metals.

Date: *9/18/12*
Data Reviewer: *Susan D. Chapnick*

New Environmental Horizons, Inc.

Lab: TestAmerica Lab Project #: 360-40738-1

Blanks: No EB included with samples in this SDG. Method blank (MB) & instrument blanks (ICB/CCB) were non-detected for all metals except for Barium in one CCB detected at 17.9 µg/L. This calculates to: 17.9 x 100mL/2g x 1/1000 = 0.9 mg/Kg soil-equivalent value. Blank action level = 5x blank level = ~ 4.5 mg/Kg. No action required for Barium since all soil sample results were > 5x the blank level. Lab qualified 3 Barium results "^" for detection in an associated CCB; however, since no action was required, these flags were removed during validation in the EDD for the final qualification of data.

LCS/LCSD: Lab performed both LCS and LCS duplicate (LCSD), though LCSD not required in Davis QAPP. LCS/LCSD met acceptance criteria for all Metals for accuracy (based on soil SRM control limits listed by lab on Form 7, consistent with QAPP criteria for this media) and precision (RPD <30% lab criteria).

MS/MD: Performed on site sample SB-FS-PC-22-16.0-18.0 (360-40738-3) though not requested on COC. All recoveries and RPDs acceptable except as follows. Antimony low MS recovery at 47%. Post-digest spikes showed acceptable recoveries for all Metals indicating that there was a matrix effect in the field sample for low MS for antimony (not caused during instrument analysis). Aluminum and Iron high MS recoveries but spikes swamped out (sample concentrations > 4x spike level); therefore, no action required.

**ACTION: Estimate (UJ) antimony results in all 11 samples due to low MS recovery; potential low bias.*

Serial Dilution: Performed on site sample SB-FS-PC-22-16.0-18.0 (360-40738-3) - all % difference results were acceptable.

IS: IS not applicable for Method 6010C.

Sensitivity: All RLs for non-detects met Davis QAPP Table 4-5C for Soil requirements for sensitivity (RL) based on being lower than the PALs (even though some, for example antimony, were > PQLs they were still lower than the PALs). Therefore, sensitivity met project DQOs.

Professional Judgment - Other: Data users are cautioned that the detected Metals results for selenium reported from ICP-AES Method 6010C (ranging from 0.71 mg/Kg to 2.5 mg/Kg) may be false positives based on professional judgment knowledge of positive interference for selenium on ICP-AES in some matrices. Since the reported selenium results were orders-of-magnitude below the PAL and since all QC criteria were met, no action was taken other than to note this issue.

Date: *9/18/12*
Data Reviewer: *Susan D. Chapnick*

Lab: TestAmerica Lab Project #: 360-40738-1

FD pair samples: No FD was collected with this set of samples.

FD Precision:

Analyte	Sample	Qual	FD	Qual	Precision RPD* %	Action	Comment
Aluminum					#DIV/0!	none	
Antimony					#DIV/0!	none	
Arsenic					#DIV/0!	none	
Barium					#DIV/0!	none	
Beryllium					#DIV/0!	none	
Cadmium					#DIV/0!	none	
Calcium					#DIV/0!	none	
Chromium					#DIV/0!	none	
Cobalt					#DIV/0!	none	
Copper					#DIV/0!	none	
Iron					#DIV/0!	none	
Lead					#DIV/0!	none	
Magnesium					#DIV/0!	none	
Manganese					#DIV/0!	none	
Mercury					#DIV/0!	none	
Nickel					#DIV/0!	none	
Potassium					#DIV/0!	none	
Selenium					#DIV/0!	none	
Silver					#DIV/0!	none	
Sodium					#DIV/0!	none	
Thallium					#DIV/0!	none	
Vanadium					#DIV/0!	none	
Zinc					#DIV/0!	none	

Laboratory Narrative: No further issues noted.

Date: *9/18/12*
Data Reviewer: *Susan D. Chapnick*

QC & DV Action Criteria for Davis Superfund Site Metals [based on Davis QAPP 2012 & EPA Region I DV guidance]:

Pres./HT:	HT exceedance: J detects; Non-detects: R or UJ based on professional judgment. pH >2 use professional judgment to J detects; UJ non-detects.
Blanks:	Method Blanks and instrument blanks: Metals < RL unless all sample results are > 10 blank level. Detected results < matrix-matched blank level report as "U" (non-detected at level found). Equipment Blank: EB > RL for any metals; qualify associated detected results < 5x EB level as "EB" - potential high bias based on EB contamination.
Tune:	Mass calibration (amu) > QC limit: J/UJ. Mass resolution/peak width (amu) > QC limit: J/UJ. %RSD > QC limit: J/UJ. See EPA SW-846 Method 6020A for Tune criteria. Tune not performed: R all associated data.
ICV/CCV:	Recoveries < 90%: J / UJ; recoveries > 110%: J detects; if severe exceedance <75%: R non-detects; > 160%: R detects.
CRI:	Low-level standard at the level of the RL: % recovery <70%: J / UJ; >130%: J detects.
LCS:	Aqueous: %Recoveries < 80%: J / UJ. %Recoveries > 120%: J detects. %Recoveries < 50%, may R non-detects & J detects but use professional judgment to accept results if MS is in-control indicating acceptable accuracy in sample matrix. Solids: SRM control limits are criteria; J/UJ outside these limits; use professional judgment for severe exceedances of control limits.
ICSA/AB:	Recoveries > 120% or < 80%: J / UJ unless extremely low for ICSAB at <50%: R non-detects / J detects.
MS:	%Recoveries < 75%: J / UJ. %Recoveries > 125%: J detects. %Recoveries < 30%, may R non-detects & J detects but use professional judgment if sample concentration > 2x spike level.
MD:	Groundwater/Surface Water: Results >5xRL: RPD >20%: J/UJ associated results in batch. Results < 5xRL: difference > ±RL, J/UJ associated results. Soil/Sed: Results >5xRL: RPD >35%: J/UJ associated results in batch. Results < 5xRL: difference > ±2xRL, J / UJ associated results.
FD:	Groundwater/Surface Water: Results > 5xRL: RPD > 30%: J/UJ FD results only. Results < 5xRL: difference > ±2xRL,, J/UJ FD results only. Soil/Sed: Results >5xRL: RPD > 50%: J/UJ FD results only. Results <5xRL: use professional judgment.
IS:	Recoveries < 70%: J / UJ; recoveries > 130%: J detects; use professional judgment for severe exceedances.
Serial Dil:	Results > 50xRL: % Difference > 15%: J detects. EPA guidance UJ non-detects; however, use professional judgment on whether it is a suppression or enhancement to qualify associated non-detects.

Qualifiers: U = analyte is non-detect at the sample-specific Reporting Limit (RL) (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.

References: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island;* prepared by ESS Group, Inc., March 23, 2012 (Davis QAPP); Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996, including Part IV – Inorganic Data Validation Functional Guidelines, November 2008; Region I T*iered Organic and Inorganic Data Validation Guidelines* , July 1, 1993 draft; & USEPA SW846 Methods 6010C, 6020, & 7470A/7471A.

Date: *9/18/12*
Data Reviewer: *Susan D. Chapnick*

environmental chemistry consultants

DATA VALIDATION REPORT
EPA Region I Tier II-Type for VOCs, TCL SVOCs, TCL Pesticides, TCL PCBs, & TAL Metals

Client: ESS Group, Inc., East Providence, Rhode Island

Site: Davis Liquid Waste Superfund Site, Smithfield, Rhode Island
Soil Sampling - 2012

Laboratory: TestAmerica Westfield, Westfield, Massachusetts

Lab Project/SDG #: 360-40787-1

Number of Samples: 13 soil samples + 1 Trip Blank for project-specific list of 52 Volatile Organic Compounds (VOCs)
6 soil samples for Target Compound List (TCL) Semivolatile Organic Compounds (SVOCs), TCL Pesticides, TCL Polychlorinated Biphenyls (PCBs), Target Analyte List (TAL) Metals and Percent Solids

Data Reviewers: Nancy C. Rothman, Ph.D., New Environmental Horizons, Inc.
Susan D. Chapnick, M.S., New Environmental Horizons, Inc.

Date: October 25, 2012

EPA Tier II-type Data Validation Review was performed on the data included in this SDG with the following intentions: 1) to determine if the data were generated and reported in accordance with the following documents: *Remedial Design Work Plan and Pre-Design Investigation Plan* (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996 and updates including Part II, III, and IV (Volatile/Semivolatile, Pesticide/PCB, and Inorganic Data Validation Functional Guidelines); EPA *Region I Tiered Organic and Inorganic Data Validation Guidelines*, July 1993, and USEPA SW846 Method 8260C, 8270D, 8081B, 8082A, 6010C, and 7471A 2) to determine if the data met the project data quality objectives for acceptable accuracy, precision, sensitivity; and technical usability; and 3) to update the project database with validated results and appropriate data validation qualifiers.

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The Data Validation Report consists of three parts:

- This Data Validation Report letter summarizing the actions taken;
- The spreadsheet of validated sample results with validation qualifiers based on actions taken; and
- The Data Validation Checklists to document the Tier II-type validations. These Checklists are an integral part of the validation report as they contain comprehensive details of all QC reviewed, the acceptance criteria used, professional judgment and actions taken.

I. Sample Descriptions and Analytical Parameters

The sample IDs, date of sampling, matrix, and sample type (e.g. Field Sample, Field Duplicate, etc., as applicable) and the analytical parameters reviewed are listed below in Table 1.

Table 1. Sample Descriptions and Analytical Parameters

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-FS-TB-PC-23-0.5-2.0	5/24/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-PC-23-24.0-24.5	5/24/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-TB-PC-25-0.5-2.0	5/24/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-TB-PC-25-1.5-2.0	5/24/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-25-11.5-12.0	5/24/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-25-12.5-13.0	5/24/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-25-11.0-13.0	5/24/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-PC-25-27.0-27.5	5/24/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-25-34.0-36.0	5/24/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-PC-25-35.0-35.5	5/24/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-TB-PC-23-0.5-1.0	5/24/12	Soil	VOCs & Percent Solids	Field Sample

Table 1. Sample Descriptions and Analytical Parameters (continued)

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-FS-TB-PC-12-1.5-2.0	5/24/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-23-13.0-13.5	5/24/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-23-18.0-18.5	5/24/12	Soil	VOCs & Percent Solids	Field Sample [used for VOC MS/MSD]
SB-FS-PC-23-14.0-16.0	5/24/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-PC-23-14.0-14.5	5/24/12	Soil	VOCs & Percent Solids	Field Sample
SB-PCB-2	5/24/12	Soil	VOCs & Percent Solids	Field Duplicate of SB-FS-PC-23-14.0-14.5
SB-FS-PC-23-28.0-31.0	5/24/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-PC-23-29.0-29.5	5/24/12	Soil	VOCs & Percent Solids	Field Sample
TB-052512-1	5/25/12	Water	VOCs	Trip Blank

Analytical method references:

Volatiles: 52 project-specific VOCs by USEPA SW846 Method 8260C that includes the TCL plus diethyl ether and tetrahydrofuran and minus 1,4-dioxane (not required for soils; note 1,4-dioxane was reported in the TB).

Semivolatiles: TCL SVOCs by USEPA SW846 Method 8270D

Pesticides: TCL Pesticides by USEPA SW846 Method 8081B

PCBs: TCL PCB Aroclors by USEPA SW846 Method 8082A

Metals: TAL Metals by USEPA SW846 Method 6010C (ICP-AES), which includes 22 Metals, plus Mercury by USEPA SW846 Method 7471A Cold Vapor Atomic Absorption (CVAA)

Percent Moisture / Percent Solids were performed and reported for all samples to convert results to dry-weight units.

II. Quality Control Reviewed during Data Validation

The following QC elements, as applicable to the analytical methods, were reviewed during the Tier II-type validation of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals:

- Data package completeness and reporting protocols
- Sample receipt, holding times and preservation criteria
- Blank results including Method Blanks, Equipment Blanks, & Trip blanks
- Laboratory Control Sample (LCS) recoveries / LCS Duplicate Recoveries
- Standard Reference Material (SRM) Recoveries, if applicable
- Surrogate Recoveries
- Matrix Spike (MS) / Matrix Spike Duplicate (MSD) Recoveries
- MS/MSD, LCS/LCSD, and sample/Field Duplicate (FD) Relative Percent Differences (RPDs)
- Sample result reporting (including compound lists, reporting limits, and units)
- Calibration criteria (including tune criteria, initial calibration and continuing calibration verification)
- Internal Standard (IS) Recoveries
- Retention Time windows
- Other method-specific QC if applicable and reported in Summary QC
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

III. Data Validation Report Summary

During the Tier II-type data validation review of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals, no data were rejected. Several results were negated (U) or estimated (J or UJ) due to QC issues. Table 2 summarizes the actions taken during this data validation review. NEH generated a validated data spreadsheet based on the electronic project database file (EDD) received from ESS for this SDG. All results were considered usable for project decisions compared to the Davis RDWP QAPP requirements with the understanding of the potential uncertainty (bias) in the qualified results presented in Table 2.

The remainder of this report documents "exceptions" to method or QAPP criteria or clarifications of data reported. QC elements not discussed below met all QAPP criteria. The full documentation of all QC elements reviewed during the Tier II-type validations are presented in the attached Data Validation Checklists. Data users should also reference the full Tier III-type data validation performed on soil samples included in SDG 360-40815-1 for additional information on general reporting issues and calculation verification from review of raw data (which is not performed in a Tier II-type validation).

Exceptions from Davis QAPP or Method QC Criteria

- The initial SVOC analysis did not include all compounds requested. A re-extraction and re-analysis was performed outside of holding time for 5 compounds. Results for these compounds were estimated (UJ) as indicated in Table 2.
- Percent solids for VOC sample SB-FS-PC-25-11.5-12.0 was <30%. EPA Region I DV criteria indicates that for samples containing greater than or equal to 10% solids but less than or equal to 30% solids, all detects should be qualified as estimated (J) and non-detects rejected (R) as

unusable data. However, professional judgment was used to estimate (UJ) non-detect data rather than reject these data based on low % solids content. The user is cautioned that non-detects for samples with less than 30% solids may not be representative of the site location. Actions taken in sample SB-FS-PC-25-11.5-12.0 are listed in Table 2.

- The method blank for VOCs and SVOCs reported results below the Reporting Limit (RL) for methylene chloride. A comparison of the levels in the blank with the levels reported for this compound in the associated samples resulted in the following actions:
  - Methylene chloride was negated (U) in one VOC sample, as shown in Table 2, and the result raised to the sample specific RL.
- Exceedances of Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) recoveries or RPD were as follows:
  - VOCs – acetone, 2-butanone, and chloroethane showed LCS/LCSD recoveries outside of criteria. Actions taken to estimate (UJ) affected sample results due to VOC LCS/LCSD exceedances are listed in Table 2.
- Matrix Spike (MS) and MS Duplicate (MSD) analyses were performed on sample SB-FS-PC-23-18.0-18.5 for VOCs only. Exceedances of the MS/MSD recoveries or RPD are as follows:
  - 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, acetone, and 2-butanone showed recoveries and RPDs outside of criteria. Actions taken to estimate (UJ) affected sample results due to SVOC MS/MSD exceedances are listed in Table 2.
- No site sample in this SDG was identified for MS/MSD analyses for SVOCs, Pesticides, PCBs, or Metals; therefore, MS/MD analyses for these parameters were not performed.
- There was one Field Duplicate (FD) pair included in this SDG for VOCs only: SB-FS-PC-23-14.0-14.5 and SB-PCB-2. The FD results indicate acceptable overall precision and representativeness in the site soil matrix at the FD location for VOCs.
- A Field Duplicate (FD) pair was not included in this SDG for SVOCs, Pesticides, PCBs, or Metals.
- Various initial and continuing calibrations reported results that were outside of criteria for VOCs and SVOCs. Actions to estimate (UJ) results and the potential bias are listed in Table 2.
- For PCBs, samples SB-FS-TB-PC-23-0.5-2.0 and SB-FS-TB-PC-25-0.5-2.0 show complex mixtures in the chromatogram; however, none were matched to a specific Aroclor pattern.

Sensitivity & Reporting

- The laboratory flagged all results for VOCs and SVOCs that were less than the RL (supported by the low-level standard in the calibration curve) as "J". The "J" qualifier was maintained during validation to indicate that these results were estimated due to uncertainty in quantitation below the calibration range. Affected samples/analytes are listed in Table 2.
- All non-detects for VOCs, SVOCs, and PCBs were below the Project Action Limit (PAL) given in QAPP Tables 4-1C, 4-2C and 4-4B for soils except:
  - All samples: 1,2-dibromo-3-chloropropane and ethylene dibromide, as expected, due to method limitations.
  - SB-FS-PC-25-11.5-12.0: 1,1-dichloroethene, 1,1,2,2-tetrachloroethane, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,2-dichloroethane, 1,2-dichloropropane, benzene, chloroform, chlorobenzene, chlorodibromomethane, and dichlorobromomethane.
  - SB-FS-PC-25-11.0-13.0: 1,1-biphenyl, benzo[a]pyrene, bis-2-chloroethylether, chrysene, dibenz(a,h)anthracene, hexachlorobenzene, and all Aroclors except Ar-1016.
- The laboratory reported results for all 21 target Pesticides required, except technical-chlordane was reported instead of alpha-chlordane. The technical-chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. All

RLs for Pesticides were less than or equal to the PALs given in QAPP Table 4-3B and therefore met sensitivity requirements with the exception of toxaphene in all samples (due to raising the RL during validation), and aldrin in sample SB-FS-PC-25-11.0-13.0. No PAL was defined for technical-chlordane in the site QAPP. The data user will need to evaluate usability of the non-detected results with elevated RLs for project uses.

- All non-detects for Metals were below the PALs given in QAPP Table 4-5C for soil. Therefore, sensitivity DQOs were met for Metals.
- Data users are cautioned that the detected Metals results for selenium reported from ICP-AES Method 6010C may be false positives based on professional judgment knowledge of positive interference for selenium on ICP-AES in some matrices. Since the reported selenium results were orders-of-magnitude below the PAL and since all QC criteria were met, no action was taken other than to note this issue.

Table 2. Summary of Data Validation Actions

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
All Pesticide samples	Chlordane (technical) Toxaphene	U		Raised RL
SB-FS-PC-23-14.0-14.5 SB-FS-PC-23-18.0-18.5 SB-FS-PC-23-24.0-24.5 SB-FS-PC-23-29.0-29.5 SB-FS-PC-25-12.5-13.0 SB-FS-PC-25-27.0-27.5 SB-FS-PC-25-35.0-35.5 SB-FS-TB-PC-12-1.5-2.0 SB-FS-TB-PC-23-0.5-1.0 SB-FS-TB-PC-25-1.5-2.0 SB-PCB-2	1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-Chloropropane	UJ	L	Low Calibration verification
SB-FS-PC-23-13.0-13.5	1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-Chloropropane	UJ	I	Low Calibration verification + Low IS recovery
SB-FS-PC-23-13.0-13.5	1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene 1,2-Dichlorobenzene 1,4-Dichlorobenzene Bromoform	UJ	I	Low IS recovery
All samples except: SB-FS-PC-25-11.5-12.0 SB-FS-PC-23-18.0-18.5	Acetone	UJ	L	Low LCS/LCSD recoveries
SB-FS-PC-23-18.0-18.5	Acetone	UJ	L	Low LCS/LCSD recoveries + Low MS/MSD recoveries
SB-FS-PC-23-18.0-18.5	1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene 2-Butanone	UJ	L	Low MS/MSD recoveries
SB-FS-PC-25-11.5-12.0	All VOCs (Except as listed below that have additional QC issues)	J / UJ	I	Low % Solids
SB-FS-PC-25-11.5-12.0	1,2-Dibromo-3-Chloropropane	UJ	I	Low % Solids + Low Calibration verification
SB-FS-PC-25-11.5-12.0	2-Butanone (MEK) Acetone Chloroethane	UJ	I	Low % Solids + Low LCS/LCSD recoveries

Table 2. Summary of Data Validation Actions (continued)

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
SB-FS-PC-25-11.5-12.0	Methylene Chloride	UJ	I	Negated due to Blank Action + Low % Solids
SB-FS-PC-23-13.0-13.5	Carbon disulfide	J	I	Result uncertain below the calibration range
SB-FS-PC-23-18.0-18.5	1,1-Dichloroethane Vinyl chloride	J	I	Result uncertain below the calibration range
SB-FS-PC-25-12.5-13.0	2-Butanone (MEK)	J	I	Result uncertain below the calibration range
SB-FS-PC-25-35.0-35.5	cis-1,2-Dichloroethene	J	I	Result uncertain below the calibration range
SB-FS-TB-PC-12-1.5-2.0	1,2,4-Trichlorobenzene	J	I	Result uncertain below the calibration range
SB-FS-TB-PC-23-0.5-1.0	Tetrachloroethene	J	I	Result uncertain below the calibration range
SB-FS-PC-25-11.5-12.0	Tetrachloroethene trans-1,2-Dichloroethene	J	I	Result uncertain below the calibration range + Low % Solids
All SVOC samples	1,1'-Biphenyl 2,3,4,6-Tetrachlorophenol Atrazine Benzaldehyde Caprolactam	UJ	L	HT Exceedance
All SVOC samples	4,6-Dinitro-2-methylphenol	UJ	I	Initial Calibration outside criteria
All SVOC samples	2,4-Dinitrophenol	UJ	I	Low LCS recovery + Initial Calibration outside criteria
SB-FS-PC-23-28.0-31.0	Naphthalene	J	I	Result uncertain below the calibration range

Qualifiers: U = Analyte is non-detect at the "LIMIT2" value in the EDD, which is the sample-specific reporting limit (RL); UJ = Non-detect is estimated; J = Result is estimated; R = Result is rejected and is unusable for project decisions.

Bias: L = Low; H = High; I = Indeterminate

Acronyms used in Table 2:

HT = Holding Time
LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample Duplicate
MS = Matrix Spike
MSD = Matrix Spike Duplicate
RL = Reporting Limit
% = Percent

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Volatile Tier II-type Data Review Checklist

Lab Project: 360-40787-1

Lab: TestAmerica Westfield
Date Sampled: 5/24/12 - 5/25/12
Method of Analysis: 8260C - EI only (no SIM)

No. Samples: 12 + 1 TB + 1 FD
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 70-130%	LCS/LCSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	MS/MSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√			√				NA	
No			Estimate (UJ) 15 results	Estimate (UJ) 4 results in SB-FS-PC-23-18.0-18.5		Estimate (UJ) 25 results	Estimate (UJ) 7 results in 1 sample	Accept 9 "J" results		Negate 1 result - Blank Action, Estimate all results 1 sample due to % Solids

% solids OK? N SB-FS-PC-25-11.5-12.0 (40787-13) % Solids = 29%, all data estimated for this sample.
Other Issues: No

Comments:

Method 8260C used for reporting of project-specific list of VOCs. TB sample results were reviewed for potential blank actions (see below); however, full data review of this field QC sample was not performed as these results are not directly used for project decisions.

Samples were received intact at TestAmerica on 5/25/12, the day of and after collection at 4±2°C . The lab noted in the checklist that one VOC sample was received that was not listed on the COC (sample SB-FS-TB-PC-12-1.5-2.0 sampled on 5/25/12). The laboratory added this sample to the CoC. Samples were properly preserved. No action required.

Samples were all analyzed by 6/3/12 - HT met for all samples, No Action required.

Surrogates : All 3 VOC surrogates were recovered within 70-130% in all samples and QC - no Action required

LCS/LCSD:LCS 360-91356/1-A & 2-A. Lab spiked all 52 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable except: 2-butanone, acetone, chloroethane (LCS/LCSD rec. low).

***ACTION: 2-butanone, acetone, and chloroethane estimated (UJ) with possible low bias in associated soil samples due to low LCS/LCSD recoveries (SB-FS-PC-25-11.5-12.0).*

Date: ***10/18/12***

Data Reviewer: ***Deborah A. Loring***

New Environmental Horizons, Inc.

Lab: TestAmerica Westfield

Lab Project: 360-40787-1

LCS/LCSD: LCS 360-91471/1-A & 2-A. Lab spiked all 52 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable except: acetone (LCS/LCSD rec. low).

***ACTION: acetone estimated (UJ) with possible low bias in associated soil samples due to low LCS/LCSD recoveries (all samples in SDG except SB-FS-PC-25-11.5-12.0).*

Blank Action: Blanks Reviewed: MB: Water - MB 360-91437/6 Soil - MB 360-91356/3-A, MB 360-91471/3-A
TB: TB052512-1

Blank ID	Contaminant / Level	Matrix Related?	Action Level / Action	Sample and Reported Result	Corrected Result
MB 360-91437/6	None Detected	Y		No Blank Action required	
MB 360-91356/3-A	2-hexanone 3.29 J µg/kg	Y	8225 µg/kg*	Associated samples ND - No Blank Action required	
	methylene chloride 2.89 J µg/kg	Y	7225 µg/kg*	SB-FS-PC-25-11.5-12.0 2100 J	2900 U
MB 360-91471/3-A	2-hexanone 15.5 J µg/kg	Y	77.5 µg/kg	Associated samples ND - No Blank Action required	
TB-052312-1	None Detected	N		No Blank Action required	

* Medium level blank in data presented as low level (i.e. factor of 250, resulting from 100 uL methanol per 25 mL purge was not taken into account in reporting medium level blank data. This factor was built into the blank action level.

MS/MSD: MS/MSD analyses were performed on sample SB-FS-PC-23-18.0-18.5. All %Rec and RPDs were within limits except 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, acetone and 2-butanone (MS/MSD low).

***ACTION: Estimate (UJ) 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, acetone and 2-butanone in sample SB-FS-PC-23-18.0-18.5 due to low MS/MSD recoveries.*

FD pair: SB-FS-PC-23-14.0-14.5 / SB-PCB-2. A comparison of detected results shown below.

Field Duplicate Evaluation_ Sample IDs: Sample = SB-FS-PC-23-14.0-14.5 FD = SB-PCB-2

Analyte Name	DF= 1 RL (µg/Kg)	Sample µg/Kg	Q	Sample Result Level	FD µg/Kg	Q	FD Result Level	RPD	Action
1,1-Dichloroethane	2.7	3.8		< 2 X RL	3.1		< 2 X RL	20%	None

Date: ***10/18/12***

Data Reviewer: ***Deborah A. Loring***

Additional Notes:

*FD: T*hough the detected results are lower than twice the RL, thus not at a high enough concentration to be considered statistically able to demonstrate precision, they are within limits. All other VOCs were non-detect in both samples; therefore, while these results are consistent with one another, unable to quantitatively evaluate FD precision based on calculation of RPD. FD precision considered acceptable for this FD pair

Tunes: Instrument HP#1 GC/MS. 3/23/12 16:40, 05/30/12 19:59, 6/2/12 23:31 All tune abundances were acceptable and all samples and standards were analyzed within 12 hours of BFB tune.

ICAL : HP#1 3/23/12 6-9 level ICAL for all Targets + several non-target compounds. All calibrations met QAPP criteria for Target Compounds (ICAL from 0.5, 1 or 5 up to 160 µg/L. %RSD ≤ 20% or r2 ≥ 0.99 and all RRFs ≥ 0.05 . Valid ICAL - No Action required.

CCAL: HP#1 05/30/2012 20:22 %D (or %Drift) ≤ ± 20% for all target compounds and RRF ≥ 0.05 except 1,2-dibromo-3-chloropropane (%D=-21.0%).

***ACTION: Estimate (UJ) 1,2-dibromo-3-chloropropane in sample SB-FS-PC-25-11.5-12.0 with indeterminate bias due to additional QC issue (low % solids).*

CCAL: HP#1 6/2/2012 23:55 %D (or %Drift) ≤ ± 20% for all target compounds and RRF ≥ 0.05 except 1,1,2,2-tetrachloroethane (-24.8%), and 1,2-dibromo-3-chloropropane (-23.5%).

***ACTION: Estimate (UJ) 1,2-dibromo-3-chloropropane and 1,1,2,2-tetrachloroethane in all samples except SB-FS-PC-25-11.5-12.0 with low bias.*

IS: All 4 IS Areas and RTs were in criteria except 1,4-dichlorobenzene-d4 low in sample SB-FS-PC-23-13.0-13.5.

***ACTION: Estimate (UJ) the following compounds associated with the IS 1,4-dichlorobenzene-d4 in sample SB-FS-PC-23-13.0-13.5: 1,2-Dichlorobenzene, 1,2-Dibromo-3-Chloropropane, 1,2,3-Trichlorobenzene, 1,2,4-Trichlorobenzene, 1,1,2,2-Tetrachloroethane, 1,4-Dichlorobenzene, and Bromoform.*

Lab reported results for m- Xylene & p-Xylene (reported as a single entry due to coelution) and o-Xylene in addition to Xylenes, total, as requested in the QAPP. All 52 project-specific VOCs were reported so with the added Xylenes, a total of 54 VOC results reported per sample. Note that bromodichloromethane, as listed in Table 4-1C, is called dichlorobromomethane in EDD and data and Dibromochloromethane, as listed in Table 4-1C, is called chlorodibromomethane in EDD and data.

9 results were reported at levels < RL and were flagged "J" by the lab (not including 1 result negated due to blank action). These "J" results were accepted for reporting with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

Date: ***10/18/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40787-1

Additional Notes:

All RLs were at or below the PQLs and PALs required in the QAPP Table 4-1C for all samples except PQLs were exceeded in sample SB-FS-PC-25-11.5-12.0, as its results were derived from the medium level analysis; and in sample SB-FS-PC-25-12.5-13.0 due to the low percent solids. PALs were exceeded for 1,2-dibromo-3-chloropropane and ethylene dibromide in all samples as expected, due to method limitations, and the following compounds in sample SB-FS-PC-25-11.5-12.0: 1,1,2,2-Tetrachloroethane, 1,1,2-Trichloro-1,2,2-trifluoroethane, 1,1-Dichloroethene, 1,2-Dichloroethane, 1,2-Dichloropropane, Benzene, Chlorobenzene, Chlorodibromomethane, Chloroform, and Dichlorobromomethane.

Narrative did not raise any issues not already addressed.

Date: ***10/18/12***

Data Reviewer: ***Deborah A. Loring***

8260C and Project Action Summary:

Preservation:	Waters - headspace present or received at > 10°C, J det / J NDs or R ND Soils/Sediment - EnCore extrusion and sample preservation unacceptable or received at > 10°C, J det / J NDs or R ND Waters - pH < 2; 14d <HT≤ 28d; J det/ J NDs; HT >28d, J det/R ND Soils/Sediment - 14d <HT< 28d; J det/ J NDs; HT >28d, J det/R ND
Surrogates:	Surr. %Rec > 130%, J det/Accept ND; 10% ≤ %Rec < 70%, J det/J NDs;
LCS	%Rec<10%, J det/ R NDs; 10% <%Rec<70, J det/ J NDs; %Rec >130, J det/Accept NDs. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. LCS must contain all targets.
Tunes:	Samples analyzed within 12-hrs and criteria met per Method 8260C. If out, use professional judgment.
ICAL:	minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs. If avg. RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
CCAL:	%D (or %Drift) > - 20% , J det/J ND; %D (or %Drift) > +20%, J det/Accept ND. If RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
Blanks:	Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for acetone, 2-butanone, and methylene chloride which are 10 x value in blank.
MS/MSD:	%Rec<10%, J det/ R NDs; 10% <%Rec<70%, J det/ J NDs; %Rec >130%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. MS/MSD must contain all targets.
FD:	Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data
IS:	20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs
QLs:	Verify RLs met RLs and PALs given in QAPP; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.
TICs:	Not required
% solids:	If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs
Narrative:	If there are any issues raised in narrative not previously addressed, take appropriate action
Reference:	*Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8260C

Date: ***10/18/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Semivolatile Tier II-type Data Review Checklist

Lab Project: 360-40787

Lab: TestAmerica Westfield
Date Sampled: 5/24/12
Method of Analysis: 8270D

No. Samples: 6
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates w: 30-130%BN 15-110% Acid s: 30-130%	LCS 40-140%BN 30-130%Acid	MS/MSD 40-140%BN 30-130%Acid w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes		√		NA	NA		√		NA	NA
No	Estimate (UJ) 5 results in all samples		Estimate (UJ) 1 result in all samples			Estimated (UJ) 2 results in all samples		Accept 1 "J" result		

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 5/25/12, the day after collection at 4±2°C . Samples were properly preserved. No action required.

All samples were extracted on 6/6/12, however, several compounds were not included in the associated QC samples: 1,1'-Biphenyl, 2,3,4,6-Tetrachlorophenol, Atrazine, Benzaldehyde, and Caprolactam. The samples were re-extracted on 6/11/12 and analyzed by 6/25/12 for these compounds. Both sets of data were presented. Extraction holding times for these compounds were exceeded by 5 days. Analytical holding times were met.

***ACTION: Estimate (UJ) 1,1'-Biphenyl, 2,3,4,6-Tetrachlorophenol, Atrazine, Benzaldehyde, and Caprolactam results in all samples due to holding time exceedance.*

Surrogates : All 3BN and 3 Acid Surrogates were recovered within QAPP Criteria in all field and QC samples except for the re-extraction of sample SB-FS-PC-25-11.0-13.0 (4-787-15) in which terphenyl-d14 exceeded limits (135%). No target analytes were detected in this analysis, therefore no action required for increased sensitivity. No action required.

LCS/LCSD : LCS 360-91615/2-A & 3-A. Lab spiked all 67 target analytes requested in LCS. All spiked target compounds reported acceptable %Rec and LCS/LCSD RPD except 2,4-dinitrophenol LCS rec low, 3-nitroaniline, carbazole, and di-n-butylphthalate (LCS/LCD rec. high), and 4-nitroaniline (LCSD rec. high).

***ACTION: Estimate (UJ) 2,4-dinitrophenol in all samples due to low LCS recovery. Bias indeterminate since also qualified for ICAL.*

Date: ***10/22/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40787

Blank Action: Blanks Reviewed: MB: MB 360-91615/1-A, MB 360-91782/1-A, MB 360-91783/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91615/1-A	di-n-butylphthalate 184 J µg/kg	Y		1840 µg/kg		Associated samples ND - No Blank Action required	
MB 360-91783/1-A	di-n-butylphthalate 177 J µg/kg	Y		1770 µg/kg		No Blank Action required	
MB 360-91783/1-A	None Detected	Y				No Blank Action required	

LCS/LCSD : LCS 360-91782/2-A/2-A & LCS 360-91783/2-A & 3-A. Lab spiked all 5 target analytes reported from these batches. All spiked target compounds reported acceptable %Rec and LCS/LCSD RPD - no action required.

MS/MSD: MS/MSD analyses were not performed with this SDG.

FD pair: There was no FD pair submitted with this SDG.

Tunes: Instrument B 6/11/12 14:37, 21:23 6/12/12 13:45 6/18/12 14:17. All abundances were acceptable and all samples were analyzed within 12 hours of tune - No Action required

ICAL : 6/11/12 Inst. B, 8- to 10- level ICAL performed from 0.2 to 25 µg/mL (for full 10-level) for all Targets + several non-target compounds. Form VI flagged several results as not meeting minimum RRF criteria; however, lab used CLP criteria and not QAPP criteria. %RSD $\leq$ 20% or r2 $\geq$ 0.99 for all and all RRFs $\geq$ 0.05 except: 2,4-dinitrophenol % RSD = 46.0% and 4,6-dinitro-2-methylphenol %RSD = 39.0%.

**ACTION: 2,4-Dinitrophenol and 4,6-dinitro-2-methylphenol estimated (UJ) with indeterminate bias in all samples due to high RSD.*

CCALs: Inst. B 06/11/2012 21:55 %D or %Drift $\leq \pm$ 20% and RRF $\geq$ 0.05 for all target compounds except: 3-nitroaniline (+23.7%). No action required for increased sensitivity as this analyte was not detected in the associated samples. No action required for increased sensitivity as these analytes are not detected in the associated samples.

Date: ***10/22/12***

Data Reviewer: ***Deborah A. Loring***

Additional Notes:

CCALs: Inst. B 06/12/2012 14:17 %D or %Drift ≤ ± 20% and RRF ≥ 0.05 for all target compounds except: 4-chloroaniline (+23.7%), 3-nitroaniline (+63.2%), carbazole (+60.2%), indeno[1,2,3-cd]pyrene (+23.1%), dibenz(a,h)anthracene (+21.9%), and benzo[g,h,i]perylene (+23.6%). No action required for increased sensitivity as this analyte was not detected in the associated samples. No action required for increased sensitivity as these analytes are not detected in the associated samples.

CCALs: Inst. B 06/18/2012 14:48 %D or %Drift ≤ ± 20% and RRF ≥ 0.05 for all target compounds except: 3-nitroaniline (+53.4%), 2,4-dinitrophenol (-27.2%), carbazole(+44.3%), 4-Nitroaniline (+42.3%) and Carbazole (+77.5%). No action required for increased sensitivity as these analytes are not detected in the associated samples. No action required for increased sensitivity as these analytes are not detected in the associated samples. CCAL associated only with MB and LCS/LCSD so no action taken for low recovery of 2,4-dinitrophenol.

Tunes: Instrument B 6/19/12 15:43, 6/20/12 13:55. All abundances were acceptable and all samples were analyzed within 12 hours of tune - No Action required

ICAL : 6/19/12 Inst. B, 7- to 10- level ICAL performed from 0.2 to 25 µg/mL (for full 10-level) for all Targets + several non-target compounds. Form VI flagged several results as not meeting minimum RRF criteria; however, lab used CLP criteria and not QAPP criteria. %RSD ≤ 20% or r2 ≥ 0.99 for all and all RRFs ≥ 0.05. No action required.

CCALs: Inst. B 06/20/2012 14:27 %D or %Drift ≤ ± 20% and RRF ≥ 0.05 for all target compounds. No action required.

Tunes: Instrument B 6/25/12 09:15 16:05 All abundances were acceptable and all samples were analyzed within 12 hours of tune. Tune on 16:05 utilized a single scan less one background scan rather than an average of 3 scans as usual - No Action required

ICAL: 6/25/12 Inst. B, Evaluated for 5 affected compounds only: 8- to 10- level ICAL performed from 0.2 to 25 µg/mL (for full 10-level) for all Targets + several non-target compounds. Form VI flagged several results as not meeting minimum RRF criteria; however, lab used CLP criteria and not QAPP criteria. %RSD ≤ 20% or r2 ≥ 0.99 for all and all RRFs ≥ 0.05. No action required.

CCALs: Inst. B 06/25/2012 16:36 %D or %Drift ≤ ± 20% and RRF > 0.05 for all target compounds except 2,4-Dinitrophenol (-25.5%), and Pentachlorophenol (-26.4%). Note that only the 5 compounds reported from the re-extracted analyses were reported from the sample runs associated with this CCAL, therefore, no action required.

IS: All 6 IS Areas and RTs were in criteria for all analyses except Perylene-d12 was high in samples LCS/LCSDLCS 360-91782/2-A & 3-A. No action required for IS in LCS/LCSD.

Lab reported results for all 67 target SVOCs required. The lab reported 3&4-methylphenol rather than 4-methylphenol as the two co-elute.

1 result was reported at a level < RL and were flagged "J" by the lab. This result was accepted for reporting with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

Date: ***10/22/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40787

Additional Notes:

All RLs reported were less than or equal to the PQLs given in QAPP Table 4-2C except di-n-butylphthalate and bis-2-ethylhexylphthalate in all samples, and all compounds in sample SB-FS-PC-25-11.0-13.0 due to extract dilution. All non-detects were reported at levels below the PALs given in Table 4-2C for all samples except for benzo[a]pyrene, bis-2-chloroethylether, chrysene, dibenz(a,h)anthracene, hexachlorobenzene, and 1,1-biphenyl in sample SB-FS-PC-25-11.0-13.0.

Date: ***10/22/12***

Data Reviewer: ***Deborah A. Loring***

8270D and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: waters: BN 30 - 130%, acids 15-110%; solids: all surrogates 30-130%
2 BN or 2 Acids Recovery > Criteria, J det/Accept ND; 10% ≤ 2 or more surrogates < Criteria, J det/J NDs;
Recovery < 10%, J det/R NDs. Action taken on Acid and/or BN analytes based on Surrogates out.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs.

Tunes: Samples analyzed within 12-hrs and criteria met per Table 3 or Method 8270C. If out, use professional judgment.

ICAL: minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs; min. RRF < 0.05, J det/UJ NDs.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank

Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for phthalates which are 10 x value in blank.

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs- Unspiked Sample only. RPD > Limit, J det/UJ NDs.
MS/MSD must contain all targets.

FD: Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data

IS: 20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs

QLs: Verify RLs met QAPP QLs ; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

TICs: Not required

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8270D

Date: ***10/22/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
PCB Tier II-type Data Review Checklist

Lab Project # 360-40787

Lab: TestAmerica Westfield
Date Sampled: 5/24/12
Method of Analysis: 8082A

No. Samples: 6
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 40-140% RPD ≤ 30%	FD w:RPD≤30% s:RPD≤50%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)	Other (pattern match, etc.)
Yes	√	√	√	NA	√	√	√	√	----
No									

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 5/25/12, the day after collection at 4±2°C . Samples were properly preserved. No action required.

Samples were extracted on 6/6/12 - HT met for extraction. All extracts were analyzed by 6/7/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - no action required. Note, lab used in-house criteria for recovery of surrogates; QAPP criteria used to determine data acceptance.

LCS/LCSD: LLCS 360-91616/2-A & 3-A . Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec for AR1016 & AR1260 in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD: MS/MSD analyses were not performed with this SDG.

FD pair: There was no FD pair submitted with this SDG.

Date: ***10/22/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40787

Blank Action: Blanks Reviewed: MB: MB 360-91616/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91616/1-A	None					No Blank Action required	

Additional Notes:

ICAL: Instrument M 4/13/12 6-level calibration from 50 to 2000 µg/L for Ar 1016/1260 and a single point calibration at 1000 µg/L for Ar-1221/1254, Ar-1232, Ar-1242, Ar-1248, Ar-1262, Ar-1268. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), linear regression performed for Ar-1016 & 1260 on both columns, and r2 > 0.99. Valid ICAL - no action required.

CCALs : CCAL: CCV 360-91628/1 6/7/12 11:10 Average %D < 20% except Col 1 Ar-1016 %D = -23.7. Column 2 within limits so no action required. CCV 360-91628/12 6/7/12 16:20 Average %D < 20% on both columns. No action required.

CCALs : CCV 360-91544/1 on 06/05/2012 14:34 (Opening CCV): All %D ≤ ± 20% on both GC columns for all Aroclor peaks except Column 1 - 1 Ar-1016-3 (-31.9%), Ar-1016-4 (-24.5%), Ar-1016-5 (-22.3%) Average OK Ar-1260-1 (-23.3%), Ar-1260-4 (-22.8%), Ar-1260-5 (-25.2%), (Average = -20.54%); Column 2 - Ar-1260-5 (+20.3) Average OK. No action required as Column 2 was within limits for both Aroclors and no Aroclors were detected in the sample. CCV 360-91544/22 on 06/05/2012 22:52: All %D < ± 20% on both GC columns for all Aroclor peaks except Column 1 Ar-1016-3 (+54.8%), Average OK, Col 2 OK. No action required.

Lab reported the lowest of the two column values. Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. No PCBs reported in samples - no action required.

RLs for all samples except SB-FS-PC-25-11.0-13.0, reported were slightly above the PQLs given in QAPP Table 4-C (RLs 110 µg/kg vs. 100 µg/kg), due to % solids. RLs for sample SB-FS-PC-25-11.0-13.0 exceeded PQLs due to low percent solids in sample (33%).

All RLs reported were less than or equal to the PALs given in QAPP Table 4-C except all Aroclors except Ar-1016 in sample SB-FS-PC-25-11.0-13.0 exceeded PALs.

All chromatograms for all samples visually inspected and appear to have been reported correctly. Samples SB-FS-TB-PC-23-0.5-2.0 and SB-FS-TB-PC-25-0.5-2.0 show complex mixtures, however, none were matched to a specific Aroclor pattern.

Narrative did not raise any issues not already addressed.

Date: ***10/22/12***
Data Reviewer: ***Deborah A. Loring***

8082A and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs- Unspiked Sample only. RPD > 30% solids, J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multi-components), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multi-components) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8082A

Date: ***10/22/12***
Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Pesticide Tier II-type Data Review Checklist

Lab Project # 360-40787

Lab: TestAmerica Westfield
Date Sampled: 5/24/12
Method of Analysis: 8081B

No. Samples: 6
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 30-150% w: RPD≤20% sr:RPD≤30%	FD w:RPD≤30% s:RPD≤50%	RCM (Resolve. > 60%)	PEMs Brkdwn< 15% %D ≤ ± 15%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)
Yes	√	√	√	√	√	√	√	√	√	√
No										

% solids OK? Y
Other Issues: No Technical chlordane was reported instead of alpha-chlordane. Low-level initial calibration for Toxaphene and Technical chlordane did not support the lab-reported RL - action taken to raise RL for Toxaphene and Technical chlordane (see page 2).

Comments:

Samples were received intact at TestAmerica on 5/25/12, the day after collection at 4±2°C . Samples were properly preserved. No action required.

Samples were extracted on 6/6/12 and analyzed by 6/8/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - No Action required. Note, lab used in-house criteria for recovery of surrogates; QAPP criteria used to determine data acceptance.

LCS/LCSD: LCS 360-91616/4-A & 5-A Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD: MS/MSD analyses were not performed with this SDG.

FD pair: There was no FD pair submitted with this SDG.

Date: ***10/22/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40787

Blank Action:

Blanks Reviewed: MB: MB 360-91616/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91616/1-A	None					No Blank Action required	

Resolution Check : RCM not analyzed per se; however, CCALs reviewed and all peaks appear to be adequately resolved - No Action required

PEM DDT and Endrin Breakdown evaluations: PEM 360-91653/16 06/07/2012 20:56, and PEM 360-91653/28 06/08/2012 01:11 - %Breakdown for DDT and Endrin ≤ 15% + Combined Breakdown was ≤ 30% on each GC Column. No Action required.

ICAL: Instrument H 6/7/12 7-level from 1 to 100 µg/L for single-component Pesticides (some extras not required for project) + surrogates and 3-level from 500 to 2,500 µg/L for Toxaphene and Technical Chlordane. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), %RSD ≤ 20% or r2 ≥ 0.99 for all compounds. Several compounds used regression analysis for calibration on Columns 1 & 2. Valid ICAL - no action required.

CCALs : CCVRT 360-91653/17 on 06/07/2012 21:17 (Opening CCV for single-components), CCV 360-91653/18 on 06/07/2012 21:38 (Technical Chlordane), and CCV 360-91653/19 on 06/07/2012 22:00 (Toxaphene) - all %D ≤ ±20% on both GC columns for all Pesticides except Endrin aldehyde (+23.6%) on GC Column 2. CCV 360-91653/29 on 06/08/2012 01:33 CCV 360-91653/30 on 06/08/2012 01:54 (Technical Chlordane) and CCV 360-91653/31 on 06/08/2012 02:15 (Toxaphene) - all %D ≤ ±20% on both GC columns for all Pesticides. CCV 360-91653/50 on 06/08/2012 09:00 all %D ≤ ±20% on both GC columns for all Pesticides. A positive %D indicates increased sensitivity to detection during CCAL as compared to sensitivity during ICAL; therefore, since all samples were non-detect for these compounds, no action for enhanced sensitivity in CCVs (i.e. non-detects accurate as reported). No action required.

Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. %D calculated in review, all within limits.

The narrative did not raise any issues not already addressed.

All RLs reported were less than or equal to the PQLs given in QAPP Table 4-3B except for all analytes in sample SB-FS-PC-25-11.0-13.0 and toxaphene in all samples and dieldrin and aldrin in all samples except sample SB-FS-TB-PC-23-0.5-2.0. No PQL was defined for Technical chlordane in the QAPP.

Lab reported results for all 21 target Pesticides required, except technical chlordane was reported instead of alpha-chlordane. The technical chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. The resulting RL was above the PAL for Toxaphene in all samples. All other RLs reported were less than or equal to the PALs given in QAPP Table 4-3B except Aldrin in sample SB-FS-PC-25-11.0-13.0. No PAL was defined for Technical chlordane in the site QAPP.

Date: ***10/22/12***
Data Reviewer: ***Deborah A. Loring***

8081B and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

RCM: RCM < 60% resolution, J detects based on technical judgment

PEM: 4,4'-DDT breakdown > 15%, J detected DDT, DDE, DDD; R ND 4,4'-DDT and accept ND DDE & DDD
Endrin breakdown > 15%, J detected Endrin, Endrin Aldehyde & Endrin Ketone; R ND Endrin and accept ND Endrin Aldehyde & Endrin Ketone
4,4'-DDT and Endrin > 30%, accept NDs of breakdown products and J detects for 4,4'-DDT and Endrin; J detects of breakdown products and reject (R) non-detects for 4,4'-DDT and Endrin.
%D> ± 20%, J det/J ND on a per column basis. % Resolution < 90.0% qualify data based on professional judgment.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<30%, J det/ J NDs; %Rec >150%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters (or 30% solids), J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multicomponents), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multicomponents) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8081B

Date: ***10/22/12***
Data Reviewer: ***Deborah A. Loring***

RDWP - Davis Liquid Waste Superfund Site
EPA Region I Tier II-type DV Checklist - Metals

Lab: TestAmerica-Westfield, Westfield, MA
Date Sampled: 5/24/12
Analysis: Metals by EPA SW-846 Method 6010C & 7471A

Lab Project # 360-40787-1
No. Samples: 6
Matrix: Soil

QC Met Criteria?		HT and Preserve	RL QAPP PALs	Tune 6020 criteria	Calibration ICV/CCV 90-110%R	CRI RL Check 70-130%R	EB MB < RL	LCS/LCSD SRM limits RPD ≤ 30%	ICSA/AB 80-120% R	MS / MSD 75-125% R	MD RPD ≤ 20%	FD RPD ≤ 30%	IS 6020 70-130% R	Serial Dilution ± 15% D
Yes		√	√	NA	√	√	√	√	√	NA	NA	NA	NA	NA
No														

Soils for Target Analyte List (TAL) of 23 Metals: Mercury by CVAA SW846 Method 7471A; and Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, & Zinc by ICP-AES Method 6010C.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data for Tier II level in accordance with the Davis QAPP (ESS 2012) & EPA Region 1 present in the data package? ***Yes.***

2. Were all result forms for all samples listed on the chain-of-custody present in data package? ***Yes***.

Chain-of-Custody (COC): 6 soil samples received for Total TAL Metals - received at lab on 5/25/12 (one day after sample collection) and intact. Documentation acceptable.

Preservation: Samples received at 4.0°C and 5.4°C on ice. Acceptable preservation for soils.

Holding Time (HT): ICP-AES 6010C analysis 5/31/12; CVAA 7471A analysis 6/05/12. Acceptable HT.

Calibration Criteria: ICV/CCV and CRI (RL check standard supporting the level of the RL reported) met acceptance criteria for all Metals. Note CRI not required by Davis QAPP but reviewed as additional support of the lab RLs (criteria set at 70-130%). Tune criteria not applicable for Method 6010C. ICSA/AB met recovery criteria for all ICP metals.

Date: *10/24/12*
Data Reviewer: *Susan D. Chapnick*

New Environmental Horizons, Inc.

Lab: TestAmerica Lab Project #: 360-40787-1

Blanks: No EB included with samples in this SDG. Method blank (MB) & instrument blanks (ICB/CCB) were non-detected for all metals except for Barium, Calcium, and Iron; detected at 0.64, 11.3, and 6.41 mg/Kg, respectively. No action required since all soil sample results were > 5x the blank levels for these 3 metals. Lab also qualified several results for these 3 metals as "B" on the Form 1 results and in the EDD for detection in an associated blank; however, since no blank action was required, all "B" flags were removed during validation.

LCS/LCSD: Lab performed both LCS and LCS duplicate (LCSD), though LCSD not required in Davis QAPP. LCS/LCSD met acceptance criteria for all Metals for accuracy (based on soil SRM control limits listed by lab on Form 7, consistent with QAPP criteria for this media) and precision (RPD <30% lab criteria).

MS/MD: No site-sample MS/MD was identified to be performed in this SDG.

Serial Dilution: No serial dilution on a site sample was performed in this SDG.

IS: IS not applicable for Method 6010C.

Sensitivity: All RLs for non-detects met Davis QAPP Table 4-5C for Soil requirements for sensitivity (RL) based on being lower than the PALs (even though some, for example antimony, were > PQLs they were still lower than the PALs).

Professional Judgment - Other: Data users are cautioned that the detected Metals results for Selenium reported from ICP-AES Method 6010C (ranging from 0.81 mg/Kg to 4.2 mg/Kg) may be false positives based on professional judgment knowledge of positive interference for selenium on ICP-AES in some matrices. Since the reported Selenium results were orders-of-magnitude below the PAL and since all QC criteria were met, no action was taken other than to note this issue.

Laboratory Narrative: No further issues noted.

Date: *10/24/12*
Data Reviewer: *Susan D. Chapnick*

Lab: TestAmerica Lab Project #: 360-40787-1

FD pair samples: No FD samples were collected in this SDG for Metals.

FD Precision (concentration units = mg/Kg dry-weight):

Analyte	Sample	Qual	FD	Qual	Precision RPD* %	Action	Comment
Aluminum					NA	none	
Antimony					NA	none	
Arsenic					NA	none	
Barium					NA	none	
Beryllium					NA	none	
Cadmium					NA	none	
Calcium					NA	none	
Chromium					NA	none	
Cobalt					NA	none	
Copper					NA	none	
Iron					NA	none	
Lead					NA	none	
Magnesium					NA	none	
Manganese					NA	none	
Mercury					NA	none	
Nickel					NA	none	
Potassium					NA	none	
Selenium					NA	none	
Silver					NA	none	
Sodium					NA	none	
Thallium					NA	none	
Vanadium					NA	none	
Zinc					NA	none	

Date: *10/24/12*
Data Reviewer: *Susan D. Chapnick*

QC & DV Action Criteria for Davis Superfund Site Metals [based on Davis QAPP 2012 & EPA Region I DV guidance]:

Pres./HT:	HT exceedance: J detects; Non-detects: R or UJ based on professional judgment. pH >2 use professional judgment to J detects; UJ non-detects.
Blanks:	Method Blanks and instrument blanks: Metals < RL unless all sample results are > 10 blank level. Detected results < matrix-matched blank level report as "U" (non-detected at level found). Equipment Blank: EB > RL for any metals; qualify associated detected results < 5x EB level as "EB" - potential high bias based on EB contamination.
Tune:	Mass calibration (amu) > QC limit: J/UJ. Mass resolution/peak width (amu) > QC limit: J/UJ. %RSD > QC limit: J/UJ. See EPA SW-846 Method 6020A for Tune criteria. Tune not performed: R all associated data.
ICV/CCV:	Recoveries < 90%: J / UJ; recoveries > 110%: J detects; if severe exceedance <75%: R non-detects; > 160%: R detects.
CRI:	Low-level standard at the level of the RL: % recovery <70%: J / UJ; >130%: J detects.
LCS:	Aqueous: %Recoveries < 80%: J / UJ. %Recoveries > 120%: J detects. %Recoveries < 50%, may R non-detects & J detects but use professional judgment to accept results if MS is in-control indicating acceptable accuracy in sample matrix. Solids: SRM control limits are criteria; J/UJ outside these limits; use professional judgment for severe exceedances of control limits.
ICSA/AB:	Recoveries > 120% or < 80%: J / UJ unless extremely low for ICSAB at <50%: R non-detects / J detects.
MS:	%Recoveries < 75%: J / UJ. %Recoveries > 125%: J detects. %Recoveries < 30%, may R non-detects & J detects but use professional judgment if sample concentration > 2x spike level.
MD:	Groundwater/Surface Water: Results >5xRL: RPD >20%: J/UJ associated results in batch. Results < 5xRL: difference > ±RL, J/UJ associated results. Soil/Sed: Results >5xRL: RPD >35%: J/UJ associated results in batch. Results < 5xRL: difference > ±2xRL, J / UJ associated results.
FD:	Groundwater/Surface Water: Results > 5xRL: RPD > 30%: J/UJ FD results only. Results < 5xRL: difference > ±2xRL,, J/UJ FD results only. Soil/Sed: Results >5xRL: RPD > 50%: J/UJ FD results only. Results <5xRL: use professional judgment.
IS:	Recoveries < 70%: J / UJ; recoveries > 130%: J detects; use professional judgment for severe exceedances.
Serial Dil:	Results > 50xRL: % Difference > 15%: J detects. EPA guidance UJ non-detects; however, use professional judgment on whether it is a suppression or enhancement to qualify associated non-detects.

Qualifiers: U = analyte is non-detect at the sample-specific Reporting Limit (RL) (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.

References: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island;* prepared by ESS Group, Inc., March 23, 2012 (Davis QAPP); Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996, including Part IV – Inorganic Data Validation Functional Guidelines, November 2008; Region I T*iered Organic and Inorganic Data Validation Guidelines* , July 1, 1993 draft; & USEPA SW846 Methods 6010C, 6020, & 7470A/7471A.

Date: *10/24/12*
Data Reviewer: *Susan D. Chapnick*

DATA VALIDATION REPORT
EPA Region I Tier II-Type for VOCs, TCL SVOCs, TCL Pesticides, TCL PCBs, & TAL Metals

Client: ESS Group, Inc., East Providence, Rhode Island

Site: Davis Liquid Waste Superfund Site, Smithfield, Rhode Island
Soil Sampling - 2012

Laboratory: TestAmerica Westfield, Westfield, Massachusetts

Lab Project/SDG #: 360-40791-1

Number of Samples: 5 soil samples + 1 Trip Blank for project-specific list of 52 Volatile Organic Compounds (VOCs)
7 soil samples for Target Compound List (TCL) Semivolatile Organic Compounds (SVOCs), TCL Pesticides, TCL Polychlorinated Biphenyls (PCBs), Target Analyte List (TAL) Metals and Percent Solids

Data Reviewers: Nancy C. Rothman, Ph.D., New Environmental Horizons, Inc.
Susan D. Chapnick, M.S., New Environmental Horizons, Inc.

Date: October 27, 2012; *revised October 30, 2012 based on lab re-submittal*

EPA Tier II-type Data Validation Review was performed on the data included in this SDG with the following intentions: 1) to determine if the data were generated and reported in accordance with the following documents: *Remedial Design Work Plan and Pre-Design Investigation Plan* (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996 and updates including Part II, III, and IV (Volatile/Semivolatile, Pesticide/PCB, and Inorganic Data Validation Functional Guidelines); EPA *Region I Tiered Organic and Inorganic Data Validation Guidelines*, July 1993, and USEPA SW846 Method 8260C, 8270D, 8081B, 8082A, 6010C, and 7471A 2) to determine if the data met the project data quality objectives for acceptable accuracy, precision, sensitivity; and technical usability; and 3) to update the project database with validated results and appropriate data validation qualifiers.

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The Data Validation Report consists of three parts:

- This Data Validation Report letter summarizing the actions taken;
- The spreadsheet of validated sample results with validation qualifiers based on actions taken; and
- The Data Validation Checklists to document the Tier II-type validations. These Checklists are an integral part of the validation report as they contain comprehensive details of all QC reviewed, the acceptance criteria used, professional judgment and actions taken.

I. Sample Descriptions and Analytical Parameters

The sample IDs, date of sampling, matrix, and sample type (e.g. Field Sample, Field Duplicate, etc., as applicable) and the analytical parameters reviewed are listed below in Table 1.

Table 1. Sample Descriptions and Analytical Parameters

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-FS-TB-PC-11-1.5-2.0	5/25/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-TB-PC-11-0.5-2.0	5/25/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-PC-11-5.0-10.0	5/25/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-PC-11-6.0-6.5	5/25/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-11-19.0-21.0	5/25/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-PC-11-20.0-20.5	5/25/12	Soil	VOCs & Percent Solids	Field Sample
TB-052512-2	5/25/12	Water	VOCs	Trip Blank
SB-FS-TB-PC-12-0.5-2.0	5/25/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-TB-2	5/25/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Duplicate of SB-FS-TB-PC-12-0.5-2.0
SB-FS-PC-12-14.0-14.5	5/25/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-12-12.0-15.0	5/25/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample

Table 1. Sample Descriptions and Analytical Parameters (continued)

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-FS-PC-12-20-22	5/25/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-PC-12-21.5-22	5/25/12	Soil	VOCs & Percent Solids	Field Sample

Analytical method references:

Volatiles: 52 project-specific VOCs by USEPA SW846 Method 8260C that includes the TCL plus diethyl ether and tetrahydrofuran and minus 1,4-dioxane (not required for soils; note 1,4-dioxane was reported in the TB).

Semivolatiles: TCL SVOCs by USEPA SW846 Method 8270D

Pesticides: TCL Pesticides by USEPA SW846 Method 8081B

PCBs: TCL PCB Aroclors by USEPA SW846 Method 8082A

Metals: TAL Metals by USEPA SW846 Method 6010C (ICP-AES), which includes 22 Metals, plus Mercury by USEPA SW846 Method 7471A Cold Vapor Atomic Absorption (CVAA)

Percent Moisture / Percent Solids were performed and reported for all samples to convert results to dry-weight units.

II. Quality Control Reviewed during Data Validation

The following QC elements, as applicable to the analytical methods, were reviewed during the Tier II-type validation of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals:

- Data package completeness and reporting protocols
- Sample receipt, holding times and preservation criteria
- Blank results including Method Blanks, Equipment Blanks, & Trip blanks
- Laboratory Control Sample (LCS) recoveries / LCS Duplicate Recoveries
- Standard Reference Material (SRM) Recoveries, if applicable
- Surrogate Recoveries
- Matrix Spike (MS) / Matrix Spike Duplicate (MSD) Recoveries
- MS/MSD, LCS/LCSD, and sample/Field Duplicate (FD) Relative Percent Differences (RPDs)
- Sample result reporting (including compound lists, reporting limits, and units)
- Calibration criteria (including tune criteria, initial calibration and continuing calibration verification)
- Internal Standard (IS) Recoveries
- Retention Time windows
- Other method-specific QC if applicable and reported in Summary QC
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

III. Data Validation Report Summary

During the Tier II-type data validation review of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals, no data were rejected. Several results were negated (U) or estimated (J or UJ) due to QC issues. Table 2 summarizes the actions taken during this data validation review. NEH generated a validated data spreadsheet based on the electronic project database file (EDD) received from ESS for this SDG. All results were considered usable for project decisions compared to the Davis RDWP QAPP requirements with the understanding of the potential uncertainty (bias) in the qualified results presented in Table 2.

The remainder of this report documents "exceptions" to method or QAPP criteria or clarifications of data reported. QC elements not discussed below met all QAPP criteria. The full documentation of all QC elements reviewed during the Tier II-type validations are presented in the attached Data Validation Checklists. Data users should also reference the full Tier III-type data validation performed on soil samples included in SDG 360-40815-1 for additional information on general reporting issues and calculation verification from review of raw data (which is not performed in a Tier II-type validation).

Exceptions from Davis QAPP or Method QC Criteria

- The initial SVOC analysis did not include all compounds requested. A re-extraction and re-analysis was performed outside of holding time for 5 compounds. Results for these compounds were estimated (J or UJ) as indicated in Table 2.
- Bis-2-ethylhexylphthalate was accepted for reporting from the initial analysis of sample SB-FS-PC-12-12.0-15.0, rather than the re-extraction analysis, which was out of holding time. The EDD was changed to reflect this reporting decision during validation and the result for this compound was estimated (J) due to uncertainty in the result reported, which was above the calibration range.
- The method blank for VOCs reported results below the Reporting Limit (RL) for methylene chloride. A comparison of the levels in the blank with the levels reported for this compound in the associated samples resulted in the following actions:
  - Methylene chloride was negated (U) in one VOC sample, as shown in Table 2, and the result raised to the sample specific RL.
- Exceedances of Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) recoveries or RPD were as follows:
  - <u>VOCs</u> – acetone, 2-butanone, and chloroethane showed recoveries outside of criteria. Actions taken to estimate (UJ) affected sample results due to VOC LCS/LCSD exceedances are listed in Table 2.
  - <u>SVOCs</u> – 2,4-dinitrophenol showed recovery outside of criteria. Actions taken to estimate (UJ) affected sample results due to SVOC LCS exceedance are listed in Table 2.
- No site sample was identified in this SDG for Matrix Spike (MS) and Matrix Spike Duplicate (MSD) analyses; therefore, MS/MSDs were not performed for VOCs, SVOCs, Pesticides, PCB Aroclors, or Metals.
- There was one Field Duplicate (FD) pair included in this SDG for SVOCs, Pesticides, PCBs, and Metals: SB-FS-TB-PC-12-0.5-2.0 and SB-FS-TB-2. The FD results indicate acceptable overall precision and representativeness in the site soil matrix at the FD location for these parameters except for caprolactam, which was detected in the FD but not in the sample. Results for caprolactam were estimated (J and UJ) with indeterminate bias as listed in Table 2.

- A Field Duplicate (FD) pair was not included in this SDG for VOCs.
- Various initial and continuing calibrations reported results that were outside of criteria for VOCs and SVOCs. Actions to estimate (UJ) results and the potential bias are listed in Table 2.
- For PCBs, samples SB-FS-TB-PC-11-0.5-2.0, SB-FS-PC-11-5.0-10.0, SB-FS-TB-PC-12-0.5-2.0, SB-FS-TB-2, and SB-FS-PC-12-12.0-15.0 show complex mixtures in the chromatogram; however, none were matched to a specific Aroclor pattern.

Sensitivity & Reporting

- The laboratory flagged all results for VOCs and SVOCs that were less than the RL (supported by the low-level standard in the calibration curve) as "J". The "J" qualifier was maintained during validation to indicate that these results were estimated due to uncertainty in quantitation below the calibration range. Affected samples/analytes are listed in Table 2.
- The laboratory incorrectly reported results from the medium-level VOC analysis of sample SB-FS-PC-12-14.0-14.5 (lab ID #360-40791-10). The laboratory was contacted on October 24, 2012 to re-submit the corrected data and the re-submittal was received on October 29, 2012. NEH manually edited the EDD to correct these results, which were low by a factor of 250.
- All non-detects for VOCs, SVOCs, and PCBs were below the Project Action Limit (PAL) given in QAPP Tables 4-1C, 4-2C, and 4-4B, respectively, except:
    - All samples: 1,2-dibromo-3-chloropropane and ethylene dibromide, as expected, due to method limitations.
    - SB-FS-PC-24-14.5-15.0: 1,1,2-trichloroethane, 1,2-dichloroethane, 1,2-dichloropropane, tetrachloroethene, and vinyl chloride.
    - SB-FS-TB-PC-11-0.5-2.0, SB-FS-TB-PC-12-0.5-2.0, and SB-FS-TB-2: hexachlorobenzene.
- The laboratory reported results for all 21 target Pesticides required, except technical-chlordane was reported instead of alpha-chlordane. The technical-chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. All RLs for Pesticides were less than or equal to the PALs given in QAPP Table 4-3B and therefore met sensitivity requirements with the exception of toxaphene in all samples (due to raising the RL during validation). No PAL was defined for technical-chlordane in the site QAPP. The data user will need to evaluate usability of the non-detected results with elevated RLs for project uses.
- All non-detects for Metals were below the PALs given in QAPP Table 4-5C for soil. Therefore, sensitivity DQOs were met for Metals.
- Data users are cautioned that the detected Metals results for selenium reported from ICP-AES Method 6010C may be false positives based on professional judgment knowledge of positive interference for selenium on ICP-AES in some matrices. Since the reported selenium results were orders-of-magnitude below the PAL and since all QC criteria were met, no action was taken other than to note this issue.

Table 2. Summary of Data Validation Actions

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
All Pesticide samples	Chlordane (technical) Toxaphene	U		Raised RL

Table 2. Summary of Data Validation Actions (continued)

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
SB-FS-PC-11-20.0-20.5 SB-FS-PC-11-6.0-6.5 SB-FS-PC-12-21.5-22 SB-FS-TB-PC-11-1.5-2.0	1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-Chloropropane Chloroethane Methyl acetate Vinyl Chloride	J / UJ	L	Low Calibration verification
SB-FS-PC-11-6.0-6.5	1,2-Dichlorobenzene	J	L	Low Calibration verification
SB-FS-PC-11-20.0-20.5 SB-FS-PC-12-21.5-22 SB-FS-TB-PC-11-1.5-2.0	1,2-Dichlorobenzene	J	I	Low Calibration verification + Result uncertain below the calibration range
SB-FS-PC-11-20.0-20.5 SB-FS-PC-11-6.0-6.5 SB-FS-PC-12-14.0-14.5 SB-FS-PC-12-21.5-22 SB-FS-TB-PC-11-1.5-2.0	2-Butanone (MEK) Acetone	UJ	L	Low LCS/LCSD recoveries
SB-FS-PC-12-14.0-14.5	Chloroethane	UJ	L	Low LCS/LCSD recoveries
SB-FS-PC-12-14.0-14.5	Methylene Chloride	U		Negated due to Blank Action
SB-FS-PC-11-20.0-20.5	trans-1,2-Dichloroethene	J	I	Result uncertain below the calibration range
SB-FS-PC-11-6.0-6.5	cis-1,2-Dichloroethene Trichloroethene	J	I	Result uncertain below the calibration range
SB-FS-PC-12-14.0-14.5	1,1,1-Trichloroethane cis-1,2-Dichloroethene	J	I	Result uncertain below the calibration range
SB-FS-PC-12-21.5-22	Ethylbenzene trans-1,2-Dichloroethene	J	I	Result uncertain below the calibration range
SB-FS-TB-PC-11-1.5-2.0	Trichloroethene	J	I	Result uncertain below the calibration range
SB-FS-PC-11-19.0-21.0 SB-FS-PC-11-5.0-10.0 SB-FS-PC-12-12.0-15.0 SB-FS-PC-12-20-22 SB-FS-TB-PC-11-0.5-2.0	1,1'-Biphenyl 2,3,4,6-Tetrachlorophenol Atrazine Benzaldehyde Caprolactam	UJ	L	HT Exceedance
SB-FS-TB-PC-12-0.5-2.0	1,1'-Biphenyl 2,3,4,6-Tetrachlorophenol Atrazine Benzaldehyde	UJ	L	HT Exceedance
SB-FS-TB-PC-12-0.5-2.0 SB-FS-TB-2	Caprolactam	J / UJ	I	HT Exceedance + FD imprecision
SB-FS-TB-2	1,1'-Biphenyl 2,3,4,6-Tetrachlorophenol Atrazine	UJ	L	HT Exceedance
SB-FS-TB-2	Benzaldehyde	J	I	HT Exceedance + Result uncertain below the calibration range
All SVOC samples	4,6-Dinitro-2-methylphenol	UJ	I	Initial Calibration outside criteria

Table 2. Summary of Data Validation Actions (continued)

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
All SVOC samples	2,4-Dinitrophenol	UJ	I	Low LCS recovery + Initial Calibration outside criteria
SB-FS-PC-12-12.0-15.0	Bis(2-ethylhexyl) phthalate	J	I	Result uncertain above the calibration range
SB-FS-PC-12-12.0-15.0	2-Methylnaphthalene Pyrene	J	I	Result uncertain below the calibration range
SB-FS-TB-PC-11-0.5-2.0	Bis(2-ethylhexyl) phthalate	J	I	Result uncertain below the calibration range

Qualifiers: U = Analyte is non-detect at the "LIMIT2" value in the EDD, which is the sample-specific reporting limit (RL); UJ = Non-detect is estimated; J = Result is estimated; R = Result is rejected and is unusable for project decisions.

Bias: L = Low; H = High; I = Indeterminate

Acronyms used in Table 2:
HT = Holding Time
LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample Duplicate
RL = Reporting Limit

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Volatile Tier II-type Data Review Checklist

Lab Project: 360-40791-1

Lab: TestAmerica Westfield
Date Sampled: 5/25/12
Method of Analysis: 8260C - EI only (no SIM)

No. Samples: 5 + 1 TB
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 70-130%	LCS/LCSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	MS/MSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√		NA	NA		√		NA	
No			Estimate (UJ) 11 results			Estimate (UJ) 24 results		Accept 11 "J" results		Negate 1 result - Blank Action

% solids OK? Y
Other Issues: No

Comments:

Method 8260C used for reporting of project-specific list of VOCs. TB sample results were reviewed for potential blank actions (see below); however, full data review of this field QC sample was not performed as these results are not directly used for project decisions.

Samples were received intact at TestAmerica on 5/25/12, the day of collection at 4±2°C. Samples were properly preserved. No action required. Lab re-submittal was required to add missing VOC compounds and to correct the medium-level VOC results that were calculated incorrectly for sample 40791-10 (250x error).

Samples were all analyzed by 6/7/12 - HT met for all samples, No Action required.

Surrogates : All 3 VOC surrogates were recovered within 70-130% in all samples and QC - no Action required

LCS/LCSD:LCS 360-91417/1-A & 2-A. Lab spiked all 52 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable except: 2-butanone, acetone, chloroethane (LCS/LCSD rec. low).

***ACTION: 2-butanone, acetone, and chloroethane estimated (UJ) with possible low bias in associated soil samples due to low LCS/LCSD recoveries (SB-FS-PC-12-14.0-14.5, 40787-10).*

Date: ***10/25/12; revised 10/30/12 based on lab resubmittal***

Data Reviewer: ***Deborah A. Loring***

Lab Project: 360-40791-1

Lab: TestAmerica Westfield

Blank Action: Blanks Reviewed: MB: Water - MB 360-91437/6 Soil - MB 360-91417/3-A, MB 360-91661/3-A
TB: TB052512-2

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91437/6	None Detected	Y				No Blank Action required	
MB 360-91417/3-A	2-hexanone 3.79 J µg/kg	Y		4738 µg/kg*		Associated samples ND - No Blank Action required	
	methylene chloride 3.50 J µg/kg	Y		8750 µg/kg*		SB-FS-PC-12-14.0-14.5 1200	1200 U
MB 360-91661/3-A	None Detected	Y				No Blank Action required	
TB-052512-2	None Detected	N				No Blank Action required	

* Medium level blank in data presented as low level (i.e. factor of 250, resulting from 100 uL methanol per 25 mL purge was not taken into account in reporting medium level blank data. This factor was built into the blank action level.

LCS/LCSD: LCS 360-91661/1-A & 2-A. Lab spiked all 52 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable except: 2-butanone and acetone (LCS/LCSD rec. low), and carbon tetrachloride (LCS recovery high). No action required for increased sensitivity of carbon tetrachloride as it was not detected in the associated samples.

**Action: acetone and 2-butanone estimated (UJ) with possible low bias in associated soil samples due to low LCS/LCSD recoveries (all samples in SDG except SB-FS-PC-12-14.0-14.5, 40787-10).*

MS/MSD: MS/MSD analyses were not performed with this SDG.

FD pair: There was no FD pair submitted with this SDG.

Tunes: Instrument HP#1 GC/MS. 3/23/12 16:40, 06/01/12 00:30, 06/07/12 15:32 All tune abundances were acceptable and all samples and standards were analyzed within 12 hours of BFB tune.

ICAL : HP#1 3/23/12 6-9 level ICAL for all Targets + several non-target compounds. All calibrations met QAPP criteria for Target Compounds (ICAL from 0.5, 1 or 5 up to 160 µg/L. %RSD $\leq$ 20% or r2 $\geq$ 0.99 and all RRFs $\geq$ 0.05 . Valid ICAL - No Action required.

Date: ***10/25/12; revised 10/30/12 based on lab resubmittal***

Data Reviewer: ***Deborah A. Loring***

Additional Notes:

CCAL: HP#1 06/01/2012 00:53 %D (or %Drift) ≤ ± 20% for all target compounds and RRF ≥ 0.05 except dichlorodifluoromethane (+22.4%) and methylene chloride (+24.6%). No action required as samples were non-detect for compounds with increased sensitivity.

CCAL: HP #1 6/7/12 15:55 criteria met for all targets except vinyl chloride %D = -24.1%, chloroethane %D = -28.3%, methyl acetate %D = -20.1%, carbon tetrachloride %D = +20.2%, 1,1,2,2-tetrachloroethane %D = -27.5%, 1,2-dichlorobenzene = - 21.6%, 1,2-dibromo-3-chloropropane %D = -29.4%. All associated samples were non-detect for carbon tetrachloride, therefore, no action required for enhanced sensitivity on day of analysis for this compound.

**ACTION: vinyl chloride, chloroethane, methyl acetate, 1,1,2,2-tetrachloroethane, 1,2-dichlorobenzene, and 1,2-dibromo-3-chloropropane estimated (UJ, J) in associated samples (all samples in SDG except SB-FS-PC-12-14.0-14.5, 40787-10).*

IS: All 4 IS Areas and RTs were in criteria.

Lab reported results for m- Xylene & p-Xylene (reported as a single entry due to coelution) and o-Xylene in addition to Xylenes, total, as requested in the QAPP. All 52 project-specific VOCs were reported so with the added Xylenes, a total of 54 VOC results reported per sample. Note that bromodichloromethane, as listed in Table 4-1C, is called dichlorobromomethane in EDD and data and Dibromochloromethane, as listed in Table 4-1C, is called chlorodibromomethane in EDD and data.

11 results were reported at levels < RL and were flagged "J" by the lab. These "J" results were accepted for reporting with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

All RLs were at or below the PQLs and PALs required in the QAPP Table 4-1C for all samples except for sample SB-FS-PC-24-14.5-15.0 as the medium level extract was analyzed. PALs were exceeded for 1,2-dibromo-3-chloropropane and ethylene dibromide in all samples as expected, due to method limitations and the following compounds in sample SB-FS-PC-24-14.5-15.0: 1,1,2-trichloroethane, 1,2-dichloroethane, 1,2-dichloropropane, tetrachloroethene, and vinyl chloride.

Narrative did not raise any issues not already addressed.

Date: ***10/25/12; revised 10/30/12 based on lab resubmittal***

Data Reviewer: ***Deborah A. Loring***

8260C and Project Action Summary:

Preservation:	Waters - headspace present or received at > 10°C, J det / J NDs or R ND Soils/Sediment - EnCore extrusion and sample preservation unacceptable or received at > 10°C, J det / J NDs or R ND Waters - pH < 2; 14d <HT≤ 28d; J det/ J NDs; HT >28d, J det/R ND Soils/Sediment - 14d <HT< 28d; J det/ J NDs; HT >28d, J det/R ND
Surrogates:	Surr. %Rec > 130%, J det/Accept ND; 10% ≤ %Rec < 70%, J det/J NDs;
LCS	%Rec<10%, J det/ R NDs; 10% <%Rec<70, J det/ J NDs; %Rec >130, J det/Accept NDs. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. LCS must contain all targets.
Tunes:	Samples analyzed within 12-hrs and criteria met per Method 8260C. If out, use professional judgment.
ICAL:	minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs. If avg. RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
CCAL:	%D (or %Drift) > - 20% , J det/J ND; %D (or %Drift) > +20%, J det/Accept ND. If RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
Blanks:	Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for acetone, 2-butanone, and methylene chloride which are 10 x value in blank.
MS/MSD:	%Rec<10%, J det/ R NDs; 10% <%Rec<70%, J det/ J NDs; %Rec >130%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. MS/MSD must contain all targets.
FD:	Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data
IS:	20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs
QLs:	Verify RLs met RLs and PALs given in QAPP; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.
TICs:	Not required
% solids:	If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs
Narrative:	If there are any issues raised in narrative not previously addressed, take appropriate action
Reference:	*Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8260C

Date: ***10/25/12; revised 10/30/12 based on lab resubmittal***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Semivolatile Tier II-type Data Review Checklist

Lab Project: 360-40791

Lab: TestAmerica Westfield
Date Sampled: 5/25/12
Method of Analysis: 8270D

No. Samples: 6 + 1 FD
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates w: 30-130%BN 15-110% Acid s: 30-130%	LCS 40-140%BN 30-130%Acid	MS/MSD 40-140%BN 30-130%Acid w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes		√		NA			√		NA	
No	Estimate (J, UJ) 5 results in all samples		Estimate (UJ) 1 result in all samples		Estimate (J) 1 result in sample & FD	Estimated (UJ) 2 results in all samples		Accept 4 "J" results		Accept 1 "J" result above cal range, replace it with initial result

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 5/25/12, the day of collection at 4±2°C . Samples were properly preserved. No action required.

All samples were extracted on 6/6/12, however, several compounds were not included in the associated QC samples: 1,1'-Biphenyl, 2,3,4,6-Tetrachlorophenol, Atrazine, Benzaldehyde, and Caprolactam. The samples were re-extracted on 6/11/12 and analyzed by 6/19/12 for these compounds. Extraction holding times for these compounds were exceeded by 3 days. Analytical holding times were met.

***ACTION: Estimate (J, UJ) 1,1'-Biphenyl, 2,3,4,6-Tetrachlorophenol, Atrazine, Benzaldehyde, and Caprolactam results in all samples due to holding time exceedance.*

Surrogates : All 3BN and 3 Acid Surrogates were recovered within QAPP Criteria in all field and QC samples. No action required.

LCS/LCSD : LCS 360-91615/2-A & 3-A. Lab spiked all 67 target analytes requested in LCS. All spiked target compounds reported acceptable %Rec and LCS/LCSD RPD except 2,4-dinitrophenol LCS rec low, 3-nitroaniline, carbazole, and di-n-butylphthalate (LCS/LCD rec. high), and 4-nitroaniline (LCSD rec. high). No action required for high recoveries as these compounds were not detected in the associated samples.

***ACTION: Estimate (UJ) 2,4-dinitrophenol in all samples with low bias due to low LCS recovery.*

Date: ***10/23/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40791

Blank Action: Blanks Reviewed: MB: MB 360-91615/1-A, MB 360-91782/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91615/1-A	di-n-butylphthalate 184 J µg/kg	Y		1840 µg/kg		Associated samples ND - No Blank Action required	
MB 360-91782/1-A	di-n-butylphthalate 177 J µg/kg	Y		1770 µg/kg		Associated samples ND - No Blank Action required	

LCS/LCSD : LCS 360-91782/2-A/2-A. Lab spiked all 5 target analytes reported from these batches. All spiked target compounds reported acceptable %Rec and LCS/LCSD RPD except 4-nitroaniline, di-n-butylphthalate LCSD rec. high , carbazole LCS/LCSD rec. high - no action required as these compounds were not detected in associated samples, and this re-extraction for five compounds noted above only.

MS/MSD: MS/MSD analyses were not performed with this SDG.

FD pair: SB-FS-TB-PC-12-0.5-2.0 / SB-FS-TB-2. A comparison of detected results shown below.

Field Duplicate Evaluation_ Sample IDs: Sample = SB-FS-TB-PC-12-0.5-2.0 FD = SB-FS-TB-2

Analyte Name	DF= 1 RL (µg/Kg)	Sample µg/Kg	Q	Sample Result Level	FD µg/Kg	Q	FD Result Level	RPD	Action
Benzaldehyde	36	ND			26		< 2 X RL	#VALUE!	None
Caprolactam	36	ND			82		> 2 X RL	200%	J

Action: Estimate (J) Caprolactam in samples SB-FS-TB-PC-12-0.5-2.0 and SB-FS-TB-2 due to FD imprecision.

Tunes: Instrument B 6/11/12 14:37, 21:23 6/12/12 13:45 6/18/12 14:17. All abundances were acceptable and all samples were analyzed within 12 hours of tune - No Action required

Date: ***10/23/12***

Data Reviewer: ***Deborah A. Loring***

Additional Notes:

ICAL : 6/11/12 Inst. B, 8- to 10- level ICAL performed from 0.2 to 25 µg/mL (for full 10-level) for all Targets + several non-target compounds. Form VI flagged several results as not meeting minimum RRF criteria; however, lab used CLP criteria and not QAPP criteria. %RSD ≤ 20% or r2 ≥ 0.99 for all and all RRFs ≥ 0.05 except: 2,4-dinitrophenol % RSD = 46.0% and 4,6-dinitro-2-methylphenol %RSD = 39.0%.

**ACTION: 2,4-Dinitrophenol and 4,6-dinitro-2-methylphenol estimated (UJ) with indeterminate bias in all samples due to high RSD.*

CCALs: Inst. B 06/11/2012 21:55 %D or %Drift ≤ ± 20% and RRF ≥ 0.05 for all target compounds except: 3-nitroaniline (+23.7%). No action required for increased sensitivity as this analyte was not detected in the associated samples.

CCALs: Inst. B 06/12/2012 14:17 %D or %Drift ≤ ± 20% and RRF ≥ 0.05 for all target compounds except: 4-chloroaniline (+23.7%), 3-nitroaniline (+63.2%), carbazole (+60.2%), indeno[1,2,3-cd]pyrene (+23.1%), dibenz(a,h)anthracene (+21.9%), and benzo[g,h,i]perylene (+23.6%). No action required for increased sensitivity as this analyte was not detected in the associated samples. No action required for increased sensitivity as these analytes are not detected in the associated samples.

CCALs: Inst. B 06/18/2012 14:48 %D or %Drift ≤ ± 20% and RRF ≥ 0.05 for all target compounds except: 3-nitroaniline (+53.4%), 2,4-dinitrophenol (-27.2%), carbazole(+44.3%), 4-Nitroaniline (+42.3%) and Carbazole (+77.5%). No action required for increased sensitivity as these analytes are not detected in the associated samples. No action required for increased sensitivity as these analytes are not detected in the associated samples. CCAL associated only with MB and LCS/LCSD so no action taken for low recovery of 2,4-dinitrophenol.

Tunes: Instrument B 6/19/12 15:43, 22:30. All abundances were acceptable and all samples were analyzed within 12 hours of tune - No Action required

ICAL : 6/19/12 Inst. B, 7- to 10- level ICAL performed from 0.2 to 25 µg/mL (for full 10-level) for all Targets + several non-target compounds. Form VI flagged several results as not meeting minimum RRF criteria; however, lab used CLP criteria and not QAPP criteria. %RSD ≤ 20% or r2 ≥ 0.99 for all and all RRFs ≥ 0.05. No action required.

CCALs: Inst. B 06/19/2012 23:02 %D or %Drift ≤ ± 20% and RRF ≥ 0.05 for 5 target compounds reported from re-extractions. No action required.

IS: All 6 IS Areas and RTs were in criteria for all analyses except Perylene-d12 was high in samples LCS/LCSDLCS 360-91782/2-A & 3-A. No action required for IS in LCS/LCSD.

Lab reported results for all 67 target SVOCs required. The lab reported 3&4-methylphenol rather than 4-methylphenol as the two co-elute.

4 results were reported at a level < RL and were flagged "J" by the lab. These results were accepted for reporting with indeterminate bias due to uncertainty in quantitation at levels below the instrument calibration range.

Date: ***10/23/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40791

Additional Notes:

Bis-2-ethylhexylphthalate was reported from the re-extraction analysis in sample SB-FS-PC-12-12.0-15.0, which was out of holding time. Both the initial analysis and the re-extraction analysis of this sample reported bis-2-ethylhexylphthalate with an "E" flag to indicate that the result exceeded the calibration range. There was no explanation as to why the result from the re-extraction was reported. The EDD was changed to reflect the result from the initial analysis which was within holding time

***ACTION: The bis-2-ethylhexylphthalate result was changed to initial result from analysis within holding time (1800 µg/kg).*

All RLs reported were less than or equal to the PQLs given in QAPP Table 4-2C except di-n-butylphthalate and bis-2-ethylhexylphthalate in all samples, and most compounds in sample SB-FS-TB-PC-11-0.5-2.0 & SB-FS-TB-PC-12-0.5-2.0 and the 5 re-extracted compounds in sample SB-FS-PC-11-5.0-10.0 due to extract dilution. All non-detects were reported at levels below the PALs given in Table 4-2C for all samples except for hexachlorobenzene in samples SB-FS-TB-PC-11-0.5-2.0, SB-FS-TB-PC-12-0.5-2.0 & SB-FS-TB-2.

Date: ***10/23/12***

Data Reviewer: ***Deborah A. Loring***

8270D and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: waters: BN 30 - 130%, acids 15-110%; solids: all surrogates 30-130%
2 BN or 2 Acids Recovery > Criteria, J det/Accept ND; 10% ≤ 2 or more surrogates < Criteria, J det/J NDs;
Recovery < 10%, J det/R NDs. Action taken on Acid and/or BN analytes based on Surrogates out.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs.

Tunes: Samples analyzed within 12-hrs and criteria met per Table 3 or Method 8270C. If out, use professional judgment.

ICAL: minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs; min. RRF < 0.05, J det/UJ NDs.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank

Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for phthalates which are 10 x value in blank.

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs- Unspiked Sample only. RPD > Limit, J det/UJ NDs.
MS/MSD must contain all targets.

FD: Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data

IS: 20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs

QLs: Verify RLs met QAPP QLs ; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

TICs: Not required

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8270D

Date: ***10/23/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
PCB Tier II-type Data Review Checklist

Lab Project # 360-40791

Lab: TestAmerica Westfield
Date Sampled: 5/25/12
Method of Analysis: 8082A

No. Samples: 6 + 1 FD
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 40-140% RPD ≤ 30%	FD w:RPD≤30% s:RPD≤50%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)	Other (pattern match, etc.)
Yes	√	√	√	NA	√	√	√	NA	----
No									

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 5/25/12, the day of collection at 4±2°C . Samples were properly preserved. No action required.

Samples were extracted on 6/6/12 - HT met for extraction. All extracts were analyzed by 6/7/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - no action required. Note, lab used in-house criteria for recovery of surrogates; QAPP criteria used to determine data acceptance.

LCS/LCSD: LLCS 360-91616/2-A & 3-A . Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec for AR1016 & AR1260 in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD: MS/MSD analyses were not performed with this SDG.

Date: ***10/24/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40791

Blank Action: Blanks Reviewed: MB: MB 360-91616/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91616/1-A	None					No Blank Action required	

Additional Notes:

FD pair: SB-FS-TB-PC-12-0.5-2.0 / SB-FS-TB-2. All Pesticides were non-detect in both samples; therefore, while these results are consistent with one another, unable to quantitatively evaluate FD precision based on calculation of RPD. FD precision considered acceptable for this FD pair.

ICAL: Instrument M 4/13/12 6-level calibration from 50 to 2000 µg/L for Ar 1016/1260 and a single point calibration at 1000 µg/L for Ar-1221/1254, Ar-1232, Ar-1242, Ar-1248, Ar-1262, Ar-1268. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), linear regression performed for Ar-1016 & 1260 on both columns, and r2 > 0.99. Valid ICAL - no action required.

CCALs : CCAL: CCV 360-91628/1 6/7/12 11:10 Average %D < 20% except Col 1 Ar-1016 %D = -23.7. Column 2 within limits so no action required. CCV 360-91628/12 6/7/12 16:20 Average %D < 20% on both columns. CCV 360-91628/25 Average %D < 20% on both columns. No action required.

Lab reported the lowest of the two column values. Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. No PCBs reported in samples - no action required.

RLs for samples SB-FS-PC-11-19.0-21.0, SB-FS-PC-12-12.0-15.0 and SB-FS-PC-12-20-22 reported were slightly above the PQLs given in QAPP Table 4-C (RLs 110 µg/kg vs. 100 µg/kg), due to % solids.

All RLs reported were less than or equal to the PALs given in QAPP Table 4-C.

All chromatograms for all samples visually inspected and appear to have been reported correctly. Samples SB-FS-TB-PC-11-0.5-2.0, SB-FS-PC-11-5.0-10.0, SB-FS-TB-PC-12-0.5-2.0, SB-FS-TB-2, and SB-FS-PC-12-12.0-15.0 show complex mixtures, however, none were matched to a specific Aroclor pattern.

Narrative did not raise any issues not already addressed.

Date: ***10/24/12***
Data Reviewer: ***Deborah A. Loring***

8082A and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs- Unspiked Sample only. RPD > 30% solids, J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multi-components), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multi-components) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8082A

Date: ***10/24/12***
Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Pesticide Tier II-type Data Review Checklist

Lab Project # 360-40791

Lab: TestAmerica Westfield
Date Sampled: 5/25/12
Method of Analysis: 8081B

No. Samples: 6 + 1 FD
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 30-150% w: RPD≤20% sr:RPD≤30%	FD w:RPD≤30% s:RPD≤50%	RCM (Resolve. > 60%)	PEMs Brkdwn< 15% %D ≤ ± 15%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)
Yes	√	√	√	NA	√	√	√	√	√	NA
No										

% solids OK? Y
Other Issues: No Technical chlordane was reported instead of alpha-chlordane. Low-level initial calibration for Toxaphene and Technical chlordane did not support the lab-reported RL - action taken to raise RL for Toxaphene and Technical chlordane (see page 2).

Comments:

Samples were received intact at TestAmerica on 5/25/12, the day of collection at 4±2°C . Samples were properly preserved. No action required.

Samples were extracted on 6/6/12 and analyzed by 6/8/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - No Action required. Note, lab used in-house criteria for recovery of surrogates; QAPP criteria used to determine data acceptance.

LCS/LCSD: LCS 360-91616/4-A & 5-A Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD: MS/MSD analyses were not performed with this SDG.

FD pair: SB-FS-TB-PC-12-0.5-2.0 / SB-FS-TB-2. All Pesticides were non-detect in both samples; therefore, while these results are consistent with one another, unable to quantitatively evaluate FD precision based on calculation of RPD. FD precision considered acceptable for this FD pair.

Date: ***10/24/12***
Data Reviewer: ***Deborah A. Loring***

Lab Project # 360-40791

Lab: TestAmerica Westfield

Blank Action:

Blanks Reviewed: MB: MB 360-91616/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91616/1-A	None	Y				No Blank Action required	

Resolution Check : RCM not analyzed per se; however, CCALs reviewed and all peaks appear to be adequately resolved - No Action required

PEM DDT and Endrin Breakdown evaluations: PEM 360-91653/16 06/07/2012 20:56, and PEM 360-91653/28 06/08/2012 01:11 - %Breakdown for DDT and Endrin ≤ 15% + Combined Breakdown was ≤ 30% on each GC Column. No Action required.

ICAL: Instrument H 6/7/12 7-level from 1 to 100 µg/L for single-component Pesticides (some extras not required for project) + surrogates and 3-level from 500 to 2,500 µg/L for Toxaphene and Technical Chlordane. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), %RSD ≤ 20% or r2 ≥ 0.99 for all compounds. Several compounds used regression analysis for calibration on Columns 1 & 2. Valid ICAL - no action required.

CCALs : CCVRT 360-91653/17 on 06/07/2012 21:17 (Opening CCV for single-components), CCV 360-91653/18 on 06/07/2012 21:38 (Technical Chlordane), and CCV 360-91653/19 on 06/07/2012 22:00 (Toxaphene) - all %D ≤ ±20% on both GC columns for all Pesticides except Endrin aldehyde (+23.6%) on GC Column 2. CCV 360-91653/29 on 06/08/2012 01:33 CCV 360-91653/30 on 06/08/2012 01:54 (Technical Chlordane) and CCV 360-91653/31 on 06/08/2012 02:15 (Toxaphene) - all %D ≤ ±20% on both GC columns for all Pesticides. CCV 360-91653/50 on 06/08/2012 09:00 all %D ≤ ±20% on both GC columns for all Pesticides. A positive %D indicates increased sensitivity to detection during CCAL as compared to sensitivity during ICAL; therefore, since all samples were non-detect for these compounds, no action for enhanced sensitivity in CCVs (i.e. non-detects accurate as reported). No action required.

Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D, however, only detects were in the LCS/LCSD results. No action required.

The narrative did not raise any issues not already addressed.

All RLs reported were less than or equal to the PQLs given in QAPP Table 4-3B except for all toxaphene in all samples and dieldrin and aldrin in samples SB-FS-PC-11-19.0-21.0, SB-FS-PC-12-12.0-15.0 and SB-FS-PC-12-20-22. No PQL was defined for Technical chlordane in the QAPP.

Lab reported results for all 21 target Pesticides required, except technical chlordane was reported instead of alpha-chlordane. The technical chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. The resulting RL was above the PAL for Toxaphene in all samples. All other RLs reported were less than or equal to the PALs given in QAPP Table 4-3B. No PAL was defined for Technical chlordane in the site QAPP.

Date: ***10/24/12***
Data Reviewer: ***Deborah A. Loring***

8081B and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

RCM: RCM < 60% resolution, J detects based on technical judgment

PEM: 4,4'-DDT breakdown > 15%, J detected DDT, DDE, DDD; R ND 4,4'-DDT and accept ND DDE & DDD
Endrin breakdown > 15%, J detected Endrin, Endrin Aldehyde & Endrin Ketone; R ND Endrin and accept ND Endrin Aldehyde & Endrin Ketone
4,4'-DDT and Endrin > 30%, accept NDs of breakdown products and J detects for 4,4'-DDT and Endrin; J detects of breakdown products and reject (R) non-detects for 4,4'-DDT and Endrin.
%D> ± 20%, J det/J ND on a per column basis. % Resolution < 90.0% qualify data based on professional judgment.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<30%, J det/ J NDs; %Rec >150%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters (or 30% solids), J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multicomponents), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multicomponents) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8081B

Date: ***10/24/12***
Data Reviewer: ***Deborah A. Loring***

RDWP - Davis Liquid Waste Superfund Site
EPA Region I Tier II-type DV Checklist - Metals

Lab: TestAmerica-Westfield, Westfield, MA
Date Sampled: 5/25/12
Analysis: Metals by EPA SW-846 Method 6010C & 7471A

Lab Project # 360-40791-1
No. Samples: 7
Matrix: Soil

QC Met Criteria?		HT and Preserve	RL QAPP PALs	Tune 6020 criteria	Calibration ICV/CCV 90-110%R	CRI RL Check 70-130%R	EB MB < RL	LCS/LCSD SRM limits RPD ≤ 30%	ICSA/AB 80-120% R	MS / MSD 75-125% R	MD RPD ≤ 20%	FD RPD ≤ 30%	IS 6020 70-130% R	Serial Dilution ± 15% D
Yes		√	√	NA	√	√	√	√	√	NA	NA	√	NA	NA
No														

Soils for Target Analyte List (TAL) of 23 Metals: Mercury by CVAA SW846 Method 7471A; and Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, & Zinc by ICP-AES Method 6010C.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data for Tier II level in accordance with the Davis QAPP (ESS 2012) & EPA Region 1 present in the data package? ***Yes.***

2. Were all result forms for all samples listed on the chain-of-custody present in data package? ***Yes***.

Chain-of-Custody (COC): 7 soil samples received for Total TAL Metals - received at lab on 5/25/12 (same day as sample collection) and intact. Documentation acceptable.

Preservation: Samples received at 4.0°C and 5.4°C on ice. Acceptable preservation for soils.

Holding Time (HT): ICP-AES 6010C analysis 5/31/12 & 6/06/12; CVAA 7471A analysis 6/05/12. Acceptable HT.

Calibration Criteria: ICV/CCV and CRI (RL check standard supporting the level of the RL reported) met acceptance criteria for all Metals. Note CRI not required by Davis QAPP but reviewed as additional support of the lab RLs (criteria set at 70-130%). Tune criteria not applicable for Method 6010C. ICSA/AB met recovery criteria for all ICP metals.

Date: *10/25/12*
Data Reviewer: *Susan D. Chapnick*

New Environmental Horizons, Inc.

Lab: TestAmerica Lab Project #: 360-40791-1

Blanks: No EB included with samples in this SDG. Method blank (MB) & instrument blanks (ICB/CCB) were non-detected for all metals except for Barium, Calcium, and Iron; detected at 0.64, 11.3, and 6.41 mg/Kg, respectively in one MB and Calcium detected at 11.0 mg/Kg in the second MB. No action required since all soil sample results were > 5x the blank levels for these 3 metals. Lab also qualified associated soil results for these 3 metals as "B" on the Form 1 and in the EDD for detection in an associated blank; however, since no blank action was required, all "B" flags were removed during validation.

LCS/LCSD: Lab performed both LCS and LCS duplicate (LCSD), though LCSD not required in Davis QAPP. LCS/LCSD met acceptance criteria for all Metals for accuracy (based on soil SRM control limits listed by lab on Form 7, consistent with QAPP criteria for this media) and precision (RPD <30% lab criteria).

MS/MD: No site-sample MS/MD was identified to be performed in this SDG.

Serial Dilution: No serial dilution on a site sample was performed in this SDG.

IS: IS not applicable for Method 6010C.

Sensitivity: All RLs for non-detects met Davis QAPP Table 4-5C for Soil requirements for sensitivity (RL) based on being lower than the PALs (even though some, for example antimony, were > PQLs they were still lower than the PALs). Sample SB-FS-PC-11-19.0-21.0 was analyzed at a 2x dilution due to "non-target compounds" (as based on lab narrative). All non-detected results in this sample still were < PAL; therefore, all sensitivity objectives met for Metals.

Professional Judgment - Other: Data users are cautioned that the detected Metals results for Selenium reported from ICP-AES Method 6010C (ranging from 1.1 mg/Kg to 3.0 mg/Kg) may be false positives based on professional judgment knowledge of positive interference for selenium on ICP-AES in some matrices. Since the reported Selenium results were orders-of-magnitude below the PAL of 390 mg/Kg and since all QC criteria were met, no action was taken other than to note this issue.

Laboratory Narrative: No further issues noted.

Date: *10/25/12*
Data Reviewer: *Susan D. Chapnick*

Lab: TestAmerica Lab Project #: 360-40791-1

FD pair samples: SB-FS-TB-PC-12-0.5-2.0 and SB-FS-TB-2. All FD precision met acceptance criteria.

FD Precision: all units are mg/Kg dry-weight

Analyte	Sample SB-FS-TB-PC-12-0.5-2.0	Qual	FD SB-FD-TB-2	Qual	Precision RPD* %	Action	Comment
Aluminum	9500		9100		4	none	
Antimony	0.66	U	0.67	U	NC	none	
Arsenic	2.6		2.7		4	none	
Barium	44		39		12	none	
Beryllium	0.49		0.45		9	none	
Cadmium	0.26	U	0.27	U	NC	none	
Calcium	1200		1100		9	none	
Chromium	7.4		7.6		3	none	
Cobalt	4.4		5.2		17	none	
Copper	11		12		9	none	
Iron	16000		16000		0	none	
Lead	18		19		5	none	
Magnesium	2000		1700		16	none	
Manganese	200		150		29	none	
Mercury	0.092	U	0.076	U	NC	none	
Nickel	4.8		5		4	none	
Potassium	2500		2300		8	none	
Selenium	1.6		1.1		37	none	
Silver	0.66	U	0.67	U	NC	none	
Sodium	130	U	130	U	NC	none	
Thallium	1.3	U	1.3	U	NC	none	
Vanadium	16		15		6	none	
Zinc	59		53		11	none	

Date: *10/25/12*
Data Reviewer: *Susan D. Chapnick*

QC & DV Action Criteria for Davis Superfund Site Metals [based on Davis QAPP 2012 & EPA Region I DV guidance]:

Pres./HT:	HT exceedance: J detects; Non-detects: R or UJ based on professional judgment. pH >2 use professional judgment to J detects; UJ non-detects.
Blanks:	Method Blanks and instrument blanks: Metals < RL unless all sample results are > 10 blank level. Detected results < matrix-matched blank level report as "U" (non-detected at level found). Equipment Blank: EB > RL for any metals; qualify associated detected results < 5x EB level as "EB" - potential high bias based on EB contamination.
Tune:	Mass calibration (amu) > QC limit: J/UJ. Mass resolution/peak width (amu) > QC limit: J/UJ. %RSD > QC limit: J/UJ. See EPA SW-846 Method 6020A for Tune criteria. Tune not performed: R all associated data.
ICV/CCV:	Recoveries < 90%: J / UJ; recoveries > 110%: J detects; if severe exceedance <75%: R non-detects; > 160%: R detects.
CRI:	Low-level standard at the level of the RL: % recovery <70%: J / UJ; >130%: J detects.
LCS:	Aqueous: %Recoveries < 80%: J / UJ. %Recoveries > 120%: J detects. %Recoveries < 50%, may R non-detects & J detects but use professional judgment to accept results if MS is in-control indicating acceptable accuracy in sample matrix. Solids: SRM control limits are criteria; J/UJ outside these limits; use professional judgment for severe exceedances of control limits.
ICSA/AB:	Recoveries > 120% or < 80%: J / UJ unless extremely low for ICSAB at <50%: R non-detects / J detects.
MS:	%Recoveries < 75%: J / UJ. %Recoveries > 125%: J detects. %Recoveries < 30%, may R non-detects & J detects but use professional judgment if sample concentration > 2x spike level.
MD:	Groundwater/Surface Water: Results >5xRL: RPD >20%: J/UJ associated results in batch. Results < 5xRL: difference > ±RL, J/UJ associated results. Soil/Sed: Results >5xRL: RPD >35%: J/UJ associated results in batch. Results < 5xRL: difference > ±2xRL, J / UJ associated results.
FD:	Groundwater/Surface Water: Results > 5xRL: RPD > 30%: J/UJ FD results only. Results < 5xRL: difference > ±2xRL,, J/UJ FD results only. Soil/Sed: Results >5xRL: RPD > 50%: J/UJ FD results only. Results <5xRL: use professional judgment.
IS:	Recoveries < 70%: J / UJ; recoveries > 130%: J detects; use professional judgment for severe exceedances.
Serial Dil:	Results > 50xRL: % Difference > 15%: J detects. EPA guidance UJ non-detects; however, use professional judgment on whether it is a suppression or enhancement to qualify associated non-detects.

Qualifiers: U = analyte is non-detect at the sample-specific Reporting Limit (RL) (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.

References: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island;* prepared by ESS Group, Inc., March 23, 2012 (Davis QAPP); Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996, including Part IV – Inorganic Data Validation Functional Guidelines, November 2008; Region I T*iered Organic and Inorganic Data Validation Guidelines* , July 1, 1993 draft; & USEPA SW846 Methods 6010C, 6020, & 7470A/7471A.

Date: *10/25/12*
Data Reviewer: *Susan D. Chapnick*

environmental chemistry consultants

DATA VALIDATION REPORT
EPA Region I Tier III-Type for VOCs, TCL SVOCs, TCL Pesticides, TCL PCBs & TAL Metals

Client: ESS Group, Inc., East Providence, Rhode Island

Site: Davis Liquid Waste Superfund Site, Smithfield, Rhode Island
Soil Sampling - 2012

Laboratory: TestAmerica Edison, Edison, New Jersey

Lab Project/SDG #: 360-40815-1

Number of Samples: 13 soil samples + 1 Trip Blank for project-specific list of 52 Volatile Organic Compounds (VOCs)
6 soil samples for Target Compound List (TCL) Semivolatile Organic Compounds (SVOCs), TCL Pesticides, and TCL Polychlorinated Biphenyl Compounds (PCBs)
6 soil samples for Target Analyte List (TAL) Metals

Data Reviewers: Nancy C. Rothman, Ph.D., New Environmental Horizons, Inc.
Susan D. Chapnick, M.S., New Environmental Horizons, Inc.

Date: October 16, 2012

EPA Tier III-type Data Validation Review was performed on the data included in this SDG with the following intentions: 1) to determine if the data were generated and reported in accordance with the following documents: *Remedial Design Work Plan and Pre-Design Investigation Plan* (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996 and updates including Part II, III, and IV (Volatile/Semivolatile, Pesticide/PCB, and Inorganic Data Validation Functional Guidelines); EPA *Region I Tiered Organic and Inorganic Data Validation Guidelines*, July 1993, and USEPA SW846 Method 8260C, 8270D, 8081B, 8082A, 6010C, and 7471A 2) to determine if the data met the project data quality objectives for acceptable accuracy, precision, sensitivity; and technical usability; and 3) to update the project database with validated results and appropriate data validation qualifiers.

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The Data Validation Report consists of three parts:

- This Data Validation Report letter summarizing the actions taken;
- The spreadsheet of validated sample results with validation qualifiers based on actions taken; and
- The Data Validation Checklists to document the Tier III-type validations. These Checklists are an integral part of the validation report as they contain comprehensive details of all QC reviewed, the acceptance criteria used, professional judgment and actions taken.

I. Sample Descriptions and Analytical Parameters

The sample IDs, date of sampling, matrix, and sample type (e.g. Field Sample, Field Duplicate, etc., as applicable) and the analytical parameters reviewed are listed below in Table 1.

Table 1. Sample Descriptions and Analytical Parameters

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-FS-PC-18-14.0-17.0	5/29/2012	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, & TAL Metals	Field Sample
SB-FS-PC-18-16.0-16.5	5/29/2012	Soil	VOCs	Field Sample
SB-FS-PC-18-20.0-20.5	5/29/2012	Soil	VOCs	Field Sample
SB-FS-PC-18-20.0-22.0	5/29/2012	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, & TAL Metals	Field Sample
SB-FS-PC-18-23.0-23.5	5/29/2012	Soil	VOCs	Field Sample
SB-FS-PC-19-11.5-12.0	5/29/2012	Soil	VOCs	Field Sample
SB-FS-PC-19-18.5-19.0	5/29/2012	Soil	VOCs	Field Sample
SB-FS-PC-19-5.5-6.0	5/29/2012	Soil	VOCs	Field Sample
SB-FS-PC-28-4.5-5.0	5/29/2012	Soil	VOCs	Field Sample
SB-FS-TB-PC-18-0.5-1.0	5/29/2012	Soil	VOCs	Field Sample
SB-FS-TB-PC-18-0.5-2.0	5/29/2012	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, & TAL Metals	Field Sample

Table 1. Sample Descriptions and Analytical Parameters - *continued*

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-FS-TB-PC-18-3.0-3.5	5/29/2012	Soil	VOCs	Field Sample
SB-FS-TB-PC-18-3.0-5.0	5/29/2012	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, & TAL Metals	Field Sample
SB-FS-TB-PC-19-0.5-2.0	5/29/2012	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, & TAL Metals	Field Sample
SB-FS-TB-PC-19-1.5-2.0	5/29/2012	Soil	VOCs	Field Sample
SB-FS-TB-PC-20-0.5-1.0	5/29/2012	Soil	VOCs	Field Sample
SB-FS-TB-PC-20-0.5-2.0	5/29/2012	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, & TAL Metals	Field Sample
SB-FS-TB-PC-20-9.0-9.5	5/29/2012	Soil	VOCs	Field Sample
SB-PCB-3	5/29/2012	Soil	VOCs	Field Duplicate of SB-FS-PC-19-11.5-12.0
TB-053012-1	5/29/2012	Water	VOCs	Trip Blank

Analytical method references:

Volatiles: 52 project-specific VOCs by USEPA SW846 Method 8260C that includes the TCL plus diethyl ether and tetrahydrofuran and minus 1,4-dioxane (not required for soils; note 1,4-dioxane was reported in the TB).

Semivolatiles: TCL SVOCs by USEPA SW846 Method 8270D

Pesticides: TCL Pesticides by USEPA SW846 Method 8081B

PCBs: TCL PCB Aroclors by USEPA SW846 Method 8082A

Metals: TAL Metals by USEPA SW846 Method 6010C (ICP-AES), which includes 22 Metals, plus Mercury by USEPA SW846 Method 7471A Cold Vapor Atomic Absorption (CVAA)

Percent Moisture / Percent Solids were performed and reported for all samples to convert results to dry-weight units.

II. Quality Control Reviewed during Data Validation

The following QC elements, as applicable to the analytical methods, were reviewed during the Tier III-type validation of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals:

- Data package completeness and reporting protocols
- Sample receipt, holding times and preservation criteria
- Blank results including Method Blanks, Equipment Blanks, & Trip blanks
- Laboratory Control Sample (LCS) recoveries / LCS Duplicate Recoveries
- Standard Reference Material (SRM) Recoveries, if applicable
- Surrogate Recoveries
- Matrix Spike (MS) / Matrix Spike Duplicate (MSD) Recoveries
- MS/MSD, LCS/LCSD, and sample/Field Duplicate (FD) Relative Percent Differences (RPDs)
- Sample result reporting (including compound lists, reporting limits, and units)
- Calibration criteria (including tune criteria, initial calibration and continuing calibration verification)
- Internal Standard (IS) Recoveries
- Retention Time windows
- Other method-specific QC if applicable and reported
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

III. Data Validation Report Summary

During the Tier III-type data validation review of VOCs, TCL SVOCs, TCL Pesticides, PCB Aroclors, and TAL Metals, several results were estimated (J or UJ) due to QC issues. Table 2 summarizes the actions taken during this data validation review. NEH generated a validated data spreadsheet based on the electronic project database file (EDD) received from ESS for this SDG. All results were considered usable for project decisions compared to the RDWP QAPP requirements with the understanding of the potential uncertainty (bias) in the qualified results presented in Table 2.

The remainder of this report documents "exceptions" to method criteria or clarifications of data reported. QC elements not discussed below met all QAPP criteria. The full documentation of all QC elements reviewed during the Tier III-type validations are presented in the attached Data Validation Checklists.

Sample Receipt and Holding Time

- All samples were received intact, properly preserved, and all holding times were met.

Accuracy

- No equipment blanks were associated with these soil samples.
- The method blanks were all non-detect for VOCs, SVOCs, Pesticides, and PCBs, except for 1,2,4-trichlorobenzene and di-n-butylphthalate, which were detected at a at levels less than their Reporting Limits (RL), and neither of which were detected in the associated samples. The trip blank was also non-detect for all VOCs. Therefore, no blank actions were required for VOCs, SVOCs, Pesticides, or PCBs.

- The method blanks for Metals were all less than the reporting limits (RLs) with the exception of calcium. The laboratory flagged calcium results "B" since calcium was detected in the method blank. This qualifier was removed during validation since no blank action was required based on the soil calcium concentrations (which were greater than the blank action level).
- Various compounds recovered high compared to criteria in the MS/MSD, LCS, and/or continuing calibration analyses; however, since the associated samples were non-detect for these compounds, no actions were required.
- Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) reported acceptable accuracy for Metals, VOCs, SVOCs, and Pesticides except as follows:
  - VOCs - Three LCS/LCSD pairs were run for soils and one was run for the Trip Blank. In the LCS/LCSD associated with the Trip Blank, 2-butanone, 2-hexanone, 4-methyl-2-pentanone, and acetone reported low recoveries for the LCS and LCSD, therefore the results for these compounds were estimated with a low bias. In the three soil LCS/LCSD pairs, acetone, 2-butanone, and chloroethane (chloroethane in 1 batch only) recovered low, but above 10% in the LCS and/or the LCSD. Results for these three compounds were estimated (UJ) with possible low bias in the associated samples as shown in Table 2. In two batches, one compound was slightly low in the LCSD only, but within limits for the LCS and the RPD (2-hexanone in a soil batch and chloromethane in the water batch). Results were accepted without qualification based on professional judgment.
- Matrix Spike (MS) and Matrix Spike Duplicate (MSD) analyses for Metals, SVOCs, Pesticides, and PCBs were performed on sample SB-FS-TB-PC-18-3.0-5.0. An additional MS was also performed for Metals on sample SB-FS-TB-PC-19-0.5-2.0 in a separate QC batch. MS/MSD for VOCs was performed on sample SB-FS-PC-19-18.5-19.0. Accuracy was acceptable for all compounds/analytes except as follows:
  - VOCs - 1,1,2-trichloro-1,2,2-trifluoroethane, 2-hexanone, 2-butanone, and acetone recovered below criteria but above 10% in the MS and/or MSD; and cis-1,2-dichloroethene recovered below 10% in both the MS and MSD. 1,1,2-Trichloro-1,2,2-trifluoroethane , 2-hexanone, 2-butanone, and acetone were estimated (UJ) with low bias, and cis-1,2-dichloroethene was estimated (J) with indeterminate bias due to low MS/MSD recoveries. The indeterminate bias assignment for cis-1,2-dichoroethane is based on professional judgment as the sample shows a higher "native" concentration of cis-1,2-dichloroethane than its corresponding MS/MSD, which is more likely indicative of sample heterogeneity issues than of low bias in the native sample result.
  - SVOCs – 3,3'-Dichlorobenzidine recovered below criteria, but above 10% in the MS and MSD. Action was not taken for high carbazole recovery as it was not detected in the associated sample. 3,3'-Dichlorobenzidine was estimated (UJ) with indeterminate bias (due to additional QC exceedance) in sample SB-FS-TB-PC-18-3.0-5.0 as shown in Table 2.
  - Metals – antimony recovered below criteria, but above 30%, in the MS/MSD on sample SB-FS-TB-PC-18-3.0-5.0 and the MS on sample SB-FS-TB-PC-19-0.5-2.0. Calcium recovered high above criteria in the MS on sample SB-FS-TB-PC-19-0.5-2.0. Therefore, antimony was estimated (J or UJ) in all samples and calcium was estimated in sample SB-FS-TB-PC-19-0.5-2.0 only. The laboratory performed post-digestion spikes that showed acceptable recoveries for antimony and calcium. This indicates that there was a matrix effect in the original field samples and the effect was not caused during instrument analysis. Estimated results have a potential low bias for antimony and a potential high bias for calcium as shown in Table 2. MS/MSD exceedances were also observed for aluminum and iron. However, the level of these metals in the sample was greater than 4x that of the spike level; therefore, the spike level was not appropriate to the sample concentration and no action was required.

- The initial calibration associated with the VOC analysis of samples SB-FS-TB-PC-18-3.0-3.5 and SB-FS-PC-18-16.0-16.5 reported low recovery for tetrahydrofuran. This compound was estimated (UJ) with possible low bias due to low calibration verification as shown in Table 2.
- The initial calibration associated with the SVOC analysis of all samples reported results that exceeded the relative standard deviation criterion. Affected compounds in associated samples were estimated (UJ) with indeterminate bias as shown in Table 2.
- Various continuing calibrations reported low recovery for one or more compounds as follows:
  - VOCs – The continuing calibration associated with sample (TB-053012-1) reported low recoveries for chloromethane, acetone, methyl acetate, tetrahydrofuran, 2-butanone, 4-methyl-2-pentanone, and 2-hexanone. The continuing calibration associated with samples SB-FS-TB-PC-18-0.5-1.0, SB-FS-PC-18-20.0-20.5, SB-FS-PC-18-23.0-23.5, SB-FS-PC-19-5.5-6.0, SB-FS-TB-PC-19-1.5-2.0, SB-FS-PC-19-18.5-19.0, and SB-FS-TB-PC-20-0.5-1.0 reported low recoveries for vinyl chloride, chloroethane, methyl acetate, 1,1,2,2-tetrachloroethane, 1,2-dichlorobenzene, and 1,2-dibromo-3-chloropropane. The continuing calibration associated with samples SB-FS-TB-PC-18-3.0-3.5 and SB-FS-PC-18-16.0-16.5 reported low recovery for tetrahydrofuran. These compounds were estimated (UJ) in the associated results with possible low bias due to low calibration verification as shown in Table 2.
  - SVOCs – 2,4-Dinitrophenol reported low recovery in the continuing calibration associated with the analysis of all samples; therefore, results for this compound were estimated (UJ) with possible low bias as shown in Table 2.
  - Pesticides – some pesticides recovered outside criteria on one of the GC columns used for analysis, but not both columns. Since the affected compounds were all non-detect in the samples, no actions were required.

Precision

- The LCS/LCSDs reported acceptable precision for all Metals, VOCs, SVOCs, and Pesticides.
- Precision was acceptable in the MS/MSD analyses performed for Metals, SVOCs, Pesticides, and PCBs on sample SB-FS-TB-PC-18-3.0-5.0, the MS/MSD performed on sample SB-FS-PC-19-18.5-19.0 for VOCs, and the matrix duplicate (MD) performed for Metals on sample SB-FS-TB-PC-19-0.5-2.0 with the following exceptions:
  - SVOCs – 3,3'dichlorobenzidine MS/MSD precision exceeded criteria. Therefore, the results for this compound were estimated (UJ) with indeterminate bias in sample SB-FS-TB-PC-18-3.0-5.0 as shown in Table 2.
- There was one Field Duplicate (FD) pair included in this SDG for VOCs only: SB-FS-PC-19-11.5-12.0 and SB-PCB-3. FD precision was acceptable with the exception of cis-1,2-dichloroethene, ethylbenzene, m&p-xylene, o-xylene, and total xylenes. Therefore, these results in the FD pair were estimated (J) with indeterminate bias as listed in Table 2. The FD results indicate variable overall precision and representativeness for VOCs in the site soil matrix at the FD location sampled.

Sensitivity & Reporting

- The laboratory reported results for all 21 target Pesticides required, except technical-chlordane was reported instead of alpha-chlordane. The technical-chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. All RLs for Pesticides reported were less than or equal to the PALs given in QAPP Table 4-3B and therefore met sensitivity requirements with the exception of toxaphene (due to raising the RL

during validation). No PAL was defined for technical-chlordane in the site QAPP. The data user will need to evaluate usability of the non-detected toxaphene results with elevated RLs for project uses.

- The laboratory flagged all results for VOCs and SVOCs that were less than the RL (supported by the low-level standard in the calibration curve) as "J". The "J" qualifier was maintained during validation to indicate that these results were estimated due to uncertainty in quantitation below the calibration range. Affected samples/analytes are listed in Table 2.
- All non-detects for VOCs were below the Project Action Limit (PAL) given in QAPP Table 4-1C except for:
    - All samples: 1,2-dibromo-3-chloropropane and ethylene dibromide, as expected, due to method limitations.
    - SB-FS-PC-19-11.5-12.0, SB-PCB-3, and SB-FS-TB-PC-20-9.0-9.5: 1,1,2-trichloroethane, 1,1-dichloroethene, 1,2-dichloroethane, 1,2-dichloropropane, benzene, tetrachloroethene, trichloroethene, and vinyl chloride due to reporting of results from the medium-level (methanol preserved) analysis.
    - SB-FS-PC-28-4.5-5.0: 1,1,2-Trichloroethane, 1,1-Dichloroethene, 1,2-Dichloroethane, 1,2-Dichloropropane, Benzene, Chloroform, Bromodichloromethane, Tetrachloroethene, Trichloroethene, and Vinyl chloride due to reporting of results from the medium-level (methanol preserved) analysis.
- All non-detects for SVOCs, Pesticides, and PCBs were below the Project Action Limit (PAL) given in QAPP Tables 4-2C, 4-3B, and 4-4B, respectively except:
    - All samples: toxaphene.
    - SB-FS-TB-PC-18-3.0-5.0, SB-FS-TB-PC-19-0.5-2.0, and SB-FS-TB-PC-20-0.5-2.0: hexachlorobenzene.
- All non-detects for Metals were below the PALs given in QAPP Table 4-5C. Therefore, sensitivity DQOs were met for Metals.
- The laboratory reported results for m-xylene and p-xylene (reported as a single entry due to coelution) and o-xylene in addition to xylenes, total, as requested in the QAPP. All 52 project-specific VOCs were reported; therefore, with the added xylene isomers, a total of 54 VOC results were reported per sample.
- The VOC compounds bromodichloromethane and dibromochloromethane listed in QAPP Table 4-1C were reported in the hardcopy and electronic data file using the pseudonyms dichlorobromomethane and chlorodibromomethane, respectively.
- The laboratory reported dual GC column precision for Pesticide analysis using relative percent difference (RPD) rather than percent difference (%D). This did not adversely affect the results; therefore, no action was required.

Other Metals QC

- The low-level calibration check standard (CRI) on ICP-AES and ICP-MS, analyzed at the level of the RL, met lab acceptance criteria of 70-130%. This low-level check standard supported the RLs for Metals analyzed by ICP. For CVAA (mercury), the RL was supported by the low-level in the calibration curve.
- The Davis QAPP required Metals results to be reported to the RL only (not below). Therefore, results reported below the RL were considered as non-detects at the level of the RL for purposes of this data validation. Based on this approach, several results for the CRI check standard (described above) were reported as "ND" on the QC summary form, but are associated with acceptable % recoveries. This is a reporting anomaly since the value found was < RL and used to calculate the % recovery but reported as non-detected. No action was required.

- Data users are cautioned that the detected Metals results for selenium reported from ICP-AES Method 6010C may be false positives based on professional judgment knowledge of positive interference for selenium on ICP-AES in some matrices. Since the reported selenium results were orders-of-magnitude below the PAL and since all QC criteria were met, no action was taken other than to note this issue.

Table 2. Summary of Data Validation Actions

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
All samples	Antimony	J / UJ	L	Low MS/MSD recoveries
SB-FS-TB-PC-19-0.5-2.0	Calcium	J	H	High MS recovery
All Pesticide samples	Chlordane (technical) Toxaphene	U		Raised RL
SB-FS-PC-19-11.5-12.0 SB-PCB-3	cis-1,2-Dichloroethene Ethylbenzene m-Xylene & p-Xylene Xylenes, Total	J	I	FD imprecision
SB-FS-PC-19-11.5-12.0	o-Xylene	J	I	FD imprecision + Result uncertain below the calibration range
SB-PCB-3	o-Xylene	J	I	FD imprecision
SB-FS-PC-18-16.0-16.5 SB-FS-TB-PC-18-3.0-3.5	Tetrahydrofuran	UJ	L	Initial Calibration outside criteria + Low Calibration verification
SB-FS-PC-18-20.0-20.5 SB-FS-PC-18-23.0-23.5 SB-FS-PC-19-5.5-6.0 SB-FS-TB-PC-18-0.5-1.0 SB-FS-TB-PC-19-1.5-2.0 SB-FS-TB-PC-20-0.5-1.0	1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-Chloropropane 1,2-Dichlorobenzene Chloroethane Methyl acetate Vinyl chloride	J / UJ	L	Low Calibration verification
SB-FS-PC-19-18.5-19.0	1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-Chloropropane 1,2-Dichlorobenzene Methyl acetate Vinyl Chloride	J / UJ	L	Low Calibration verification
SB-FS-PC-19-18.5-19.0	Chloroethane	J	I	Low Calibration verification + Result uncertain below the calibration range
TB-053012-1	Chloromethane Methyl acetate Tetrahydrofuran	UJ	L	Low Calibration verification
SB-FS-PC-19-11.5-12.0 SB-FS-TB-PC-20-9.0-9.5 SB-PCB-3	2-Butanone (MEK) Acetone Chloroethane	UJ	L	Low LCS/LCSD recoveries

Table 2. Summary of Data Validation Actions - *continued*

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
SB-FS-PC-18-16.0-16.5 SB-FS-PC-18-20.0-20.5 SB-FS-PC-18-23.0-23.5 SB-FS-PC-19-5.5-6.0 SB-FS-TB-PC-18-0.5-1.0 SB-FS-TB-PC-18-3.0-3.5 SB-FS-TB-PC-19-1.5-2.0 SB-FS-TB-PC-20-0.5-1.0	2-Butanone (MEK) Acetone	UJ	L	Low LCS/LCSD recoveries
SB-FS-PC-28-4.5-5.0	Acetone Chloroethane	UJ	L	Low LCS/LCSD recoveries
TB-053012-1	2-Butanone (MEK) 2-Hexanone 4-Methyl-2-pentanone Acetone	UJ	L	Low LCS/LCSD recoveries + Low Calibration verification
SB-FS-PC-19-18.5-19.0	2-Butanone (MEK) Acetone	UJ	L	Low LCS/LCSD recoveries + Low MS/MSD recoveries
SB-FS-PC-19-5.5-6.0	2-Butanone (MEK)	J	I	Low LCS/LCSD recoveries + Result uncertain below the calibration range
SB-FS-PC-19-18.5-19.0	1,1,2-Trichloro-1,2,2-trifluoroethane 2-Hexanone	UJ	L	Low MS recovery
SB-FS-PC-19-18.5-19.0	cis-1,2-Dichloroethene	J	I	Low MS/MSD recoveries; evidence of heterogeneity
SB-FS-PC-18-16.0-16.5	1,1,1-Trichloroethane Ethylbenzene Methylene Chloride	J	I	Result uncertain below the calibration range
SB-FS-PC-18-20.0-20.5	o-Xylene trans-1,2-Dichloroethene	J	I	Result uncertain below the calibration range
SB-FS-PC-18-23.0-23.5	Carbon disulfide Ethylbenzene	J	I	Result uncertain below the calibration range
SB-FS-PC-19-18.5-19.0	1,2,3-Trichlorobenzene Toluene trans-1,2-Dichloroethene	J	I	Result uncertain below the calibration range
SB-FS-PC-19-5.5-6.0	Ethylbenzene Methylcyclohexane	J	I	Result uncertain below the calibration range
SB-FS-PC-28-4.5-5.0	1,2,4-Trichlorobenzene 1,3-Dichlorobenzene Cyclohexane	J	I	Result uncertain below the calibration range
SB-FS-TB-PC-18-3.0-3.5	Methylene Chloride	J	I	Result uncertain below the calibration range
SB-FS-TB-PC-20-9.0-9.5	Ethylbenzene	J	I	Result uncertain below the calibration range

Table 2. Summary of Data Validation Actions - *continued*

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
SB-FS-PC-18-14.0-17.0 SB-FS-PC-18-20.0-22.0 SB-FS-TB-PC-18-0.5-2.0 SB-FS-TB-PC-18-3.0-5.0 SB-FS-TB-PC-19-0.5-2.0 SB-FS-TB-PC-20-0.5-2.0	2,4-Dinitrophenol 4,6-Dinitro-2-methylphenol	UJ	I	Initial Calibration outside criteria + Low Calibration verification
SB-FS-TB-PC-18-3.0-5.0	3,3'-Dichlorobenzidine	UJ	I	Low MS/MSD recoveries + MS/MSD imprecision
SB-FS-PC-18-14.0-17.0	Di-n-octyl phthalate	J	I	Result uncertain below the calibration range
SB-FS-PC-18-20.0-22.0	1,1'-Biphenyl 2-Methylnaphthalene	J	I	Result uncertain below the calibration range
SB-FS-TB-PC-18-0.5-2.0	Fluoranthene Pyrene	J	I	Result uncertain below the calibration range
SB-FS-TB-PC-18-3.0-5.0	1,2,4,5-Tetrachlorobenzene	J	I	Result uncertain below the calibration range
SB-FS-TB-PC-19-0.5-2.0	Bis(2-ethylhexyl) phthalate Caprolactam	J	I	Result uncertain below the calibration range
SB-FS-TB-PC-20-0.5-2.0	Bis(2-ethylhexyl) phthalate	J	I	Result uncertain below the calibration range

Qualifiers: U = Analyte is non-detect at the "Limit_2" value in the EDD, which is the sample-specific reporting limit (RL); UJ = Non-detect is estimated; J = Result is estimated; R = Result is rejected and is unusable for project decisions.

Bias: L = Low; H = High; I = Indeterminate

Acronyms used in Table 2:

FD = Field Duplicate
LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample Duplicate
MD = Matrix Duplicate
MS = Matrix Spike
MSD = Matrix Spike Duplicate

EPA Region 1 Tier III-type Review of VOCs by Method 8260C-EI and 8260C-SIM

Lab: TestAmerica Westfield, Westfield, Massachusetts

Project ID: 360-40815-1

The Data Validation Criteria used within this checklist are based upon the following:

Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012;

Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and

USEPA SW846 Method 8260C.

Validation Note: Davis QAPP included as Appendix B-1 to the RDWP (ESS 2012) specified VOC Method 8260B & 8260C for groundwater sample analysis. Method 8260C is the updated version of the VOC GC/MS method and is considered compliant with the QAPP DQOs.

Date Reviewed: August 13, 2012 & updated October 15, 2012 for re-submittals received at NEH.

Data Reviewer: *Deborah A. Loring*
New Environmental Horizons, Inc.

1. Holding Times

Holding times and QC association with the samples are reviewed to ensure the accuracy of the reported results. The table on the following page (Table 1a) was completed to document the holding times and QC association.

Was headspace or air bubbles present in the aqueous samples? **NA.** Was the pH of aqueous samples < 2 upon receipt at the lab? **NA.**

For soil/sediment samples, were the samples collected in appropriate containers (EnCores collected and extruded properly for low-and medium-level VOC analysis or low-level = pre-weighed vials with 5mL water + stir bar, medium-level = pre-weighed vials with 10 mL methanol)? **Yes.** Were the vials weighed upon receipt and frozen until analysis? **Yes.** If no, list below.

Was the temperature of the samples upon receipt 4 °C ± 2°C? **Yes**. Were there any COC issues specific to the VOC samples? **No.**

Were the holding time requirements (non-acid preserved waters analyzed within 7 days, acid preserved waters analyzed within 14 days from sample collection) met for each sample? **Yes**. If no, list below the affected samples and the number of days outside of holding time.

Action: If there is severe temperature exceedance for samples, estimate (J) detects and reject (R) non-detects. Professional judgement required in data qualification.
Waters: If headspace (air bubbles > 2mm in diameter) was present, estimate detects (J) and reject (R) non-detects. **If pH < 2**: if 14 days < HT ≤ 28 days; estimate detects and non-detects (J and UJ), if HT > 28 days, estimate detects (J) and reject (R) non-detects. **If pH > 2**: if 7days < HT≤ 28 days, estimate detects and non-detects (J and UJ; if HT > 28 days estimate detects (J) and reject non-detects (R).
Soils/Sediments: If 14 days < HT ≤ 28 days, estimate detects and non-detects (J and UJ); if HT > 28 days, estimate (J) detects and reject (R) non-detects.

Comments:

One Cooler was received at 4 ± 2°C at the lab on 5/30/12, and one cooler was received on 5/31/12 at 4 ± 2°C, in both cases, on the day after sample collection. All containers were intact upon receipt. There were no COC issues noted.

Samples were all analyzed within HT – No Action required.

Table 1a. Holding Time and Associated QC Table

Sample Matrix: Soil

Sample ID	Lab ID	Date Sampled	Field Blank	Trip Blank	Method Blank	Analyzed
TB-050312-1	360-40815-19	5/30/2012	NA	NA	MB 360-91437/6 & MB 360-90438/6 (SIM)	6/1/2012
SB-FS-PC-19-11.5-12.0	360-40815-13	5/29/2012	NA	TB-050312-1	MB 360-91550/3-A	6/5/2012
SB-PCB-3	360-40815-14	5/29/2012	NA	TB-050312-1	MB 360-91550/3-A	6/5/2012
SB-FS-TB-PC-20-9.0-9.5	360-40815-18	5/29/2012	NA	TB-050312-1	MB 360-91550/3-A	6/5/2012
SB-FS-PC-28-4.5-5.0	360-40815-20	5/30/2012	NA	NA	MB 360-91550/3-A	6/5/2012
SB-FS-TB-PC-18-0.5-1.0	360-40815-2	5/29/2012	NA	TB-050312-1	MB 360-91661/3-A	6/7/2012
SB-FS-PC-18-20.0-20.5	360-40815-8	5/29/2012	NA	TB-050312-1	MB 360-91661/3-A	6/7/2012
SB-FS-PC-18-23.0-23.5	360-40815-9	5/29/2012	NA	TB-050312-1	MB 360-91661/3-A	6/7/2012
SB-FS-PC-19-5.5-6.0	360-40815-11	5/29/2012	NA	TB-050312-1	MB 360-91661/3-A	6/7/2012
SB-FS-TB-PC-19-1.5-2.0	360-40815-12	5/29/2012	NA	TB-050312-1	MB 360-91661/3-A	6/7/2012
SB-FS-PC-19-18.5-19.0 & MS/MSD	360-40815-15	5/29/2012	NA	TB-050312-1	MB 360-91661/3-A	6/7/2012
SB-FS-TB-PC-20-0.5-1.0	360-40815-16	5/29/2012	NA	TB-050312-1	MB 360-91661/3-A	6/7/2012
SB-FS-TB-PC-18-3.0-3.5	360-40815-4	5/29/2012	NA	TB-050312-1	MB 360-91826/3-A	6/12/2012
SB-FS-PC-18-16.0-16.5	360-40815-5	5/29/2012	NA	TB-050312-1	MB 360-91826/3-A	6/12/2012

2. GC/MS Instrument Performance Check

The BFB instrument performance checks (tunes) are reviewed to assess the accuracy and sensitivity of the results relative to instrument performance.

m/z	Ion Abundance Criteria
50	15 - 40% of m/z 95
75	30 - 60% of m/z 95
95	base peak, 100% Relative Abundance
96	5 - 9% of m/z 95 (see NOTE)
173	less than 2% of m/z 174
174	50 – 120% of m/z 95
175	5 - 9% of m/z 174
176	95% - 101% of m/z 174
177	5 - 9% of m/z 176

NOTE: All ion abundances must be normalized to m/z 95, the nominal base peak, even though the ion abundance of m/z 174 may be greater than that of m/z 95.

Review the tune summaries for BFB. Were all defined mass calibration and ion abundance criteria met for the BFB? **Yes**. If no, list below the tune and affected samples.

Review the raw data for one tune. Did the laboratory obtain the BFB mass spectrum in a straight-forward manner (e.g., average of three scans centered across the BFB peak with background subtraction from a scan within 20 scans prior to the BFB scan)? **No**. If no, list below the method used to obtain the mass spectrum and the affected samples.

HP #1 6/5/2012 14:26, 14:59 — In the initial submission, the BFB run before the CCV was obtained using a single scan, and m/z 176 was out of specifications (94%). In the resubmitted data; the BFB from the calibration standard was presented and used a single scan; this passed criteria. No action is required.

Were all samples analyzed within 12 hours of an acceptable tune? **Yes**. If no, list below the affected samples.

Action: If the mass assignment criteria were not met (e.g., base peak assigned to m/z 96 instead of m/z 95), reject (R) all associated data. If the ion abundance criteria were not met, sound technical judgment should be used in evaluating whether or not the data require estimation (U and UJ) or rejection (R) (e.g., the criteria requirements for the m/z 95/96, 174/175, 174/176 and 176/177 ratios are most important for proper tune while the relative abundances for m/z 50 and 75 are of lesser importance.)

Comments:

Instrument Agilent #2 GC/MS used for Full Scan and SIM analysis – single injection with dual detection systems (EI and SIM). Tunes Full Scan & SIM GCMS Agilent #2 5/14/12 (ICAL) & 6/1/12. Full Scan HP#1 3/23/12 (ICAL) 6/5/12 & 6/7/2012, HP#3 6/12/12 (ICAL) & 6/12/12 CCAL. Criteria for acceptance were the same as listed above (except the lab uses an additional significant figure). All tune abundances were acceptable and all samples and standards were analyzed within 12 hours of BFB tune.

Raw data evaluated and tunes acquired properly - no Action required.

3. Initial Calibration

The initial calibration data are reviewed to determine if the standards were compliant with the method protocols and QAPP criteria.

Review the Initial Calibration Data Summary. Check and recalculate the RRFs, avg. RRF and %RSD for at least one volatile analyte across the ICAL. Does the avg. RRF and %RSD check back to the raw data? **Yes** Were the RRFs for all analytes (including Surrogates) in the standard all greater than or equal to 0.05? **Yes for all targets except for 1,4-Dioxane and Tetrahydrofuran.**

Were at least five concentration levels of each compound analyzed during the initial calibration? **Yes** Were all calibration standards analyzed within 12 hours of BFB tune? **Yes**

Were retention times for each target analyte stable across the calibration (i.e., within ± 0.06 RRT units of the mean RT for each compound)? **Yes (one compound verified across ICAL).**

Did the initial calibration meet %RSD criteria (%RSD ≤ 20% or r > 0.99 (linear regression) or r2 > 0.99 (non-linear regression) for all project target analytes? **Yes**.

Action: If RRF < 0.05, use professional judgment to estimate (J) positive detects and estimate (UJ) or reject (R) non-detects. If the %RSD >40%, qualify positive and non-detected results as estimated (J and UJ). Sound technical judgment should be used in qualification of the data. The results for each sample associated with ICAL should be evaluated to determine if a result reported would be impacted by the miss-calibration.

Comment:

Check of calculations shown on the next page.

6-9 level ICAL for all Targets + several non-target compounds performed on HP#1 3/23/12, HP #3 6/12/12 and Agilent # 2 5/14/12 (TB only – full scan and SIM).

All calibrations met QAPP criteria for Target Compounds except Tetrahydrofuran in HP # 3 analyzed on 6/12/2012 in which the tetrahydrofuran RRF = 0.0234) and SIM analysis for 1,4-Dioxane reported RRFs for this compound which were < 0.05 but > 0.010 (average RRF by SIM was 0.0295). Since the minimum acceptable RRF for 1,4-Dioxane from USEPA Contract Laboratory Program (CLP) and National Functional Guidelines for Superfund Organic Methods Data Review, June 2008 is 0.010; decision made, based on professional judgment, to accept 1,4-Dioxane calibration if RRF > 0.010 rather than using QAPP criteria of 0.05 for this one compound. Additionally, LCS and MS recoveries are acceptable for 1,4-Dioxane indicating acceptable sensitivity for analysis of this compound in this work.

**ACTION: Estimate (UJ) tetrahydrofuran in all samples associated with the HP # 3 6/12/2012 curve (360-40815-4 & -5).*

Verified that the lowest-concentration ICAL standard was at or below the RLs reported for all compounds – acceptable levels for calibrations.

Lab deliverable did not contain a complete Form VI for 1,4-Dioxane calibration. Information provided on next page correlates with the average RRF reported by lab.

3. Initial Calibration - continued

8260C-EI ICAL Check: Compound Checked 3/23/12 HP #1 Tetrahydrofuran (with IS = Fluorobenzene)

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Concentration	NA	5	10	50	100	200	400
Response Cpd	NA	6315	10246	65534	122917	286379	609323
Conc, IS	NA	963222	993081	1073201	1109114	1209493	1303822
Response IS	NA	20	20	20	20	20	20
RRF	NA	0.0262	0.0206	0.0244	0.0222	0.0237	0.0234

	Avg. RRF	%RSD
Concentration		
Response Cpd		
Conc, IS		
Response IS		
RRF	0.0234	7.5%

8260C-SIM ICAL Check: 1,4-Dioxane (with IS = 1,2-dichloroethane-d4)

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Concentration	3	5	10	50	100	200	400
Response Cpd	178	261	597	2803	5315	11267	21634
Conc, IS	37004	36910	37242	36106	36183	36959	36820
Response IS	20	20	20	20	20	20	20
RRF	0.0321	0.0283	0.0321	0.0311	0.0294	0.0305	0.0294

	Level 8	Level 9		Avg. RRF	%RSD
Concentration	800	1600			
Response Cpd	42601	72686			
Conc, IS	38070	36472			
Response IS	20	20			
RRF	0.0280	0.0249		0.0295	7.5%

4. Continuing Calibration Verification (CCV)

The continuing calibration data are reviewed to determine if the standards were contractually compliant.

Review the Continuing Calibrations and Summaries. Check and recalculate the RRF and %D for at least one of the target volatile compounds in one of the CCALs. Does the RRF and %D check back to the raw data? **Yes**. Were the RRFs for all analytes in the CCVs all ≥ 0.05? **No.**

Was a continuing calibration check performed every 12 hours following tuning verification of the instrument? **Yes**. Was the level of CCV appropriate (mid-level concentration range)? **Yes.** If no, list below all the affected samples.

Were the target analytes recovered within the expected retention time window based upon the initial calibration (i.e., drift of instrument was acceptable)? **Yes**.

Did the CCVs meet criteria for verification of %D or %Drift ≤ 20% for all Target Volatiles? **No**.

Action: If RRF < 0.05, use professional judgment to estimate (J) positive detects and estimate (UJ) or reject (R) non-detects. If the %RSD >40%, qualify positive and non-detected results as estimated (J and UJ). If the %D > + criteria (e.g., + 20%) and the CCV RRF ≥ 0.05 (i.e., instrument more sensitive to detection of the compound on the day of CCV relative to the ICAL), estimate (J) positive detects and accept non-detected results without qualification. If the %D > - criteria (e.g., - 20%), and RRF > 0.05, estimated positive and non-detect results (J and UJ) for samples analyzed following this standard for the compound(s) that was outside of calibration. If RRF < min. RRF but ≥ 0.010, estimated (J or UJ) all results (National Functional Guidelines DV criteria)

Comments:

CCAL Check: Standard ID V26415.D Compound Checked Methylene chloride

Responses	RRF	avg. RRF ICAL	% Difference
413604 @ 20	0.7763	0.7513	3.3%
IS: 532771 @20			

Agilent # 2 6/1/12 13:58 CCV: criteria met for all targets except: 1,4-dioxane RRF < 0.05 but > 0.010 (not reported in data but hand calculated as 0.0323 - see ICAL for professional judgment in accepting this with qualification), chloromethane %D = -25.9%, bromomethane %D = +28.2%, 1,1-dichloroethene %D = +25.4%, 1,1,2-trichloro-1,2,2-trifluoroethane %D = +45.0%, acetone %D = -30.8%, methyl acetate %D = -23.2%, chlorobromomethane %D = +32.1%, Tetrahydrofuran %D = -27.3%, 2-butanone %D = -22.3%, Tetrachloroethene %D = +25.0%, 4-methyl-2-pentanone %D = -33.3%, and 2-hexanone %D = -25.6%. All samples were non-detect for bromomethane, 1,1-dichloroethene, 1,1,2-trichloro-1,2,2-trifluoroethane, chlorobromomethane, and tetrachloroethene in associated sample (TB-053012-1); therefore, no action required for enhanced sensitivity on day of analysis for this compound.

**ACTION: Chloromethane, acetone, methyl acetate, tetrahydrofuran, 2-butanone, 4-methyl-2-pentanone, and 2-hexanone estimated (UJ) in associated sample (TB-053012-1) with possible low bias due to low calibration verification.*

HP #1 6/5/12 14:59 CCV: criteria met for all targets except 1,1,2-trichloro-1,2,2-trifluoromethane %D = +23.3%, carbon tetrachloride %D = +36.3%, 1,1,1-trichloroethane %D = +29.2%, and 1,2-dichloroethane %D = +24.5%. All associated samples (SB-FS-PC-19-11.5-12.0 (360-40815-13), SB-PCB-3 (360-40815-14), SB-FS-TB-PC-20-9.0-9.5 (360-40815-18), and SB-FS-PC-28-4.5-5.0 (360-40815-20)) were non-detect for all of these compounds; therefore, no action required for enhanced sensitivity on day of analysis for these compounds.

HP #1 6/7/12 15:55 CCV: criteria met for all targets except vinyl chloride %D = -24.1%, chloroethane %D = -28.3%, methyl acetate %D = -20.1%, carbon tetrachloride %D = +20.2%, 1,1,2,2-tetrachloroethane %D = -27.5%, 1,2-dichlorobenzene = - 21.6%, 1,2-dibromo-3-chloropropane %D = -29.4%. All associated samples (SB-FS-TB-PC-18-0.5-1.0 [360-40815-2], SB-FS-PC-18-20.0-20.5 [360-40815-8], SB-FS-PC-18-23.0-23.5 [360-40815-9], SB-FS-PC-19-5.5-6.0 [360-40815-11], SB-FS-TB-PC-19-1.5-2.0 [360-40815-12], SB-FS-PC-19-18.5-19.0 [360-40815-15], and SB-FS-TB-PC-20-0.5-1.0 [360-40815-16]) were non-detect for carbon tetrachloride, therefore, no action required for enhanced sensitivity on day of analysis for this compound.

**ACTION: vinyl chloride, chloroethane, methyl acetate, 1,1,2,2-tetrachloroethane, 1,2-dichlorobenzene, and 1,2-dibromo-3-chloropropane estimated (UJ, J) in associated samples (SB-FS-TB-PC-18-0.5-1.0 [360-40815-2], SB-FS-PC-18-20.0-20.5 [360-40815-8], SB-FS-PC-18-23.0-23.5 [360-40815-9], SB-FS-PC-19-5.5-6.0 [360-40815-11], SB-FS-TB-PC-19-1.5-2.0 [360-40815-12], SB-FS-PC-19-18.5-19.0 [360-40815-15], and SB-FS-TB-PC-20-0.5-1.0 [360-40815-16]) with possible low bias due to low calibration verification.*

HP #3 6/12/12 14:59 CCV criteria met for all targets except tetrahydrofuran RRF < 0.05 (RRF=0.0213).

**ACTION: Estimate (UJ) tetrahydrofuran in all samples associated with the HP # 3 6/12/2012 CCAL (360-40815-4 & -5).*

%D not shown on 1,4-Dioxane CCV Form VII; however, %D = +15%, which is acceptable.

5. Laboratory and Field Blank Results

Laboratory and field blank results (equipment and trip blanks) are reviewed to assess the presence of contaminants, which affect the accuracy and sensitivity of the results. See Table 1a, where the Holding Time and Associated QC Table were completed for the samples within this SDG.

Was a Trip Blank associated with each sampling event for volatiles? **Yes, for samples received 5/30/12. No Trip Blank was received with this SDG for sample SB-FS-PC-28-4.5-5.0 received on 5/31/12**. If no, list below affected samples. Was an equipment blank associated with the samples in this SDG? **No – not needed since dedicated sampling equipment used.**

Receipt Date	Field Sample ID	Lab Sample ID
5/31/12	SB-FS-PC-28-4.5-5.0	360-40815-20

Was each sample analysis associated with the appropriate method blank, *i*.e., correct matrix, correct matrix level, same batch? **Yes**. If no, list below affected samples.

Review the reporting forms for each method, equipment, and trip blank. Were any target compounds in the blanks detected? **Yes.** If yes, were methylene chloride, acetone, cyclohexane, or 2-butanone the only compounds reported? **No.** If yes, were these "common laboratory contaminants" < 5 times the RL? **N/A.**

Action: - Blanks should not contain contaminants above the RL except for acetone, 2-butanone, or methylene chloride that must not be present above 5 times the RL. The Blank Action Level is defined as five times the level seen in the matrix-matched blank associated with the samples, except if acetone, 2-butanone, or methylene chloride are present, in which case the Blank action is ten times the level observed in any matrix-matched blank. The following actions should be taken if conditions warrant:

1. If the blank is not matrix matched, qualify all sample data, for the contaminant associated with this blank, with EB or TB, as appropriate.
2. If the reported result in a sample is below the reporting limit (sample < RL) and if a matrix-matched blank contains a result above the sample-equivalent level reported, the result in the sample should be negated (U) and raised to the sample-specific RL for that sample
3. If the sample result is between the reporting limit and the blank Action Level (RL < sample < Action Level), the result for the sample is negated (U) at the level found in the sample. Based on the level of contamination suspected in the sample, the reporting limit may be elevated. Professional judgment will be used in assessing the action needed.
4. If the sample result is greater than the RL and the blank Action Level, no action is taken.

Comments:

Blanks evaluated: Method Blank: MB 360-91437/6, MB 360-91550/3-A, MB 360-91661/3-A, MB 360-91826/3-A, & MB 360-914386/6 (SIM)
Trip Blank: TB-053012-1

5. Laboratory and Field Blank Results - continued

Blank ID	Contaminant / Level (µg/L)	Matrix Related	Action Level	Sample/Reported Result (µg/L)	Corrected Result
MB 360-91437/6	None	Y		No Blank Action Required	
MB 360-91550/3-A	None	Y		No Blank Action Required	
MB 360-91661/3-A	None	Y		No Blank Action Required	
MB 360-91826/3-A	1,2,4-trichlorobenzene 1.02 µg/kg J	Y	5.10 µg/kg	The associated samples were all ND - No Action required	
MB 360-914386/6 (SIM)	None	Y		No Blank Action Required	
TB-053012-1	None	Y		No Blank Action Required	

6. Surrogates

The surrogate spike recoveries are reviewed to assess the accuracy of the results relative to laboratory performance and specific sample matrix.

Review the Surrogate Recovery information for each field and quality control sample. For one sample, verify that the recoveries reported correspond to the raw data and that the recovery calculation was done properly. Were the recovery data reported properly? **Yes.**

Were the surrogate recoveries within QAPP defined accuracy limits (70-130% for all matrices)? **Yes.** If no, were the affected samples reanalyzed? **NA**. List below the affected samples.

Action - If one or more volatile surrogate recoveries exceed 130%, estimate (J) positive due to a potential high bias of the results; no action is required for non-detect results. If one or more volatile surrogate recoveries is below 70% but above 10% recovery, estimate (J and UJ) the positive and non-detect results due to a potential low bias in the results. If any surrogate recovery is below 10%, reject (R) non-detect results and estimate positive results (J) due to potential false negatives and low bias in the results, respectively.. List below the affected samples and required actions.

Comments:

All 3 Surrogates were recovered within criteria in all samples and QC – no Action required

Sample SB-FS-TB-PC-18-0.5-2.0 Dibromofluoromethane on-column amount = 22.4 µg/L; Amt. spiked = 20 µg/L so recovery is 22.4/20 x 100 = 112% √

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recovery and Precision

The matrix spike/matrix spike duplicate (MS/MSD) recoveries are reviewed to assess the accuracy of the results relative to the specific sample matrix and the relative percent differences (RPDs) are reviewed to assess the precision of the results relative to the specific sample matrix.

Review the unspiked sample, Matrix Spike, and Matrix Spike Duplicate (MS/MSD) raw data and recovery results. Were the recoveries for the MS/MSD calculated properly? **Yes**. Did the laboratory spike all Target compounds into the MS/MSD? **Yes.**

Did the laboratory perform MS/MSDs for each matrix and matrix level analyzed for each analytical batch prepared for analysis? **Yes**. If no, list below the affected samples.

Were the MS/MSD recoveries within QAPP accuracy limits (70-130% for all matrices)? **No.** Were the RPDs between the MS/MSD within the QAPP precision criteria (RPD ≤ 20% for groundwaters/surface water and RPD ≤ 30% for soils/sediments and leachate)? **Yes**. If no, list below the affected compounds. Was the spiking level for the MS/MSD appropriate for the matrix? **Yes.**

Action: No action is taken to the entire data set based on MS/MSD results alone. The unspiked sample may be qualified based on MS/MSD results as follows: if the MS/MSD recoveries were greater than 130%, estimate (J) positive results due to potential high bias; no action is required for non-detect results; if the MS/MSD recoveries were below 70% but above 10%, estimate (J and UJ) positive and non-detect results due to potential low bias; if a MS/MSD compound was recovered below 10%, estimate (J) positive results due to potential low bias and evaluate the non-detected results to determine whether estimation (UJ) or rejection (R) of the unspiked sample data is warranted. If the RPD between the MS and MSD > QAPP criteria, estimate (J and UJ) positive and non-detected results in the unspiked sample. Professional judgment should be used if spike level for MS/MSD is inappropriate to the sample matrix (i.e., spike swamped out)

Comments:

Sample SB-FS-PC-19-18.5-19.0 MS 1,1-dichloroethane:

MS Amount = 22.6 ug/L x (0.005L/(0.005183kg)(0.925)) x 5 = 117.84 ug/kg
Sample Amount = 1.17 ug/L x (0.005 L/(0.006761 kg)(0.925) x 5 = 7.16 ug/kg
Recovered = (117.84 µg/kg – 7.16 µg/kg /104.29 µg/kg spiked x 100% = 106% √

SB-FS-PC-19-18.5-19.0 MS/MSD %Rec and MS/MSD RPD all within criteria except: 1,1,2-trichloro-1,2,2-trifluoroethane MS low (69%), 1,2-dichloroethane MS/MSD high (131%, 136%), 2-butanone MS/MSD low (50%, 53%), 2-hexanone MS low (66%), acetone MS/MSD low (39%, 40%), carbon tetrachloride MS/MSD high (139%, 138%) and cis-1,2-dichloroethene MS/MSD < 10% (5%, -9%).

No action taken for 1,2-dichloroethane and carbon tetrachloride as they are not detected in the samples, therefore no action required for high recoveries.

**ACTION: 1,1,2-trichloro-1,2,2-trifluoroethane & 2-hexanone estimated (UJ) with possible low bias in sample SB-FS-PC-19-18.5-19.0 due to low MS recovery, 2-butanone & acetone estimated (UJ) in this sample with possible low bias due to low MS/MSD recoveries; cis-1,2-dichloroethene estimated (J) with indeterminate bias due to low MS/MSD recoveries. The indeterminate bias assignment for cis-1,2-dichoroethane is based on professional judgment – the native value in the sample is 170 ug/kg, the spike amount 104 ug/kg, and the amount in the MS/MSD 170 & 174 ug/kg respectively, (5% and -9%). It appears that the sample analysis shows a higher "native" concentration of cis-1,2-dichloroethane than its corresponding MS/MSD. This is more likely indicative of sample heterogeneity issues than it is of low bias in the native sample result, thus an indeterminate bias was assigned.*

8. Laboratory Control Sample (LCS) Recovery Results

The Laboratory Control Samples (LCS) are reviewed to assess the accuracy of the results relative to the analytical procedure.

Review the raw data and recovery information for the LCS

Did the laboratory perform a LFB for each matrix and analytical batch at a level between the lowest and second lowest calibration level? **Yes**. Were all target analytes spiked into the LCS? **Yes.** If no, list below the affected samples.

Were the LCS recoveries within QAPP requirements for recovery (70-130%)? **No**. If no, list below the affected compounds.

Action: If the LCS recoveries are above 130%, estimate (J) positive results due to potential high bias, no qualification of non-detected results is necessary. If the LCS recoveries are between 10% and the 70%, estimate (J and UJ) positive and non-detect results for the samples associated with the analytical batch due to potential low bias in the results. If the recovery in the LCS is less than 10%, estimate (J) positive results due to low bias and reject (R) non-detect results due to potential false negatives.

Comments:

Although not required by QAPP (Table 4-7A), lab performed a Laboratory Control Sample Duplicate (LCSD) in addition to the LCS – precision criteria used by lab was the same as for MS/MSD

LCS/LCSD Batch 360-91437 & 360-91438 (SIM) % Rec and LCS/LCSD RPD were all acceptable except: LCS/LCSD low 2-butanone (45%, 48%), 2-hexanone (58%, 60%), 4-methyl-2-pentanone (60%, 62%), acetone (60%, 62%); LCSD low chloromethane (68%); LCS high bromomethane (140%). Chloromethane LCS recovery is acceptable and LCS/LCSD RPD was acceptable; therefore, no action to qualify sample data necessary for this compound based on professional judgment. Bromomethane was not detected in associated sample so qualification of data was not necessary for this compound.

**ACTION: 2-Butanone, 2-hexanone, and 4-methyl-2-pentanone, and acetone estimated (UJ) in associated sample (TB-053012-1) with possible low bias due to low LCS/LCSD recoveries.*

LCS/LCSD Batch 360-91550/1-A % Rec and LCS/LCSD RPD were all acceptable except LCD/LCSD low 2-butanone (64%, 67%), acetone (49%, 49%), chloroethane (69%, 66%), and trichlorofluoromethane LCS high (136%). Trichlorofluoromethane was not detected in associated samples so qualification of data was not necessary for this compound.

**ACTION: 2-Butanone, acetone, and chloroethane estimated (UJ) in associated samples (360-40815-13 [SB-FS-PC-19-11.5-12.0], 360-40815-14 [SB-PCB-3], 360-40815-18 [SB-FS-TB-PC-20-9.0-9.], 360-40815-20 [SB-FS-PC-28-4.5-5.0]) with possible low bias due to low LCS/LCSD recoveries.*

LSC/LCSD Batch 360-91661 % Rec and LCS/LCSD RPD were all acceptable except LCS/LCSD low 2-Butanone (58%, 56%), acetone (43%, 40%), and carbon tetrachloride LCS high (139%).

**ACTION: 2-Butanone and acetone estimated (UJ) in associated samples (360-40815-2 [SB-FS-TB-PC-18-0.5-1.0], 360-40815-8 [SB-FS-PC-18-20.0-20.5], 360-40815-9 [SB-FS-PC-18-23.0-23.5], 360-40815-11 [SB-FS-PC-19-5.5-6.0], 360-40815-12 [SB-FS-TB-PC-19-1.5-2.0], 360-40815-15 [SB-FS-PC-19-18.5-19.0], 360-40815-16 [SB-FS-TB-PC-20-0.5-1.0]) with possible low bias due to low LCS/LCSD recoveries.*

LCS/LCSD Batch 360-91826 % Rec and LCS/LCSD RPD were all acceptable except LCS/LCSD low 2-butanone (68%, 65%), acetone (45%, 39%) LCSD low 2-hexanone (68%), and LCS high carbon disulfide (136%). 2-Hexanone LCS recovery is acceptable and LCS/LCSD RPD was acceptable; therefore, no action to qualify sample data necessary for this compound based on professional judgment. Carbon disulfide was not detected in associated samples so qualification of data was not necessary for this compound.

**ACTION: 2-Butanone and acetone estimated (UJ) in associated samples (360-40815-4 [SB-FS-TB-PC-18-3.0-3.5], 360-40815-5 [SB-FS-PC-18-16.0-16.5] with possible low bias due to low LCS/LCSD recoveries.*

9. Internal Standards

The Internal Standard (IS) response in the samples and standards is evaluated to ensure that the analytical system was in control during analysis.

Were the IS areas for each sample and standard analyzed within 50-200% of the CCV? **Yes**. Were the retention times for the IS within ±0.5 minutes from the retention time established in the opening CCV? **Yes.**

Action: Action is taken only on the specific compounds associated with an IS that is outside of criteria. If an IS area is greater than 200% compared to the continuing calibration, qualify positive results as estimated (J), non-detects do not require action. If the IS area is < 50% but ≥ 20% of CCV, estimate positive and non-detected results (U and UJ). If the area drop off or retention time shift for the IS is too severe (IS < 20% of CCV), non-detected results may require rejection (R). Professional judgment must be used in evaluating the data associated with poor IS performance.

Comments:

Lab used the following IS: 1,2-Dichloroethane-d4, Fluorobenzene, Chlorobenzene-d_5 and 1,4-Dichlorobenzene-d_4

All 4 IS were recovered with criteria and RTs were stable across the analytical runs – no action required.

ISTD # 1, 1,2-Dichloroethane-d4, was not used in full scan analyses, used for SIM quantitation of 1,4-dioxane only.

10. Sample Quantitation Limits

Review raw data and reporting forms. Did the sample-specific RLs meet the PQLs given in QAPP Table 4-1C (Volatiles in Soil)? **No.** Did the laboratory accurately adjust sample reporting limits to account for sample specific preparation and analysis conditions? **Yes.** Were results reported in the proper units (waters in µg/L and soils/sediments in µg/Kg ?) **Yes.** Did the laboratory report results for all 53 project-specific volatile compounds listed in QAPP Table 4-1A? **Yes.**

Were all components reported in the samples quantitated within the calibration region of the instrument for the detected analytes? **No.** Were the relative retention times for all components reported within the retention time windows established during initial calibration? **Yes.**

Were all non-detects reported at or below the project-specific Action Levels (QAPP Table 4-1C)? **No.**

Action - If the quantitation limits for non-detect results are lower than the lowest calibration standard, or if a positive result is detected outside of the calibration range, estimate positive and non-detected results (J and UJ).

Comments:

Lab reported results for m- Xylene & p-Xylene (reported as a single entry due to coelution) and o-Xylene in addition to Xylenes, total, as requested in the QAPP. All 53 project-specific VOCs were reported so with the added Xylenes, a total of 54 VOC results reported per sample. Chloromethane and 4-methyl-2-pentanone results for the 4 samples run as medium level were not included in the initial report but were provided in the resubmission.

All RLs were at or below the PQLs required by the QAPP for all samples except for samples 360-40815-13 [SB-FS-PC-19-11.5-12.0], 360-40815-14 [SB-PCB-3], 360-40815-18 [SB-FS-TB-PC-20-9.0-9.5], 360-40815-20 [SB-FS-PC-28-4.5-5.0]. These samples were analyzed as medium levels; therefore, the RLs achieved were generally 50-100 times higher than the PQLs given in Table 4-1C.

All non-detects were reported at levels at or below the PALs given in QAPP Table 4-1C with the following exceptions:

All samples: 1,2-Dibromo-3-chloropropane and Ethylene Dibromide, as expected, due to method limitations.

360-40815-13 [SB-FS-PC-19-11.5-12.0]: 1,1,2-Trichloroethane, 1,1-Dichloroethene, 1,2-Dichloroethane, 1,2-Dichloropropane, Benzene, Tetrachloroethene, Trichloroethene, and Vinyl chloride due to reporting of results from the medium level analysis.

360-40815-14 [SB-PCB-3]: 1,1,2-Trichloroethane, 1,1-Dichloroethene, 1,2-Dichloroethane, 1,2-Dichloropropane, Benzene, Tetrachloroethene, Trichloroethene, and Vinyl chloride due to reporting of results from the medium level analysis.

360-40815-18 [SB-FS-TB-PC-20-9.0-9.5]: 1,1,2-Trichloroethane, 1,1-Dichloroethene, 1,2-Dichloroethane, 1,2-Dichloropropane, Benzene, Tetrachloroethene, Trichloroethene, and Vinyl chloride due to reporting of results from the medium level analysis.

360-40815-20 [SB-FS-PC-28-4.5-5.0]: 1,1,2-Trichloroethane, 1,1-Dichloroethene, 1,2-Dichloroethane, 1,2-Dichloropropane, Benzene, Chloroform, Bromodichloromethane, Tetrachloroethene, Trichloroethene, and Vinyl chloride due to reporting of results from the medium level analysis.

There were 20 results which were reported at concentrations < RL and qualified "J" by the laboratory. These 20 results were accepted for reporting as estimated (J) data with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

11. Field Duplicate Precision

Field duplicate samples are reviewed to assess representativeness of the sample aliquot to the area sampled and the precision of the results relative to field sampling techniques.

Review analytical results for the duplicate sample analyses.

Action: If field duplicate precision exceeded 30% RPD for groundwater/surface waters/leachates or 50% RPD for soils/sediment samples for any compound reported at > 2 x RL, estimate (J and UJ) positive and non-detect results for the affected compounds in both samples. If severe imprecision was noted in the field duplicate sample (i.e., RPD >100%), qualify the remainder of the associated field sample data based on sound technical judgment.

Comments:

Field Duplicate Samples: SB-FS-PC-19-11.5-12.0 and SB-PCB-3

Comparison of detected results for these samples shown below

Analyte Name	RL	Sample µg/L	Q	Sample Result Level	FD µg/L	Q	FD Result Level	RPD	Action
cis-1,2-Dichloroethene	260	5600		> 2 x RL	4200		> 2 x RL	29%	None
Ethylbenzene	260	310		>RL but < 2xRL	940		> 2 x RL	101%	J
m-Xylene & p-Xylene	520	670		>RL but < 2xRL	2200		> 2 x RL	107%	J
o-Xylene	260	250	J	< RL	800		> 2 x RL	105%	J
Toluene	260	5900		> 2 x RL	9700		> 2 x RL	49%	None
trans-1,2-Dichloroethene	260	460		>RL but < 2xRL	430		>RL but < 2xRL	7%	None*
Vinyl chloride	260	260	U	< RL	250		< 2 x RL	NA	None
Xylenes, Total	260	920		> 2 x RL	3000		> 2 x RL	106%	J

* Action only taken for RPD > criteria if results > 2xRL

ACTION: Estimate cis-1,2-dichloroethene, ethylbenzene, m&p-xylene, o-xylene, and total xylenes in sample SB-FS-PC-19-11.5-12.0 and field duplicate SB-PCB-3.

12. Target Compound Identification

The sample chromatograms, quantitation reports, and detected compound mass spectra are evaluated to determine whether the laboratory reported the data properly.

For all positively detected results in all samples, were the RRTs of detects within ± 0.33 minutes of the CCV standard RRT for the compound? **Yes.** If no, list below

Did the sample compound mass spectra meet criteria relative to the standard mass spectra (i.e., all ions > 10% in standard mass spectrum present in sample spectrum, relative intensities of ions agree within ± 20%, and ions > 10% in sample which are not in standard are accounted for)? **Yes.** If no, list below

Were all major peaks in the sample chromatogram accounted for in the reporting of results (i.e., either detected compounds, surrogates, IS', or TICs)? **No.** If no, list below

ACTION: Professional judgment should be used to negate (U) data or reject (R) data as necessary.

Comments:

Since TICs were not required, none were reported. Some samples (e.g., SB-FS-PC-28-4.5-5.0) contained 1 or 2 peaks > 10% of nearest IS, which were not associated with Target compounds or spikes (surrogates/IS).

13. Tentatively Identified Compound (TIC) Analysis

Was TIC determination performed by the laboratory? **No.** Were up to 30 non-alkane, non-target compounds (including DMCs and ISs) reported for each sample? **NA.** Were alkanes present (straight-chain, branched, or cyclic alkanes)? **NA**. If yes, were they reported on the Form I VOA-TIC as "total alkanes"? **NA.**

Review the TIC results. Were the identifications made by the laboratory appropriate based upon NEH's review of the data (e.g., was library search match ≥ 85%)? **NA.** If a valid tentative identification was not possible, was the TIC reported as "unknown" or with additional classification (e.g., "unknown aromatic compound") **NA.**

Were all TICs qualified as estimated (J)? **NA**. For those TICs identified with presumptive certainty, was the CAS reported and were the compounds also qualified with an "N" to indicate this certainty in qualitative identification? **NA.**

Action: Ensure all TICs estimated (J) and for those with presumptive certainty, that the "N" qualifier is also added to the result. For any TIC which was a target compound for another analysis for the sample being reported (and verified to be present by NEH), reject (R) the data. Professional judgment must be used in the identification and reporting of TICs.

Comments:

TICs were not required by QAPP. No action required.

14. Additional QA/QC Issues

List any additional issues which may affect the quality of the results. List the affected samples, QA/QC issue, and necessary actions taken in the comments section below.

Did the narrative contain any issues which may affect data quality which have not been addressed in this checklist? **No.**

Narrative was complete. All issues noted in the narrative have already been addressed during this review except the following: the following samples were provided to the laboratory with a significantly different initial weight than that required by the reference method: SB-FS-PC-18-23.0-23.5 (360-40815-9), SB-FS-PC-19-18.5-19.0 (360-40815-15), SB-FS-TB-PC-19-1.5-2.0 (360-40815-12). The method requires a 1:1 +/- 25% ratio of soil to DI water. The amount of soil provided was slightly above this range. No action is required for this issue.

Example Sample Calculations

Review of one sample per data package is performed to determine if sample results and quantitation limits were correctly calculated and reported.

Sample ID: SB-PCB-3 was selected for review in this data package.

A. Form 1 Review

1. Were the Form 1s completed appropriately? **Yes**. If no, list below the affected fields.

2. Reproduce the reporting limit for VOC in one of the samples; did the laboratory correctly calculate the quantitation limits? **Yes**. If no, list below.

B. Quantitation Review

Reproduce a calculation for one volatile analyte in one of the samples that contained a positive result and compare the calculated result to the result reported by the laboratory.

Analyte Checked: cis-1,2-dichloroethene

Laboratory Result: 4200 µg/kg Calculated Result: 4200 µg/kg

Example Calculation:

RL – lowest ICAL standard for compound = 0.5 µg/L. For sample, with DF=474, RF should be 237 µg/L or higher. Lab reported RL at 240 µg/kg, which is supported by ICAL.

10.572 g, 67.2% Solids /10 mL MeOH, 0.1 mL MeOH/25 mL purge
Response of cis-1,2-dichloroethene = 111342
IS Response = 4704000 @ 20µg/L

$$DF = \frac{0.010\ L + (0.328 \times 0.010572))\ MeOH}{0.010572\ kg \times 0.672} \times \frac{25\ mL}{0.10\ mL} = 474$$

ICAL RRF = 0.5346

$$Conc. = \frac{111342 \times 20\ \mu g/L}{470400 \times 0.5346} \times \frac{(0.010\ L + (0.328 \times 0.010572))\ MeoH}{0.010572\ kg \times 0.672} \times \frac{25\ mL}{0.10\ mL} = 4200\ \mu g/kg\ \surd$$

EPA Region 1 Tier III-type Review of SVOC Method 8270D-EI

Lab: TestAmerica Westfield, Westfield, Massachusetts

Project ID: 360-40815-1

The Data Validation Criteria used within this checklist are based upon the following:

Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012;

Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and

USEPA SW846 Method 8270D.

Date Reviewed: August 17, 2012

Data Reviewer: *Deborah A. Loring,*
New Environmental Horizons, Inc.

1. Holding Times

Holding times and QC association with the samples are reviewed to ensure the accuracy of the reported results. The table on the following page (Table 1a) was completed to document the holding times and QC association.

Review the Semivolatile Organic Analysis Data Sheet.

Were the holding time requirements (waters extracted within 7 days of sampling and soil/sediment extracted within 14 days of sampling/thawing; extracts analyzed within 40 days of preparation) met for each sample? **Yes**. If no, list below the affected samples and the number of days outside of holding time.

Action: If the holding times were slightly exceeded, estimate (J and UJ) positive and non-detect results. If the holding times were grossly exceeded (more than twice the allowed holding time), professional judgment should be used to determine the action necessary. Evaluation of screening, undiluted and dilution analyses, if available, should be made to determine the impact of the holding time violation on the data quality (e.g., whether or not positive values are estimated (J) and whether non-detected values should be estimated (UJ) or rejected (R)).

Comments:

Samples were received intact at 4 ± 2°C and there were no COC issues. All samples were extracted and analyzed within HT – No Action required.

Table 1a. Holding Time and Associated QC Table

Sample Matrix: Soil

Sample ID	Date Sampled	Field Blank	Method Blank	LCS	Date Extracted		Date Analyzed
SB-FS-TB-PC-18-0.5-2.0	5/30/2012	NA	MB 360-91782/1	LCS 360-91782/2 & /3	6/11/2012		6/18/2012
SB-FS-TB-PC-18-3.0-5.0	5/30/2012	NA	MB 360-91782/1	LCS 360-91782/2 & /3	6/11/2012		6/18/2012
SB-FS-TB-PC-18-3.0-5.0	5/30/2012	NA	MB 360-91782/1	LCS 360-91782/2 & /3	6/11/2012		6/18/2012
SB-FS-TB-PC-18-3.0-5.0	5/30/2012	NA	MB 360-91782/1	LCS 360-91782/2 & /3	6/11/2012		6/18/2012
SB-FS-PC-18-14.0-17.0	5/30/2012	NA	MB 360-91782/1	LCS 360-91782/2 & /3	6/11/2012		6/18/2012
SB-FS-PC-18-20.0-22.0	5/30/2012	NA	MB 360-91782/1	LCS 360-91782/2 & /3	6/11/2012		6/18/2012
SB-FS-TB-PC-19-0.5-2.0	5/30/2012	NA	MB 360-91782/1	LCS 360-91782/2 & /3	6/11/2012		6/18/2012
SB-FS-TB-PC-20-0.5-2.0	5/30/2012	NA	MB 360-91782/1	LCS 360-91782/2 & /3	6/11/2012		6/18/2012

2. GC/MS Instrument Performance Check

The DFTPP instrument performance checks (tunes) are reviewed to assess the accuracy and sensitivity of the results relative to instrument performance.

Review the tune summaries for DFTPP

Were all Method 8270D defined mass calibration and ion abundance criteria met for the DFTPP analyses? **Yes**. Was 4.4'-DDT breakdown < 20%? **Yes**. Were pentachlorophenol and benzidine peak tailing acceptable? **Yes** If no, list below the tune and affected samples.

Review the raw data for one tune. Did the laboratory obtain the DFTPP mass spectrum in a straight-forward manner (e.g., average of three scans centered across the DFTPP peak with background subtraction from a scan within 20 scans prior to the DFTPP scan)? **Yes**. If no, list below the method used to obtain the mass spectrum and the affected samples.

Were all samples analyzed within 12 hours of an acceptable tune? **Yes**. If no, list below the affected samples.

Action: If the mass assignment criteria were not met (e.g., base peak assigned to m/z 199 instead of m/z 198), reject (R) all associated data. If the ion abundance criteria were not met, sound technical judgment should be used in evaluating whether or not the data require estimation (U and UJ) or rejection (R) (e.g., the criteria requirements for the m/z 198/199 and 442/443 ratios and relative abundances of m/z 68, 70, 197, and 441 are most important for proper tune while the relative abundances for m/z 51, 127 and 275 are of lesser importance.)

Comments:

Verified that Method 8270D tuning criteria used and proper acquisition of DFTPP performed

DFTPP: Instrument B 6/11/12 (ICAL) and 6/18/12.

DDT breakdown not calculated; however, during this validation DDT breakdown shown to be 4.6% for 6/11/12; 6.6% for 6/18/12. All Breakdowns acceptable – no Action.

3. Initial Calibration

The initial calibration data are reviewed to determine if the standards were compliant with the method protocols.

Review the Initial Calibration Data Summary. Check and recalculate the RRFs, avg. RRF and %RSD for at least one 8270D-EI SVOC across the ICALs. Do the avg. RRF and %RSD check back to the raw data? **Yes**. Were the RRFs for all analytes in the standard all greater than or equal to 0.05? **Yes.** If no, explain whether, based on professional judgment, the RRFs are acceptable.

Were at least five concentration levels of each compound analyzed during the initial calibration? **Yes.** Were all calibration standards analyzed within 12 hours of DFTPP tune? **Yes.**

Was the lowest initial calibration standard at a concentration lower than or equivalent to the sample-specific reporting limit? **Yes.** Were retention times for each target analyte stable across the calibration (i.e., minimum drift)? **Yes.**

Did the initial calibration meet QAPP criteria (%RSD ≤ 20% or r > 0.99 (linear regression) or r2 > 0.99 (non-linear regression) for all project target analytes? **No.**

Action: If RRF < 0.05 and the CLP IS' were used for quantitation, estimate (J) positive detects and reject (R) non-detects. If the RRF < 0.05; however, alternate IS' have been used and the analyte has adequate sensitivity to detection, accept all results based on RRF evaluation.

If the %RSD >20%, evaluate analyte to determine source of high %RSD. If elimination of lowest point causes %RSD to be ≤ 20%, estimate (J) any positive detects for analyte between new acceptable lowest calibration point and original calibration point and raise all non-detects for analyte to new sample-equivalent RL associated with new lowest calibration point. If elimination of high-point results in %RSD ≤ 20%, estimate (J) all data reported above the new highest level of calibration, on a sample-equivalent basis, and accept all non-detects. If elimination of the highest or the lowest point in the calibration does not result in %RSD ≤ 20%, qualify positive and non-detected results as estimated (J and UJ). Sound technical judgment should be used in qualification of the data. The results for each sample associated with ICAL should be evaluated to determine if a result reported would be impacted by the miss-calibration.

Comments:

8- to 10- level ICAL performed on 6/11/12 for all Targets + several non-target compounds. Form VI flagged several results as not meeting minimum RRF criteria; however, lab used CLP criteria and not QAPP criteria. All compounds had RRF > 0.05 and in cases where quadratic used, average RRF was not presented, though did pass for all compounds. %RSD exceeded for 2,4-Dinitrophenol (46.0%) and 4,6-dinitro-2-methylphenol (39.0%).

**ACTION: 2,4-Dinitrophenol and 4,6-dinitro-2-methylphenol results estimated (UJ) with indeterminate bias in all samples.*

3. Initial Calibration - continued

8270D-EI ICAL Check: Compound Pyrene

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Concentration	0.200	0.500	1	2.5	5	8
Response Cpd	13171	41278	97544	199948	483728	981686
Conc, IS	4	4	4	4	4	4
Response IS	215948	255829	305423	238560	281015	360522
RRF	1.2198	1.2908	1.2775	1.3410	1.3771	1.3615

	Level 7	Level 8	Level 9	Level 10	Avg. RRF	%RSD
Concentration	10	15	20	25		
Response Cpd	1343601	1478834	2182151	3634930		
Conc, IS	4	4	4	4		
Response IS	431831	285913	316605	435421		
RRF	1.2446	1.3793	1.3785	1.3357	1.3206	4.4%

RL check: SB-FS-TB-PC-18-0.5-2.0 30.03 g extracted to 1 mL final volume; 2µL injection (of samples and standards). Assuming 0.200 µg/mL lowest level standard, then RL = 0.2ug/mL x 1 mL extract /(0.03003 kg)(0.923) = 7.2 µg/kg. RLs reported actually based on 5 µg/ml level which would be equivalent to 36 µg/kg.

4. Continuing Calibration Verification

The continuing calibration data are reviewed to determine if the standards were contractually compliant.

Review the Continuing Calibrations and Summaries. Check and recalculate the RRF and %Difference (%D) for at least one analyte by 8270D-EI in one of the CCALs. Does the RRF and %D check back to the raw data? **Yes**. Were the RRFs for all analytes in the standard all ≥ 0.05? **Yes.**

Was a continuing calibration verification (CCV) performed every 12 hours following tuning verification of the instrument? **Yes**. If no, list below all the affected samples.

Were the target analytes recovered within the expected retention time window based upon the initial calibration (i.e., drift of instrument was acceptable)? **Yes**.

Did the continuing calibrations meet QAPP criteria for verification of %D or %Drift ≤ ±20%? **No**. If no, list below the outliers and the affected samples.

Action: If the %D > +20% (i.e., instrument more sensitive to detection of the compound on the day of CCAL relative to the ICAL), estimate (J) positive detects and accept non-detected results without qualification. If the %D > - 20%, estimated positive and non-detect results (J and UJ) for samples analyzed following this standard for the compound(s) that was outside of calibration. If the RRF <0.05, but ICAL RRF > 0.05, qualify positive results as estimated (J) and reject (R) non-detected results as unusable.

Comments:

CCAL Check: Standard ID B17731.D : Compound Checked: 2-methylphenol

Responses	RRF	avg. RRF ICAL	% Difference
Cpd 165319 @ 5	1.2150	1.1671	4.1%
IS: 108856 @4			

CCVs 6/18/12: All %D or %Drift met criteria for CCAL except 3-nitroaniline %D = +53.4%, 2,4-dinitrophenol %D = -27.1% Carbazole %D=+44.3% . No action required for compounds with positive %D since all associated samples are non-detect for these compounds – only action is for 2.4-dinitrophenol.

**ACTION: 2,4-dinitrophenol estimated (UJ) in all samples due to low calibration verification (bias indeterminate due to ICAL).*

5. Laboratory and Field Blank Results

Laboratory and field blank results are reviewed to assess the presence of contaminants, which affect the accuracy and sensitivity of the results. See Table 1a. where the Holding Time and Associated QC Table was completed for the samples within this SDG.

Was each sample analysis associated with the appropriate method blank, *ie*., correct matrix, correct matrix level, same extraction batch? **Yes**. If no, list below affected samples.

Review the reporting forms for each method and field blank. Were any target compounds in the method blanks detected at concentrations above the Reporting Limit (RL)? **Yes**. If yes, were these compounds phthalates and were they reported at < 5 times the RL? **Yes.**

Action: - Blanks should not contain contaminants above the RL except for phthalates that must not be present above 5 times the RL. The Blank Action Level is defined as five times the level seen in the matrix-matched blank associated with the samples, except if phthalates are present, in which case the Blank action is ten times the level observed in any matrix-matched blank. The following actions should be taken if conditions warrant:

1. If the blank is not matrix matched, qualify all sample data, for the contaminant associated with this blank, with EB, as appropriate.
2. If the reported result in a sample is below the reporting limit (sample < RL) and if a matrix-matched blank contains a result above the sample-equivalent level reported, the result in the sample should be negated (U) and raised to the sample-specific RL for that sample
3. If the sample result is between the reporting limit and the blank Action Level (RL < sample < Action Level), the result for the sample is negated (U) at the level found in the sample. Based on the level of contamination suspected in the sample, the reporting limit may be elevated. Professional judgment will be used in assessing the action needed.
4. If the sample result is greater than the RL and the blank Action Level, no action is taken.

Comments:

Blanks evaluated: Method Blanks: MB 360-91782/1-A

Blank ID	Contaminant / Level (µg/L)	Matrix Related	Action Level	Sample/Reported Result (µg/L)	Corrected Result
MB 360-91782/1-A	Di-n-butylphthalate 177 J µg/kg	Y	1770 µg/kg	Associated samples were ND – No Blank Action required	

6. Surrogate Spike Recoveries

The surrogate spike recoveries are reviewed to assess the accuracy of the results relative to laboratory performance and specific sample matrix.

Review the Surrogate Recovery information for each field and quality control sample. For one sample, verify that the recoveries reported correspond to the raw data and that the recovery calculation was done properly. Were the recovery data reported properly? **Yes**. Did the laboratory use different surrogates for the 8270D-EI and 8270D-SIM, if applicable? **NA.**

Were the surrogate recoveries within QAPP defined accuracy limits (30-130% for all surrogates for sediments/soils and 30-130% for BN and 15-110% for Acid surrogates in groundwater and surface water)? **Yes**. If no, were the affected samples reanalyzed? **NA**. List below the affected samples.

Action - If two Base/Neutral (BN) or two Acid surrogate recoveries exceed the upper limit, estimate (J) positive results (for the fraction affected) due to a potential high bias of the results; no action is required for non-detect results. If two BN or 2 Acid surrogate recoveries are below lower accuracy limit but above 10% recovery, estimate (J and UJ) the positive and non-detect results, for the affected fraction, due to a potential low bias in the results. If any surrogate recoveries are below 10%, reject (R) non-detect results and estimate positive results (J) due to potential false negatives and low bias in the results, respectively. List below the affected samples and required actions.

Comments:

6 standard 8270 Surrogates used (3 Acid and 3BN) – control limits = QAPP limits.

All surrogates in samples and QC were recovered within criteria – No Action required.

SB-FS-TB-PC-18-3.0-5.0 Phenol-d5 on-column amount = 3.50 µg/mL with spike level = 5 µg/mL so that recovery is 3.50/5 x 100 = 70% √

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recovery and Precision

The matrix spike/matrix spike duplicate (MS/MSD) recoveries are reviewed to assess the accuracy of the results relative to the specific sample matrix and the relative percent differences (RPDs) are reviewed to assess the precision of the results relative to the specific sample matrix.

Review the unspiked sample, Matrix Spike, and Matrix Spike Duplicate (MS/MSD) raw data and recovery results. Were the recoveries for the MS/MSD calculated properly? **Yes**.

Did the laboratory perform MS/MSDs for each matrix and matrix level analyzed for each analytical batch prepared for analysis? **Yes**. Were all target analytes spiked into the matrix for the MS/MSD analysis? **Yes.** Was the MS/MSD spike level appropriate relative to the unspiked sample level (*i.e.,* was the level in the unspiked sample < 4 times the level of the spike?) **Yes.**

Were the MS/MSD recoveries within accuracy limits (within 40-140% for BN and 30-130% acid compounds in all matrices)? **No.** Were the RPDs between the MS/MSD within the QAPP precision criteria recovery (RPD ≤ 20% for groundwater / surface water or RPD ≤ 30% for sediment / soil)? **No**. If no, list below the affected compounds.

Action: No action is taken to the entire data set based on MS/MSD results alone. If the spike level was not appropriate to the matrix, no action to qualify sample data should be taken. The unspiked sample may be qualified based on MS/MSD results as follows: if the MS/MSD recoveries were greater than the upper accuracy limit, estimate (J) positive results due to potential high bias; no action is required for non-detect results; if the MS/MSD recoveries were below the lower accuracy limit but above 10%, estimate (J and UJ) positive and non-detect results due to potential low bias; if a MS/MSD compound was recovered below 10% or not at all, estimate (J) positive results due to potential low bias and evaluate the non-detected results to determine whether estimation (UJ) or rejection (R) of the unspiked sample data is warranted. If the RPD between the MS and MSD > QAPP criteria, estimate (J and UJ) positive and non-detected results in the unspiked sample.

Comments:

SB-FS-TB-PC-18-3.0-5.0 MS pyrene on-column amount = 8.15 µg/mL with spike level = 8 µg/mL so that recovery is 8.15/8 x 100 = 101.8% = 102% √

MS/MSD performed on SB-FS-TB-PC-18-3.0-5.0. MS & MSD %Rec and MS/MSD RPD were acceptable for all Target SVOCs except: 3,3'-dichlorobenzidine %Rec low (27%, 18%) and RPD high (37%) and Rec High, MS Carbazole (142%). No action for high recoveries for carbazole since the unspiked sample was non-detect for this compound.

**ACTION: 3,3'-dichlorobenzidine estimated (UJ) with indeterminate bias in sample SB-FS-TB-PC-18-3.0-5.0 due to low MS/MSD recoveries and MS/MSD imprecision.*

8. Laboratory Control Samples

The Laboratory Control Sample (LCS) and, if analyzed, Laboratory Control Sample Duplicates (LCSD) are reviewed to assess the accuracy and precision of the results relative to the analytical procedure.

Review the raw data and recovery information for the LCS/LCSD.

Did the laboratory perform a LCS/LCSD for each matrix and analytical batch at a level between the lowest and second lowest calibration level? **Yes**. Were all target analytes spiked into the LCS? **Yes.** If no, list below the affected samples.

Were the LCS recoveries within QAPP requirements for recovery (40-140% for BN compounds and 30-130% for acid compounds)? **Yes**. Were the RPDs between the LCS/LCSD within the precision criteria recovery (RPD ≤ 20% for groundwater / surface water or RPD ≤ 30% for sediment / soil)? **Yes**. If no, list below the affected compounds.

Action: If the LCS recoveries are above criteria, estimate (J) positive results due to potential high bias, no qualification of non-detected results is necessary. If the LCS recoveries are between 10% to the lower recovery limit, estimate (J and UJ) positive and non-detect results for the samples associated with the analytical batch due to potential low bias in the results. If the recovery in the LCS is less than 10%, estimate (J) positive results due to low bias and reject (R) non-detect results due to potential false negatives. Professional judgment should be used in qualifying data based on the LCS/LCSD results if they are not in align with site-specific MS/MSD recovery and precision results.

Comments:

Although not required by QAPP, lab performed LCSD analysis as well as LCS. Criteria used for precision was the same as for MS/MSD.

LCS/LCSD: 360-91782/2-A / LCSD 360-91782/3-A: All %Rec and RPDs OK except: 4-nitroaniline %Rec high LCSD (150%), carbazole LCS/LCSD %Rec high (204%, 205%), and di-n-butylphthalate % Rec high LCSD (142%). No action for high recoveries since the unspiked sample was non-detect for all compounds that exhibited high recovery.

9. Internal Standards

The Internal Standard (IS) response in the samples and standards is evaluated to ensure that the analytical system was in control during analysis.

Were the IS areas for each sample and standard analyzed within 50-200% of the continuing calibration? **No**. Were the retention times for the IS within ±30 seconds from the retention time established in the continuing calibration? **Yes**.

Action: Action is taken only on the specific compounds associated with an IS that is outside of criteria. If an IS area is greater than 200% compared to the continuing calibration, qualify positive results as estimated (J), non-detects do not require action. If the IS area is < 50% but ≥ 20% of CCV, estimate positive and non-detected results (U and UJ). If the area drop off or retention time shift for the IS is too severe (IS < 20% of CCV), non-detected results may require rejection (R). Professional judgment must be used in evaluating the data associated with poor IS performance.

Comments:

Lab used the following IS: 1,4-Dichlorobenzene-d4, Naphthalene-d8, Acenapthene-d10, Phenanthrene-d10, Chrysene-d12 and Pyrene-d12

All IS Areas and RTs were acceptable for samples and QC except for perylene-d12 was high in the LCS and LCSD. No action was taken as LCS/LSCD data is not affected. LCS/LCSD showed recoveries within limits.

10. Sample Quantitation Limits

Review raw data and reporting forms. Did the sample-specific RLs meet the QAPP PQL criteria? **Yes.** Did the laboratory accurately adjust sample reporting limits to account for sample specific preparation and analysis conditions? **Yes** Were results reported in the proper units (waters in µg/L; soils/sediments in µg/Kg dry weight?) **Yes.** Did the laboratory report results for all compounds listed in the QAPP for the particular matrix being evaluated? **Yes.**

Were all components reported in the samples quantitated within the calibration region of the instrument for the detected analytes? **No.** Were the relative retention times for all components reported within the retention time windows established during initial calibration? **Yes.**

If the sample analyses were performed at dilutions, were more concentrated analyses performed or was sample screening information included in the data package? **No.**

Were sample dilutions appropriate relative to scaling of the chromatograms and the calibration levels employed (e.g., peaks of interest within upper half of the chromatogram and quantitation done within the calibration range)? **Yes.**

Action - If the quantitation limits for non-detect results are lower than the lowest calibration standard, or if a positive result is detected outside of the calibration range, estimate positive and non-detected results (J and UJ).

Comments:

Sample SB-FS-TB-PC-18-3.0-5.0 was run at a 1:2 dilution, sample SB-FS-TB-PC-19-0.5-2.0 (360-40815-10) was run at a 1:5 dilution, and sample SB-FS-TB-PC-20-0.5-2.0 (360-40815-17) was run at a 1:5 dilution; due to the levels of unresolved complex mixtures in the samples. No undiluted analyses were reported and sample screening data was not included in the package.

Lab reported results for all 67 target SVOCs required. All RLs reported were less than or equal to the PQLs given in QAPP Table 4-2C except for bis-2-ethylhexylphthalate and di-n-butylphthalate in all samples; 2-nitroaniline, 3-nitroaniline, 4,6-dinitro-2-methylphenol, 4-nitroaniline, 4-nitrophenol and hexachlorobenzene in sample SB-FS-TB-PC-18-3.0-5.0 and all analytes except 2,4-dinitrophenol and pentachlorophenol in samples SB-FS-TB-PC-19-0.5-2.0 (360-40815-10) and SB-FS-TB-PC-20-0.5-2.0 (360-40815-17).

9 SVOC results were reported below the RL and flagged "J" by the lab. These 9 results were accepted for reporting as estimated (J) data with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

All non-detects were reported at levels below the PALs given in Table 4-2C except for hexachlorobenzene in samples SB-FS-TB-PC-18-3.0-5.0, SB-FS-TB-PC-19-0.5-2.0, and SB-FS-TB-PC-20-0.5-2.0.

11. Field Duplicate Precision

Field duplicate samples are reviewed to assess representativeness of the sample aliquot to the area sampled and the precision of the results relative to field sampling techniques.

Review analytical results for the duplicate sample analyses.

Action: If field duplicate precision exceeded 30% RPD for groundwater/surface waters/leachates or 50% RPD for soils/sediment samples for any compound reported at > 2 x RL, estimate (J and UJ) positive and non-detect results for the affected compounds in both samples. If severe imprecision was noted in the field duplicate sample (i.e., RPD >100%), qualify the remainder of the associated field sample data based on sound technical judgment.

Comments:

Field Duplicate Samples:

No field duplicate samples were submitted for SVOC analysis in this SDG.

12. Target Compound Identification

The sample chromatograms, quantitation reports, and detected compound mass spectra are evaluated to determine whether the laboratory reported the data properly.

For all positively detected results in all samples, were the RRTs of the detects within ± 0.06 RRT units of the CCAL standard RRT for the compound? **Yes.** If no, list below

Did the sample compound mass spectra meet criteria relative to the standard mass spectra (i.e., all ions > 10% in standard mass spectrum present in sample spectrum, relative intensities of ions agree within ± 20%, and ions > 10% in sample which are not in standard accounted for)? **Yes.** If no, list below

Were all major peaks in the sample chromatogram accounted for in the reporting of results (i.e., either detected compounds, surrogates, IS', or TICs)? **No.** If no, list below

ACTION: Professional judgment should be used to negate (U) data or reject (R) data as necessary.

Comments:

Since TICs were not required, none were reported. All samples contained non-target compounds and all also had an unresolved complex mixture evident within the chromatograms.

13. Tentatively Identified Compound (TIC) Analysis

Was TIC determination performed by the laboratory? **No.** Were up to 20 non-target non-hydrocarbon compounds (TICs) reported for each sample? **NA.**

Review the TIC results. Were the CLP rules for TIC identification followed? **NA.** Were the identifications made by the laboratory appropriate based upon NEH's review of the data? **NA.**

Were all TICs qualified as estimated (J)? **NA**. For those TICs identified with presumptive certainty, was the CAS reported and were the compounds also qualified with an "N" to indicate this certainty in qualitative identification? **NA.**

Action:
Ensure all TICs estimated (J) and for those with presumptive certainty, that the "N" qualifier is also added to the result. For any TICs identified as aldol condensation products (should have been also qualified "A" by laboratory), eliminate these from the project database file so that only sample-specific TICs are reported. Professional judgment must be used in the identification and reporting of TICs.

Comments:

TICs were not required by QAPP. No action required.

14. Additional QA/QC Issues

Were the percent solids for the samples >30%. **Yes.**

For sediments, was freeze-drying of samples employed? **NA.**

For Sediments only, did the laboratory report analytes by 8270D-EI and 8270D-SIM as required in QAPP Table 4-2D? (3 PAHs by 8270D-SIM and all other targets by 8270D-EI)? **NA**.

Did lab report both 8270D-EI and 8270D-SIM results for the same target**?** **NA.** If yes, were the 8270D-SIM and 8270D-EI data comparable? **NA.** If multiple results for each compound per sample reported, were all 8270D-SIM data accepted for reporting of results and 8270D-EI data eliminated from the database? **NA**. If No, explain below.

List any additional issues which may affect the quality of the results. List the affected samples, QA/QC issue, and necessary actions taken in the comments section below.

> **Action**: If the %solids were between 10% and 30%, qualify positive results as estimated (J) and reject non-detected results (R). If the %solids were < 10%, reject (R) positive and non-detected results.

Comments:

Narrative was complete. All issues noted in the narrative have already been addressed during this review.

IV. Example Sample Calculations

Review of one sample per data package is performed to determine if sample results and quantitation limits were correctly calculated and reported.

Sample ID: SB-FS-TB-PC-18-0.5-2.0 was selected for review in this data package.

A. Form 1 Review

1. Were the Form 1s completed according to the method/QAPP requirements? **Yes**. If no, list below the affected fields.

2. Reproduce the reporting limit for SVOC in one of the samples; did the laboratory correctly calculate the quantitation limits? **Yes**. If no, list below.

B. Quantitation Review

Reproduce a calculation for one SVOC analyte in one of the samples that contained a positive result and compare the calculated result to the result reported by the laboratory.

Analyte Checked: Pyrene

Laboratory Result: 11 J µg/kg Calculated Result: 10.7 J µg/kg

Example Calculation:

30.03 g extracted to 1 mL final volume; DF =1
Response of naphthalene = 40895
IS Response = 417474 @ 4

ICAL RRF = 1.3206

$$\text{Conc.} = \frac{40895 \times 4\ \mu g/mL \times 1mL\ extract}{417474 \times 1.3206 \times (0.03003\ kg)(0.923)} = 10.7\ J\ \mu g/kg\ \surd$$

EPA Region 1 Tier III-type Review of Polychlorinated Biphenyl (PCB) Aroclors by Method 8082A

Lab: TestAmerica Westfield, Westfield, Massachusetts

Project ID: 360-40815-1

The Data Validation Criteria used within this checklist are based upon the following:

Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012;

Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, December 1996, including Part III (Pesticide/PCB Data Validation Functional Guidelines);

USEPA SW846 Methods 8082A.

Date Reviewed: August 21, 2012

Data Reviewer: *Deborah A. Loring*
New Environmental Horizons, Inc.

III. Review of Pesticide Data

1. Holding Times

Holding times and QC association with the samples are reviewed to ensure the accuracy of the reported results. The table on the following page (Table 1a) was completed to document the holding times and QC association.

Review the Pesticide Data Sheets.

Were the holding time requirements (samples extracted within 7 days of sampling or thawing and extracts analyzed within 40 days of preparation) met for each sample? **Yes**. If no, list below the affected samples and the number of days outside of holding time.

Action: If the holding times were slightly exceeded, estimate (J and UJ) positive and non-detect results or use professional judgment (e.g., EPA has rescinded HTs for PCBs; therefore, estimating results for extraction outside of HT may not be needed). If the holding times were grossly exceeded (more than twice the allowed holding time), professional judgment should be used to determine the action necessary. Evaluation of screening, undiluted and dilution analyses, if available, should be made to determine the impact of the holding time violation on the data quality (e.g., whether or not positive values are estimated (J) and whether non-detected values should be estimated (UJ) or rejected (R)).

Comments:

Samples were received intact at 4 ± 2°C and there were no COC issues. All samples were extracted and analyzed within HT – No Action required.

Table 1a. Holding Time and Associated QC Table

Sample Matrix: Soil

Sample ID	Date Sampled	Field Blank	Method Blank	LCS	Date Extracted		Date Analyzed
SB-FS-TB-PC-18-0.5-2.0	5/29/12	NA	MB 360-91616/1	LCS 360-91616/2 & LCSD 360-91616/3	6/6/12		6/7/12
SB-FS-PC-18-14.0-17.0	5/29/12	NA	MB 360-91616/1	LCS 360-91616/2 & LCSD 360-91616/3	6/6/12		6/7/12
SB-FS-PC-18-20.0-22.0	5/29/12	NA	MB 360-91616/1	LCS 360-91616/2 & LCSD 360-91616/3	6/6/12		6/7/12
SB-FS-TB-PC-19-0.5-2.0	5/29/12	NA	MB 360-91616/1	LCS 360-91616/2 & LCSD 360-91616/3	6/6/12		6/7/12
SB-FS-TB-PC-20-0.5-2.0	5/29/12	NA	MB 360-91616/1	LCS 360-91616/2 & LCSD 360-91616/3	6/6/12		6/7/12
SB-FS-TB-PC-18-3.0-5.0 & MS/MSD	5/29/12	NA	MB 360-91669/1	LCS 360-91669/2 & LCSD 360-91616/3	6/7/12		6/8/12

2. Initial Calibration

The initial calibration data are reviewed to determine if the standards were compliant with the method protocols.

Review the Initial Calibration Data Summary for PCBs. Were linear (CFs) statistics or calibration curves used in the initial calibration? Calibration**.** If linear calibration, check and recalculate at least one peak for an Aroclor across the ICAL. Does the CF and %RSD check back to the raw data? **NA**. Did the initial calibration meet %RSD criteria of ≤ 20% for Aroclor 1016 and Aroclor 1260? **NA.**

Were a minimum of 5-levels used for Aroclor 1016/1260 and a single point for the other 7 Aroclors (AR1221, AR1232, AR1242, AR1248, AR1254, AR1262, and AR1268)? **Yes**. If curve statistics were used for the initial calibration, was the regression coefficient > 0.99? **Yes.** Were the curves generated with sufficient points (linear with 5 points, quadratic with 6) **Yes.** Was the curve forced through the origin? **No.** (Method 8000c allows the curve to be forced through the origin).

Was the lowest initial calibration standard at a concentration equivalent to the sample-specific reporting limit? **Yes.** Were retention times for each target analyte stable across the calibration (i.e., minimum drift)? **Yes.**

Action: If the %RSD >20%, qualify positive and non-detected results as estimated (J and UJ). Sound technical judgment should be used in qualification of the data. The results for each sample associated with ICAL should be evaluated to determine if a result reported would be impacted by the miss-calibration. For curve analysis, if the percent Difference (%D) between the calculated area and the reported area > ±25%, qualify positive and non-detected results as estimated (J and UJ).

Comments: *None*.

Linear PCB ICAL Check: Compound/Peak Checked

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Avg. RRF	%RSD
Concentration								
Response Cpd								
CF								

2. Initial Calibration – continued

If curve statistics are used, verification of the computer generated equation may be difficult across the ICAL. Instead, a check is made for one PCB peak to determine whether the equation matches the data obtained as follows:

Curve equation: $y = a + bx + cx^2 + dx^3$

Where: $y = \frac{\text{Area compound}}{\text{Area Internal Standard}}$ or y = Area compound (external std. calibration)

$x = \frac{\text{Concentration Compound}}{\text{Concentration IS}}$ or x = Conc. compound (external std calibration)

Since solving for x is somewhat difficult, the system is checked by using the Calculated Compound Concentration to solve for the Area of the compound as follows:

PCB Compound evaluated:

Standard evaluated:

ICAL calibration formula:

Amount Reported	Amount of IS	Calculated x	Calculated y	Area of IS	Calculated Area of compound	Reported Area of Compound
					%Difference	

Comments:

4/13/12 Instrument M: 1-point cal @ 1000 ug/L on column for Ar 1221, 1254, 1221, 1232, 1242, 1248, 1262, 1268, and 6-point cal @ 50 – 2000 ug/L on column for Ar-1016 & 1260. Linear regression performed with r2 $\geq$ 0.99. No action required.

3. Continuing Calibration Verification

The continuing calibration data are reviewed to determine if the standards were contractually compliant.

Review the Continuing Calibrations (CCAL) and Summaries. If average CFs are used, check and recalculate the CF and %Difference (%D) for at least one peak of one Aroclor in one of the CCALs. Does the CF and %D check back to the raw data? **NA.**

If curve statistic calibrations were used, check one of the CCALs for one Aroclor to determine if the calibration relates properly back to the corresponding ICAL. Do the CCALs properly reference the correct ICALs? **Yes.**

Was a continuing calibration check performed every 12 hours or every 20 samples, whichever is sooner? **Yes**. If an Aroclor other than AR1016/AR1260 was detected, was this Aroclor analyzed as part of the continuing calibration? **NA.**

Were the target analytes recovered within the expected retention time window based upon the initial calibration (i.e., drift of instrument was acceptable)? **Yes**.

Did the continuing calibrations meet criteria for verification of %D ≤ ±20% or %Drift ≤ ±20% for every compound? **No**. If no, list below the outliers and the affected samples.

Action: If the %D or %Drift for a compound > ±20%, estimate positive and non-detected results (J and UJ) for samples analyzed following this standard for the compound(s) that was outside of calibration, if that compound was reported from the GC column showing calibration anomalies. If the %D > ±20% on one column but that was not used for sample quantitation, no action may be necessary. Professional judgment may be used in this case or if the associated samples are non-detect for the analyte and the %D variation indicates a possible high-bias in the data or if variation is on the column not chosen for reporting of results.

Comments: Note – the following calculation was done by linear regression and differed slightly from the results calculated by the lab (768 µg/L vs. 766 µg/L) using a modified linear regression equation. No action required.

Linear CCAL PCB check: CCV 360-91628/1

CCAL Check: Standard ID _CCV 360-91628/1___ Peak Checked __PCB-1260 Peak 5_Col 1____

Responses	µg/L from Curve	True Value µg/L	% Difference
Cpd: 1280222304	768	1000	-23.2%
IS: NA			

3. Continuing Calibration Verification - continued

If curve statistics are used, verification of the computer generated equation may be difficult across the ICAL. Instead, a check is made for one PCB peak to determine that the correct equations were used to generate the amount found in the CCAL standard

Curve equation: $y = a + bx + cx^2 + dx^3$

Where: $y = \frac{\text{Area compound}}{\text{Area Internal Standard}}$ or y = Area compound (external std. calibration)

$x = \frac{\text{Concentration Compound}}{\text{Concentration IS}}$ or x = Conc. compound (external std calibration)

Since solving for x is somewhat difficult, the system is checked by using the Calculated Compound Concentration to solve for the Area of the compound as follows:

Pesticide Compound evaluated:

Standard evaluated:

ICAL calibration formula:

Amount Reported	Amount of IS	Calculated x	Calculated y	Area of IS	Calculated Area of compound	Reported Area of Compound
					%Difference	

Amount Found	Theoretical Amount	% Drift

Comments:

CCAL: CCV 360-91628/1 6/7/12 11:10 Average %D $\leq$ 20% except Col 1 Ar-1016 %D = -23.7. Column 2 within limits so no action required.

CCAL: CCV 360-91628/12 6/7/12 16:20, 21:04; 6/8/12 10:35, 17:20 Average %D $\leq$ 20% on both columns.

4. Laboratory and Field Blank Results

Laboratory and field blank results are reviewed to assess the presence of contaminants, which affect the accuracy and sensitivity of the results. See Table 1a. where the Holding Time and Associated QC Table was completed for the samples within this SDG.

Was each sample analysis associated with the appropriate method blank, *ie*., correct matrix, correct matrix level, same extraction batch? **Yes**. If no, list below affected samples. Were Cleanup Blanks analyzed? **NA.**

Review the reporting forms for each method and field blank. Were any target compounds in the method blanks detected? **No**.

Action: - Blanks should not contain contaminants above the RL. The Blank Action Level is defined as five times the highest level seen in the matrix-matched blanks associated with the samples. The following actions should be taken if conditions warrant:

1. If the blank is not matrix matched, qualify all sample data, for the contaminant associated with this blank, with EB, as appropriate.
2. If the reported result in a sample is below the reporting limit (sample < RL) and if a matrix-matched blank contains a result above the sample-equivalent level reported, the result in the sample should be negated (U) and raised to the sample-specific RL for that sample
3. If the sample result is between the reporting limit and the blank Action Level (RL < sample < Action Level), the result for the sample is negated (U) at the level found in the sample. Based on the level of contamination suspected in the sample, the reporting limit may be elevated. Professional judgment will be used in assessing the action needed.
4. If the sample result is greater than the RL and the blank Action Level, no action is taken.

Comments:

Blanks evaluated: MB 360-91616/1-A & MB 360-91669/1-A

4. Laboratory and Field Blank Results - continued

Blank ID	Contaminant / Level	Matrix Related	Action Level	Sample/Reported Result	Corrected Result
MB 360-91616/1-A	None			No Blank Action Required	
MB 360-91669/1-A	None			No Blank Action Required	

5. Surrogate Spike Recoveries

The surrogate spike recoveries are reviewed to assess the accuracy of the results relative to laboratory performance and specific sample matrix.

Review the Surrogate Recovery information for each field and quality control sample. For one sample, verify that the recoveries reported correspond to the raw data and that the recovery calculation was done properly. Were the recovery data reported properly? **Yes**.

Were the surrogate recoveries within 30-150%? **Yes**. If no, were the affected samples reanalyzed? **NA**. Did the chromatography of the affected samples show interferences? **No.** Was the retention time (RT) of the surrogates within criteria (Tetrachloro-m-xylene within ± 0.05 min and Decachlorobiphenyl ± 0.10 min from average RT of surrogate from ICAL)? **Yes.** List below the affected samples.

Action – Professional judgment must be used in qualifying data for PCBs based upon the surrogate recoveries. If recovery is outside of criteria on one column, but acceptable on the other, and all quantitative results are obtained for the samples on the second column, then qualification of the data may not be required. If quantitation is reported for a particular column, and surrogate recoveries are outside of criteria, the following actions may be taken: if 10% < %Rec < 30%, qualify detected and non-detected results as estimated (J and UJ); if %Rec > 150% estimate detected results (J), no action required for non-detects; if %Rec < 10%, estimate (J) positive results and reject (R) non-detects. A review of the data for both columns, comparing sample chromatograms to standard chromatograms, must be done and professional judgment must be used to determine if action is warranted. List below the affected samples and required actions.

Comments:

Both surrogates in all samples + QC were recovered within QAPP limits on both GC Columns. No Action required.

SB-FS-TB-PC-18-3.0-5.0 DCB on-column amount, Col 2 = 25.8 µg/L with spike level = 30 µg/L so that recovery is 25.8/30 x 100 = 86.0% = 86% √

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recovery and Precision

The matrix spike/matrix spike duplicate (MS/MSD) recoveries are reviewed to assess the accuracy of the results relative to the specific sample matrix and the relative percent differences (RPDs) are reviewed to assess the precision of the results relative to the specific sample matrix.

Review the unspiked sample, Matrix Spike, and Matrix Spike Duplicate (MS/MSD) raw data and recovery results. Were the recoveries for the MS/MSD calculated properly? **Yes**.

Did the laboratory perform MS/MSDs for each matrix and matrix level analyzed for each analytical batch prepared for analysis? **Yes**. Was the MS/MSD spike level appropriate relative to the unspiked sample level (*i.e.,* was the level in the unspiked sample < 4 times the level of the spike?) **Yes.** Did the MS/MSD contain AR1016 & AR1260? **Yes.** If no, list below the affected samples.

Were the MS/MSD recoveries within 40-140% accuracy limits (all matrices)? **Yes.** Were the RPDs between the MS/MSD within the QAPP precision criteria recovery (RPD ≤ 30%)? **Yes**. If no, list below the affected compounds.

Action: No action is taken to the entire data set based on MS/MSD results alone. If the spike level was not appropriate to the matrix, no action to qualify sample data should be taken. The unspiked sample may be qualified based on MS/MSD results as follows: if the MS/MSD recoveries were > 140%, estimate (J) positive results due to potential high bias; no action is required for non-detect results; if the MS/MSD recoveries were < 40% but above 10%, estimate (J and UJ) positive and non-detect results due to potential low bias; if a MS/MSD compound was recovered below 10% or not at all, estimate (J) positive results due to potential low bias and evaluate the non-detected results to determine whether estimation (UJ) or rejection (R) of the unspiked sample data is warranted. If the RPD between the MS and MSD > QAPP criteria, estimate (J and UJ) positive and non-detected results in the unspiked sample. .

Comments:

MS/MSD performed on sample SB-FS-TB-PC-18-3.0-5.0

SB-FS-TB-PC-18-3.0-5.0 MS a-BHC on-column amount = 362.92 µg/L with spike level = 500 µg/L so that recovery is 362.92/500 x 100% = 72.6% = 73% √

All MS/MSD recoveries and RPDs were within QAPP criteria - No Action required.

7. Laboratory Control Samples

The Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicates (LCSD) are reviewed to assess the accuracy and precision of the results relative to the analytical procedure.

Review the raw data and recovery information for the LCS/LCSD.

Did the laboratory perform a LCS/LCSD for each matrix and analytical batch at a level between the lowest and second lowest calibration level? **Yes**. Were AR1016 & AR1260 spiked into the LCS? **Yes** If no, list below the affected samples.

Were the LCS recoveries within QAPP requirements for recovery (40-140%)? **Yes**. Were the RPDs between the LCS/LCSD within lab precision criteria recovery? **Yes**. If no, list below the affected compounds.

Action: . If the LCS recoveries are above criteria, estimate (J) positive results due to potential high bias, no qualification of non-detected results is necessary. If the LCS recoveries are between 10% to the lower recovery limit, estimate (J and UJ) positive and non-detect results for the samples associated with the analytical batch due to potential low bias in the results. If the recovery in the LCS is less than 10%, estimate (J) positive results due to low bias and reject (R) non-detect results due to potential false negatives. Professional judgment should be used in qualifying data based on the LCS/LCSD results if they are not in align with site-specific MS/MSD recovery and precision results.

Comments:

LCS: LCS/LCSD 360-91616/2-A & /3-A, LCS/LCSD 360-91669/2-A & /3-A.

LCS 360-91616/2-A: Ar-1260 on-column amount = 345.3 µg/L with spike level = 500 µg/L so that recovery is 345.3/500 x 100% = 69.1% = 69% √

All LCS/LCSD recoveries and RPDs were within QAPP criteria - No Action required.

8. PCB Cleanup Checks

Where cleanup protocols used on the PCB extracts? **No**. If yes, what cleanups were used and what QC was generated to verify the adequacy of the cleanup:

List all general extraction/cleanup procedures used:

No Cleanup procedures used for these samples based on preparation log information.

Were all samples and QC from the original extraction put through the cleanup protocols? **No**. Were there any QC results which indicated that the cleanup was not adequate? **No**.

Action: If a QC sample, for example Method Blank or LFB, demonstrates unacceptable results (e.g., contamination or loss of analytes of interest), the data associated with these QC samples may require qualification based on professional judgment.

Comments:

No Action required – cleanup is optional for the matrix.

9. Sample Quantitation and Identification

Review raw data and reporting forms. Did the sample-specific RLs meet the QAPP criteria (Table 4-4A for GW; Table 4-4B for Soil)? **Yes.** If no, note below whether PALs were exceeded in any sample. Did the laboratory accurately adjust sample reporting limits to account for sample specific preparation and analysis conditions? **NA.** Did the laboratory report results for all compounds listed in QAPP for the particular matrix being evaluated? **Yes.**

Were all components reported in the samples quantitated within the calibration region of the instrument for the detected analytes? **NA.** Was a minimum of 3 peaks used for quantitation of detected Aroclors? **NA.**

If the sample analyses were performed at dilutions, were more concentrated analyses performed or was sample screening information included in the data package? **NA.**

Were sample dilutions appropriate relative to scaling of the chromatograms and the calibration levels employed (e.g., peaks of interest within upper half of the chromatogram and quantitation done within the calibration range)? **NA.**

For detected PCBs, did results fall within the expected retention time window on both GC columns? **NA.** Explain below, if necessary.

Were there any detected results with quantitation between the two columns/channels differed by more than 40% (i.e., %D > 40%)? **NA.** Did the lab always report the lowest value from the two columns? **NA.** *[Note: EPA Region I judges dual column precision based on %D ≤ 25%; however, QAPP and SW-846 requires precision to be evaluated at %D ≤ 40%]*

Was there a pattern of peaks in the chromatogram that suggest that weathered Aroclors were present which weren't identified by the laboratory? **No.** If yes, explain below and recommendation for action.

Action - If the quantitation limits for non-detect results are lower than the lowest calibration standard, or if a positive result is detected outside of the calibration range, estimate results (J and UJ) as necessary.

If the results from two columns/channels differ from each other by more than 40% but %D < 500% (Toxaphene), then estimate (J) result. If %D > 500%, reject (R) result. If one result is < QL and the other column result is > QL, J/UJ result as necessary. The result may also be negated at the level found if in the judgment of the reviewer, the Aroclor pattern in the sample does not match the Aroclor pattern from the standards.

9. Sample Quantitation and Identification - continued

Comments:

All samples were run with no dilution and were ND for all Aroclors.

All RLs reported were less than or equal to the PALs given in QAPP Table 4-3B.

All RLs reported were less than or equal to the PQLs given in QAPP Table 4-3B except all Aroclors in samples SB-FS-PC-18-14.0-17.0, SB-FS-PC-18-20.0-22.0, and SB-FS-TB-PC-18-0.5-2.0 (RLs 110 µg/kg vs. 100 µg/kg PQL due to percent solids).

10. Field Duplicate Precision

Field duplicate samples are reviewed to assess representativeness of the sample aliquot to the area sampled and the precision of the results relative to field sampling techniques. No Field Duplicates are required for Fish Tissue,

Review analytical results for the duplicate sample analyses.

Action: If field duplicate precision exceeded 30% (waters) or 50% (solids) RPD for any Aroclor reported at level > 2 x RL, estimate (J and UJ) positive and non-detect results for the affected Aroclors in both samples. If severe imprecision was noted in the field duplicate sample (i.e., RPD >100%), qualify the remainder of the associated field sample data based on sound technical judgment.

Comments:

Field Duplicate Samples: _____ _____

There was no field duplicate sample for PCBs submitted with this SDG.

11 Additional QA/QC Issues

Were the percent solids for the samples >30%. **Yes.**

For sediment samples, was freeze-drying performed? **NA.**

List any additional issues which may affect the quality of the results. List the affected samples, QA/QC issue, and necessary actions taken in the comments section below.

> **Action**: If the %solids were between 10% and 30%, qualify positive results as estimated (J) and reject non-detected results (R). If the %solids were < 10%, reject (R) positive and non-detected results.

Narrative was complete. All issues noted in the narrative have already been addressed during this review.

IV. Example Sample Calculations

Review of one sample per data package is performed to determine if sample results and quantitation limits were correctly calculated and reported.

Sample ID: SB-FS-TB-PC-18-3.0-5.0 MS was selected for review in this data package.

A. Form 1 Review

1. Were the Form 1s completed according to the method/QAPP requirements? **Yes**. If no, list below the affected fields.

2. Reproduce the reporting limit for one PCB Aroclor in one of the samples; did the laboratory correctly calculate the quantitation limits? **Yes**. If no, list below.

B. Quantitation Review

Reproduce a calculation for one PCB in one of the samples that contained a positive result and compare the calculated result to the result reported by the laboratory.

Analyte Checked: Ar-1260, Peak 5, Col 2
Laboratory Result: 388 µg/kg Calculated Result: 388 µg/kg

Example Calculation:

Average Ar-1260 result Col 1,

$$362.9\ \mu g/L \times \frac{0.010\ L}{0.01035\ kg\ (0.904)} = 387.9\ \mu g/kg = 388\ \mu g/kg\ \surd$$

EPA Region 1 Tier III-type Review of Pesticides by Method 8081B

Lab: TestAmerica Westfield, Westfield, Massachusetts

Project ID: 360-40815-1

The Data Validation Criteria used within this checklist are based upon the following:

Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012;

Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996, including Part III (Pesticide/PCB Data Validation Functional Guidelines);

USEPA SW846 Methods 8081B.

Date Reviewed: August 20, 2012

Data Reviewer: *Deborah A. Loring,*
New Environmental Horizons, Inc.

1. Holding Times

Holding times and QC association with the samples are reviewed to ensure the accuracy of the reported results. The table on the following page (Table 1a) was completed to document the holding times and QC association.

Review the Pesticide Data Sheets.

Were the holding time requirements (waters extracted within 7 days of sampling and soil/sediment extracted within 14 days of sampling/thawing; extracts analyzed within 40 days of preparation) met for each sample? **Yes**. If no, list below the affected samples and the number of days outside of holding time.

Action: If the holding times were slightly exceeded, estimate (J and UJ) positive and non-detect results. If the holding times were grossly exceeded (more than twice the allowed holding time), professional judgment should be used to determine the action necessary. Evaluation of screening, undiluted and dilution analyses, if available, should be made to determine the impact of the holding time violation on the data quality (e.g., whether or not positive values are estimated (J) and whether non-detected values should be estimated (UJ) or rejected (R)).

Comments:

Samples were received intact at 4 ± 2°C and there were no COC issues. All samples were extracted and analyzed within HT – No Action required.

Table 1a. Holding Time and Associated QC Table

Sample Matrix: Soil

Sample ID	Date Sampled	Field Blank	Method Blank	LCS	Date Extracted		Date Analyzed
SB-FS-TB-PC-18-0.5-2.0	5/29/12	NA	MB 360-91616/1	LCS 360-90616/4 & /5	6/6/2012		6/8/2012
SB-FS-PC-18-14.0-17.0	5/29/12	NA	MB 360-91616/1	LCS 360-90616/4 & /5	6/6/2012		6/8/2012
SB-FS-PC-18-20.0-22.0	5/29/12	NA	MB 360-91616/1	LCS 360-90616/4 & /5	6/6/2012		6/8/2012
SB-FS-TB-PC-19-0.5-2.0	5/29/12	NA	MB 360-91616/1	LCS 360-90616/4 & /5	6/6/2012		6/8/2012
SB-FS-TB-PC-20-0.5-2.0	5/29/12	NA	MB 360-91616/1	LCS 360-90616/4 & /5	6/6/2012		6/8/2012
SB-FS-TB-PC-18-3.0-5.0 & MS/MSD	5/29/12	NA	MB 360-91669/1	LCS 360-91669/4	6/7/2012		6/11/2012

2. GC/ECD Instrument Performance Check

The instrument performance check, called Performance Evaluation Mixture (PEM) is analyzed to ensure the accuracy and sensitivity of the results relative to instrument performance.

Review the PEMs for the Pesticides. 6-7-20:56 6-8 1:11 6-11 7:46

Was the degradation of 4,4'-DDT to 4,4'-DDE and 4,4'-DDD < 15% and was the degradation of Endrin to Endrin aldehyde and Endrin ketone < 15%? **Yes**. Were all compounds in the PEM 90% resolved on each GC Column? **Yes.**

Was a PEM analyzed daily or every 12 hours of instrument use? **Yes.** If no, list below the affected samples.

Action: If resolution of the PEM compounds is not acceptable (on one or both columns) professional judgment must be used in qualifying data. If 4,4'-DDT breakdown > 20% (Region I DV Criteria), J detected DDT, DDE, DDD; reject (R) non-detect 4,4'-DDT and accept non-detect DDE & DDD. If Endrin breakdown > 20%, J detected Endrin, Endrin Aldehyde & Endrin Ketone; reject (R) non-detect Endrin and accept non-detect Endrin Aldehyde & Endrin Ketone. If combined breakdown > 30%, accept non-detects of breakdown products and J detects for 4,4'-DDT and Endrin; J detects of breakdown products and reject (R) non-detects for 4,4'-DDT and Endrin. If %D> ± 25%, estimate detects and non-detect (J and UJ), as appropriate.

Comments:
PEM 360-91652/1 (6/7/12 @ 12:03) This PEM was not included in the data package.

PEM 360-91653/16 (6/7/12 20:56), PEM 360-91653/28 (6/8/12 01:11), PEM 360-91733/1 6/11/12 07:46- Breakdown on Col. 1 (RTX-CLPest 1) and Col. 2 (RTX-CLPest 2) for DDT and Endrin acceptable. Visually, a review of the chromatograms indicates peak resolution all acceptable.

No Action required.

3. Initial Calibration

The initial calibration data are reviewed to determine if the standards were compliant with the method protocols.

Review the Initial Calibration Data Summary for Pesticides. Were linear (RRFs or CFs) statistics or calibration curves used in the initial calibration? **Both used.** If linear calibration, check and recalculate at least one pesticide across the ICAL. Does the CF (or RRF) and %RSD check back to the raw data? **Yes**. Did the initial calibration meet %RSD criteria of ≤ 20% for all analytes (surrogates and targets) across the calibration range on both GC Columns? **No.** If no, was regression analysis performed? **Yes.**

If curve statistics were used for the initial calibration, was the regression coefficient > 0.99? **Yes.** Were the curves generated with sufficient points (linear with 5 points, quadratic with 6) **Yes.** Was the curve forced through the origin? **Yes, in some cases – as is allowable by Method 8000C.**

Was the lowest initial calibration standard at a concentration lower than or equivalent to the sample-specific reporting limit? **Yes – Lower than except for Toxaphene.** Were retention times for each target analyte stable across the calibration (i.e., minimum drift)? **Yes.**

Action: If the %RSD >20%, evaluate analyte to determine source of high %RSD. If elimination of lowest point causes %RSD to be ≤ 20%, estimate (J) any positive detects for analyte between new acceptable lowest calibration point and original calibration point and raise all non-detects for analyte to new sample-equivalent RL associated with new lowest calibration point. If elimination of high-point results in %RSD ≤ 20%, estimate (J) all data reported above the new highest level of calibration, on a sample-equivalent basis, and accept all non-detects. If elimination of the highest or the lowest point in the calibration does not result in %RSD ≤ 20%, qualify positive and non-detected results as estimated (J and UJ). Sound technical judgment should be used in qualification of the data. The results for each sample associated with ICAL should be evaluated to determine if a result reported would be impacted by the miss-calibration. For curve analysis, if the percent Difference (%D) between the calculated area and the reported area > ±25%, qualify positive and non-detected results as estimated (J and UJ).

Comments:

Linear Pesticide ICAL Check: Compound Checked = beta-BHC on RTX-CLPest1

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Avg. RRF	%RSD
Concentration	1	10	20	30	40	50	100		
Response Cpd	774	7544	14318	21682	28461	37896	77377		
CF	774.00	754.40	715.90	722.73	711.53	757.92	773.77	744.3	3.4%

3. Initial Calibration – continued

If curve statistics are used, verification of the computer generated equation may be difficult across the ICAL. Instead, a check is made for one pesticide to determine whether the equation matches the data obtained as follows:

Curve equation: $y = a + bx + cx^2 + dx^3$

Where: $y = \frac{\text{Area compound}}{\text{Area Internal Standard}}$ or y = Area compound (external std. calibration)

$x = \frac{\text{Concentration Compound}}{\text{Concentration IS}}$ or x = Conc. compound (external std calibration)

Since solving for x is somewhat difficult, the system is checked by using the Calculated Compound Concentration to solve for the Area of the compound as follows:

Pesticide Compound evaluated:
Standard evaluated:
ICAL calibration formula:

Amount Reported	Amount of IS	Calculated x	Calculated y	Area of IS	Calculated Area of compound	Reported Area of Compound

ICAL 6/7/12 on Instrument H – on GC Col. 1 all %RSD ≤ 20% except a-BHC (Lin), g-BHC (Lin1), d-BHC (Lin), Aldrin (Lin1), g-Chlordane (Lin1), Endosulfan I (LinF), Endrin (LinF), Methoxychlor (LinF), Endrin ketone (Lin1), TCMX (Lin1) and DBCB (Lin1) used linear regression for calibration with r2 ≥ 0.99. On Col. 2 all %RSD < 20% except Heptachlor (Lin1), Heptachlor epoxide (LinF), g-Chlordane (LinF), Dieldrin (LinF), DDT (Lin1), Endrin aldehyde (LinF), Endrin ketone (LinF), and DCB (Lin1) used a regression analysis for calibration with r2 ≥ 0.99 – acceptable.

RL check – lowest concentration standard at 1 µg/L, for sample SB-FS-TB-PC-18-0.5-2.0, 10.17 g 92.3% Solids extracted to 10 mL final volume with 2 µL injection, DF=1. RL = (1 µg/L x 0.010 mL) /(0.01017 kg)(0.923) = 1.07 µg/kg. Lab reported RL = 11 µg/kg which is equivalent to the 10 µg/L standard level (L2) on a sample-specific basis.

Toxaphene ICAL – 6/7/12 on Instrument H – GC Col 1 &2 - all %RSD ≤ 20%. 3 point from 500 to 2500 µg/L. RL based on lowest standard is: RL = 500 µg/L x 0.010 mL) /(0.01017 kg)(0.923) = 533 µg/kg which is 2.5 times higher than RLs reported by lab.

**ACTION: All Toxaphene RLs raised to the sample-specific level equivalent to the 500 µg/L lowest concentration ICAL standard.*

Technical chlordane ICAL – 6/7/12 on Instrument H – GC Col 1 &2 - all %RSD ≤ 20%. 3 point from 500 to 2500 µg/L. RL based on lowest standard is: RL = 500 µg/L x 0.010 mL) /(0.01017 kg)(0.923) = 533 µg/kg which is 2.5 times higher than RLs reported by lab.

**ACTION: All Technical chlordane RLs raised to the sample-specific level equivalent to the 500 µg/L lowest concentration ICAL standard.*

4. Continuing Calibration Verification

The continuing calibration data are reviewed to determine if the standards were contractually compliant.

Review the Continuing Calibrations (CCAL) and Summaries. If average RRFs or CFs are used, check and recalculate the RRF and %Difference (%D) for at least one of the Pesticides in one of the CCALs. Does the RRF or CF and %D check back to the raw data? **Yes.**

If curve statistic calibrations were used, check one of the CCALs for one Pesticide to determine if the calibration relates properly back to the corresponding ICAL. Do the CCALs properly reference the correct ICALs? **Yes.**

Was a continuing calibration check performed every 12 hours or every 20 samples, whichever is sooner? **Yes**. Was the analytical sequence for the calibration verifications method compliant (e.g., PIBLK/PEM, samples, PIBLK, INDA&INDB, samples, PIBLK, PEM, etc.)? **Yes.**

Were the target analytes recovered within the expected retention time window based upon the initial calibration (i.e., drift of instrument was acceptable)? **Yes**.

Did the continuing calibrations meet criteria for verification of %D ≤ ±20% or %Drift ≤ ±20% for every compound? **No**. Did the continuing calibrations meet criteria for verification where the average of all compounds analyzed had %D ≤ ±20% or %Drift ≤ ±20% for every compound? **Yes.** If no, list below the outliers and the affected samples.

Action: If the %D or %Drift for a compound > ±20%, estimate positive and non-detected results (J and UJ) for samples analyzed following this standard for the compound(s) that was outside of calibration, if that compound was reported from the GC column showing calibration anomalies. If the %D > ±20% on one column but that was not used for sample quantitation, no action may be necessary. Professional judgment may be used in this case or if the associated samples are non-detect for the analyte and the %D variation indicates a possible high-bias in the data or if variation is on the column not chosen for reporting of results.

Comments:

Linear CCAL Pesticide check:

CCAL Check: Standard ID CCVRT 360-91653/17 6/7/12 @ 21:17
Compound Checked Endosulfan I on GC Column 2 (RTX-CLPest2)

Responses	RRF/CF	avg. RRF(CF) ICAL	% Difference
Cpd: 108368 @ 40	2709	2549	6.3

4. Continuing Calibration Verification - continued

If curve statistics are used, verification of the computer generated equation may be difficult across the ICAL. Instead, a check is made for one pesticide to determine that the correct equations were used to generate the amount found in the CCAL standard

Curve equation: $y = a + bx + cx^2 + dx^3$

Where: $y = \frac{\text{Area compound}}{\text{Area Internal Standard}}$ or y = Area compound (external std. calibration)

$x = \frac{\text{Concentration Compound}}{\text{Concentration IS}}$ or x = Conc. compound (external std calibration)

Since solving for x is somewhat difficult, the system is checked by using the Calculated Compound Concentration to solve for the Area of the compound as follows:

Pesticide Compound evaluated:
Standard evaluated:
ICAL calibration formula:

Amount Reported	Amount of IS	Calculated x	Calculated y	Area of IS	Calculated Area of compound	Reported Area of Compound
					%Difference	

Amount Found	Theoretical Amount	% Drift

Opening CCAL 6/7/12 Individuals @ 21:17 Toxaphene @ 22:00 Technical chlordane @ 21:38. %D ≤ ±20% for all compounds in both CCALs on GC Col. 1 and GC Col. 2 except Endrin aldehyde (%D = + 23.6%). No action required as this compound was not detected in associated samples, response was high in relation to ICAL, and compound was within limits on one column.

CCAL: 6/8/12 Individuals @ 01:33 Toxaphene @ 02:15 Technical chlordane @ 01:54 %D ≤ 20% for all compounds in both CCALs on GC Col. 1 and GC Col. 2. No action required.

CCAL:

CCAL: 6/11/12 Individuals @ 08:07 Toxaphene @ 10:51 Technical chlordane @ 10:29. %D < 20% for all compounds in both CCALs on GC Col. 1 and GC Col. 2. No action required.

Closing CCAL: 6/11/12 Individuals @ 18:20 %D < 20% for all compounds in both CCALs on GC Col. 1 and GC Col. 2 except DDD %D = +24.7% on Col 1, D = 21.1% on Col 2. No action required as this compound was not detected in associated samples, response was high in relation to ICAL, and compound was within limits on one column.

5. Laboratory and Field Blank Results

Laboratory and field blank results are reviewed to assess the presence of contaminants, which affect the accuracy and sensitivity of the results. See Table 1a. where the Holding Time and Associated QC Table was completed for the samples within this SDG.

Was each sample analysis associated with the appropriate method blank, *ie*., correct matrix, correct matrix level, same extraction batch? **Yes**. If no, list below affected samples. Were Cleanup Blanks analyzed? **NA.**

Review the reporting forms for each method and field blank. Were any target compounds in the method blanks detected? **No**.

Action: - Blanks should not contain contaminants above the RL. The Blank Action Level is defined as five times the highest level seen in the matrix-matched blanks associated with the samples. The following actions should be taken if conditions warrant:

1. If the blank is not matrix matched, qualify all sample data, for the contaminant associated with this blank, with EB, as appropriate.
2. If the reported result in a sample is below the reporting limit (sample < RL) and if a matrix-matched blank contains a result above the sample-equivalent level reported, the result in the sample should be negated (U) and raised to the sample-specific RL for that sample
3. If the sample result is between the reporting limit and the blank Action Level (RL < sample < Action Level), the result for the sample is negated (U) at the level found in the sample. Based on the level of contamination suspected in the sample, the reporting limit may be elevated. Professional judgment will be used in assessing the action needed.
4. If the sample result is greater than the RL and the blank Action Level, no action is taken.

Comments:
Blanks evaluated: Method Blank = MB 360-91616/1-A, MB 360-91669/1-A; No Field Blank

5. Laboratory and Field Blank Results - continued

Blank ID	Contaminant / Level	Matrix Related	Action Level	Sample/Reported Result	Corrected Result
MB 360-91616/1-A	None			No Blank Action Required	
MB 360-91669/1-A	None			No Blank Action Required	

6. Surrogate Spike Recoveries

The surrogate spike recoveries are reviewed to assess the accuracy of the results relative to laboratory performance and specific sample matrix.

Review the Surrogate Recovery information for each field and quality control sample. For one sample, verify that the recoveries reported correspond to the raw data and that the recovery calculation was done properly. Were the recovery data reported properly? **Yes**.

Were the surrogate recoveries within 30-150%? **Yes**. If no, were the affected samples reanalyzed? **NA**. Did the chromatography of the affected samples show interferences? **NA.** Was the retention time (RT) of the surrogates within criteria (Tetrachloro-m-xylene within ± 0.05 min and Decachlorobiphenyl ± 0.10 min from average RT of surrogate from ICAL)? **Yes.** List below the affected samples.

Action – Professional judgment must be used in qualifying data for Pesticides based upon the surrogate recoveries. If recovery is outside of criteria on one column, but acceptable on the other, and all quantitative results are obtained for the samples on the second column, then qualification of the data may not be required. If quantitation is reported for a particular column, and surrogate recoveries are outside of criteria, the following actions may be taken: if 10% < %Rec < 30%, qualify detected and non-detected results as estimated (J and UJ); if %Rec > 150% estimate detected results (J), no action required for non-detects; if %Rec < 10%, estimate (J) positive results and reject (R) non-detects. A review of the data for both columns, comparing sample chromatograms to standard chromatograms, must be done and professional judgment must be used to determine if action is warranted. List below the affected samples and required actions.

Comments:

Lab used in-house limits to judge surrogate recoveries rather than QAPP limits – both surrogates in all samples + QC were recovered within QAPP limits on both GC Columns. No Action required.

SB-FS-TB-PC-18-0.5-2.0 TCX on-column amount, Col 1 = 28.9 µg/L with spike level = 30 µg/L so that recovery is 28.9/30 x 100 = 96.3% = 96% √

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recovery and Precision

The matrix spike/matrix spike duplicate (MS/MSD) recoveries are reviewed to assess the accuracy of the results relative to the specific sample matrix and the relative percent differences (RPDs) are reviewed to assess the precision of the results relative to the specific sample matrix.

Review the unspiked sample, Matrix Spike, and Matrix Spike Duplicate (MS/MSD) raw data and recovery results. Were the recoveries for the MS/MSD calculated properly? **Yes**.

Did the laboratory perform MS/MSDs for each matrix and matrix level analyzed for each analytical batch prepared for analysis? **Yes**. Was the MS/MSD spike level appropriate relative to the unspiked sample level (*i.e.,* was the level in the unspiked sample < 4 times the level of the spike?) **Yes.** Did the MS/MSD contain all single-component target Pesticides? **Yes.** If no, list below the affected samples.

Were the MS/MSD recoveries within 30-150% accuracy limits (all matrices)? **Yes.** Were the RPDs between the MS/MSD within the QAPP precision criteria recovery (RPD ≤ 20% for waters and RPD ≤ 30% for soils/sediments)? **Yes**. If no, list below the affected compounds.

Action: No action is taken to the entire data set based on MS/MSD results alone. If the spike level was not appropriate to the matrix, no action to qualify sample data should be taken. The unspiked sample may be qualified based on MS/MSD results as follows: if the MS/MSD recoveries were > 140%, estimate (J) positive results due to potential high bias; no action is required for non-detect results; if the MS/MSD recoveries were < 40% but above 10%, estimate (J and UJ) positive and non-detect results due to potential low bias; if a MS/MSD compound was recovered below 10% or not at all, estimate (J) positive results due to potential low bias and evaluate the non-detected results to determine whether estimation (UJ) or rejection (R) of the unspiked sample data is warranted. If the RPD between the MS and MSD > QAPP criteria, estimate (J and UJ) positive and non-detected results in the unspiked sample. .

Comments:

MS/MSD performed on sample SB-FS-TB-PC-18-3.0-5.0

SB-FS-TB-PC-18-3.0-5.0 MS a-BHC on-column amount = 57.1 µg/L with spike level = 60 µg/L so that recovery is 57.1/60 x 100 = 95.2% = 95% √

Lab used in-house limits to judge acceptable accuracy for MS/MSD – for this review, QAPP limits used. All MS/MSD recoveries and RPDs were within QAPP criteria - No Action required.

8. Laboratory Control Samples

The Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicates (LCSD) are reviewed to assess the accuracy and precision of the results relative to the analytical procedure.

Review the raw data and recovery information for the LCS/LCSD.

Did the laboratory perform a LCS/LCSD for each matrix and analytical batch at a level between the lowest and second lowest calibration level? **Yes**. Were all single-component target analytes spiked into the LCS? **Yes.** If no, list below the affected samples.

Were the LCS recoveries within QAPP requirements for recovery (40-140%)? **Yes**. Were the RPDs between the LCS/LCSD within the QAPP precision criteria recovery RPD ≤ 20% for waters and RPD ≤ 30% for soils/sediments)? **Yes**. If no, list below the affected compounds.

Action: If the LCS recoveries are above criteria, estimate (J) positive results due to potential high bias, no qualification of non-detected results is necessary. If the LCS recoveries are between 10% to the lower recovery limit, estimate (J and UJ) positive and non-detect results for the samples associated with the analytical batch due to potential low bias in the results. If the recovery in the LCS is less than 10%, estimate (J) positive results due to low bias and reject (R) non-detect results due to potential false negatives. Professional judgment should be used in qualifying data based on the LCS/LCSD results if they are not in align with site-specific MS/MSD recovery and precision results.

Comments:

Lab used in-house limits to judge acceptable accuracy for LCS/LCSD – for this review, QAPP limits used. All LCS recoveries and RPDs were within QAPP criteria - No Action required.

9. Pesticide Cleanup Checks

Where cleanup protocols used on the Pesticide extracts? **No**. If yes, what cleanups were used and what QC was generated to verify the adequacy of the cleanup:

List all general extraction/cleanup procedures used:

No Cleanup procedures used for these samples based on preparation log information.

Were all samples and QC from the original extraction put through the cleanup protocols? **NA**. Were there any QC results which indicated that the cleanup was not adequate? **No**.

Action: If a QC sample, for example Method Blank or LFB, demonstrates unacceptable results (e.g., contamination or loss of analytes of interest), the data associated with these QC samples may require qualification based on professional judgment.

Comments:

No Action required – cleanup is optional for the matrix.

10. Sample Quantitation and Identification

Review raw data and reporting forms. Did the sample-specific RLs meet the QAPP criteria? **Yes, except for Toxaphene RLs which were raised during validation.** Did the laboratory accurately adjust sample reporting limits to account for sample specific preparation and analysis conditions? **Yes.** Did the laboratory report results for all compounds listed in QAPP? **Yes, except technical chlordane was reported instead of alpha-chlordane.** Were all components reported in the samples quantitated within the calibration region of the instrument for the detected analytes? **Yes.** Were the relative retention times for all components reported within the retention time windows established during initial calibration? **Yes.**

If the sample analyses were performed at dilutions, were more concentrated analyses performed or was sample screening information included in the data package? **NA.**

Were sample dilutions appropriate relative to scaling of the chromatograms and the calibration levels employed (e.g., peaks of interest within upper half of the chromatogram and quantitation done within the calibration range)? **NA.**

For detected Pesticides, did results fall within the expected retention time window on both GC columns? **Yes.** Explain below, if necessary.

Were there any detected results with quantitation between the two columns/channels differed by more than 40% (i.e., %D > 40%)? **No.** Did the lab always report the lowest value from the two columns? **Yes** *[Note: EPA Region I judges dual column precision based on %D ≤ 25%; however, QAPP and SW-846 requires precision to be evaluated at %D ≤ 40%]*

Action - If the quantitation limits for non-detect results are lower than the lowest calibration standard, or if a positive result is detected outside of the calibration range, estimate results (J and UJ) as necessary. If the results from two columns/channels differ from each other by more than 40% but %D < 100% (single-components) or < 500% (Toxaphene), then estimate (J) result. If %D > 100% (single-components) or >500% (Toxaphene), reject (R) result. If one result is < QL and the other column result is > QL, J/UJ result as necessary.

Comments:

Lab reported results for all 21 target Pesticides required, except technical chlordane was reported instead of alpha-chlordane. The technical chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. The resulting RL was above the PAL for Toxaphene in all samples. All other RLs reported were less than or equal to the PALs given in QAPP Table 4-3B. No PAL was defined for Technical chlordane in the site QAPP.

All RLs reported were less than or equal to the PQLs given in QAPP Table 4-3B except Aldrin, Dieldrin in samples SB-FS-PC-18-14.0-17.0, SB-FS-PC-18-20.0-22.0, and SB-FS-TB-PC-18-0.5-2.0 and toxaphene in all samples. No PQL was defined for Technical chlordane in the site QAPP.

A check of the only reported detect (DDT in sample SB-FS-TB-PC-18-3.0-5.0) indicates the lower of the two values was reported, as required by the QAPP.

No Action required.

11. Field Duplicate Precision

Field duplicate samples are reviewed to assess representativeness of the sample aliquot to the area sampled and the precision of the results relative to field sampling techniques. No Field Duplicates are required for Fish Tissue,

Review analytical results for the duplicate sample analyses.

Action: If field duplicate precision exceeded 50% RPD for sediment for any compound reported at level > 2 x RL, estimate (J and UJ) positive and non-detect results for the affected compounds in both samples. If severe imprecision was noted in the field duplicate sample (i.e., RPD >100%), qualify the remainder of the associated field sample data based on sound technical judgment.

Comments:

Field Duplicate Samples: N/A

There was no field duplicate sample for Pesticides submitted with this SDG.

12. Additional QA/QC Issues

Were the percent solids for the samples >30%. **Yes.**

For sediment samples, was freeze-drying performed? **NA.**

List any additional issues which may affect the quality of the results. List the affected samples, QA/QC issue, and necessary actions taken in the comments section below.

> **Action**: If the %solids were between 10% and 30%, qualify positive results as estimated (J) and reject non-detected results (R). If the %solids were < 10%, reject (R) positive and non-detected results.

Comments:

Evaluation of sample chromatograms indicate that there are peaks present in the samples (and Method Blank) which are not attributable to surrogates (i.e., samples by GC-ECD were not clean). However, scaling of the sample chromatograms may make the background appear to be larger than it really is. There were no detects on one column but not on the other; therefore, the chromatography for these Soil samples is acceptable.

IV. Example Sample Calculations

Review of one sample per data package is performed to determine if sample results and quantitation limits were correctly calculated and reported.

Sample ID: SB-FS-TB-PC-18-3.0-5.0 was selected for review in this data package.

A. Form 1 Review

1. Were the Form 1s completed according to the method/QAPP requirements? **Yes**. If no, list below the affected fields.

2. Reproduce the reporting limit for one Pesticide in one of the samples, did the laboratory correctly calculate the quantitation limits? **Yes**. If no, list below.

B. Quantitation Review

Reproduce a calculation for one Pesticide analyte in one of the samples that contained a positive result and compare the calculated result to the result reported by the laboratory.

Analyte Checked: 4,4'-DDT in MS since all Pesticides were non-detect

Laboratory Result: 13 µg/kg Calculated Result: 13 µg/kg

Example Calculation:

10.54 g of sample 90.4% solids extracted to 10 mL final volume.

GC Column 1: Response = 16091
CF from ICAL Col. 1 = 970.50

$$\text{Conc.} = \frac{16091 \text{ ug/L} \times 0.010 \text{ L}}{970.50 \times (0.01054 \text{ kg})(0.904)} = 17.4 \text{ µg/kg}$$

GC Column 2 Response = 19269
CF from ICAL Col. 2 = 1564.27

$$\text{Conc.} = \frac{19269 \times 0.010 \text{ L}}{1564.27 \times (0.01054 \text{ kg})(0.904)} = 12.9 \text{ µg/kg rounds to } 13 \text{ µg/kg} \checkmark$$

RPD = 29.7% *(note lab reported dual column precision from RPD rather than %, RPD calculates out slightly differently from lab result of 32.4% but no impact on this SDG)*

EPA Region 1 Tier III-type Review of TAL Metals by EPA SW846 Methods 6010, 6020, 7470/7471

Lab: TestAmerica Edison, Edison, New Jersey

Project ID: 360-40815-1

The Data Validation Criteria used within this checklist are based upon the following:

- *Remedial Design Work Plan and Pre-Design Investigation Plan* (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012.
- Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996, including Part IV (Inorganic Data Validation Functional Guidelines), November 2008.
- *Region I Tiered Organic and Inorganic Data Validation Guidelines*, July 1, 1993 draft.
- USEPA SW846 Methods 6010C, 6020, 7470A, & 7471A.

I. Data Package Completeness

a. Review the data package for completeness based on EPA Region I and Site QAPP requirements.

b. Were all required reporting forms and associated raw data included in the data package? **Yes**.

c. Were Form 1s (result forms) and raw data for all samples listed in the laboratory case narrative included in the data package? **Yes**. Were all sample analyses requested on the Chain-of-Custody performed by the laboratory? **Yes**.

Tabulate the number and types of samples in this SDG and the QAPP-required data validation level.

Number and Type of Samples	Parameter(s)	Data Validation Level (EPA Region I Tier)
6 soil samples	Total Metals by ICP-AES Method 6010C: Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, & Zinc	Tier III-type
6 soil samples	Total Mercury by CVAA Method 7471A	Tier III-type

Comments:

23 TAL Metals – all required information present in data package for DV.

Data Reviewer: *Susan D. Chapnick, M.S.*
New Environmental Horizons, Inc.
Dates Reviewed: August 21, 2012 and *revised Oct.8, 2012 upon receipt of lab resubmittals and revised EDD*

II. Review of CLP-Like QC Summary Forms and Additional QA/QC Parameters

A. Holding Times/Preservation Criteria

- Were holding times/preservation criteria met for all samples/analyses as indicated below? **Yes.**

Groundwaters*:

Metals (except Hg) 180 days from date of collection, preserved to pH < 2 with HNO_3
Mercury (Hg) 28 days from date of collection, preserved to pH < 2 with HNO_3

Soil/ Sediments**:

Metals (except Hg) 180 days from date of collection, maintained at 4° ± 2° C
Mercury (Hg) 28 days from date of collection, maintained at 4°± 2° C

***** Dissolved metals must be shipped cold & filtered within 24 hours of collection and then preserved to pH < 2
** Soil & Sediments can be frozen to arrest holding times.

Actions: If the holding times were exceeded, estimate (J and UJ) positive and non-detect results. If the holding times were grossly exceeded (>2x HT), use professional judgment to estimate (J) positive results and reject (R) non-detect results. If samples were improperly preserved, use professional judgment – may estimate (J and UJ) associated results.

Holding Time / Preservation Actions

Analyte	Holding Time Exceedance	Preservation Issue	Action / Bias	Affected Sample(s) / Comments
All samples met Preservation and HT requirements – No action required.				

Comments:

Samples collected for Metals on 5/29/12 and received at lab 5/30/12 intact. Samples preservation verified by lab on receipt (Login Sample Receipt Checklist). Samples received on-ice at 3.8 °C.

ICP-AES 6010C: all samples analyzed by 6/06/12
CVAA 7471A: all samples analyzed by 6/13/12

B. Calibration

1. Instrument Calibration (all methods) & MS Tune (ICP-MS Method 6020 only)

Instrument calibrations were reviewed to ensure that the laboratory followed the correct method procedures.

- Were instrument calibrations for all methods & MS-Tunes for ICP-MS performed daily? **Yes –** for calibrations as reported on Analysis Run Logs for 6010C & 7471A and in raw instrument data. No analysis by ICP-MS 5020 required for soils; therefore, MS Tunes are not applicable.
- Were MS tune criteria, as required by method 6020, met? **NA.**
- Was the proper number of standards used for each calibration as compliant with SW846 Method requirements? **Yes.**
- Were the calibration curves compliant with linearity requirements of the SW846 Method if a linear curve was used ($r \geq 0.995$)? **Yes.**

Actions: If no to any of the above, list affected samples/analytes and actions to qualify data (J or UJ) in the comment section, below.

2. Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV) Standards

All ICVs and CCVs were reviewed to assess the accuracy and sensitivity of the results.

- Did all ICVs and CCVs meet the recovery criteria? **Yes**.

Actions: If the ICV/CCV recovery criteria exceeded the defined limits indicated below, estimate (J) associated positive results; no action is required for nondetect results. If ICV/CCV recoveries were below defined QC limits, estimate (J and UJ) associated positive and nondetect results. Results may be rejected (R) if severe exceedances of < 75% for ICV.

	Site QAPP Control Limits
TAL Metals (by 6010C/6020):	90-110%
Mercury (by 7471A/7470A):	90-110%

Comments:

Form 2A in lab data package:

All ICV/CCV recoveries met 90-110% for ICP-AES metals and CVAA for mercury.

B. Calibration (continued)

3. Low Level Standard Analysis

The Low Level Standard at the level of the Reporting Limit (RL) is a direct measure of the instrument sensitivity near the detection limit.

- Were the low-level standards analyzed at the level of the reported RLs and daily? **Yes.**
- Did all low-level standard results meet lab acceptance limits of 70-130% recovery? **Yes.**

If no, list the samples/analytes affected and actions below.

Actions: If the recovery was greater than 130% for metals, estimate (J) all positive results which were < 10x RL; no action is required for non-detects. If the recovery was less than 70%, estimate (J and UJ) positive and nondetect results <10x RL. Use professional judgment to reject (R) non-detect results if RL standard was < 50% recovery.

Low Level Standard Recovery Actions

Analyte	% Recovery	Action / Bias	Affected Sample(s) / Comments
All met 70-130% recovery – no action required.			

Comments:

Form 2B in lab data package:

This low-level (RL) QC sample was not required by the Davis QAPP (2012) but it was performed by the lab and therefore reviewed herein as an additional measure of support for the accuracy of the RLs reported by the lab. Note that some results are listed as “ND” but have an acceptable % recovery reported; this is a reporting anomaly for the form since the value found was < RL but still detected within the % recovery criteria. No action required other than to note this discrepancy.

C. Blank Results

1. Laboratory Blanks

Laboratory (preparation and calibration) blank results were reviewed to assess the presence of contaminants that ultimately affect the accuracy and sensitivity of the results. Blanks were assessed compared to the project-specific reporting limits (RL) listed in QAPP Table 4-5A, 4-5B, 4-5C, & 4-5D for Metals in Groundwater, Surface Water, Soil, & Sediment, respectively (Davis RDWP QAPP section, ESS 2012) and to the laboratory RLs.

- Were lab blanks (preparation/method blank, ICBs, CCBs) performed at the QAPP and method-required frequencies for all analyses? **Yes**.
- Were all analytes either non-detected or detected in the laboratory blanks at levels less than the RLs? **Yes.**
- Were negative baseline drifts, if observed as negative ICB/CCB or preparation blank results, observed at absolute values less than the RL? **Negative drift not observed.**

Blank Actions

Metal	**Highest Lab Blank Result** Units = as listed	**Source of Blank Result** ICB / CCB/ MB	**Blank Action Level (BAL 5x)** Units = mg/Kg	**Actions / Affected Field Sample IDs** Associated samples: All 3 GW samples by ICP-MS, ICP-AES, and CVAA Units = µg/L U = Negate result (see action criteria at end of this section)
Calcium	11.1 mg/Kg	MB	55.5	None – all results > BAL

CCB = Continuing Calibration Blank (analysis-instrument blank)
ICB = Initial Calibration Blank (analysis-instrument blank)
MB = Method Blank (preparation blank)

Comments:

Form 3 in lab data package.

Lab qualified calcium results associated with the detected MB as “B”. Removed the “B” qualifier during validation since no action is required based on sample calcium concentrations.

C. Blank Results (continued)

2. Field Blank Results

Field blank results were reviewed to assess the presence of contaminants that ultimately affect the accuracy and sensitivity of the sample results.

- Was there a field rinsate blank associated with the samples in this SDG? **No.**

Field Rinseate Blank Sample ID	Associated Field Sample IDs
No Field Rinseate Blank was associated with the groundwater samples in this SDG.	

- Were all analytes detected in the field blank(s) at levels less than the RL? **Not Applicable.**

NOTE: Use the maximum field blank concentration in cases where multiple field blanks are associated.

Analyte	Field Blank ID / Result (Units)
Not Applicable	

BLANK ACTION CRITERIA:

Method / Preparation Blanks: associated results ≤ 5x blank level and < RL: negate (U) at the level of the RL; results ≤ 5x blank level and ≥ RL: negate (U) at the level found (this level is now the sample RL).
Lab Instrument Blanks (ICB/CCB): same as for method / preparation blanks.
Equipment Blank (EB): For matrix-matched aqueous samples: same as for method / preparation blanks. Note: actions must be taken on EB from lab blanks first then use remaining EB detects to evaluate blank actions on field samples.
Negative Baseline Drift: Any blank reported with a negative result was evaluated as 5x the absolute value of the result for determining actions: associated results ≤ 5x absolute value of the negative drift: estimate nondetects (UJ) and detects (J) with potential low bias or use professional judgment as to the effect of the negative drift on reported results.

D. Matrix QC Results

1. Matrix Spike Recoveries

Matrix spike (MS) results were reviewed to assess the accuracy of the results relative to the specific sample matrix.

- Were matrix spike (MS) results present for all analytes at the proper frequency as required by the Davis QAPP Table 4-11A (Groundwater / Surface Water) and 4-11B (Soil / Sediment)? **Yes.**
- Were matrix spike recovery criteria of 75-125% met for all analytes? **No.**

List the affected analytes and actions in the table below.

Actions: If the spike recovery was > 125% for total metals and cyanide, estimate (J) all positive results. No action is taken for non-detects. If the spike recovery fell within the range of 30-74%, estimate (UJ or J) all sample results. If the spike recoveries were less than 30%, reject (R) the nondetect results as unusable and estimate (J) the positive results for extremely low bias.

If the sample concentration exceeds the spike-added concentration by a factor of 4 or more, no action is taken because the spike level was "swamped-out" by the native concentration in the sample.

Matrix Spike (MS) Accuracy Action Table

MS/MSD performed on site sample SB-FS-TB-PC-18-3.0-5.0 (Lab ID# 40815-3).

Analyte	MS/MSD % Recovery	Action	Comments/Affected Samples Batch associated with all samples except 40815-10
Aluminum	166 / 157	None	Sample concentration > 4x spike level; no action required
Antimony	47 / 48	J / UJ	All samples except SB-FS-TB-PC-19-0.5-2.0 (40815-10); potential low bias
Iron	-152 / 137	None	Sample concentration > 4x spike level; no action required

MS performed on site sample SB-FS-TB-PC-19-0.5-2.0 (Lab ID# 40815-10).

Analyte	MS % Recovery	Action	Comments/Affected Samples Batch associated with sample except 40815-10 only
Antimony	39	UJ	Sample SB-FS-TB-PC-19-0.5-2.0; potential low bias
Calcium	137	J	Sample SB-FS-TB-PC-19-0.5-2.0; potential high bias
Iron	-56	None	Sample concentration > 4x spike level; no action required

Comments:

Form 5 in lab data package:
Lab performed MS/MSD on sample 40815-3 (associated with all samples except 40815-10) and MS/MD on 40815-10 (associated with this sample only – in its own batch). The lab performed post-digestion spikes, which showed acceptable recoveries for all Metals that fell outside control limits in the MS and/or MSD. This indicates that there was a matrix effect in the original field sample (the effect was not caused during instrument analysis). Actions taken are based on the associated samples in the lab batch as indicated above.

D. Matrix QC Results (continued)

2. Sample/Matrix Duplicate Results

Matrix (laboratory) duplicate (MD) results were reviewed to access the precision of the results relative to the specific sample matrix.

- Were matrix duplicate (MD) analyses present for all analytes at the proper frequency as required by the Davis QAPP Table 4-11A (Groundwater / Surface Water) and 4-11B (Soil / Sediment)? **Yes.**
- Were criteria as defined below, met for all analytes? **Yes.**

List the analytes affected and actions in the table below.

Site QAPP Control Limits:	GW/SW:	RPD ≤ 20% for results > 5xRL difference ± RL for results < 5xRL
	Soil/Sed:	RPD ≤ 35% for results > 5xRL difference ± 2x RL for results < 5xRL

Actions: Estimate (J and UJ) all results for analytes that do not meet precision criteria.

Matrix Duplicate (MD) Precision Action Table

MS/MSD performed on site sample SB-FS-TB-PC-18-3.0-5.0 (Lab ID# 40815-3).
MD performed on site sample SB-FS-TB-PC-19-0.5-2.0 (Lab ID# 40815-10).

Analyte	MD RPD	Action	Comments/Affected Samples
All RPDs met acceptance criteria for soils – no action required.			

Comments:

Form 5A for MSD RPD and Form 6 for MD RPD in lab data package:

Lab performed MS/MSD on sample 40815-3 and MS/MD on sample 40815-10. All RPDs met precision criteria for soils.

D. Matrix QC Results (continued)

3. Field Duplicate Precision

Field duplicate sample results were reviewed to assess representativeness of the sample aliquot to the area sampled and the precision of the results relative to field sampling techniques.

- Was a field duplicate pair included in this SDG? **No.**
- If Yes, identify FD pair: NA

Actions: If field duplicate precision exceeded criteria, below, for any analyte, estimate (J and UJ) positive and non-detected results for the affected analytes in the field duplicate pair only. If severe imprecision was noted in the field duplicate results, qualify the remainder of the associated field sample data based on sound technical judgment.

Site QAPP Control Limits:	GW/SW:	RPD $\leq$ 30% for results > 5xRL difference $\pm$ 2x RL for results < 5xRL
	Soil/Sed:	RPD $\leq$ 50% for results > 5xRL Professional judgment for results < 5xRL

FD criteria defined in Davis QAPP Table 4-11A (Groundwater / Surface Water) and 4-11B (Soil / Sediment).

Professional judgment guidance for results < 5xRL that do not meet the RPD criteria: EPA Region 1 defines the following control limits: control limit of $\pm$ 2xRL for water and $\pm$ 4xRL for soil/sediment for results that are < 5xRL.

Field Duplicate (FD) Precision/Representativeness Action Table – see page 10

Comments:

No FD for metals was collected with the samples in this SDG. Data users are directed to other soil SDGs for this project for FD result evaluations.

Field Duplicate Precision Worksheet – ***Not Applicable to SDG 360-40815***

Analyte	Sample Result mg/Kg	Qual	FD Result mg/Kg	Qual	Precision RPD* %	Action	Comment
Aluminum						None	
Antimony						None	
Arsenic						None	
Barium						None	
Beryllium						None	
Cadmium						None	
Calcium						None	
Chromium						None	
Cobalt						None	
Copper						None	
Iron						None	
Lead						None	
Magnesium						None	
Manganese						None	
Mercury						None	
Nickel						None	
Potassium						None	
Selenium						None	
Silver						None	
Sodium						None	
Thallium						None	
Vanadium						None	
Zinc						None	

E. Method QC

1. Laboratory Control Sample Recoveries

The laboratory control sample (LCS) recoveries were reviewed to assess the accuracy of the results relative to the laboratory method performance of each step during the preparation, analysis, and reporting of environmental samples.

- Was an appropriate (water, soil/sediment) LCS performed for all analytes at the proper frequency as required by the Davis QAPP Table 4-11A (Groundwater / Surface Water) and 4-11B (Soil / Sediment)? **Yes.**
- Did all analytes meet Davis QAPP recovery criteria of 80-120% for water and vendor control limits for solids? **Yes.**

If no, list the affected analytes and actions in the table, below.

Actions: If the LCS recovery for any analyte was greater than 120% for metals or the established upper soil or sediment control limit for an SRM or solid LCS for metals, estimate (J) all positive sample results. If the LCS recovery was less than 80% for metals or less than the established lower soil or sediment control limit, estimate (J and UJ) the results. Use professional judgment if LCS is severely low (< 50%, EPA Region I criterion for total metals), and the MS was out of control, to reject (R) associated results as unusable. Use professional judgment if LCS is out of control and MS is in control, to accept results for acceptable accuracy in sample matrix.

Laboratory Control Sample (LCS) Accuracy Action Table

Analyte	LCS % Recovery	Action	Comments/Affected Samples
All LCS recoveries acceptable – no action required.			

Comments:

Form 7A in lab data package:

The lab performed an LCS and an LCS Duplicate, though not required by the Davis QAPP. Both LCS and LCSD recoveries met QAPP criteria for acceptance indicating that the method of analysis for soil was in-control. Precision between LCS/LCSD results met lab criteria of RPD < 30% for solid LCS/LCSD. Acceptance control limits for % recovery were those reported by lab for the solid certified reference material used for the LCS and LCSD.

E. Method QC (continued)

2. ICP Method QC - ICP Interference Check Sample Results

ICP interference check procedures were performed to evaluate and verify the laboratory's interelement and background corrections for ICP analyses.

- Were analyte levels in the ICSA and ICSAB reported for all metals? **Yes.**
- Was the ICSA and ICSAB analyzed as the correct frequency as defined in the Davis QAPP Table 4-11A (Groundwater / Surface Water) and 4-11B (Soil / Sediment)? **Yes**.
- Did all analytes meet recovery criteria of 80-120% in the ICSAB solution? **No.**
- Were all analytes that were not supposed to be detected in the ICSA either ND or detected at absolute values < 2xRL? **Yes.**

If no to any of the above, list the affected samples, analytes, concentrations and actions in the section below. Actions can be J, UJ, or R depending on the severity of the exceedance.

Comments:

Form 4 in lab data package.

3. ICP-MS Method QC – Internal Standards

Internal Standards (IS) are spiked into every sample and QC to help control for interference effects during analysis. The following control limits for the IS % relative intensities were defined in the Davis QAPP Tables 4-11A & 4-11B:

IS % relative intensities for QC samples: > 70%
IS % relative intensities for field samples: > 70%

Actions: Sample results associated with QC that did not meet IS control limits, or sample results that themselves exceeded IS control limits are qualified J or UJ to indicate presence of matrix interference. Explain all actions and potential bias in accuracy of the results below.

Comments:

Not Applicable – ICP-MS was not performed for soils.

E. Method QC (continued)

4. ICP Serial Dilution Results

- Was a field sample used for ICP serial dilution analysis? **Yes.**
- Did all analytes meet criteria for %D in the serial dilution results as listed in Davis QAPP Tables 4-11A & 4-11B? **Yes.**

List the affected samples/analytes and actions in the table below.

Actions: Estimate (J) all positive results if the %D > 15% (QAPP criterion) for results that are > 50x the RL.

Serial Dilution Result Actions

Serial Dilution performed on site sample SB-FS-TB-PC-18-3.0-5.0 (Lab ID# 40815-3)
And on site sample SB-FS-TB-PC-19-0.5-2.0 (Lab ID# 40815-10).

Analyte	% Difference	Action / Affected Samples
% D met for all serial dilution results – No Action required.		

Comments:

Form 8 in lab data package:

Lab qualified barium and manganese % difference results on Form 8 for exceedance of serial dilution performed on sample 40815-10 for 11% Difference; however, this meets project criteria of < 15% difference; therefore, no action required.

F. Verification of RLs, Linear Ranges, IECs

1. Sample Detection Limits

Analyte detection limits were reviewed to assess if the sensitivity of the results met the project-specific requirements.

- Were the Metals RLs compliant with project-specific reporting limit requirements as listed in Davis QAPP Table 4-5A for Groundwater, Table 4-5B for Surface water, Table 4-5C for Soil, and Table 4-5D for Sediment? **No – not all meet PQLs; however, all do meet PALs.**

Actions: Non-detected results that do not meet project-required reporting limit may not be usable for specific data uses such as risk assessment.

Table of Results That Do Not Meet QAPP PQL (Sensitivity) Requirements

Analyte	Sample ID # (s) Affected	Highest QL reported (units)	QAPP PQL (units)	QAPP PAL (units)	Reason (% solids; blank action; *etc.*)	Usability
Antimony	SB-FS-PC-18-14.0-17.0 SB-FS-PC-18-20.0-22.0 SB-FS-TB-PC-18-0.5-2.0 SB-FS-TB-PC-19-0.5-2.0 SB-FS-TB-PC-20-0.5-2.0	0.69 mg/Kg	0.5 mg/Kg	3.1 mg/Kg	% solids	Usable since < PAL
Mercury	SB-FS-TB-PC-18-0.5-2.0 SB-FS-TB-PC-19-0.5-2.0	0.11 mg/Kg	0.1 mg/Kg	10	% solids	Usable since < PAL

F. Verification of RLs, IECs - ***continued***

2. ICP Interelement Correction Factors – only for ICP-AES (for ICP-MS, these are hard-coded into instrument based on natural abundances of the elements)

- Review QC Summary form for ICP Interelement Correction Factors (IEC)
- Were the current (annual) IECs present in the data package? **Yes.**

Actions: If no, use professional judgment to determine the severity of the affect on the results.

3. ICP Linear Ranges – only for ICP-AES (for ICP-MS, these are checked using the LR check standard previously reviewed or high-level included in calibration curve)

- Review QC Summary form for ICP Linear Ranges.
- Were current (annual) linear range data present in the data package? **Yes.**

Actions: If no, use professional judgment to determine the severity of the affect on the results.

Comments:

Form 10 in lab data package:

ICP-AES IECs performed on 4/03/12, within one year of Metals ICP-AES (6010C) analysis performed for site samples on 6/04/12 & 6/06/12.

Form 11 in lab data package:

ICP-AES Linear Ranges performed on 8/19/11, within one year of Metals ICP-AES (6010C) analysis performed for site samples on 6/04/12 & 6/06/12.

No Actions Required.

G. Preparation and Analysis Logs

1. Preparation Logs

- Were sample preparation logs present and do they contain all samples/analytes performed in the SDG? **Yes.**

Comments:

Form 12 in lab data package:

Prep method EPA SW846 3050B for ICP-AES metals: initial weight 1.5 to 2.0 g / final volume 100 mL; samples prepared 6/04/12 and 6/06/12.

Prep method EPA SW846 7471A for CVAA (Mercury): initial weight 0.2 to 0.27 g / final volume 50mL; samples digested 6/05/12 and 6/13/12.

2. Analysis Run Logs

- Were analysis run logs present for all required samples/methods for this SDG? **Yes.**
- Was the correct analytical sequence followed for the QC for each EPA method? **Yes.**
- Were the calibration standards (*i.e.,* ICV, ICB, CCV, CCB, ICSA, and ICSAB) analyzed at the proper frequency consistent with the EPA methods and the Davis QAPP Tables 4-11A & 4-11B? **Yes.**

If no list the affected samples/analytes and actions in the comment section, below.

Comments:

Form 13 in lab data package:

All analyses present.

H. Additional QA/QC Issues

1. Percent Solids

Percent solids data were reviewed to further assess the affect of the sample matrix on result quantitation.

- Were percent solids > 30% for all soil/ sediment samples? **Yes.**

If no, list affected samples and actions in the table, below.

Actions: If percent solids results were > 30%, no actions are required. If percent solids were < 30% but > 10%, use professional judgment to either estimate (UJ) or reject all non-detected results (R) and estimate (J) all detected results. If percent solids were <10%, use professional judgment to either estimate (UJ) or reject (R) all results.

Percent Solids Action Table

Sample ID	% Solids	Action / Comments
All % Solids > 30% - no action required.		

2. Sample Result Verification – Uncertainty Near the Level of Detection

Sample results were reviewed to assess quantitation of results near the Reporting Limits. Results reported below the lab's RL, down to the MDL, have uncertainty near this level of detection.

- Were all sample results reported at ≥ RL or PQL? **Yes.**

  If No, actions to estimate these results, reported between the MDL and the RL, may be taken.

Action: Estimate (J) all results between the lab IDL or MDL and the project RL due to uncertainty at a level below the RL.

Comments:

All Metals reported to the sample-specific RLs (including all preparation/digestion factors and % solids dry-weight conversion). No "J" data, detected results < RL but > MDL, were reported for Metals. This reporting protocol is compliant with the Davis QAPP requirements included in Tables 4-5A/B/C/D and 4-11A/B, which require that all data be reported down to the RL only.

- Professional Judgment - Other: Data users are cautioned that the detected Metals results for selenium reported from ICP-AES Method 6010C (ranging from 0.76 mg/Kg to 2.0 mg/Kg) may be false positives based on professional judgment knowledge of positive interference for selenium on ICP-AES in some matrices. Since the reported selenium results were orders-of-magnitude below the PAL and since all QC criteria were met, no action was taken other than to note this issue.

III. Review of Overall Data Package Compliance

Review of the overall data package was performed to determine if the laboratory met all EPA SW846 method and project QAPP requirements.

Case Narrative Review

Review the Laboratory Narrative provided with the data package and list all issues of noncompliance or QA/QC exceedances noted that have not been previously evaluated in this DV Review. For each issue listed, state what qualification to the data has been taken.

Comments:

Lab narrated an exceedance of mercury in a batch QC MSD performed on a sample not associated with the site soils in this SDG; therefore, no action required.
No further issues were reported in the lab narrative that were not already addressed during this data validation review.

IV. Review of One Sample – Calculation Verifications

The review of one sample per fraction for each data package was performed to determine if sample results and quantitation limits were correctly calculated and reported.

Sample ID SB-FS-TB-PC-20-0.5-2.0 (lab ID: 360-40815-17) was selected for review in this data package.

A. Detection / Reporting Limit Review

Reproduce the sample detection limit for one analyte for each method (ICP-AES, ICP-MS, and CVAA, as applicable). Did the laboratory correctly calculate the detection limits? **Yes**.

ICP-AES (6010C):

Single-point calibration for some metals and multi-point for others – compliant with EPA SW846 Method 6010C. Lab analyzed a Low-level Check Standard (CRI-RL) at the level of the RL, which supported the RL and achieved acceptable % recovery; this is acceptable alternative to having the RL supported by the low-level in the calibration standards. Analyte-specific RLs were consistent with the concentration in the low-level check standard.

Example:
Sample SB-FS-TB-PC-20-0.5-2.0 (Lab ID 360-40815-17), analyzed 6/04/12 at time 16:45 for Antimony = non-detect instrument result (9.05772 µg/L; page 1879 of lab data package) reported by lab as 0.67 U mg/Kg, consistent with low-level check standard concentration for Antimony of 10.00000 µg/L (CRI-RL on data package page 1838);
% solids 93.2% dry-weight conversion; initial weight = 1.61 g; final vol = 100 mL

[10.0 µg/L x 100 mL/1.61g] x 1/0.932 x 1/1000 units conversion = 0.666 mg/Kg;
Rounds to 0.67 U mg/Kg dry weight as sample-specific RL √

A. Detection / Reporting Limit Review – continued

CVAA (7471A):

Multi-level calibration for Mercury from 0.2 to10.0 µg/L (5-level plus blank at 0). Email communication with Steve Hartmann of TestAmerica (to Susan Chapnick of NEH on 8/21/12) indicated that lab uses RL at instrument of 0.4 µg/L (rather than 0.2 µg/L) for Soils. This is acceptable as the RL is supported by the low-level in the calibration curve.

Example:
Sample SB-FS-PC-18-14.0-17.0 (Lab ID 360-40815-6), analyzed 6/05/12 at time 15:31 for Mercury = non-detect instrument result (0.048 ppb; page 1964 of lab data package) – reported by lab as 0.086 U mg/Kg; calculation as follows (calibration on data package page 1955):

% solids 86.6% dry-weight conversion; initial weight = 0.27 g; final vol = 50 mL

[0.4 µg/L x 50 mL/0.27g] x 1/0.866 x 1/1000 units conversion = 0.0855 mg/Kg;
Rounds to 0.086 U mg/Kg dry weight as sample-specific RL √

B. Sample Result Verification

A calculation for one analyte for each method is reproduced below and compared to the result reported by the laboratory. List any discrepancies noted and actions taken.

Sample ID SB-FS-TB-PC-20-0.5-2.0 (lab ID: 360-40815-17)

1. ICP-AES (6010C) Analyte: Manganese

   Laboratory Result: 200 mg/Kg

Calculation Verification: Raw data ICP-AES results for aqueous samples are reported as "final" concentrations (including sample-specific factors). Confirmed that instrument output matched Form I results and EDD and checked preparation factors.

% Solids = 93.2
Preparation factors: Initial weight = 1.61 g; Final volume = 100.0 mL; prep date = 6/04/2012
Dilution factor at instrument = 1
Analysis Date = 6/04/2012
Analysis Time = 16:45 (4:45 PM)
Instrument readout from raw data (page 1879 in lab data package) = 2962.84 µg/L

[(2962.84 µg/L x 100 mL/1.61g) x 1 x 1/0.932] x 1/1000 units conversion factor = 197 mg/Kg

Final Result rounded to 2 significant figures (for values ≥ 10) = 200 mg/Kg dry weight √

B. Sample Result Verification - continued

2. CVAA (7471A) Analyte: Mercury

   Laboratory Result: 0.08 mg/Kg

Calculation Verification: Raw data CVAA results for aqueous samples are reported as "final" concentrations (including sample-specific factors). Confirmed that instrument output matched Form I results and EDD and checked preparation factors.

% Solids = 93.2
Preparation factors: Initial weight = 0.27 g; Final volume = 50 mL; prep date = 6/05/2012
Dilution factor at instrument = 1
Analysis Date = 6/05/2012
Analysis Time = 15:35 (3:35 PM)
Instrument readout from raw data (page 1964 in lab data package) = 0.401 ppb

[(0.401 ppb x 50 mL/0.27g) x 1 x 1/0.932] x 1/1000 units conversion factor = 0.0797 mg/Kg

Final Result rounded to 1 significant figure (for values < 10) = 0.08 mg/Kg dry weight √

Data Summary Key for Data Validation Review

J - The associated numerical value is an estimated quantity due to quality control criteria exceedance(s). The value is usable for project decisions as an estimated result.

U - The analyte was analyzed for, but was not detected. The associated numerical value is the sample reporting/quantitation limit. The value is usable for project decisions as a nondetect result at the reporting limit.

UJ - The analyte was analyzed for, but was not detected. The associated numerical value is the sample reporting/quantitation limit and is an estimated quantity. The value is usable for project decisions as a non-detect result at the estimated reporting limit.

EB - The analyte was detected in a non-matrix-matched associated equipment blank and might therefore be biased high. The result is usable for project decisions.

R - Reject data due to severe or cumulative exceedance of quality control criteria. The value is unusable (analyte may or may not be present) for project decisions. Re-sampling and reanalysis may be necessary for verification.

NA - Not Analyzed

List of Inorganic Data Validation Review Acronyms

CCB	-	Continuing Calibration Blank
CCV	-	Continuing Calibration Verification Sample
CLP	-	Contract Laboratory Program
CRDL	-	Contract Required Detection Limit
%D	-	Percent Difference
DISS	-	dissolved sample analysis
DQO	-	Data Quality Objective
EPA	-	Environmental Protection Agency
FB	-	Field Blank
FD	-	Field Duplicate
g	-	gram
ICB	-	Initial Calibration Blank
ICP-AES	-	Inductively Coupled Plasma Spectrophotometry-Axial or Optical
ICP-MS-	ICP-Mass Spectrometry	
ICS	-	Interference Check Sample
ICV	-	Initial Calibration Verification Sample
IDL	-	Instrument Detection Limit
Kg	-	kilogram
L	-	liter
LCS	-	Laboratory Control Sample
MD	-	Matrix Duplicate
MDL	-	Method Detection Limit
mg	-	milligram
mg/Kg	-	milligram per kilogram
MS	-	Matrix Spike
NA	-	Not Applicable
ND	-	Non-detect
ppb	-	part per billion
PQL	-	Practical Quantitation Limit
QA	-	Quality Assurance
QAPP	-	Quality Assurance Project Plan
QC	-	Quality Control
r	-	correlation coefficient of linear regression curve
RB	-	Rinsate Blank (equipment rinsate field blank)
RL	-	Reporting Limit
RPD	-	Relative Percent Difference
SDG	-	Sample Delivery Group
SOW	-	Statement of Work for Inorganic Analysis
SRM	-	Standard Reference Material
TAL	-	Target Analyte List
TOT	-	total sample analysis
μg/Kg	-	micrograms per kilogram
μg/L	-	micrograms per liter

environmental chemistry consultants

DATA VALIDATION REPORT
EPA Region I Tier II-Type for VOCs, TCL SVOCs, TCL Pesticides, TCL PCBs, & TAL Metals

Client: ESS Group, Inc., East Providence, Rhode Island

Site: Davis Liquid Waste Superfund Site, Smithfield, Rhode Island
Soil Sampling - 2012

Laboratory: TestAmerica Westfield, Westfield, Massachusetts

Lab Project/SDG #: 360-40826-1

Number of Samples: 12 soil samples + 1 Trip Blank for project-specific list of 52 Volatile Organic Compounds (VOCs)
7 soil samples for Target Compound List (TCL) Semivolatile Organic Compounds (SVOCs), TCL Pesticides, TCL Polychlorinated Biphenyls (PCBs), Target Analyte List (TAL) Metals and Percent Solids

Data Reviewers: Nancy C. Rothman, Ph.D., New Environmental Horizons, Inc.
Susan D. Chapnick, M.S., New Environmental Horizons, Inc.

Date: October 26, 2012

EPA Tier II-type Data Validation Review was performed on the data included in this SDG with the following intentions: 1) to determine if the data were generated and reported in accordance with the following documents: *Remedial Design Work Plan and Pre-Design Investigation Plan* (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996 and updates including Part II, III, and IV (Volatile/Semivolatile, Pesticide/PCB, and Inorganic Data Validation Functional Guidelines); EPA *Region I Tiered Organic and Inorganic Data Validation Guidelines*, July 1993, and USEPA SW846 Method 8260C, 8270D, 8081B, 8082A, 6010C, and 7471A 2) to determine if the data met the project data quality objectives for acceptable accuracy, precision, sensitivity; and technical usability; and 3) to update the project database with validated results and appropriate data validation qualifiers.

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The Data Validation Report consists of three parts:

- This Data Validation Report letter summarizing the actions taken;
- The spreadsheet of validated sample results with validation qualifiers based on actions taken; and
- The Data Validation Checklists to document the Tier II-type validations. These Checklists are an integral part of the validation report as they contain comprehensive details of all QC reviewed, the acceptance criteria used, professional judgment and actions taken.

I. Sample Descriptions and Analytical Parameters

The sample IDs, date of sampling, matrix, and sample type (e.g. Field Sample, Field Duplicate, etc., as applicable) and the analytical parameters reviewed are listed below in Table 1.

Table 1. Sample Descriptions and Analytical Parameters

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-FS-PC-28-6.5-7.0	5/30/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-28-9.0-9.5	5/30/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-28-19.0-19.5	5/30/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-28-5.0-7.0	5/30/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-PC-28-27.0-34.0	5/30/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-PCB-4	5/30/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Duplicate of SB-FS-PC-28-27.0-34.0
SB-FS-PC-28-30.5-31.0	5/30/12	Soil	VOCs & Percent Solids	Field Sample
TB-053112-1	5/31/12	Water	VOCs	Trip Blank
SB-FS-PC-27-6.0-6.5	5/30/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-27-10.5-11.0	5/30/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-27-19.5-20.0	5/30/12	Soil	VOCs & Percent Solids	Field Sample

Table 1. Sample Descriptions and Analytical Parameters (continued)

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-FS-PC-27-6.0-8.0	5/30/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-PC-27-34.0-36.0	5/30/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-PC-27-35.5-36.0	5/30/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-TB-PC-26-O.5-2.0	5/30/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-TB-PC-26-0.5-1.0	5/30/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-TB-PC-24-0.5-2.0	5/30/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-TB-PC-24-0.5-1.0	5/30/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-24-12.5-13.0	5/30/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-24-14.5-15.0	5/30/12	Soil	VOCs & Percent Solids	Field Sample

Analytical method references:

Volatiles: 52 project-specific VOCs by USEPA SW846 Method 8260C that includes the TCL plus diethyl ether and tetrahydrofuran and minus 1,4-dioxane (not required for soils; note 1,4-dioxane was reported in the TB).

Semivolatiles: TCL SVOCs by USEPA SW846 Method 8270D

Pesticides: TCL Pesticides by USEPA SW846 Method 8081B

PCBs: TCL PCB Aroclors by USEPA SW846 Method 8082A

Metals: TAL Metals by USEPA SW846 Method 6010C (ICP-AES), which includes 22 Metals, plus Mercury by USEPA SW846 Method 7471A Cold Vapor Atomic Absorption (CVAA)

Percent Moisture / Percent Solids were performed and reported for all samples to convert results to dry-weight units.

II. Quality Control Reviewed during Data Validation

The following QC elements, as applicable to the analytical methods, were reviewed during the Tier II-type validation of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals:

- Data package completeness and reporting protocols
- Sample receipt, holding times and preservation criteria
- Blank results including Method Blanks, Equipment Blanks, & Trip blanks
- Laboratory Control Sample (LCS) recoveries / LCS Duplicate Recoveries
- Standard Reference Material (SRM) Recoveries, if applicable
- Surrogate Recoveries
- Matrix Spike (MS) / Matrix Spike Duplicate (MSD) Recoveries
- MS/MSD, LCS/LCSD, and sample/Field Duplicate (FD) Relative Percent Differences (RPDs)
- Sample result reporting (including compound lists, reporting limits, and units)
- Calibration criteria (including tune criteria, initial calibration and continuing calibration verification)
- Internal Standard (IS) Recoveries
- Retention Time windows
- Other method-specific QC if applicable and reported in Summary QC
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

III. Data Validation Report Summary

During the Tier II-type data validation review of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals, no data were rejected. Several results were negated (U) or estimated (J or UJ) due to QC issues. Table 2 summarizes the actions taken during this data validation review. NEH generated a validated data spreadsheet based on the electronic project database file (EDD) received from ESS for this SDG. All results were considered usable for project decisions compared to the Davis RDWP QAPP requirements with the understanding of the potential uncertainty (bias) in the qualified results presented in Table 2.

The remainder of this report documents "exceptions" to method or QAPP criteria or clarifications of data reported. QC elements not discussed below met all QAPP criteria. The full documentation of all QC elements reviewed during the Tier II-type validations are presented in the attached Data Validation Checklists. Data users should also reference the full Tier III-type data validation performed on soil samples included in SDG 360-40815-1 for additional information on general reporting issues and calculation verification from review of raw data (which is not performed in a Tier II-type validation).

Exceptions from Davis QAPP or Method QC Criteria

- There were some discrepancies between the Chain-of-Custody (CO) and the sample IDs on the containers received. The laboratory noted "IDs on containers do not match the COC. Logged in per COC". Three samples listed on the COC were crossed off by the laboratory; and it was noted that these samples were with other SDGs.
- Sample ID "SB-FS-TB-PC-26-0.5-2.0" was recorded in the lab data package and EDD as "SB-FS-TB-PC-26-O.5-2.0".

- Percent solids for VOC sample SB-FS-PC-24-12.5-13.0 was <30%. EPA Region I DV criteria indicates that for samples containing greater than or equal to 10% solids but less than or equal to 30% solids, all detects should be qualified as estimated (J) and non-detects rejected (R) as unusable data. However, professional judgment was used to estimate (UJ) non-detect data rather than reject these data based on low % solids content. The user is cautioned that non-detects for samples with less than 30% solids may not be representative of the site location. Actions taken in sample SB-FS-PC-24-12.5-13.0 are listed in Table 2.
- The method blank for VOCs reported results below the Reporting Limit (RL) for methylene chloride. A comparison of the levels in the blank with the levels reported for this compound in the associated samples resulted in the following actions:
  - Methylene chloride was negated (U) in two VOC samples, as shown in Table 2, and the results raised to the levels found in the samples.
- Exceedances of Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) recoveries or RPD were as follows:
  - VOCs – acetone, 2-butanone, chloroethane, and 2-hexanone showed recoveries outside of criteria. Actions taken to estimate (UJ) affected sample result due to VOC LCS/LCSD exceedances are listed in Table 2.
- No site sample was identified in this SDG for Matrix Spike (MS) and Matrix Spike Duplicate (MSD) analyses; therefore, MS/MSD were not performed for VOCs, SVOCs, Pesticides, PCB Aroclors, or Metals.
- There was one Field Duplicate (FD) pair included in this SDG for SVOC, Pesticides, PCBs, and Metals analyses: SB-FS-PC-28-27.0-34.0 and SB-PCB-4. All SVOCs, Pesticides, and PCB Aroclors were non-detect in both samples; therefore, while these results are consistent with one another, the FD precision could not be quantitatively assessed for these parameters. FD precision was acceptable for all Metals results with the exception of chromium, which was estimated (J) in the FD pair samples due to the observed imprecision as listed in Table 2. Estimated chromium results have an indeterminate bias and are an indication of potential sample heterogeneity for chromium at this site location.
- A Field Duplicate (FD) pair was not included in this SDG for VOCs.
- Various initial and continuing calibrations were outside of criteria for VOCs and SVOCs. Actions to estimate (UJ) associated results and the potential bias are listed in Table 2.
- For PCBs, samples SB-FS-TB-PC-26-0.5-2.0, SB-FS-TB-PC-24-0.5-2.0, and SB-FS-TB-PC-24-0.5-2.0 show complex mixtures in the chromatogram; however, none were matched to a specific Aroclor pattern.

Sensitivity & Reporting

- The laboratory flagged all results for VOCs and SVOCs that were less than the RL (supported by the low-level standard in the calibration curve) as "J". The "J" qualifier was maintained during validation to indicate that these results were estimated due to uncertainty in quantitation below the calibration range. Affected samples/analytes are listed in Table 2.
- All non-detects for VOCs, SVOCs, and PCBs were below the Project Action Limit (PAL) given in soil QAPP Tables 4-1C, 4-2C, and 4-4B, respectively, except:
  - All samples: 1,2-dibromo-3-chloropropane and ethylene dibromide, as expected, due to method limitations.
  - SB-FS-PC-27-6.0-8.0: 1,1'-biphenyl, 2,4-dinitrotoluene, 3,3'-dichlorobenzidine, 4-chloroaniline, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, bis(2-chloroethyl)ether, chrysene,

dibenz(a,h)anthracene, hexachlorobenzene, indeno[1,2,3-cd]pyrene, and pentachlorophenol, and all Aroclors except Ar-1016.
  - SB-FS-TB-PC-26-O.5-2.0 and SB-FS-TB-PC-24-0.5-2.0: hexachlorobenzene.
- The laboratory reported results for all 21 target Pesticides required, except technical-chlordane was reported instead of alpha-chlordane. The technical-chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. All RLs for Pesticides were less than or equal to the PALs given in QAPP Table 4-3B and therefore met sensitivity requirements with the exception of toxaphene in all samples (due to raising the RL during validation). No PAL was defined for technical-chlordane in the site QAPP. The data user will need to evaluate usability of the non-detected results with elevated RLs for project uses.
- All non-detects for Metals were below the PALs given in QAPP Table 4-5C for soil. Therefore, sensitivity DQOs were met for Metals.
- Data users are cautioned that the detected Metals results for selenium reported from ICP-AES Method 6010C may be false positives based on professional judgment knowledge of positive interference for selenium on ICP-AES in some matrices. Since the reported selenium results were orders-of-magnitude below the PAL and since all QC criteria were met, no action was taken other than to note this issue.

Table 2. Summary of Data Validation Actions

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
SB-FS-PC-28-27.0-34.0 SB-PCB-4	Chromium	J	I	FD imprecision
All Pesticides samples	Chlordane (technical) Toxaphene	U		Raised RL
SB-FS-PC-24-14.5-15.0 SB-FS-PC-27-10.5-11.0 SB-FS-PC-27-19.5-20.0 SB-FS-PC-27-35.5-36.0 SB-FS-PC-27-6.0-6.5 SB-FS-TB-PC-24-0.5-1.0 SB-FS-TB-PC-26-O.5-1.0	Tetrahydrofuran	UJ	L	Initial Calibration outside criteria + Low Calibration verification
SB-FS-PC-28-19.0-19.5	Chloroethane	J	I	Low Calibration verification + Result uncertain below the calibration range
SB-FS-PC-28-30.5-31.0 SB-FS-PC-28-9.0-9.5	Chloroethane	UJ	L	Low Calibration verification
SB-FS-PC-28-19.0-19.5 SB-FS-PC-28-30.5-31.0 SB-FS-PC-28-9.0-9.5	1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-Chloropropane 1,2-Dichloroethane Methyl acetate Vinyl Chloride	J / UJ	L	Low Calibration verification
SB-FS-TB-PC-24-0.5-1.0	Acetone	J	I	Low LCS/LCSD recoveries + Result uncertain below the calibration range
SB-FS-TB-PC-24-0.5-1.0	2-Butanone (MEK)	UJ	L	Low LCS/LCSD recoveries
SB-FS-PC-28-6.5-7.0	Chloroethane	UJ	L	Low LCS/LCSD recoveries
SB-FS-PC-24-14.5-15.0	2-Hexanone	UJ	L	Low LCS/LCSD recoveries

Table 2. Summary of Data Validation Actions (continued)

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
SB-FS-PC-24-14.5-15.0 SB-FS-PC-27-10.5-11.0 SB-FS-PC-27-19.5-20.0 SB-FS-PC-27-35.5-36.0 SB-FS-PC-27-6.0-6.5 SB-FS-PC-28-19.0-19.5 SB-FS-PC-28-30.5-31.0 SB-FS-PC-28-6.5-7.0 SB-FS-PC-28-9.0-9.5 SB-FS-TB-PC-26-0.5-1.0	2-Butanone (MEK) Acetone	J / UJ	L	Low LCS/LCSD recoveries
SB-FS-PC-24-12.5-13.0	All VOCs	J / UJ	I	Low % Solids
SB-FS-PC-24-12.5-13.0	Tetrahydrofuran	UJ	I	Low % Solids + Initial Calibration outside criteria + Low Calibration verification
SB-FS-PC-24-12.5-13.0	2-Butanone (MEK) 2-Hexanone Acetone	UJ	I	Low % Solids + Low LCS/LCSD recoveries
SB-FS-PC-24-14.5-15.0	Methylene Chloride	U		Negated due to Blank Action
SB-FS-PC-24-12.5-13.0	Methylene Chloride	UJ	I	Negated due to Blank Action + Low % Solids
SB-FS-PC-27-10.5-11.0	Methylene Chloride	J	I	Result uncertain below the calibration range
SB-FS-PC-27-19.5-20.0	1,1-Dichloroethane Methylene Chloride	J	I	Result uncertain below the calibration range
SB-FS-PC-27-35.5-36.0	cis-1,2-Dichloroethene Methylene Chloride	J	I	Result uncertain below the calibration range
SB-FS-PC-27-6.0-6.5	Methylene Chloride m-Xylene & p-Xylene o-Xylene	J	I	Result uncertain below the calibration range
SB-FS-PC-28-19.0-19.5	1,2-Dichlorobenzene	J	I	Result uncertain below the calibration range
SB-FS-PC-28-30.5-31.0	trans-1,2-Dichloroethene	J	I	Result uncertain below the calibration range
SB-FS-PC-28-6.5-7.0	1,2-Dichlorobenzene	J	I	Result uncertain below the calibration range
SB-FS-PC-28-9.0-9.5	cis-1,2-Dichloroethene	J	I	Result uncertain below the calibration range
SB-FS-TB-PC-24-0.5-1.0	Methylene Chloride	J	I	Result uncertain below the calibration range
SB-FS-TB-PC-26-0.5-1.0	Methylene Chloride	J	I	Result uncertain below the calibration range
SB-FS-PC-28-5.0-7.0 SB-FS-TB-PC-24-0.5-2.0 SB-FS-TB-PC-26-O.5-2.0	2,4-Dinitrophenol 4,6-Dinitro-2-methylphenol	UJ	I	Initial Calibration outside criteria + Low Calibration verification

Table 2. Summary of Data Validation Actions (continued)

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
SB-FS-PC-28-5.0-7.0	Benzo[a]pyrene Naphthalene	J	I	Result uncertain below the calibration range
SB-FS-TB-PC-26-O.5-2.0	Bis(2-ethylhexyl) phthalate	J	I	Result uncertain below the calibration range

Qualifiers: U = Analyte is non-detect at the "LIMIT2" value in the EDD, which is the sample-specific reporting limit (RL); UJ = Non-detect is estimated; J = Result is estimated; R = Result is rejected and is unusable for project decisions.

Bias: L = Low; H = High; I = Indeterminate

Acronyms used in Table 2:

FD = Field Duplicate
LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample Duplicate
% = Percent
RL = Reporting Limit

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Volatile Tier II-type Data Review Checklist

Lab Project: 360-40826-1

Lab: TestAmerica Westfield
Date Sampled: 5/30/12
Method of Analysis: 8260C - EI only (no SIM)

No. Samples: 12 + 1 TB
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 70-130%	LCS/LCSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	MS/MSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√		NA	NA		√		NA	Negate 2 results: Blank Action. Estimate all results 1 sample: %Solids
No			Estimate (UJ) 27 results			Estimate (UJ) 26 results		Accept 16 "J" results		

% solids OK? N SB-FS-PC-24-12.5-13.0 (40826-19) % Solids = 28%, all data estimated (J, UJ) for this sample.
Other Issues: No

Comments:

Method 8260C used for reporting of project-specific list of VOCs. TB sample results were reviewed for potential blank actions (see below); however, full data review of this field QC sample was not performed as these results are not directly used for project decisions.

Samples were received intact at TestAmerica on 5/31/12, the day after collection at 4±2°C. Samples were properly preserved. There were some discrepancies between the Chain-of-Custody (COC) and the samples received. The laboratory noted "IDs on containers do not match the COC. Logged in per COC". Three samples listed on the COC were crossed off by the laboratory; and it was noted that these samples were with other SDGs. No action required.

Samples were all analyzed by 6/13/12 - HT met for all samples, No Action required.

Surrogates : All 3 VOC surrogates were recovered within 70-130% in all samples and QC - no Action required

LCS/LCSD Batch 360-91550/1-A % Rec and LCS/LCSD RPD were all acceptable except LCD/LCSD low 2-butanone, acetone, chloroethane, and trichlorofluoromethane LCS high. Trichlorofluoromethane was not detected in associated samples so qualification of data was not necessary for this compound.

***ACTION: 2-Butanone, acetone, and chloroethane estimated (UJ) in associated samples (SB-FS-PC-28-6.5-7.0 40826-1) with possible low bias due to low LCS/LCSD recoveries.*

Date: ***10/24/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40826-1

Additional Notes:

LCS/LCSD: LCS 360-91661/1-A & 2-A. Lab spiked all 53 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable except: 2-butanone and acetone (LCS/LCSD rec. low), and carbon tetrachloride (LCS recovery high). No action required for increased sensitivity of carbon tetrachloride as it was not detected in the associated samples.

***ACTION: acetone and 2-butanone estimated (UJ) in associated soil samples due to low LCS/LCSD recoveries (SB-FS-PC-28-19.0-19.5, SB-FS-PC-28-30.5-31.0, and SB-FS-PC-28-9.0-9.5 40826-3, 7 &2).*

LCS/LCSD: LCS 360-91800/1-A & 2-A. Lab spiked all 53 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable except: 2-butanone, acetone, 2-hexanone (LCS/LCSD rec. low)

***ACTION: 2-butanone, 2-hexanone, and acetone estimated (UJ) in associated samples (SB-FS-PC-24-12.5-13.0 & SB-FS-PC-24-14.5-15.0 40826-19 & 20) due to low LCS/LCSD recoveries.*

LCS/LCSD: LCS 360-91826/1-A & 2-A. Lab spiked all 53 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable except: 2-butanone and acetone (LCS/LCSD rec. low), 2-hexanone (LCSD rec. low) and carbon disulfide (LCS rec. high). 2-Hexanone LCS recovery is acceptable and LCS/LCSD RPD was acceptable; therefore, no action to qualify sample data necessary for this compound based on professional judgment. Carbon disulfide was not detected in associated samples so qualification of data was not necessary for this compound.

***ACTION: 2-butanone and acetone estimated (UJ) in associated samples (SB-FS-PC-27-10.5-11.0, SB-FS-PC-27-19.5-20.0, SB-FS-PC-27-35.5-36.0, SB-FS-PC-27-6.0-6.5, SB-FS-TB-PC-24-0.5-1.0, and SB-FS-TB-PC-26-0.5-1.0 40826-10, 11, 14, 9, 8 & 16) due to low LCS/LCSD recoveries.*

Blank Action: Blanks Reviewed: MB: Water - MB 360-91437/6 Soil - MB 360-91550/3-A, MB 360-91661/3-A, MB 360-91800/3-A, MB 360-91826/3-A
TB: TB053112-2

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91437/6	None Detected	Y				No Blank Action required	
MB 360-91550/3-A	None Detected	Y				No Blank Action required	
MB 360-91661/3-A	None Detected	Y				No Blank Action required	
MB 360-91800/3-A	methylene chloride 311 J µg/kg	Y		11000 µg/kg		SB-FS-PC-24-12.5-13.0 4200 B	4200 U
	methylene chloride 311 J µg/kg	Y		3110 µg/kg		SB-FS-PC-24-14.5-15.0 830 B	830 U
MB 360-91826/3-A	1,2,4-trichlorobenzene 1.02 J µg/kg	Y		5.10 µg/kg		No Blank Action required	
TB-053112-2	None Detected	N				No Blank Action required	

Date: ***10/24/12***

Data Reviewer: ***Deborah A. Loring***

Additional Notes:

MS/MSD: MS/MSD analyses were not performed with this SDG.

FD pair: There was no FD pair submitted with this SDG.

Tunes: Instrument HP#1 GC/MS. 3/23/12 16:40, 06/05/12 14:59, 06/07/12 15:32 All tune abundances were acceptable and all samples and standards were analyzed within 12 hours of BFB tune. The BFB submitted for 6/5/12 was a single scan from the CCAL, rather than an average of 3 scans as is routine. No action is required.

ICAL : HP#1 3/23/12 6-9 level ICAL for all Targets + several non-target compounds. All calibrations met QAPP criteria for Target Compounds (ICAL from 0.5, 1 or 5 up to 160 µg/L. %RSD $\leq$ 20% or r2 $\geq$ 0.99 and all RRFs $\geq$ 0.05 . Valid ICAL - No Action required.

CCAL HP #1 6/5/12 14:59 criteria met for all targets except 1,1,2-trichloro-1,2,2-trifluoromethane %D = +23.3%, carbon tetrachloride %D = +36.3%, 1,1,1-trichloroethane %D = +29.2%, and 1,2-dichloroethane %D = +24.5%. The associated sample was non-detect for all of these compounds; therefore, no action required for enhanced sensitivity on day of analysis for these compounds. No action required.

CCAL: HP #1 6/7/12 15:55 criteria met for all targets except vinyl chloride %D = -24.1%, chloroethane %D = -28.3%, methyl acetate %D = -20.1%, carbon tetrachloride %D = +20.2%, 1,1,2,2-tetrachloroethane %D = -27.5%, 1,2-dichlorobenzene = - 21.6%, 1,2-dibromo-3-chloropropane %D = -29.4%. All associated samples were non-detect for carbon tetrachloride, therefore, no action required for enhanced sensitivity on day of analysis for this compound.

***ACTION: vinyl chloride, chloroethane, methyl acetate, 1,1,2,2-tetrachloroethane, 1,2-dichlorobenzene, and 1,2-dibromo-3-chloropropane estimated (UJ, J) in associated samples (SB-FS-PC-28-19.0-19.5, SB-FS-PC-28-30.5-31.0, and SB-FS-PC-28-9.0-9.5 40826-3, 7 &2).*

Tunes: Instrument HP#3 GC/MS. 6/12/12 11:06, 6/12/12 14:36, 6/13/12 00:41. All tune abundances were acceptable and all samples and standards were analyzed within 12 hours of BFB tune.

ICAL : HP#3 6/12/12 6-9 level ICAL for all Targets + several non-target compounds. All calibrations met QAPP criteria for Target Compounds (ICAL from 0.5, 1 or 5 up to 160 µg/L. %RSD $\leq$ 20% or r2 $\geq$ 0.99 and all RRFs $\geq$ 0.05 except tetrahydrofuran RRF < 0.05 . Valid ICAL - No Action required.

***ACTION: Estimate (UJ) tetrahydrofuran with low bias in associated samples (SB-FS-PC-24-12.5-13.0, SB-FS-PC-24-14.5-15.0, (SB-FS-PC-27-10.5-11.0, SB-FS-PC-27-19.5-20.0, SB-FS-PC-27-35.5-36.0, SB-FS-PC-27-6.0-6.5, SB-FS-TB-PC-24-0.5-1.0, and SB-FS-TB-PC-26-0.5-1.0 40826-19, 20, 10, 11, 14, 9, 8 & 16) due to low sensitivity in initial calibration.*

Date: ***10/24/12***

Data Reviewer: ***Deborah A. Loring***

Additional Notes:

CCAL: HP#3 6/12 /2012 14:59 %D (or %Drift) ≤ ± 20% for all target compounds and RRF ≥ 0.05 except Tetrahydrofuran RRF < 0.05.

***ACTION: Estimate (UJ) tetrahydrofuran with low bias in associated samples (SB-FS-PC-24-12.5-13.0 & SB-FS-PC-24-14.5-15.0 40826-19 & 20) due to low calibration verification.*

CCAL: HP#3 6/13 /2012 01:04 %D (or %Drift) ≤ ± 20% for all target compounds and RRF ≥ 0.05 except Tetrahydrofuran RRF < 0.05.

***ACTION: Estimate (UJ) tetrahydrofuran with low bias in associated samples (SB-FS-PC-27-10.5-11.0, SB-FS-PC-27-19.5-20.0, SB-FS-PC-27-35.5-36.0, SB-FS-PC-27-6.0-6.5, SB-FS-TB-PC-24-0.5-1.0, and SB-FS-TB-PC-26-0.5-1.0 40826-10, 11, 14, 9, 8 & 16) due to low calibration verification.*

IS: All 4 IS Areas and RTs were in criteria - No Action required.

Lab reported results for m- Xylene & p-Xylene (reported as a single entry due to coelution) and o-Xylene in addition to Xylenes, total, as requested in the QAPP. All 52 project-specific VOCs were reported so with the added Xylenes, a total of 54 VOC results reported per sample. Note that bromodichloromethane, as listed in Table 4-1C, is called dichlorobromomethane in EDD and data and Dibromochloromethane, as listed in Table 4-1C, is called chlorodibromomethane in EDD and data.

16 results were reported at levels < RL and were flagged "J" by the lab. These "J" results were accepted for reporting with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

All RLs were at or below the PQLs and PALs required in the QAPP Table 4-1C for all samples except most PQLs were exceeded for samples SB-FS-PC-24-12.5-13.0, SB-FS-PC-24-14.5-15.0, and SB-FS-PC-24-14.5-15.0 due to analysis of the medium level extract or low percent solids in the sample. PALs were exceeded for 1,2-dibromo-3-chloropropane and ethylene dibromide in all samples as expected, due to method limitations. PALs were exceeded for SB-FS-PC-24-12.5-13.0: 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,2-dichloroethene, 1,2-dichloroethane, 1,2-dichloropropane, benzene, carbon tetrachloride, and dibromochloromethane, chloroform, bromodichloromethane, tetrachloroethene, and trichloroethene. SB-FS-PC-24-14.5-15.0: 1,1,2-trichloroethane, 1,2-dichloroethane, 1,2-dichloropropane, tetrachloroethene and vinyl chloride; SB-FS-PC-24-14.5-15.0: 1,1,2-trichloroethane, 1,2-dichloroethane, 1,2-dichloropropane, tetrachloroethene and vinyl chloride.

Narrative did not raise any issues not already addressed.

Date: ***10/24/12***

Data Reviewer: ***Deborah A. Loring***

8260C and Project Action Summary:

Preservation:	Waters - headspace present or received at > 10°C, J det / J NDs or R ND Soils/Sediment - EnCore extrusion and sample preservation unacceptable or received at > 10°C, J det / J NDs or R ND Waters - pH < 2; 14d <HT≤ 28d; J det/ J NDs; HT >28d, J det/R ND Soils/Sediment - 14d <HT< 28d; J det/ J NDs; HT >28d, J det/R ND
Surrogates:	Surr. %Rec > 130%, J det/Accept ND; 10% ≤ %Rec < 70%, J det/J NDs;
LCS	%Rec<10%, J det/ R NDs; 10% <%Rec<70, J det/ J NDs; %Rec >130, J det/Accept NDs. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. LCS must contain all targets.
Tunes:	Samples analyzed within 12-hrs and criteria met per Method 8260C. If out, use professional judgment.
ICAL:	minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs. If avg. RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
CCAL:	%D (or %Drift) > - 20% , J det/J ND; %D (or %Drift) > +20%, J det/Accept ND. If RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
Blanks:	Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for acetone, 2-butanone, and methylene chloride which are 10 x value in blank.
MS/MSD:	%Rec<10%, J det/ R NDs; 10% <%Rec<70%, J det/ J NDs; %Rec >130%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. MS/MSD must contain all targets.
FD:	Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data
IS:	20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs
QLs:	Verify RLs met RLs and PALs given in QAPP; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.
TICs:	Not required
% solids:	If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs
Narrative:	If there are any issues raised in narrative not previously addressed, take appropriate action
Reference:	*Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8260C

Date: ***10/24/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Semivolatile Tier II-type Data Review Checklist

Lab Project: 360-40826

Lab: TestAmerica Westfield
Date Sampled: 5/30/12
Method of Analysis: 8270D

No. Samples: 6 + 1 FD
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates w: 30-130%BN 15-110% Acid s: 30-130%	LCS 40-140%BN 30-130%Acid	MS/MSD 40-140%BN 30-130%Acid w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√	√	NA	√		√		NA	
No						Estimate (UJ) 6 results		Accept 3 "J" results		

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 5/31/12, the day after collection at 4±2°C. Samples were properly preserved. There were some discrepancies between the Chain-of-Custody (COC) and the samples received. The laboratory noted "IDs on containers do not match the COC. Logged in per COC". Three samples listed on the COC were crossed off by the laboratory; and it was noted that these samples were with other SDGs. No action required.

All samples were extracted on 6/11/12 and analyzed by 6/19/12. Extraction and analytical holding times met - no action required.

Surrogates : All 3BN and 3 Acid Surrogates were recovered within QAPP Criteria in all field and QC samples except for sample SB-FS-PC-27-6.0-8.0, in which all surrogates were diluted out. The sample was diluted due to non-target analytes, there were no detected analytes in the sample, and no evidence to show that extraction efficiency was compromised, therefore, no action required.

LCS/LCSD : LCS 360-91774/2-A & 3-A. Lab spiked all 67 target analytes requested in LCS. All spiked target compounds reported acceptable %Rec and LCS/LCSD RPD except carbazole and di-n-butylphthalate (LCS/LCSD rec. high). Carbazole and di-n-butylphthalate were not detected in associated samples so qualification of data was not necessary for these compounds.

Date: ***10/24/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40826

Blank Action: Blanks Reviewed: MB: MB 360-91774/1-A, MB 360-91782/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91774/1-A	di-n-Butylphthalate 158 J µg/kg	Y		1580 µg/kg		All associated samples were ND - No Action required	
MB 360-91782/1-A	di-n-Butylphthalate 177 J µg/kg	Y		1770 µg/kg		All associated samples were ND - No Action required	

LCS/LCSD : LCS 360-91782/2-A & 3-A. Lab spiked all 67 target analytes requested in LCS. All spiked target compounds reported acceptable %Rec and LCS/LCSD RPD carbazole and di-n-butylphthalate (LCS/LCSD rec. high), 4-nitroaniline (LCSD rec high) . Carbazole and di-n-butylphthalate were not detected in associated samples so qualification of data was not necessary for these compounds.

MS/MSD: MS/MSD analyses were not performed with this SDG.

FD pair: SB-FS-PC-28-27.0-34.0 / SB-PCB-4. All SVOCs were non-detect in both samples; therefore, while these results are consistent with one another, unable to quantitatively evaluate FD precision based on calculation of RPD. FD precision considered acceptable for this FD pair.

Tunes: Instrument B 6/11/12 14:37 6/14/12 12:48 6/18/12 14:17. All abundances were acceptable and all samples were analyzed within 12 hours of tune - No Action required

ICAL : 6/11/12 Inst. B, 8- to 10- level ICAL performed from 0.2 to 25 µg/mL (for full 10-level) for all Targets + several non-target compounds. Form VI flagged several results as not meeting minimum RRF criteria; however, lab used CLP criteria and not QAPP criteria. %RSD $\leq$ 20% or r2 $\geq$ 0.99 for all and all RRFs $\geq$ 0.05 except: 2,4-dinitrophenol % RSD = 46.0% and 4,6-dinitro-2-methylphenol %RSD = 39.0%.

**ACTION: 2,4-Dinitrophenol and 4,6-dinitro-2-methylphenol estimated (UJ) with indeterminate bias in all samples due to high RSD.*

CCALs: Inst. B 06/14/2012 13:19 %D or %Drift $\leq \pm$ 20% and RRF $\geq$ 0.05 for all target compounds except: n-nitroso-di-n-propylamine (+21.9%), 4-chloroaniline (+25.0%), 3-nitroaniline (+32.5%), 2,4-dinitrophenol (-23.1%), 4,6-dinitro-2-methylphenol (-23.1%) and hexachlorocyclopentadiene (+20.9%).

***ACTION: Estimate (UJ) 2,4-dinitrophenol and 4,6-dinitro-2-methylphenol in associated samples (SB-FS-TB-PC-26-O.5-2.0 & SB-FS-TB-PC-24-0.5-2.0 - 360-40826-15 &17 - bias indeterminate).*

Date: ***10/24/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40826

Additional Notes:

CCALs: Inst. B 06/18/2012 14:48 %D or %Drift ≤ ± 20% and RRF ≥ 0.05 for all target compounds except: 3-nitroaniline (+53.4%), 2,4-dinitrophenol (-27.2%), carbazole(+44.3%), 4-Nitroaniline (+42.3%) and Carbazole (+77.5%). No action required for increased sensitivity as these analytes are not detected in the associated samples. No action required for increased sensitivity as these analytes are not detected in the associated samples.

***ACTION: Estimate (UJ) 2,4-dinitrophenol and 4,6-dinitro-2-methylphenol in associated sample (SB-FS-PC-28-5.0-7.0 360-40826-4 - bias indeterminate).*

Tunes: Instrument B 6/19/12 15:43, 22:30. All abundances were acceptable and all samples were analyzed within 12 hours of tune - No Action required

ICAL : 6/19/12 Inst. B, 7- to 10- level ICAL performed from 0.2 to 25 µg/mL (for full 10-level) for all Targets + several non-target compounds. Form VI flagged several results as not meeting minimum RRF criteria; however, lab used CLP criteria and not QAPP criteria. %RSD ≤ 20% or r2 ≥ 0.99 for all and all RRFs ≥ 0.05. No action required.

CCALs: Inst. B 06/19/2012 23:02 %D or %Drift ≤ ± 20% and RRF ≥ 0.05 for 5 target compounds reported from re-extractions. No action required.

IS: All 6 IS Areas and RTs were in criteria for all analyses except Perylene-d12 was high in samples LCS/LCSDLCS 360-91782/2-A & 3-A. No action required for IS in LCS/LCSD.

Lab reported results for all 67 target SVOCs required. The lab reported 3&4-methylphenol rather than 4-methylphenol as the two co-elute.

3 results were reported at a level < RL and were flagged "J" by the lab. These results were accepted for reporting with indeterminate bias due to uncertainty in quantitation at levels below the instrument calibration range.

All RLs reported were less than or equal to the PQLs given in QAPP Table 4-2C except di-n-butylphthalate and bis-2-ethylhexylphthalate in all samples, and most compounds in samples SB-FS-PC-27-6.0-8.0, SB-FS-TB-PC-26-O.5-2.0, and SB-FS-TB-PC-24-0.5-2.0 due to extract dilution. All non-detects were reported at levels below the PALs given in Table 4-2C for all samples except for SB-FS-PC-27-6.0-8.0: 1,1'-biphenyl, 2,4-dinitrotoluene, 3,3'-dichlorobenzidine, 4-chloroaniline, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, bis(2-chloroethyl)ether, chrysene, dibenz(a,h)anthracene, hexachlorobenzene, indeno[1,2,3-cd]pyrene, and pentachlorophenol SB-FS-TB-PC-26-O.5-2.0 and SB-FS-TB-PC-24-0.5-2.0: hexachlorobenzene.

Date: ***10/24/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40826

8270D and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: waters: BN 30 - 130%, acids 15-110%; solids: all surrogates 30-130%
2 BN or 2 Acids Recovery > Criteria, J det/Accept ND; 10% ≤ 2 or more surrogates < Criteria, J det/J NDs;
Recovery < 10%, J det/R NDs. Action taken on Acid and/or BN analytes based on Surrogates out.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs.

Tunes: Samples analyzed within 12-hrs and criteria met per Table 3 or Method 8270C. If out, use professional judgment.

ICAL: minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs; min. RRF < 0.05, J det/UJ NDs.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank

Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for phthalates which are 10 x value in blank.

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs- Unspiked Sample only. RPD > Limit, J det/UJ NDs.
MS/MSD must contain all targets.

FD: Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data

IS: 20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs

QLs: Verify RLs met QAPP QLs ; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

TICs: Not required

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8270D

Date: ***10/24/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
PCB Tier II-type Data Review Checklist

Lab Project # 360-40826

Lab: TestAmerica Westfield
Date Sampled: 5/30/12
Method of Analysis: 8082A

No. Samples: 6 + 1 FD
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 40-140% RPD ≤ 30%	FD w:RPD≤30% s:RPD≤50%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)	Other (pattern match, etc.)
Yes	√	√	√	NA	√	√	√	NA	----
No									

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 5/31/12, the day after collection at 4±2°C. Samples were properly preserved. There were some discrepancies between the Chain-of-Custody (COC) and the samples received. The laboratory noted "IDs on containers do not match the COC. Logged in per COC". Three samples listed on the COC were crossed off by the laboratory; and it was noted that these samples were with other SDGs. No action required.

Samples were extracted on 6/7/12 - HT met for extraction. All extracts were analyzed by 6/8/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - no action required. Note, lab used in-house criteria for recovery of surrogates; QAPP criteria used to determine data acceptance.

LCS/LCSD: LLCS 360-91669/2-A & 3-A . Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec for AR1016 & AR1260 in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD: MS/MSD analyses were not performed with this SDG.

Date: ***10/25/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40826

Blank Action: Blanks Reviewed: MB: MB 360-91669/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91616/1-A	None					No Blank Action required	

Additional Notes:

FD pair: SB-FS-PC-28-27.0-34.0 / SB-PCB-4. All Pesticides were non-detect in both samples; therefore, while these results are consistent with one another, unable to quantitatively evaluate FD precision based on calculation of RPD. FD precision considered acceptable for this FD pair.

ICAL: Instrument M 4/13/12 6-level calibration from 50 to 2000 µg/L for Ar 1016/1260 and a single point calibration at 1000 µg/L for Ar-1221/1254, Ar-1232, Ar-1242, Ar-1248, Ar-1262, Ar-1268. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), linear regression performed for Ar-1016 & 1260 on both columns, and r2 > 0.99. Valid ICAL - no action required.

CCALs : CCV 360-91703/1 06/08/2012 10:35 Average %D < 20% on both columns. CCV 360-91703/12 06/08/2012 17:20 Average %D < 20% on both columns. CCV 360-91703/28 06/08/2012 23:10 Average %D < 20% on both columns except TCMX high on Col 1, within limits on column 2. No action required.

Lab reported the lowest of the two column values. Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. No PCBs reported in samples - no action required.

RLs for all samples except SB-FS-TB-PC-24-0.5-2.0 reported were above the PQLs given in QAPP Table 4-C (RLs 110-230 µg/kg vs. 100 µg/kg), due to % solids.

All RLs reported were less than or equal to the PALs given in QAPP Table 4-C except for sample SB-FS-PC-27-6.0-8.0 in which all Aroclors except Ar-1016 exceeded PALs due to low percent solids.

All chromatograms for all samples visually inspected and appear to have been reported correctly. Samples SB-FS-TB-PC-26-0.5-2.0, SB-FS-TB-PC-24-0.5-2.0, and SB-FS-TB-PC-24-0.5-2.0 show complex mixtures, however, none were matched to a specific Aroclor pattern.

Narrative did not raise any issues not already addressed.

Date: ***10/25/12***
Data Reviewer: ***Deborah A. Loring***

8082A and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs- Unspiked Sample only. RPD > 30% solids, J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multi-components), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multi-components) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8082A

Date: ***10/25/12***
Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Pesticide Tier II-type Data Review Checklist

Lab Project # 360-40826

Lab: TestAmerica Westfield
Date Sampled: 5/30/12
Method of Analysis: 8081B

No. Samples: 6 + 1 FD
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 30-150% w: RPD≤20% sr:RPD≤30%	FD w:RPD≤30% s:RPD≤50%	RCM (Resolve. > 60%)	PEMs Brkdwn< 15% %D ≤ ± 15%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)
Yes	√	√	√	NA	√	√	√	√	√	NA
No										

% solids OK? Y
Other Issues: No Technical chlordane was reported instead of alpha-chlordane. Low-level initial calibration for Toxaphene and Technical chlordane did not support the lab-reported RL - action taken to raise RL for Toxaphene and Technical chlordane (see page 2).

Comments:

Samples were received intact at TestAmerica on 5/31/12, the day after collection at 4±2°C. Samples were properly preserved. There were some discrepancies between the Chain-of-Custody (COC) and the samples received. The laboratory noted "IDs on containers do not match the COC. Logged in per COC". Three samples listed on the COC were crossed off by the laboratory; and it was noted that these samples were with other SDGs. No action required.

Samples were extracted on 6/7/12 and analyzed by 6/11/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - No Action required. Note, lab used in-house criteria for recovery of surrogates; QAPP criteria used to determine data acceptance.

LCS/LCSD: LCS 360-91669/4-A & 5-A Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD: MS/MSD analyses were not performed with this SDG.

Date: ***10/25/12***
Data Reviewer: ***Deborah A. Loring***

Lab Project # 360-40826

Lab: TestAmerica Westfield

Blank Action: Blanks Reviewed: MB: MB 360-91669/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91669/1-A	None	Y				No Blank Action required	

FD pair: SB-FS-PC-28-27.0-34.0 / SB-PCB-4. All Pesticides were non-detect in both samples; therefore, while these results are consistent with one another, unable to quantitatively evaluate FD precision based on calculation of RPD. FD precision considered acceptable for this FD pair.

Resolution Check : RCM not analyzed per se; however, CCALs reviewed and all peaks appear to be adequately resolved - No Action required

PEM DDT and Endrin Breakdown evaluations: PEM 360-91653/16 06/07/2012 20:56, PEM 360-91733/1 06/11/2012 07:46 - %Breakdown for DDT and Endrin $\leq$ 15% + Combined Breakdown was $\leq$ 30% on each GC Column. No Action required.

ICAL: Instrument H 6/7/12 7-level from 1 to 100 µg/L for single-component Pesticides (some extras not required for project) + surrogates and 3-level from 500 to 2,500 µg/L for Toxaphene and Technical Chlordane. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), %RSD $\leq$ 20% or r2 $\geq$ 0.99 for all compounds. Several compounds used regression analysis for calibration on Columns 1 & 2. Valid ICAL - no action required.

CCALs : CCVRT 360-91733/17 on 06/11/2012 08:07 (Opening CCV for single-components), CCVRT 360-91733/3 on 06/11/2012 10:29 (Technical Chlordane), and CCVRT 360-91733/4 on 06/11/2012 10:51 (Toxaphene) - all %D $\leq$ ±20% on both GC columns for all Pesticides. CCV 360-91733/25 on 06/11/2012 18:20 all %D $\leq$ ±20% on both GC columns for all Pesticides except DDD high on Col 1 (+24.7%) and DDE high on Col 2 (+21.1%). A positive %D indicates increased sensitivity to detection during CCAL as compared to sensitivity during ICAL; therefore, since all samples were non-detect for these compounds, no action for enhanced sensitivity in CCVs (i.e. non-detects accurate as reported). No action required.

Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D, however, only detects were in the LCS/LCSD results. No action required.

The narrative did not raise any issues not already addressed.

All RLs reported were less than or equal to the PQLs given in QAPP Table 4-3B except for all toxaphene in all samples, dieldrin and aldrin in all samples except SB-FS-TB-PC-24-0.5-2.0, and all analytes in sample SB-FS-PC-27-6.0-8.0. No PQL was defined for Technical chlordane in the QAPP.

Date: ***10/25/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40826

Additional Notes:

Lab reported results for all 21 target Pesticides required, except technical chlordane was reported instead of alpha-chlordane. The technical chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. The resulting RL was above the PAL for Toxaphene in all samples. All other RLs reported were less than or equal to the PALs given in QAPP Table 4-3B. No PAL was defined for Technical chlordane in the site QAPP.

Date: ***10/25/12***
Data Reviewer: ***Deborah A. Loring***

8081B and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

RCM: RCM < 60% resolution, J detects based on technical judgment

PEM: 4,4'-DDT breakdown > 15%, J detected DDT, DDE, DDD; R ND 4,4'-DDT and accept ND DDE & DDD
Endrin breakdown > 15%, J detected Endrin, Endrin Aldehyde & Endrin Ketone; R ND Endrin and accept ND Endrin Aldehyde & Endrin Ketone
4,4'-DDT and Endrin > 30%, accept NDs of breakdown products and J detects for 4,4'-DDT and Endrin; J detects of breakdown products and reject (R) non-detects for 4,4'-DDT and Endrin.
%D> ± 20%, J det/J ND on a per column basis. % Resolution < 90.0% qualify data based on professional judgment.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<30%, J det/ J NDs; %Rec >150%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters (or 30% solids), J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multicomponents), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multicomponents) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8081B

Date: ***10/25/12***
Data Reviewer: ***Deborah A. Loring***

RDWP - Davis Liquid Waste Superfund Site
EPA Region I Tier II-type DV Checklist - Metals

Lab: TestAmerica-Westfield, Westfield, MA
Date Sampled: 5/30/12
Analysis: Metals by EPA SW-846 Method 6010C & 7471A

Lab Project # 360-40826-1
No. Samples: 7
Matrix: Soil

QC Met Criteria?		HT and Preserve	RL QAPP PALs	Tune 6020 criteria	Calibration ICV/CCV 90-110%R	CRI RL Check 70-130%R	EB MB < RL	LCS/LCSD SRM limits RPD ≤ 30%	ICSA/AB 80-120% R	MS / MSD 75-125% R	MD RPD ≤ 20%	FD RPD ≤ 30%	IS 6020 70-130% R	Serial Dilution ± 15% D
Yes		√	√	NA	√	√	√	√	√	NA	NA		NA	NA
No												Estimate (J) 2 results in FD pair		

Soils for Target Analyte List (TAL) of 23 Metals: Mercury by CVAA SW846 Method 7471A; and Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, & Zinc by ICP-AES Method 6010C.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data for Tier II level in accordance with the Davis QAPP (ESS 2012) & EPA Region 1 present in the data package? ***Yes.***

2. Were all result forms for all samples listed on the chain-of-custody present in data package? ***Yes***.

Chain-of-Custody (COC): 7 soil samples received for Total TAL Metals - received at lab on 5/31/12 (one day after sample collection) and intact. On the Login Sample Receipt Checklist, the laboratory noted that "IDs on containers do not match the COC. Logged in per COC."

Preservation: Samples received at 1.5°C and 3.3°C on ice. No action taken for low temperature upon receipt (< 2°C) because samples were intact. Acceptable preservation for soils.

Holding Time (HT): ICP-AES 6010C analysis 6/04/12 & 6/06/12; CVAA 7471A analysis 6/05/12. Acceptable HT.

Calibration Criteria: ICV/CCV and CRI (RL check standard supporting the level of the RL reported) met acceptance criteria for all Metals. Note CRI not required by Davis QAPP but reviewed as additional support of the lab RLs (criteria set at 70-130%). Tune criteria not applicable for Method 6010C. ICSA/AB met recovery criteria for all ICP metals.

Date: *10/25/12*
Data Reviewer: *Susan D. Chapnick*

New Environmental Horizons, Inc.

Lab: TestAmerica Lab Project #: 360-40826-1

Blanks: No EB included with samples in this SDG. Method blank (MB) & instrument blanks (ICB/CCB) were non-detected for all metals except for Calcium detected at 11.1 mg/Kg. No action required since all soil sample results were > 5x the blank levels for Calcium. Lab also qualified all results for Calcium as "B" on the Form 1 and in the EDD for detection in an associated blank; however, since no blank action was required; therefore, all "B" flags were removed during validation.

LCS/LCSD: Lab performed both LCS and LCS duplicate (LCSD), though LCSD not required in Davis QAPP. LCS/LCSD met acceptance criteria for all Metals for accuracy (based on soil SRM control limits listed by lab on Form 7, consistent with QAPP criteria for this media) and precision (RPD <30% lab criteria).

MS/MD: No site-sample MS/MD was identified to be performed in this SDG.

Serial Dilution: No serial dilution on a site sample was performed in this SDG.

IS: IS not applicable for Method 6010C.

Sensitivity: All RLs for non-detects met Davis QAPP Table 4-5C for Soil requirements for sensitivity (RL) based on being lower than the PALs (even though some, for example antimony, were > PQLs they were still lower than the PALs). Sample SB-FS-PC-27-34.0-36.0 was analyzed at a 2x dilution due to "non-target compounds" (as based on lab narrative). All non-detected results in this sample still were < PAL; therefore, all sensitivity objectives met for Metals.

Professional Judgment - Other: Data users are cautioned that the detected Metals results for Selenium reported from ICP-AES Method 6010C (ranging from 0.8 mg/Kg to 1.5 mg/Kg) may be false positives based on professional judgment knowledge of positive interference for selenium on ICP-AES in some matrices. Since the reported Selenium results were orders-of-magnitude below the PAL and since all QC criteria were met, no action was taken other than to note this issue.

Laboratory Narrative: No further issues noted.

Date: *10/25/12*
Data Reviewer: *Susan D. Chapnick*

Lab: TestAmerica Lab Project #: 360-40826-1

FD pair samples: SB-FS-PC-28-27.0-34.0 and SB-PCB-4. All FD precision met acceptance criteria for all Metals except Chromium.

** ACTION: Estimate (J) results for Chromium in FD pair samples due to FD imprecision. RPD calculations and actions listed on following page.*

FD Precision: all units are mg/Kg dry-weight

Analyte	Sample SB-FS-PC-28-27.0-34.0	Qual	FD SB-PCB-4	Qual	Precision RPD* %	Action	Comment
Aluminum	3500		4200		18	none	
Antimony	0.71	U	0.71	U	NC	none	
Arsenic	1.8		1.8		0	none	
Barium	26		26		0	none	
Beryllium	0.28	U	0.28	U	NC	none	
Cadmium	0.28	U	0.28	U	NC	none	
Calcium	860		1200		33	none	
Chromium	*2.8*		*6.7*		*82*	*J*	*FD imprecision; indeterminate bias, potential heterogeneity*
Cobalt	2.8		2.9		4	none	
Copper	2.8		3.9		33	none	
Iron	11000		9400		16	none	
Lead	1.1		1.4		24	none	
Magnesium	920		1300		34	none	
Manganese	100		110		10	none	
Mercury	0.09	U	0.1	U	NC	none	
Nickel	2		3		40	none	
Potassium	2100		2000		5	none	
Selenium	0.71	U	0.71	U	NC	none	
Silver	0.71	U	0.71	U	NC	none	
Sodium	140	U	140	U	NC	none	
Thallium	1.4	U	1.4	U	NC	none	
Vanadium	6.6		7.8		17	none	
Zinc	26		23		12	none	

Date: *10/25/12*
Data Reviewer: *Susan D. Chapnick*

QC & DV Action Criteria for Davis Superfund Site Metals [based on Davis QAPP 2012 & EPA Region I DV guidance]:

Pres./HT:	HT exceedance: J detects; Non-detects: R or UJ based on professional judgment. pH >2 use professional judgment to J detects; UJ non-detects.
Blanks:	Method Blanks and instrument blanks: Metals < RL unless all sample results are > 10 blank level. Detected results < matrix-matched blank level report as "U" (non-detected at level found). Equipment Blank: EB > RL for any metals; qualify associated detected results < 5x EB level as "EB" - potential high bias based on EB contamination.
Tune:	Mass calibration (amu) > QC limit: J/UJ. Mass resolution/peak width (amu) > QC limit: J/UJ. %RSD > QC limit: J/UJ. See EPA SW-846 Method 6020A for Tune criteria. Tune not performed: R all associated data.
ICV/CCV:	Recoveries < 90%: J / UJ; recoveries > 110%: J detects; if severe exceedance <75%: R non-detects; > 160%: R detects.
CRI:	Low-level standard at the level of the RL: % recovery <70%: J / UJ; >130%: J detects.
LCS:	Aqueous: %Recoveries < 80%: J / UJ. %Recoveries > 120%: J detects. %Recoveries < 50%, may R non-detects & J detects but use professional judgment to accept results if MS is in-control indicating acceptable accuracy in sample matrix. Solids: SRM control limits are criteria; J/UJ outside these limits; use professional judgment for severe exceedances of control limits.
ICSA/AB:	Recoveries > 120% or < 80%: J / UJ unless extremely low for ICSAB at <50%: R non-detects / J detects.
MS:	%Recoveries < 75%: J / UJ. %Recoveries > 125%: J detects. %Recoveries < 30%, may R non-detects & J detects but use professional judgment if sample concentration > 2x spike level.
MD:	Groundwater/Surface Water: Results >5xRL: RPD >20%: J/UJ associated results in batch. Results < 5xRL: difference > ±RL, J/UJ associated results. Soil/Sed: Results >5xRL: RPD >35%: J/UJ associated results in batch. Results < 5xRL: difference > ±2xRL, J / UJ associated results.
FD:	Groundwater/Surface Water: Results > 5xRL: RPD > 30%: J/UJ FD results only. Results < 5xRL: difference > ±2xRL,, J/UJ FD results only. Soil/Sed: Results >5xRL: RPD > 50%: J/UJ FD results only. Results <5xRL: use professional judgment.
IS:	Recoveries < 70%: J / UJ; recoveries > 130%: J detects; use professional judgment for severe exceedances.
Serial Dil:	Results > 50xRL: % Difference > 15%: J detects. EPA guidance UJ non-detects; however, use professional judgment on whether it is a suppression or enhancement to qualify associated non-detects.

Qualifiers: U = analyte is non-detect at the sample-specific Reporting Limit (RL) (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.

References: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island;* prepared by ESS Group, Inc., March 23, 2012 (Davis QAPP); Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996, including Part IV – Inorganic Data Validation Functional Guidelines, November 2008; Region I T*iered Organic and Inorganic Data Validation Guidelines* , July 1, 1993 draft; & USEPA SW846 Methods 6010C, 6020, & 7470A/7471A.

Date: *10/25/12*
Data Reviewer: *Susan D. Chapnick*

environmental chemistry consultants

DATA VALIDATION REPORT
EPA Region I Tier II-Type for VOCs, TCL SVOCs, TCL Pesticides, TCL PCBs, & TAL Metals

Client: ESS Group, Inc., East Providence, Rhode Island

Site: Davis Liquid Waste Superfund Site, Smithfield, Rhode Island
Soil Sampling - 2012

Laboratory: TestAmerica Westfield, Westfield, Massachusetts

Lab Project/SDG #: 360-40834-1

Number of Samples: 2 soil samples for project-specific list of 52 Volatile Organic Compounds (VOCs)
2 soil samples for Target Compound List (TCL) Semivolatile Organic Compounds (SVOCs), TCL Pesticides, TCL Polychlorinated Biphenyls (PCBs), Target Analyte List (TAL) Metals and Percent Solids

Data Reviewers: Nancy C. Rothman, Ph.D., New Environmental Horizons, Inc.
Susan D. Chapnick, M.S., New Environmental Horizons, Inc.

Date: September 20, 2012

EPA Tier II-type Data Validation Review was performed on the data included in this SDG with the following intentions: 1) to determine if the data were generated and reported in accordance with the following documents: *Remedial Design Work Plan and Pre-Design Investigation Plan* (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996 and updates including Part II, III, and IV (Volatile/Semivolatile, Pesticide/PCB, and Inorganic Data Validation Functional Guidelines); EPA *Region I Tiered Organic and Inorganic Data Validation Guidelines*, July 1993, and USEPA SW846 Method 8260C, 8270D, 8081B, 8082A, 6010C, and 7471A 2) to determine if the data met the project data quality objectives for acceptable accuracy, precision, sensitivity; and technical usability; and 3) to update the project database with validated results and appropriate data validation qualifiers.

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The Data Validation Report consists of three parts:

- This Data Validation Report letter summarizing the actions taken;
- The spreadsheet of validated sample results with validation qualifiers based on actions taken; and
- The Data Validation Checklists to document the Tier II-type validations. These Checklists are an integral part of the validation report as they contain comprehensive details of all QC reviewed, the acceptance criteria used, professional judgment and actions taken.

I. Sample Descriptions and Analytical Parameters

The sample IDs, date of sampling, matrix, and sample type (e.g. Field Sample, Field Duplicate, etc., as applicable) and the analytical parameters reviewed are listed below in Table 1.

Table 1. Sample Descriptions and Analytical Parameters

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-FS-PC-24-12.5-15.5	5/30/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-24-24.0-24.5	5/30/12	Soil	VOCs	Field Sample
SB-FS-PC-24-34.0-38.0	5/30/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-24-34.0-34.5	5/30/12	Soil	VOCs	Field Sample

Analytical method references:

Volatiles: 52 project-specific VOCs by USEPA SW846 Method 8260C that includes the TCL plus diethyl ether and tetrahydrofuran. and minus 1,4-dioxane (not required for soils).

Semivolatiles: TCL SVOCs by USEPA SW846 Method 8270D

Pesticides: TCL Pesticides by USEPA SW846 Method 8081B

PCBs: TCL PCB Aroclors by USEPA SW846 Method 8082A

Metals: TAL Metals by USEPA SW846 Method 6010C (ICP-AES), which includes 22 Metals, plus Mercury by USEPA SW846 Method 7471A Cold Vapor Atomic Absorption (CVAA)

Percent Moisture / Percent Solids were performed and reported for all samples to convert results to dry-weight units.

II. Quality Control Reviewed during Data Validation

The following QC elements, as applicable to the analytical methods, were reviewed during the Tier II-type validation of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals:

- Data package completeness and reporting protocols
- Sample receipt, holding times and preservation criteria
- Blank results including Method Blanks, Equipment Blanks, & Trip blanks
- Laboratory Control Sample (LCS) recoveries / LCS Duplicate Recoveries
- Standard Reference Material (SRM) Recoveries, if applicable
- Surrogate Recoveries
- Matrix Spike (MS) / Matrix Spike Duplicate (MSD) Recoveries
- MS/MSD, LCS/LCSD, and sample/Field Duplicate (FD) Relative Percent Differences (RPDs)
- Sample result reporting (including compound lists, reporting limits, and units)
- Calibration criteria (including tune criteria, initial calibration and continuing calibration verification)
- Internal Standard (IS) Recoveries
- Retention Time windows
- Other method-specific QC if applicable and reported in Summary QC
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

III. Data Validation Report Summary

During the Tier II-type data validation review of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals, no data were rejected. Several results were estimated (J or UJ) due to QC issues. Table 2 summarizes the actions taken during this data validation review. NEH generated a validated data spreadsheet based on the electronic project database file (EDD) received from ESS for this SDG. All results were considered usable for project decisions compared to the Davis RDWP QAPP requirements with the understanding of the potential uncertainty (bias) in the qualified results presented in Table 2.

The remainder of this report documents "exceptions" to method or QAPP criteria or clarifications of data reported. QC elements not discussed below met all QAPP criteria. The full documentation of all QC elements reviewed during the Tier II-type validations are presented in the attached Data Validation Checklists. Data users should also reference the full Tier III-type data validation performed on soil samples included in SDG 360-40815-1 for additional information on general reporting issues and calculation verification from review of raw data (which is not performed in a Tier II-type validation).

Exceptions from Davis QAPP or Method QC Criteria

- One sample cooler was received outside of the 4 ± 2°C temperature criteria at 1.8°C. No action was required for low temperature upon receipt since samples were received at the lab intact.
- There were no compounds reported in the blanks that resulted in blank actions for the VOCs, SVOCs, Pesticides, or PCBs.

- Exceedances of Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) recoveries or RPD were as follows:
  - VOCs – Acetone and 2-butanone showed recoveries outside of criteria. Actions taken to estimate (UJ) affected sample results due to VOC LCS/LCSD exceedances are listed in Table 2.
- No site sample in this SDG was identified for Matrix Spike (MS), Matrix Spike Duplicate (MSD), or Matrix Duplicate (MD) analyses for VOCs, SVOCs, Pesticides, PCBs, or Metals; therefore, MS/MSD/MD analyses were not performed.
- A Field Duplicate (FD) pair was not included in this SDG.
- Various initial and continuing calibrations reported results that were outside of criteria for VOCs and SVOCs. Actions to estimate (UJ) results and the potential bias are listed in Table 2.

Sensitivity & Reporting

- The laboratory flagged all results for VOCs that were less than the RL (supported by the low-level standard in the calibration curve) as "J". The "J" qualifier was maintained during validation to indicate that these results were estimated due to uncertainty in quantitation below the calibration range. Affected samples/analytes are listed in Table 2.
- All non-detects for VOCs, SVOCs, and PCBs were below the Project Action Limit (PAL) given in QAPP Tables 4-1C, 4-2C and 4-4B for soils except for 1,2-dibromo-3-chloropropane and ethylene dibromide, as expected, due to method limitations. Therefore, sensitivity data quality objectives (DQOs) were met for these analyses.
- The laboratory reported results for all 21 target Pesticides required, except technical-chlordane was reported instead of alpha-chlordane. The technical-chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. All RLs for Pesticides were less than or equal to the PALs given in QAPP Table 4-3B and therefore met sensitivity requirements with the exception of toxaphene (due to raising the RL during validation). No PAL was defined for technical-chlordane in the site QAPP. The data user will need to evaluate usability of the non-detected toxaphene results with elevated RLs for project uses.
- All non-detects for Metals were below the PALs given in QAPP Table 4-5C for soil. Therefore, sensitivity DQOs were met for Metals.
- Data users are cautioned that the detected Metals results for selenium reported from ICP-AES Method 6010C may be false positives based on professional judgment knowledge of positive interference for selenium on ICP-AES in some matrices. Since the reported selenium results were orders-of-magnitude below the PAL and since all QC criteria were met, no action was taken other than to note this issue.

Table 2. Summary of Data Validation Actions

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
All Pesticide samples	Chlordane (technical) Toxaphene	U		Raised RL
All VOC samples	Tetrahydrofuran	UJ	L	Initial Calibration outside criteria + Low Calibration verification
All VOC samples	2-Butanone (MEK) Acetone	UJ	L	Low LCS/LCSD recoveries
SB-FS-PC-24-24.0-24.5	cis-1,2-Dichloroethene Methylene Chloride	J	I	Result below the calibration range
SB-FS-PC-24-34.0-34.5	Methylene Chloride	J	I	Result below the calibration range
All SVOC samples	2,4-Dinitrophenol 4,6-Dinitro-2-methylphenol	UJ	I	Initial Calibration outside criteria + Low Calibration verification

Qualifiers: U = Analyte is non-detect at the "LIMIT2" value in the EDD, which is the sample-specific reporting limit (RL); UJ = Non-detect is estimated; J = Result is estimated; R = Result is rejected and is unusable for project decisions.

Bias: L = Low; H = High; I = Indeterminate

Acronyms used in Table 2:
LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample Duplicate
RL = Reporting Limit

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Volatile Tier II-type Data Review Checklist

Lab Project: 360-40834-1

Lab: TestAmerica Westfield
Date Sampled: 5/30/12
Method of Analysis: 8260C - EI only (no SIM)

No. Samples: 2
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 70-130%	LCS/LCSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	MS/MSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√		NA	NA		√		NA	
No			Estimate (UJ) 4 results			Estimate (UJ) 2 results		Accept 3 "J" results		

% solids OK? Y
Other Issues: No

Comments:

Method 8260C used for reporting of project-specific list of VOCs. TB sample results were reviewed for potential blank actions (see below); however, full data review of this field QC sample was not performed as these results are not directly used for project decisions.

Samples were received intact at TestAmerica on 5/31/12, the day after collection at 4±2°C - there were no COC issues noted by the lab. Samples were properly preserved.

Samples were all analyzed by 6/12/12 - HT met for all samples, No Action required.

Surrogates : All 3 VOC surrogates were recovered within 70-130% in all samples and QC - no Action required

LCS/LCSD: LCS 360-91826/1-A & 2-A. Lab spiked all 53 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable except: 2-butanone and acetone (LCS/LCSD rec. low), 2-hexanone (LCSD rec. low) and carbon disulfide (LCS rec. high). 2-Hexanone LCS recovery is acceptable and LCS/LCSD RPD was acceptable; therefore, no action to qualify sample data necessary for this compound based on professional judgment. Carbon disulfide was not detected in associated samples so qualification of data was not necessary for this compound.

Date: ***9/14/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40834-1

Blank Action: Blanks Reviewed: MB: MB 360-91826/3-A
TB: No TB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91826/3-A	1,2,4-trichlorobenzene 1.02 J µg/kg	Y		5.10 µg/kg		No Blank Action required	

**Action: 2-butanone and acetone estimated (UJ) with possible low bias in associated samples (SSB-FS-PC-24-24.0-24.5 and SB-FS-PC-24-34.0-34.5 [-2 & -4]) due to low LCS/LCSD recoveries*

MS/MSD: MS/MSD analyses were not performed with this SDG.

FD pair: There was no field duplicate pair submitted with this SDG.

Tunes: Instrument HP#3 GC/MS. 6/12/12 11:06, 6/12/12 14:36. All tune abundances were acceptable and all samples and standards were analyzed within 12 hours of BFB tune.

ICAL : HP#3 6/12/12 6-9 level ICAL for all Targets + several non-target compounds. All calibrations met QAPP criteria for Target Compounds (ICAL from 0.5, 1 or 5 up to 160 µg/L. %RSD $\leq$ 20% or r2 $\geq$ 0.99 and all RRFs $\geq$ 0.05 except tetrahydrofuran RRF < 0.05 . Valid ICAL - No Action required.

***ACTION: Estimate (UJ) tetrahydrofuran with low bias in both samples due to low sensitivity in initial calibration.*

CCAL: HP#3 6/12 /2012 14:59 %D (or %Drift) $\leq \pm$ 20% for all target compounds and RRF $\geq$ 0.05 except Tetrahydrofuran RRF < 0.05.

***ACTION: Estimate (UJ) tetrahydrofuran with low bias in both samples due to low calibration verification.*

IS: All 4 IS Areas and RTs were in criteria - No Action required.

Lab reported results for m- Xylene & p-Xylene (reported as a single entry due to coelution) and o-Xylene in addition to Xylenes, total, as requested in the QAPP. All 53 project-specific VOCs were reported so with the added Xylenes, a total of 55 VOC results reported per sample. Note that bromodichloromethane, as listed in Table 4-1C, is called dichlorobromomethane in EDD and data and Dibromochloromethane, as listed in Table 4-1C, is called chlorodibromomethane in EDD and data.

Date: ***9/14/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40834-1

Additional Notes:

3 results were reported at levels < RL and were flagged "J" by the lab. These 3 "J" results were accepted for reporting with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

All RLs were at or below the PQLs and PALs required in the QAPP Table 4-1C for all samples except 1,2-dibromo-3-chloropropane and ethylene dibromide, as expected, due to method limitations.

Narrative did not raise any issues not already addressed.

Date: ***9/14/12***

Data Reviewer: ***Deborah A. Loring***

8260C and Project Action Summary:

Preservation:	Waters - headspace present or received at > 10°C, J det / J NDs or R ND Soils/Sediment - EnCore extrusion and sample preservation unacceptable or received at > 10°C, J det / J NDs or R ND Waters - pH < 2; 14d <HT≤ 28d; J det/ J NDs; HT >28d, J det/R ND Soils/Sediment - 14d <HT< 28d; J det/ J NDs; HT >28d, J det/R ND
Surrogates:	Surr. %Rec > 130%, J det/Accept ND; 10% ≤ %Rec < 70%, J det/J NDs;
LCS	%Rec<10%, J det/ R NDs; 10% <%Rec<70, J det/ J NDs; %Rec >130, J det/Accept NDs. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. LCS must contain all targets.
Tunes:	Samples analyzed within 12-hrs and criteria met per Method 8260C. If out, use professional judgment.
ICAL:	minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs. If avg. RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
CCAL:	%D (or %Drift) > - 20% , J det/J ND; %D (or %Drift) > +20%, J det/Accept ND. If RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
Blanks:	Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for acetone, 2-butanone, and methylene chloride which are 10 x value in blank.
MS/MSD:	%Rec<10%, J det/ R NDs; 10% <%Rec<70%, J det/ J NDs; %Rec >130%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. MS/MSD must contain all targets.
FD:	Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data
IS:	20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs
QLs:	Verify RLs met RLs and PALs given in QAPP; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.
TICs:	Not required
% solids:	If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs
Narrative:	If there are any issues raised in narrative not previously addressed, take appropriate action
Reference:	*Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8260C

Date: ***9/14/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Semivolatile Tier II-type Data Review Checklist

Lab Project: 360-40834

Lab: TestAmerica Westfield
Date Sampled: 5/30/12
Method of Analysis: 8270D

No. Samples: 2
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates w: 30-130%BN 15-110% Acid s: 30-130%	LCS 40-140%BN 30-130%Acid	MS/MSD 40-140%BN 30-130%Acid w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√	√	NA	NA		√		NA	-
No						Estimate (UJ) 2 results in all samples		Accept 1 "J" result		

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 5/31/12, the day after collection at 4±2°C - there were no COC issues noted by the lab.

All samples were extracted on 6/11/12 and analyzed by 6/14/12. Holding times met - no action required.

Surrogates : All 3BN and 3 Acid Surrogates were recovered within QAPP Criteria in all field and QC samples. No action required.

LCS/LCSD : LCS 360-91774/2-A & 3-A. Lab spiked all 67 target analytes requested in LCS. All spiked target compounds reported acceptable %Rec and LCS/LCSD RPD except carbazole and di-n-butylphthalate (LCS/LCSD rec. high). Carbazole and di-n-butylphthalate were not detected in associated samples so qualification of data was not necessary for these compounds.

MS/MSD: MS/MSD analyses were not performed in this SDG.

FD pair: An FD was not submitted with this SDG.

Date: ***9/14/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40834

Blank Action: Blanks Reviewed: MB: MB 360-91774/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91774/1-A	di-n-Butylphthalate 158 J µg/kg	Y		1580 µg/kg		All associated samples were ND - No Action required	

Tunes: Instrument B 6/11/12, 6/14/12. All abundances were acceptable and all samples were analyzed within 12 hours of tune - No Action required

ICAL : 6/11/12 Inst. B, 8- to 10- level ICAL performed from 0.2 to 25 µg/mL (for full 10-level) for all Targets + several non-target compounds. Form VI flagged several results as not meeting minimum RRF criteria; however, lab used CLP criteria and not QAPP criteria. %RSD $\leq$ 20% or r2 $\geq$ 0.99 for all and all RRFs $\geq$ 0.05 except: 2,4-dinitrophenol % RSD = 46.0% and 4,6-dinitro-2-methylphenol %RSD = 39.0%.

**ACTION: 2,4-Dinitrophenol and 4,6-dinitro-2-methylphenol estimated (UJ) with indeterminate bias in both samples due to high RSD.*

CCALs: Inst. B 06/14/2012 13:19 %D or %Drift $\leq \pm$ 20% and RRF $\geq$ 0.05 for all target compounds except: n-nitroso-di-n-propylamine (+21.9%), 4-chloroaniline (+25.0%), 3-nitroaniline (+32.5%), 2,4-dinitrophenol (-23.1%), 4,6-dinitro-2-methylphenol (-23.1%) and hexachlorocyclopentadiene (+20.9%).

***ACTION: Estimate (UJ) 2,4-dinitrophenol and 4,6-dinitro-2-methylphenol in both samples (bias indeterminate due to ICAL RSD).*

IS: All 6 IS Areas and RTs were in criteria for all analyses.

Lab reported results for all 67 target SVOCs required. The lab reported 3&4-methylphenol rather than 4-methylphenol as the two co-elute. All RLs reported were less than or equal to the PQLs given in QAPP Table 4-2C except bis-2-ethylhexylphthalate and di-n-butylphthalate in both samples and 2-nitroaniline, 3-nitroaniline, 4,6-dinitro-2-methylphenol, 4-nitroaniline, 4-nitrophenol, and hexachlorobenzene in sample SB-FS-PC-24-12.5-15.5, which was run at a 2-fold dilution. An undiluted extract was not analyzed for this sample.

1 result was reported at a level < RL and was flagged "J" by the lab. This result was accepted for reporting with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

Date: ***9/14/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40834

Additional Notes:

All non-detects were reported at levels below the PALs given in Table 4-2C for all samples.

Narrative did not raise any issues not already addressed.

Date: *9/14/12*

Data Reviewer: *Deborah A. Loring*

8270D and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: waters: BN 30 - 130%, acids 15-110%; solids: all surrogates 30-130%
2 BN or 2 Acids Recovery > Criteria, J det/Accept ND; 10% ≤ 2 or more surrogates < Criteria, J det/J NDs;
Recovery < 10%, J det/R NDs. Action taken on Acid and/or BN analytes based on Surrogates out.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs.

Tunes: Samples analyzed within 12-hrs and criteria met per Table 3 or Method 8270C. If out, use professional judgment.

ICAL: minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs; min. RRF < 0.05, J det/UJ NDs.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank

Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for phthalates which are 10 x value in blank.

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs- Unspiked Sample only. RPD > Limit, J det/UJ NDs.
MS/MSD must contain all targets.

FD: Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data

IS: 20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs

QLs: Verify RLs met QAPP QLs ; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

TICs: Not required

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8270D

Date: ***9/14/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
PCB Tier II-type Data Review Checklist

Lab Project # 360-40834

Lab: TestAmerica Westfield
Date Sampled: 5/30/12
Method of Analysis: 8082A

No. Samples: 2
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 40-140% RPD ≤ 30%	FD w:RPD≤30% s:RPD≤50%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)	Other (pattern match, etc.)
Yes	√	√	√	NA	NA	√	√	√	----
No									

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 5/31/12, the day after collection at 4±2°C - there were no COC issues noted by the lab.

Samples were extracted on 6/7/12 - HT met for extraction. All extracts were analyzed by 6/8/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - No Action required. Note, lab used in-house criteria for recovery of surrogates; QAPP criteria used to determine data acceptance.

LCS/LCSD: LCS/LCSD 360-91669/2-A & 3-A Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec for AR1016 & AR1260 in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD: MS/MSD analyses were not performed in this SDG.

Date: ***9/17/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40834

Blank Action: Blanks Reviewed: MB: MB 360-91669/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91669/1-A	None					No Blank Action required	

Additional Notes:

FD pair: An FD was not submitted with this SDG.

ICAL: Instrument M 4/13/12 6-level calibration from 50 to 2000 µg/L for Ar 1016/1260 and a single point calibration at 1000 µg/L for Ar-1221/1254, Ar-1232, Ar-1242, Ar-1248, Ar-1262, Ar-1268. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), linear regression performed for Ar-1016 & 1260 on both columns, and r2 > 0.99. Valid ICAL - no action required.

CCALs : CCV 360-91703/1 on 06/08/2012 10:35 (Opening CCV): All %D ≤ ± 20% on both GC columns for all Aroclor peaks. CCV 360-91703/12 on 06/08/2012 17:20: All %D < ± 20% on both GC columns for all Aroclor peaks. CCV 360-91703/28 at 06/08/2012 23:10 except Ar-1016-2 (+21.4%), average OK on GC Column 2. No action required.

Lab reported the lowest of the two column values. Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. No PCBs reported in samples - no action required.

All RLs reported were slightly above the PQLs given in QAPP Table 4-C (RLs ranged from 110-130 µg/kg vs. 100 µg/kg), due to % solids.

All RLs reported were less than or equal to the PALs given in QAPP Table 4-C.

All chromatograms for all samples visually inspected and appear to have been reported correctly.

Narrative did not raise any issues not already addressed.

Lab: TestAmerica Westfield

Date: ***9/17/12***
Data Reviewer: ***Deborah A. Loring***

8082A and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs- Unspiked Sample only. RPD > 30% solids, J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multi-components), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multi-components) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8082A

Date: ***9/17/12***
Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Pesticide Tier II-type Data Review Checklist

Lab Project # 360-40834

Lab: TestAmerica Westfield
Date Sampled: 5/30/12
Method of Analysis: 8081B

No. Samples: 2
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 30-150% w: RPD≤20% sr:RPD≤30%	FD w:RPD≤30% s:RPD≤50%	RCM (Resolve. > 60%)	PEMs Brkdwn< 15% %D ≤ ± 15%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)
Yes	√	√	√	NA	NA	√	√	√	√	√
No										

% solids OK? Y
Other Issues: No Technical chlordane was reported instead of alpha-chlordane. Low-level initial calibration for Toxaphene and Technical chlordane did not support the lab-reported RL - action taken to raise RL for Toxaphene and Technical chlordane (see page 2).

Comments:

Samples were received intact at TestAmerica on 5/31/12, the day after collection at 4±2°C - there were no COC issues noted by the lab.

Samples were extracted on 6/7/12 and analyzed by 6/11/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - No Action required. Note, lab used in-house criteria for recovery of surrogates; QAPP criteria used to determine data acceptance.

LCS/LCSD: LCS 360-91669/4-A & 5-A. Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD : MS/MSD analyses were not performed in this SDG.

FD pair: An FD was not submitted with this SDG.

Resolution Check : RCM not analyzed per se; however, CCALs reviewed and all peaks appear to be adequately resolved - No Action required

Date: ***9/17/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40834

Blank Action:

Blanks Reviewed: MB: MB 360-91669/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91669/1-A	None					No Blank Action required	

Additional Notes:

PEM DDT and Endrin Breakdown evaluations: PEMs PEM 360-91733/1 06/11/2012 07:46 - %Breakdown for DDT and Endrin ≤ 15% + Combined Breakdown was ≤ 30% on each GC Column. No Action required.

ICAL: Instrument H 6/7/12 7-level from 1 to 100 µg/L for single-component Pesticides (some extras not required for project) + surrogates and 3-level from 500 to 2,500 µg/L for Toxaphene and Technical Chlordane. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), %RSD ≤ 20% or r2 ≥ 0.99 for all compounds. Several compounds used regression analysis for calibration on Columns 1 & 2. Valid ICAL - no action required.

CCALs : CCVRT 360-91733/2 on 06/11/2012 08:07 (Opening CCV for single-components), CCVRT 360-91733/3 on 06/11/2012 10:29 (Technical Chlordane), and CCVRT 360-91733/4 on 06/11/2012 10:51 (Toxaphene) - all %D ≤ ±20% on both GC columns for all Pesticides. CCV 360-91733/25 on 06/11/2012 18:20 - all %D ≤ ±20% on both GC columns for all Pesticides except DDD (+24.7%) on GC Column 1 and DDE (+21.1%) on GC Column 2. A positive %D indicates increased sensitivity to detection during CCAL as compared to sensitivity during ICAL; therefore, since all samples were non-detect for these compounds, no action for enhanced sensitivity in CCVs (i.e. non-detects accurate as reported).

Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. Since Form X used to express LCS and MS results only, since all samples were non-detect for all Pesticides, no action required.

The narrative did not raise any issues not already addressed.

All RLs reported were less than or equal to the PQLs given in QAPP Table 4-3B except dieldrin, aldrin and toxaphene in all samples. No PQL was defined for Technical chlordane in the QAPP.

Lab reported results for all 21 target Pesticides required, except technical chlordane was reported instead of alpha-chlordane. The technical chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. The resulting RL was above the PAL for Toxaphene in all samples. All other RLs reported were less than or equal to the PALs given in QAPP Table 4-3B. No PAL was defined for Technical chlordane in the site QAPP.

Date: ***9/17/12***
Data Reviewer: ***Deborah A. Loring***

8081B and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

RCM: RCM < 60% resolution, J detects based on technical judgment

PEM: 4,4'-DDT breakdown > 15%, J detected DDT, DDE, DDD; R ND 4,4'-DDT and accept ND DDE & DDD
Endrin breakdown > 15%, J detected Endrin, Endrin Aldehyde & Endrin Ketone; R ND Endrin and accept ND Endrin Aldehyde & Endrin Ketone
4,4'-DDT and Endrin > 30%, accept NDs of breakdown products and J detects for 4,4'-DDT and Endrin; J detects of breakdown products and reject (R) non-detects for 4,4'-DDT and Endrin.
%D> ± 20%, J det/J ND on a per column basis. % Resolution < 90.0% qualify data based on professional judgment.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<30%, J det/ J NDs; %Rec >150%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters (or 30% solids), J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multicomponents), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multicomponents) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8081B

Date: ***9/17/12***
Data Reviewer: ***Deborah A. Loring***

RDWP - Davis Liquid Waste Superfund Site
EPA Region I Tier II-type DV Checklist - Metals

Lab: TestAmerica-Westfield, Westfield, MA
Date Sampled: 5/30/12
Analysis: Metals by EPA SW-846 Method 6010C & 7471A

Lab Project # 360-40834-1
No. Samples: 2
Matrix: Soil

QC Met Criteria?		HT and Preserve	RL QAPP PALs	Tune 6020 criteria	Calibration ICV/CCV 90-110%R	CRI RL Check 70-130%R	EB MB < RL	LCS/LCSD SRM limits RPD ≤ 30%	ICSA/AB 80-120% R	MS / MSD 75-125% R	MD RPD ≤ 20%	FD RPD ≤ 30%	IS 6020 70-130% R	Serial Dilution ± 15% D
Yes		√	√	NA	√	√	√	√	√	NA	NA	NA	NA	NA
No														

Soils for Target Analyte List (TAL) of 23 Metals: Mercury by CVAA SW846 Method 7471A; and Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, & Zinc by ICP-AES Method 6010C.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data for Tier II level in accordance with the Davis QAPP (ESS 2012) & EPA Region 1 present in the data package? ***Yes.***

2. Were all result forms for all samples listed on the chain-of-custody present in data package? ***Yes***.

Chain-of-Custody (COC): 2 soil samples received for Total TAL Metals - received at lab on 5/31/12 (the day after sample collection) and intact. Documentation acceptable.

Preservation: Samples received at 1.5 & 3.3°C on ice. No action required for < 2°C since samples were intact. Acceptable preservation for soils.

Holding Time (HT): ICP-AES 6010C analysis 6/04/12; CVAA 7471A analysis 6/05/12. Acceptable HT.

Calibration Criteria: ICV/CCV and CRI (RL check standard supporting the level of the RL reported) met acceptance criteria for all Metals. Note CRI not required by Davis QAPP but reviewed as additional support of the lab RLs (criteria set at 70-130%). Tune criteria not applicable for Method 6010C. ICSA/AB met recovery criteria for all ICP metals.

Date: *9/19/12*
Data Reviewer: *Susan D. Chapnick*

New Environmental Horizons, Inc.

Lab: TestAmerica Lab Project #: 360-40834-1

Blanks: No EB included with samples in this SDG. Method blank (MB) & instrument blanks (ICB/CCB) were non-detected for all metals except for Calcium in the method blank; detected at 11.1 mg/Kg. No action required for calcium since all soil sample results were > 5x the blank levels. Lab qualified both calcium results as "B" on the Form 1 results for detection in an associated blank; however, no action required; therefore, the "B" qualifications were removed during validation.

LCS/LCSD: Lab performed both LCS and LCS duplicate (LCSD), though LCSD not required in Davis QAPP. LCS/LCSD met acceptance criteria for all Metals for accuracy (based on soil SRM control limits listed by lab on Form 7, consistent with QAPP criteria for this media) and precision (RPD <30% lab criteria).

MS/MD: No site-sample MS/MD was identified to be performed in this SDG.

Serial Dilution: No serial dilution on a site sample was performed in this SDG.

IS: IS not applicable for Method 6010C.

Sensitivity: All RLs for non-detects met Davis QAPP Table 4-5C for Soil requirements for sensitivity (RL) based on being lower than the PALs (even though some, for example antimony, were > PQLs they were still lower than the PALs). Therefore, sensitivity met project DQOs.

Professional Judgment - Other: Data users are cautioned that the detected Metals results for selenium reported from ICP-AES Method 6010C (0.8 mg/Kg and 0.86 mg/Kg for the 2 soil samples) may be false positives based on professional judgment knowledge of positive interference for selenium on ICP-AES in some matrices. Since the reported selenium results were orders-of-magnitude below the PAL and since all QC criteria were met, no action was taken other than to note this issue.

Lab: TestAmerica Lab Project #: 360-40834-1

FD pair samples: No FD was collected with this set of samples.

FD Precision:

Analyte	Sample	Qual	FD	Qual	Precision RPD* %	Action	Comment
Aluminum					#DIV/0!	none	
Antimony					#DIV/0!	none	
Arsenic					#DIV/0!	none	
Barium					#DIV/0!	none	
Beryllium					#DIV/0!	none	
Cadmium					#DIV/0!	none	
Calcium					#DIV/0!	none	
Chromium					#DIV/0!	none	
Cobalt					#DIV/0!	none	
Copper					#DIV/0!	none	
Iron					#DIV/0!	none	
Lead					#DIV/0!	none	
Magnesium					#DIV/0!	none	
Manganese					#DIV/0!	none	
Mercury					#DIV/0!	none	
Nickel					#DIV/0!	none	
Potassium					#DIV/0!	none	
Selenium					#DIV/0!	none	
Silver					#DIV/0!	none	
Sodium					#DIV/0!	none	
Thallium					#DIV/0!	none	
Vanadium					#DIV/0!	none	
Zinc					#DIV/0!	none	

Laboratory Narrative: No further issues noted.

Date: *9/19/12*
Data Reviewer: *Susan D. Chapnick*

QC & DV Action Criteria for Davis Superfund Site Metals [based on Davis QAPP 2012 & EPA Region I DV guidance]:

Pres./HT:	HT exceedance: J detects; Non-detects: R or UJ based on professional judgment. pH >2 use professional judgment to J detects; UJ non-detects.
Blanks:	Method Blanks and instrument blanks: Metals < RL unless all sample results are > 10 blank level. Detected results < matrix-matched blank level report as "U" (non-detected at level found). Equipment Blank: EB > RL for any metals; qualify associated detected results < 5x EB level as "EB" - potential high bias based on EB contamination.
Tune:	Mass calibration (amu) > QC limit: J/UJ. Mass resolution/peak width (amu) > QC limit: J/UJ. %RSD > QC limit: J/UJ. See EPA SW-846 Method 6020A for Tune criteria. Tune not performed: R all associated data.
ICV/CCV:	Recoveries < 90%: J / UJ; recoveries > 110%: J detects; if severe exceedance <75%: R non-detects; > 160%: R detects.
CRI:	Low-level standard at the level of the RL: % recovery <70%: J / UJ; >130%: J detects.
LCS:	Aqueous: %Recoveries < 80%: J / UJ. %Recoveries > 120%: J detects. %Recoveries < 50%, may R non-detects & J detects but use professional judgment to accept results if MS is in-control indicating acceptable accuracy in sample matrix. Solids: SRM control limits are criteria; J/UJ outside these limits; use professional judgment for severe exceedances of control limits.
ICSA/AB:	Recoveries > 120% or < 80%: J / UJ unless extremely low for ICSAB at <50%: R non-detects / J detects.
MS:	%Recoveries < 75%: J / UJ. %Recoveries > 125%: J detects. %Recoveries < 30%, may R non-detects & J detects but use professional judgment if sample concentration > 2x spike level.
MD:	Groundwater/Surface Water: Results >5xRL: RPD >20%: J/UJ associated results in batch. Results < 5xRL: difference > ±RL, J/UJ associated results. Soil/Sed: Results >5xRL: RPD >35%: J/UJ associated results in batch. Results < 5xRL: difference > ±2xRL, J / UJ associated results.
FD:	Groundwater/Surface Water: Results > 5xRL: RPD > 30%: J/UJ FD results only. Results < 5xRL: difference > ±2xRL,, J/UJ FD results only. Soil/Sed: Results >5xRL: RPD > 50%: J/UJ FD results only. Results <5xRL: use professional judgment.
IS:	Recoveries < 70%: J / UJ; recoveries > 130%: J detects; use professional judgment for severe exceedances.
Serial Dil:	Results > 50xRL: % Difference > 15%: J detects. EPA guidance UJ non-detects; however, use professional judgment on whether it is a suppression or enhancement to qualify associated non-detects.

Qualifiers: U = analyte is non-detect at the sample-specific Reporting Limit (RL) (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.

References: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island;* prepared by ESS Group, Inc., March 23, 2012 (Davis QAPP); Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996, including Part IV – Inorganic Data Validation Functional Guidelines, November 2008; Region I T*iered Organic and Inorganic Data Validation Guidelines* , July 1, 1993 draft; & USEPA SW846 Methods 6010C, 6020, & 7470A/7471A.

Date: *9/19/12*
Data Reviewer: *Susan D. Chapnick*

environmental chemistry consultants

DATA VALIDATION REPORT
EPA Region I Tier II-Type for VOCs, TCL SVOCs, TCL Pesticides, TCL PCBs, & TAL Metals

Client: ESS Group, Inc., East Providence, Rhode Island

Site: Davis Liquid Waste Superfund Site, Smithfield, Rhode Island
Soil Sampling - 2012

Laboratory: TestAmerica Westfield, Westfield, Massachusetts

Lab Project/SDG #: 360-40862-1

Number of Samples: 13 soil samples + 1 Trip Blank for project-specific list of 52 Volatile Organic Compounds (VOCs)
6 soil samples for Target Compound List (TCL) Semivolatile Organic Compounds (SVOCs), TCL Pesticides, TCL Polychlorinated Biphenyls (PCBs), Target Analyte List (TAL) Metals and Percent Solids

Data Reviewers: Nancy C. Rothman, Ph.D., New Environmental Horizons, Inc.
Susan D. Chapnick, M.S., New Environmental Horizons, Inc.

Date: October 29, 2012

EPA Tier II-type Data Validation Review was performed on the data included in this SDG with the following intentions: 1) to determine if the data were generated and reported in accordance with the following documents: *Remedial Design Work Plan and Pre-Design Investigation Plan* (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996 and updates including Part II, III, and IV (Volatile/Semivolatile, Pesticide/PCB, and Inorganic Data Validation Functional Guidelines); EPA *Region I Tiered Organic and Inorganic Data Validation Guidelines*, July 1993, and USEPA SW846 Method 8260C, 8270D, 8081B, 8082A, 6010C, and 7471A 2) to determine if the data met the project data quality objectives for acceptable accuracy, precision, sensitivity; and technical usability; and 3) to update the project database with validated results and appropriate data validation qualifiers.

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The Data Validation Report consists of three parts:

- This Data Validation Report letter summarizing the actions taken;
- The spreadsheet of validated sample results with validation qualifiers based on actions taken; and
- The Data Validation Checklists to document the Tier II-type validations. These Checklists are an integral part of the validation report as they contain comprehensive details of all QC reviewed, the acceptance criteria used, professional judgment and actions taken.

I. Sample Descriptions and Analytical Parameters

The sample IDs, date of sampling, matrix, and sample type (e.g. Field Sample, Field Duplicate, etc., as applicable) and the analytical parameters reviewed are listed below in Table 1.

Table 1. Sample Descriptions and Analytical Parameters

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-FS-PC-14-11.0-11.5	5/31/12	Soil	VOCs & Percent Solids	Field Sample
SB-PCB-5	5/31/12	Soil	VOCs & Percent Solids	Field Duplicate of SB-FS-PC-14-11.0-11.5
SB-FS-PC-14-15.0-15.5	5/31/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-14-19.5-20.0	5/31/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-14-18.0-20.0	5/31/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-PC-21-6.5-7.0	5/31/12	Soil	VOCs & Percent Solids	Field Sample [used for VOC MS/MSD]
SB-FS-PC-13-2.0-2.5	5/31/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-13-22.0-22.5	5/31/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-13-20.0-25.0	5/31/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-PC-13-15.0-15.5	5/31/12	Soil	VOCs & Percent Solids	Field Sample
TB-060112-1	5/31/12	Water	VOCs	Trip Blank

Table 1. Sample Descriptions and Analytical Parameters (continued)

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-FS-PC-6-0.5-1.0	5/31/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-6-13.0-13.5	6/1/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-6-12.0-14.0	6/1/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-PC-6-20.0-22.5	6/1/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample [used for SVOCs, Pesticides, PCBs, & Metals MS/MSD]
SB-FS-PC-6-22.0-22.5	6/1/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-7-13.0-13.5	6/1/12	Soil	VOCs & Percent Solids	Field Sample
SB-FS-PC-7-13.0-15.0	6/1/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-PC-7-16.0-18.5	6/1/12	Soil	SVOCs, Pesticides, PCBs, Metals & Percent Solids	Field Sample
SB-FS-PC-7-18.0-18.5	6/1/12	Soil	VOCs & Percent Solids	Field Sample

Analytical method references:

Volatiles: 52 project-specific VOCs by USEPA SW846 Method 8260C that includes the TCL plus diethyl ether and tetrahydrofuran and minus 1,4-dioxane (not required for soils; note 1,4-dioxane was reported in the TB).

Semivolatiles: TCL SVOCs by USEPA SW846 Method 8270D

Pesticides: TCL Pesticides by USEPA SW846 Method 8081B

PCBs: TCL PCB Aroclors by USEPA SW846 Method 8082A

Metals: TAL Metals by USEPA SW846 Method 6010C (ICP-AES), which includes 22 Metals, plus Mercury by USEPA SW846 Method 7471A Cold Vapor Atomic Absorption (CVAA)

Percent Moisture / Percent Solids were performed and reported for all samples to convert results to dry-weight units.

II. Quality Control Reviewed during Data Validation

The following QC elements, as applicable to the analytical methods, were reviewed during the Tier II-type validation of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals:

- Data package completeness and reporting protocols
- Sample receipt, holding times and preservation criteria
- Blank results including Method Blanks, Equipment Blanks, & Trip blanks
- Laboratory Control Sample (LCS) recoveries / LCS Duplicate Recoveries
- Standard Reference Material (SRM) Recoveries, if applicable
- Surrogate Recoveries
- Matrix Spike (MS) / Matrix Spike Duplicate (MSD) Recoveries
- MS/MSD, LCS/LCSD, and sample/Field Duplicate (FD) Relative Percent Differences (RPDs)
- Sample result reporting (including compound lists, reporting limits, and units)
- Calibration criteria (including tune criteria, initial calibration and continuing calibration verification)
- Internal Standard (IS) Recoveries
- Retention Time windows
- Other method-specific QC if applicable and reported in Summary QC
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

III. Data Validation Report Summary

During the Tier II-type data validation review of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals, no data were rejected. Several results were negated (U) or estimated (J or UJ) due to QC issues. Table 2 summarizes the actions taken during this data validation review. NEH generated a validated data spreadsheet based on the electronic project database file (EDD) received from ESS for this SDG. All results were considered usable for project decisions compared to the Davis RDWP QAPP requirements with the understanding of the potential uncertainty (bias) in the qualified results presented in Table 2.

The remainder of this report documents "exceptions" to method or QAPP criteria or clarifications of data reported. QC elements not discussed below met all QAPP criteria. The full documentation of all QC elements reviewed during the Tier II-type validations are presented in the attached Data Validation Checklists. Data users should also reference the full Tier III-type data validation performed on soil samples included in SDG 360-40815-1 for additional information on general reporting issues and calculation verification from review of raw data (which is not performed in a Tier II-type validation).

Exceptions from Davis QAPP or Method QC Criteria

- The method blank for VOCs reported results below the Reporting Limit (RL) for methylene chloride and 1,2,4-trichlorobenzene. A comparison of the levels in the blank with the levels reported for this compound in the associated samples resulted in the following actions:
    - Methylene chloride was negated (U) in 5 VOC samples, as shown in Table 2, and the results raised to the sample specific RLs or the levels at which it was found in the sample, whichever was higher.

  - 1,2,4-trichlorobenzene was negated (U) in 3 VOC samples, as shown in Table 2, and the results raised to the sample specific RLs.
- Exceedances of Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) recoveries or RPD were as follows:
  - VOCs – acetone, 2-butanone, and 2-hexanone showed low recoveries and carbon disulfide showed high recoveries outside of criteria. Actions taken to estimate (UJ) affected sample result due to VOC LCS/LCSD exceedances are listed in Table 2.
- Matrix Spike (MS) and Matrix Spike Duplicate (MSD) analyses were performed for VOCs on sample SB-FS-PC-21-6.5-7.0. Exceedances of the MS/MSD recoveries or RPD are as follows:
  - 2-butanone and acetone showed low recoveries outside of criteria. Actions taken to estimate (UJ) affected sample results due to VOC MS/MSD exceedances are listed in Table 2.
- MS and MSD analyses were performed for SVOCs, Pesticides, PCBs, and Metals on sample SB-FS-PC-6-20.0-22.5. Exceedances of the MS/MSD recoveries or relative percent difference (RPD) are as follows:
  - Hexachlorocyclopentadiene showed low recoveries outside of criteria. Actions taken to estimate (UJ) affected sample results due to SVOC MS/MSD exceedances are listed in Table 2.
  - Antimony, manganese, and potassium showed low MS and/or MSD recoveries. Actions taken to estimate (J or UJ) all sample results with potential low bias for these three Metals are listed in Table 2.
  - Mercury showed high MSD recovery and MS/MSD imprecision (high RPD). All mercury results were estimated (UJ) with indeterminate bias, as listed in Table 2. This is evidence of potential sample heterogeneity for mercury in the site soil.
- There was one Field Duplicate (FD) pair included in this SDG for VOCs only: SB-FS-PC-14-11.0-11.5 and SB-PCB-5. FD precision was considered acceptable for VOCs.
- A Field Duplicate (FD) pair was not included in this SDG for SVOCs, Pesticides, PCBs, or Metals.
- Various initial and continuing calibrations reported results that were outside of criteria for VOCs and SVOCs. Actions to estimate (UJ) results and the potential bias are listed in Table 2.
- For PCBs, samples SSB-FS-PC-14-18.0-20.0 and SB-FS-PC-6-12.0-14.0 show complex mixtures in the chromatogram; however, none were matched to a specific Aroclor pattern.

Sensitivity & Reporting

- The laboratory flagged all results for VOCs and SVOCs that were less than the RL (supported by the low-level standard in the calibration curve) as "J". The "J" qualifier was maintained during validation to indicate that these results were estimated due to uncertainty in quantitation below the calibration range. Affected samples/analytes are listed in Table 2.
- All non-detects for VOCs, SVOCs, and PCBs were below the Project Action Limit (PAL) given in QAPP Tables 4-1C, 4-2C and 4-4B for soils except for:
  - All samples: 1,2-dibromo-3-chloropropane and ethylene dibromide, as expected, due to method limitations.
  - SB-FS-PC-7-13.0-13.5: 1,1,2-trichloroethane, 1,2-dichloropropane, 1,2-dichloroethane, tetrachloroethene and vinyl chloride.
  - SB-FS-PC-6-12.0-14.0 & SB-FS-PC-14-18.0-20.0: hexachlorobenzene.

- The laboratory reported results for all 21 target Pesticides required, except technical-chlordane was reported instead of alpha-chlordane. The technical-chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. All RLs for Pesticides were less than or equal to the PALs given in QAPP Table 4-3B and therefore met sensitivity requirements with the exception of toxaphene in all samples (due to raising the RL during validation). No PAL was defined for technical-chlordane in the site QAPP. The data user will need to evaluate usability of the non-detected toxaphene results with elevated RLs for project uses.
- All non-detects for Metals were below the PALs given in QAPP Table 4-5C for soil. Therefore, sensitivity DQOs were met for Metals.
- Data users are cautioned that the detected Metals results for selenium reported from ICP-AES Method 6010C may be false positives based on professional judgment knowledge of positive interference for selenium on ICP-AES in some matrices. Since the reported selenium results were orders-of-magnitude below the PAL and since all QC criteria were met, no action was taken other than to note this issue.

Table 2. Summary of Data Validation Actions

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
All Metals samples	Antimony	UJ	L	Low MS/MSD recoveries
All Metals samples	Manganese	J	L	Low MS/MSD recoveries
All Metals samples	Potassium	J	L	Low MS recovery
All Metals samples	Mercury	UJ	I	High MSD recovery + MS/MSD imprecision
All Pesticide samples	Chlordane (technical) Toxaphene	U		Raised RL
SB-FS-PC-13-15.0-15.5 SB-FS-PC-13-22.0-22.5 SB-FS-PC-14-15.0-15.5	Carbon disulfide	J	H	High LCS recovery
All VOC samples	Tetrahydrofuran	UJ	L	Initial Calibration outside criteria + Low Calibration verification
SB-FS-PC-13-15.0-15.5 SB-FS-PC-13-2.0-2.5 SB-FS-PC-13-22.0-22.5 SB-FS-PC-14-11.0-11.5 SB-FS-PC-14-15.0-15.5 SB-FS-PC-14-19.5-20.0 SB-PCB-5	2-Butanone (MEK) Acetone	UJ	L	Low LCS/LCSD recoveries
SB-FS-PC-21-6.5-7.0	2-Butanone (MEK) Acetone	UJ	L	Low LCS/LCSD recoveries + Low MS/MSD recoveries
SB-FS-PC-6-0.5-1.0 SB-FS-PC-6-13.0-13.5 SB-FS-PC-6-22.0-22.5 SB-FS-PC-7-13.0-13.5 SB-FS-PC-7-18.0-18.5	2-Butanone (MEK) 2-Hexanone Acetone	UJ	L	Low LCS/LCSD recoveries

Table 2. Summary of Data Validation Actions (continued)

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
SB-FS-PC-13-22.0-22.5 SB-FS-PC-14-11.0-11.5 SB-PCB-5	1,2,4-Trichlorobenzene	U		Negated due to Blank Action
SB-FS-PC-6-0.5-1.0 SB-FS-PC-6-13.0-13.5 SB-FS-PC-6-22.0-22.5 SB-FS-PC-7-13.0-13.5 SB-FS-PC-7-18.0-18.5	Methylene Chloride	U		Negated due to Blank Action
SB-FS-PC-13-15.0-15.5	1,1-Dichloroethane 1,2-Dichlorobenzene Isopropylbenzene Methylene Chloride	J	I	Result uncertain below the calibration range
SB-FS-PC-13-2.0-2.5	1,3-Dichlorobenzene Methylene Chloride Tetrachloroethene	J	I	Result uncertain below the calibration range
SB-FS-PC-13-22.0-22.5	1,1,1-Trichloroethane 1,1-Dichloroethane 1,2-Dichlorobenzene Isopropylbenzene Methylene Chloride	J	I	Result uncertain below the calibration range
SB-FS-PC-14-11.0-11.5	1,4-Dichlorobenzene Methylene Chloride	J	I	Result uncertain below the calibration range
SB-FS-PC-14-15.0-15.5	1,2-Dichlorobenzene Methylene Chloride o-Xylene Xylenes, Total	J	I	Result uncertain below the calibration range
SB-FS-PC-14-19.5-20.0	1,2-Dichlorobenzene Ethylbenzene Methylene Chloride	J	I	Result uncertain below the calibration range
SB-FS-PC-21-6.5-7.0	1,1-Dichloroethane 1,2-Dichlorobenzene Methylene Chloride	J	I	Result uncertain below the calibration range
SB-FS-PC-6-13.0-13.5	1,2-Dichlorobenzene cis-1,2-Dichloroethene Cyclohexane Isopropylbenzene	J	I	Result uncertain below the calibration range
SB-PCB-5	1,4-Dichlorobenzene Methylene Chloride	J	I	Result uncertain below the calibration range
All SVOC samples	2,4-Dinitrophenol 4,6-Dinitro-2-methylphenol	UJ	I	Initial Calibration outside criteria + Low Calibration verification
SB-FS-PC-6-20.0-22.5	Hexachlorocyclopentadiene	UJ	L	Low MS/MSD recoveries
SB-FS-PC-6-12.0-14.0	1,1'-Biphenyl Butyl benzyl phthalate Di-n-octyl phthalate	J	I	Result uncertain below the calibration range

Qualifiers: U = Analyte is non-detect at the "LIMIT2" value in the EDD, which is the sample-specific reporting limit (RL); UJ = Non-detect is estimated; J = Result is estimated; R = Result is rejected and is unusable for project decisions.

Bias: L = Low; H = High; I = Indeterminate

Acronyms used in Table 2:

LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample Duplicate
MS = Matrix Spike
MSD = Matrix Spike Duplicate
RL = Reporting Limit

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Volatile Tier II-type Data Review Checklist

Lab Project: 360-40862-1

Lab: TestAmerica Westfield
Date Sampled: 5/31/12 - 6/1/12
Method of Analysis: 8260C - EI only (no SIM)

No. Samples: 12 +1 FD + 1 TB
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 70-130%	LCS/LCSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	MS/MSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√			√		√		NA	
No			Estimate (J / UJ) 34 results	Estimate 2 results in SB-FS-PC-21-6.5-7.0		Estimate (UJ) 1 result in all samples		Accept 30 "J" results		Negate 8 results due to Blank Action.

% solids OK? Y
Other Issues: No

Comments:

Method 8260C used for reporting of project-specific list of VOCs. TB sample results were reviewed for potential blank actions (see below); however, full data review of this field QC sample was not performed as these results are not directly used for project decisions.

Samples were received intact at TestAmerica on 6/1/12, the day of and after collection at 4±2°C - there were no COC issues noted by the lab. Samples were properly preserved. No action required.
Lab re-submittal was required to add missing VOC compounds.

Samples were all analyzed by 6/14/12 - HT met for all samples, No Action required.

Surrogates : All 3 VOC surrogates were recovered within 70-130% in all samples and QC - no Action required

LCS/LCSD: LCS 360-91800/1-A & 2-A. Lab spiked all 52 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable except: 2-butanone, acetone, 2-hexanone (LCS/LCSD rec. low)

***ACTION: 2-butanone, 2-hexanone, and acetone estimated (UJ) in associated sample (SB-FS-PC-7-13.0-13.5) due to low LCS/LCSD recoveries.*

Date: ***10/25/12***

Data Reviewer: ***Deborah A. Loring***

New Environmental Horizons, Inc.

Lab: TestAmerica Westfield

Lab Project: 360-40862-1

Blank Action: Blanks Reviewed: MB: Water - MB 360-91642/6 Soil - MB 360-91800/3-A, MB 360-91826/3-A
TB: TB060112-1

Blank ID	Contaminant / Level	Matrix Related?	Action Level / Action	Sample and Reported Result		Corrected Result
MB 360-91642/6	None Detected	Y		No Blank Action required		
MB 360-91800/3-A	methylene chloride 311 J µg/kg	Y	3110 µg/kg	SB-FS-PC-7-13.0-13.5	770	770 U
MB 360-91826/3-A	1,2,4-trichlorobenzene 1.02 J µg/kg	Y	5.10 µg/kg	SB-FS-PC-13-2.0-2.5	29 B	29
				SB-FS-PC-13-22.0-22.5	1.1 JB	2.6 U
				SB-FS-PC-14-11.0-11.5	1.5 JB	2.7 U
				SB-PCB-5	1.3 JB	1.7 U
MB 360-91928/3-A	methylene chloride 5.14 J µg/kg	Y	51.4 µg/kg	SB-FS-PC-6-0.5-1.0	6.2 JB	10 U
				SB-FS-PC-6-13.0-13.5	4.7 JB	9.5 U
				SB-FS-PC-6-22.0-22.5	6.3 JB	10 U
				SB-FS-PC-7-18.0-18.5	6.5 JB	9.6 U
TB-060112-1	None Detected	N		No Blank Action required		

LCS/LCSD: LCS 360-91826/1-A & 2-A. Lab spiked all 52 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable except: 2-butanone and acetone (LCS/LCSD rec. low), 2-hexanone (LCSD rec. low) and carbon disulfide (LCS rec. high). 2-Hexanone LCS recovery is acceptable and LCS/LCSD RPD was acceptable; therefore, no action to qualify sample data necessary for this compound based on professional judgment. Carbon Disulfide non-detects not qualified as increased sensitivity on the day of analysis does not affect non-detects.

***ACTION: 2-butanone and acetone estimated (UJ) in associated samples (SB-FS-PC-13-15.0-15.5, SB-FS-PC-13-2.0-2.5, SB-FS-PC-13-22.0-22.5, SB-FS-PC-14-11.0-11.5, SB-FS-PC-14-15.0-15.5, SB-FS-PC-14-19.5-20.0, SB-FS-PC-21-6.5-7.0, and SB-PCB-5 - 40862-10, 7, 8, 1, 3, 4, 6 & 2) due to low LCS/LCSD recoveries. Positive detects for carbon disulfide estimated (J) with possible high bias for samples SB-FS-PC-13-15.0-15.5, SB-FS-PC-13-22.0-22.5, and SB-FS-PC-14-15.0-15.5 (40862-10, 8 & 3).*

LCS/LCSD: LCS 360-91928/1-A & 2-A. Lab spiked all 52 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable except: 2-butanone, 2-hexanone, and acetone (LCS/LCSD rec. low).

***ACTION: Estimate (UJ) 2-butanone, 2-hexanone, and acetone associated samples (SB-FS-PC-6-0.5-1.0, SB-FS-PC-6-13.0-13.5, SB-FS-PC-6-22.0-22.5, and SB-FS-PC-7-18.0-18.5 - 40862-12, 13, 16 & 20) due to low LCS/LCSD sensitivity.*

Date: ***10/25/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40862-1

Additional Notes:

MS/MSD: MS/MSD analyses were performed on sample SB-FS-PC-21-6.5-7.0. All %Rec and RPDs were within limits except acetone, 2-butanone (MS/MSD low), and 2-hexanone (MS low). 2-Hexanone MSD recovery is acceptable and MS/MSD RPD was acceptable; therefore, no action to qualify sample data necessary for this compound based on professional judgment.

***ACTION: Estimate (UJ) acetone and 2-butanone in sample SB-FS-PC-21-6.5-7.0 due to low MS/MSD recoveries.*

FD pair: SB-FS-PC-14-11.0-11.5 / SB-PCB-5. A comparison of detected results shown below.

Field Duplicate Evaluation_ Sample IDs: Sample = SB-FS-PC-14-11.0-11.5 FD = SB-PCB-5

Analyte Name	DF= 1 RL (µg/Kg)	Sample µg/Kg	Q	Sample Result Level	FD µg/Kg	Q	FD Result Level	RPD	Action
1,2-dichlorobenzene	2.7	2.9		< 2 X RL	2.4		< 2 X RL	19%	None
1,4-dichlorobenzene	2.7	2.1	J	< RL	1.6	J	< RL	27%	None
cis-1,2-dichloroethene	2.7	3.8		< 2 X RL	ND			NC	None
methylene chloride	11	7.9	J	< RL	6.1	J	< RL	26%	None

NC = not calculated

FD Results: FD precision considered acceptable for this FD pair.

Tunes: Instrument HP#3 GC/MS. 6/12/12 11:06, 6/12/12 14:36 6/13/12 00:41, 6/14/12 14:14: All tune abundances were acceptable and all samples and standards were analyzed within 12 hours of BFB tune.

ICAL : HP#3 6/12/12 6-9 level ICAL for all Targets + several non-target compounds. All calibrations met QAPP criteria for Target Compounds (ICAL from 0.5, 1 or 5 up to 160 µg/L. %RSD $\leq$ 20% or r2 $\geq$ 0.99 and all RRFs $\geq$ 0.05 except tetrahydrofuran RRF < 0.05 . Valid ICAL - No Action required.

Date: ***10/25/12***

Data Reviewer: ***Deborah A. Loring***

Additional Notes:

***ACTION: Estimate (UJ) tetrahydrofuran with low bias in all samples due to low sensitivity in initial calibration.*

CCAL: HP#3 6/12 /2012 14:59 %D (or %Drift) ≤ ± 20% for all target compounds and RRF ≥ 0.05 except Tetrahydrofuran RRF < 0.05.

***ACTION: Estimate (UJ) tetrahydrofuran with low bias in associated samples (SB-FS-PC-13-15.0-15.5, SB-FS-PC-13-2.0-2.5, SB-FS-PC-13-22.0-22.5, SB-FS-PC-14-11.0-11.5, SB-FS-PC-14-15.0-15.5, SB-FS-PC-14-19.5-20.0, SB-FS-PC-21-6.5-7.0, SB-PCB-5 - 40862-10, 7, 8, 1, 3, 4, 6 &2) due to low calibration verification.*

CCAL: HP#3 6/13 /2012 01:04 %D (or %Drift) ≤ ± 20% for all target compounds and RRF ≥ 0.05 except Tetrahydrofuran RRF < 0.05.

***ACTION: Estimate (UJ) tetrahydrofuran with low bias in associated samples (SB-FS-PC-7-13.0-13.5 40862-17) due to low calibration verification.*

CCAL: HP#3 06/14/2012 14:37 %D (or %Drift) ≤ ± 20% for all target compounds and RRF ≥ 0.05 except Tetrahydrofuran RRF < 0.05.

***ACTION: Estimate (UJ) tetrahydrofuran with low bias in associated samples ((SB-FS-PC-6-0.5-1.0, SB-FS-PC-6-13.0-13.5, SB-FS-PC-6-22.0-22.5, and SB-FS-PC-7-18.0-18.5 - 40862-12, 13, 16 & 20) due to low calibration verification.*

IS: All 4 IS Areas and RTs were in criteria - No Action required.

Lab reported results for m- Xylene & p-Xylene (reported as a single entry due to coelution) and o-Xylene in addition to Xylenes, total, as requested in the QAPP. All 52 project-specific VOCs were reported so with the added Xylenes, a total of 54 VOC results reported per sample. Note that bromodichloromethane, as listed in Table 4-1C, is called dichlorobromomethane in EDD and data and Dibromochloromethane, as listed in Table 4-1C, is called chlorodibromomethane in EDD and data.

30 results were reported at levels < RL and were flagged "J" by the lab (excluding those negated due to blank action). These "J" results were accepted for reporting with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

All RLs were at or below the PQLs and PALs required in the QAPP Table 4-1C for all samples except most PQLs were exceeded for samples SSB-FS-PC-7-13.0-13.5 due to analysis of the medium level extract. PALs were exceeded for 1,2-dibromo-3-chloropropane and ethylene dibromide in all samples as expected, due to method limitations. PALs were exceeded for SB-FS-PC-7-13.0-13.5: 1,1,2-trichloroethane, 1,2-dichloropropane, 1,2-dichloroethane, tetrachloroethene and vinyl chloride.

Narrative did not raise any issues not already addressed.

Date: ***10/25/12***

Data Reviewer: ***Deborah A. Loring***

8260C and Project Action Summary:

Preservation:	Waters - headspace present or received at > 10°C, J det / J NDs or R ND Soils/Sediment - EnCore extrusion and sample preservation unacceptable or received at > 10°C, J det / J NDs or R ND Waters - pH < 2; 14d <HT≤ 28d; J det/ J NDs; HT >28d, J det/R ND Soils/Sediment - 14d <HT< 28d; J det/ J NDs; HT >28d, J det/R ND
Surrogates:	Surr. %Rec > 130%, J det/Accept ND; 10% ≤ %Rec < 70%, J det/J NDs;
LCS	%Rec<10%, J det/ R NDs; 10% <%Rec<70, J det/ J NDs; %Rec >130, J det/Accept NDs. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. LCS must contain all targets.
Tunes:	Samples analyzed within 12-hrs and criteria met per Method 8260C. If out, use professional judgment.
ICAL:	minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs. If avg. RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
CCAL:	%D (or %Drift) > - 20% , J det/J ND; %D (or %Drift) > +20%, J det/Accept ND. If RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
Blanks:	Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for acetone, 2-butanone, and methylene chloride which are 10 x value in blank.
MS/MSD:	%Rec<10%, J det/ R NDs; 10% <%Rec<70%, J det/ J NDs; %Rec >130%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. MS/MSD must contain all targets.
FD:	Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data
IS:	20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs
QLs:	Verify RLs met RLs and PALs given in QAPP; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.
TICs:	Not required
% solids:	If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs
Narrative:	If there are any issues raised in narrative not previously addressed, take appropriate action
Reference:	*Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8260C

Date: ***10/25/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Semivolatile Tier II-type Data Review Checklist

Lab Project: 360-40862

Lab: TestAmerica Westfield
Date Sampled: 5/30/12
Method of Analysis: 8270D

No. Samples: 6
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates w: 30-130%BN 15-110% Acid s: 30-130%	LCS 40-140%BN 30-130%Acid	MS/MSD 40-140%BN 30-130%Acid w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√	√		NA		√		NA	
No				Estimate (UJ) 1 result in sample SB-FS-PC-6-20.0-22.5		Estimate (UJ) 2 results in all samples		Accept 3 "J" results		

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 6/1/12, the day of and after collection at 4±2°C - there were no COC issues noted by the lab. Samples were properly preserved. No action required.

All samples were extracted on 6/11/12 and analyzed by 6/18/12. Extraction and analytical holding times met - no action required.

Surrogates : All 3BN and 3 Acid Surrogates were recovered within QAPP Criteria in all field and QC samples - no action required.

LCS/LCSD : LCS 360-91774/2-A & 3-A. Lab spiked all 67 target analytes requested in LCS. All spiked target compounds reported acceptable %Rec and LCS/LCSD RPD except carbazole and di-n-butylphthalate (LCS/LCSD rec. high). Carbazole and di-n-butylphthalate were not detected in associated samples so qualification of data was not necessary for these compounds.

MS/MSD: MS/MSD analyses were performed on sample SB-FS-PC-6-20.0-22.5. All % Rec and RPDs were within limits except Carbazole (MS/MSD rec. high) and hexachlorocyclopentadiene (MS/MSD rec. low, but above 10%).

***ACTION: Estimate (UJ) hexachlorocyclopentadiene in sample SB-FS-PC-6-20.0-22.5 with possible low bias due to low MS/MSD recoveries.*

Date: ***10/25/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40862

Blank Action:

Blanks Reviewed: MB: MB 360-91774/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91774/1-A	di-n-Butylphthalate 158 J µg/kg	Y		1580 µg/kg		All associated samples were ND - No Action required	

FD pair: There was no field duplicate pair submitted with this SDG.

Tunes: Instrument B 6/11/12 14:37, 6/14/12 12:48, 6/18/12 14:17. All abundances were acceptable and all samples were analyzed within 12 hours of tune - No Action required

ICAL : 6/11/12 Inst. B, 8- to 10- level ICAL performed from 0.2 to 25 µg/mL (for full 10-level) for all Targets + several non-target compounds. Form VI flagged several results as not meeting minimum RRF criteria; however, lab used CLP criteria and not QAPP criteria. %RSD ≤ 20% or r2 ≥ 0.99 for all and all RRFs ≥ 0.05 except: 2,4-dinitrophenol % RSD = 46.0% and 4,6-dinitro-2-methylphenol %RSD = 39.0%.

**ACTION: 2,4-Dinitrophenol and 4,6-dinitro-2-methylphenol estimated (UJ) with indeterminate bias in all samples due to high RSD.*

CCALs: Inst. B 06/14/2012 13:19 %D or %Drift ≤ ± 20% and RRF ≥ 0.05 for all target compounds except: n-nitroso-di-n-propylamine (+21.9%), 4-chloroaniline (+25.0%), 3-nitroaniline (+32.5%), 2,4-dinitrophenol (-23.1%), 4,6-dinitro-2-methylphenol (-23.1%) and hexachlorocyclopentadiene (+20.9%).

***ACTION: Estimate (UJ) 2,4-dinitrophenol and 4,6-dinitro-2-methylphenol in associated samples (bias indeterminate due to ICAL RSD).*

CCALs: Inst. B 06/18/2012 14:48 %D or %Drift ≤ ± 20% and RRF ≥ 0.05 for all target compounds except: 3-nitroaniline (+53.4%), 2,4-dinitrophenol (-27.2%), carbazole(+44.3%), 4-Nitroaniline (+42.3%) and Carbazole (+77.5%). No action required for increased sensitivity as these analytes are not detected in the associated samples. No action required for increased sensitivity as these analytes are not detected in the associated samples.

***ACTION: Estimate (UJ) 2,4-dinitrophenol and 4,6-dinitro-2-methylphenol in associated samples (bias indeterminate due to ICAL RSD).*

IS: All 6 IS Areas and RTs were in criteria for all analyses. No action required.

Lab reported results for all 67 target SVOCs required. The lab reported 3&4-methylphenol rather than 4-methylphenol as the two co-elute.

Date: ***10/25/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40862

Additional Notes:

3 results were reported at a level < RL and were flagged "J" by the lab. These results were accepted for reporting with indeterminate bias due to uncertainty in quantitation at levels below the instrument calibration range.

All RLs reported were less than or equal to the PQLs given in QAPP Table 4-2C except di-n-butylphthalate and bis-2-ethylhexylphthalate in all samples, and most compounds in samples SB-FS-PC-6-12.0-14.0 and SB-FS-PC-14-18.0-20.0 due to extract dilution. All non-detects were reported at levels below the PALs given in Table 4-2C for all samples except for SB-FS-PC-6-12.0-14.0 & SB-FS-PC-14-18.0-20.0: hexachlorobenzene.

Date: ***10/25/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40862

8270D and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: waters: BN 30 - 130%, acids 15-110%; solids: all surrogates 30-130%
2 BN or 2 Acids Recovery > Criteria, J det/Accept ND; 10% ≤ 2 or more surrogates < Criteria, J det/J NDs;
Recovery < 10%, J det/R NDs. Action taken on Acid and/or BN analytes based on Surrogates out.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs.

Tunes: Samples analyzed within 12-hrs and criteria met per Table 3 or Method 8270C. If out, use professional judgment.

ICAL: minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs; min. RRF < 0.05, J det/UJ NDs.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank

Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for phthalates which are 10 x value in blank.

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs- Unspiked Sample only. RPD > Limit, J det/UJ NDs.
MS/MSD must contain all targets.

FD: Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data

IS: 20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs

QLs: Verify RLs met QAPP QLs ; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

TICs: Not required

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8270D

Date: ***10/25/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
PCB Tier II-type Data Review Checklist

Lab Project # 360-40862

Lab: TestAmerica Westfield
Date Sampled: 5/31/12 - 6/1/12
Method of Analysis: 8082A

No. Samples: 6
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 40-140% RPD ≤ 30%	FD w:RPD≤30% s:RPD≤50%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)	Other (pattern match, etc.)
Yes	√	√	√	√	NA	√	√	NA	----
No									

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 6/1/12, the day of and after collection at 4±2°C - there were no COC issues noted by the lab. No action required.

Samples were extracted on 6/7/12 - HT met for extraction. All extracts were analyzed by 6/11/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - no action required. Note, lab used in-house criteria for recovery of surrogates; QAPP criteria used to determine data acceptance.

LCS/LCSD: LLCS 360-91669/2-A & 3-A . Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec for AR1016 & AR1260 in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD: MS/MSD analyses were performed on sample SB-FS-PC-6-20.0-22.5. All % Rec and RPDs were within limits.

FD pair: There was no field duplicate pair submitted with this SDG.

Date: ***10/26/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40862

Blank Action:

Blanks Reviewed: MB: MB 360-91669/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91616/1-A	None					No Blank Action required	

Additional Notes:

ICAL: Instrument M 4/13/12 6-level calibration from 50 to 2000 µg/L for Ar 1016/1260 and a single point calibration at 1000 µg/L for Ar-1221/1254, Ar-1232, Ar-1242, Ar-1248, Ar-1262, Ar-1268. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), linear regression performed for Ar-1016 & 1260 on both columns, and r2 > 0.99. Valid ICAL - no action required.

CCALs : CCV 360-91703/1 06/08/2012 10:35 Average %D < 20% on both columns. CCV 360-91703/12 06/08/2012 17:20 Average %D < 20% on both columns. CCV 360-91703/28 06/08/2012 23:10 Average %D < 20% on both columns except TCMX high on Col 1, within limits on column 2; CCV 360-91735/17 06/11/2012 15:36 Average %D < 20% on both columns except Ar-1260 low (-27.6%) on Col 1 and DCB low on Col 1 (-24.5%) both within limits on Col 2. CCV 360-91735/37 06/12/2012 00:28 Average %D < 20% on both columns except Ar-1260 low (-26.7%) on Col 1 and DCB low on Col 1 (-25.2%) both within limits on Col 2. No action required as at least one column was within limits for all CCVs, and PCBs not detected in associated samples.

Lab reported the lowest of the two column values. Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. No PCBs reported in samples - no action required.

RLs for samples SB-FS-PC-14-18.0-20.0 and SB-FS-PC-6-20.0-22.5 were above the PQLs given in QAPP Table 4-C (RLs 110 µg/kg vs. 100 µg/kg), due to % solids.

All RLs reported were less than or equal to the PALs given in QAPP Table 4-C.

All chromatograms for all samples visually inspected and appear to have been reported correctly. Samples SB-FS-PC-14-18.0-20.0 and SB-FS-PC-6-12.0-14.0 show complex mixtures, however, none were matched to a specific Aroclor pattern.

Narrative did not raise any issues not already addressed.

Date: ***10/26/12***
Data Reviewer: ***Deborah A. Loring***

8082A and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs- Unspiked Sample only. RPD > 30% solids, J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multi-components), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multi-components) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8082A

Date: ***10/26/12***
Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Pesticide Tier II-type Data Review Checklist

Lab Project # 360-40862

Lab: TestAmerica Westfield
Date Sampled: 5/31/12 - 6/1/12
Method of Analysis: 8081B

No. Samples: 6
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 30-150% w: RPD≤20% sr:RPD≤30%	FD w:RPD≤30% s:RPD≤50%	RCM (Resolve. > 60%)	PEMs Brkdwn< 15% %D ≤ ± 15%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)
Yes	√	√	√	√	NA	√	√	√	√	NA
No										

% solids OK? Y
Other Issues: No Technical chlordane was reported instead of alpha-chlordane. Low-level initial calibration for Toxaphene and Technical chlordane did not support the lab-reported RL - action taken to raise RL for Toxaphene and Technical chlordane (see page 2).

Comments:

Samples were received intact at TestAmerica on 6/1/12, the day of and after collection at 4±2°C - there were no COC issues noted by the lab. Samples were properly preserved. No action required.

Samples were extracted on 6/7/12 and analyzed by 6/13/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - No Action required. Note, lab used in-house criteria for recovery of surrogates; QAPP criteria used to determine data acceptance.

LCS/LCSD: LCS 360-91669/4-A & 5-A Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD: MS/MSD analyses were performed on sample SB-FS-PC-6-20.0-22.5. All % Rec and RPDs were within limits. No action required.

FD pair: There was no field duplicate pair submitted with this SDG.

Date: ***10/26/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40862

Blank Action:

Blanks Reviewed: MB: MB 360-91669/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91669/1-A	None	Y				No Blank Action required	

Resolution Check : RCM not analyzed per se; however, CCALs reviewed and all peaks appear to be adequately resolved - No Action required

PEM DDT and Endrin Breakdown evaluations: PEM 360-91733/1 06/11/2012 07:46, PEM 360-91842/1 06/13/2012 09:26 , CCVRT 360-91733/2 06/11/2012 08:07- %Breakdown for DDT and Endrin ≤ 15% + Combined Breakdown was ≤ 30% on each GC Column. No Action required.

ICAL: Instrument H 6/7/12 7-level from 1 to 100 µg/L for single-component Pesticides (some extras not required for project) + surrogates and 3-level from 500 to 2,500 µg/L for Toxaphene and Technical Chlordane. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), %RSD ≤ 20% or r2 ≥ 0.99 for all compounds. Several compounds used regression analysis for calibration on Columns 1 & 2. Valid ICAL - no action required.

CCALs : CCVRT 360-91733/17 on 06/11/2012 08:07 (Opening CCV for single-components), CCVRT 360-91733/3 on 06/11/2012 10:29 (Technical Chlordane), and CCVRT 360-91733/4 on 06/11/2012 10:51 (Toxaphene) - all %D ≤ ±20% on both GC columns for all Pesticides. CCV 360-91733/25 on 06/11/2012 18:20 all %D ≤ ±20% on both GC columns for all Pesticides except DDD high on Col 1 (+24.7%) and DDE high on Col 2 (+21.1%). CCVRT 360-91842/2 06/13/2012 09:47 (Opening CCV for single-components) CCVRT 360-91842/3 06/13/2012 10:09 (Technical chlordane) CCVRT 360-91842/4 06/13/2012 10:30 (Toxaphene) - all %D ≤ ±20% on both GC columns for all Pesticides except Endrin aldehyde high (+21.0%) on Col 2. CCV 360-91842/24A 06/13/2012 18:00 %D ≤ ±20% on both GC columns for all Pesticides except DDD high (+28.7%) on Col 1 and Endrin aldehyde high (+26.6%) on Col 2. A positive %D indicates increased sensitivity to detection during CCAL as compared to sensitivity during ICAL; therefore, since all samples were non-detect for these compounds, no action for enhanced sensitivity in CCVs (i.e. non-detects accurate as reported). No action required.

Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D, however, only detects were in the LCS/LCSD results. No action required.

The narrative did not raise any issues not already addressed.

All RLs reported were less than or equal to the PQLs given in QAPP Table 4-3B except for all toxaphene in all samples, and dieldrin and aldrin in samples SB-FS-PC-14-18.0-20.0 and SB-FS-PC-6-20.0-22.5. No PQL was defined for Technical chlordane in the QAPP.

Lab reported results for all 21 target Pesticides required, except technical chlordane was reported instead of alpha-chlordane. The technical chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. The resulting RL was above the PAL for Toxaphene in all samples. All other RLs reported were less than or equal to the PALs given in QAPP Table 4-3B. No PAL was defined for Technical chlordane in the site QAPP.

Date: ***10/26/12***
Data Reviewer: ***Deborah A. Loring***

8081B and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

RCM: RCM < 60% resolution, J detects based on technical judgment

PEM: 4,4'-DDT breakdown > 15%, J detected DDT, DDE, DDD; R ND 4,4'-DDT and accept ND DDE & DDD
Endrin breakdown > 15%, J detected Endrin, Endrin Aldehyde & Endrin Ketone; R ND Endrin and accept ND Endrin Aldehyde & Endrin Ketone
4,4'-DDT and Endrin > 30%, accept NDs of breakdown products and J detects for 4,4'-DDT and Endrin; J detects of breakdown products and reject (R) non-detects for 4,4'-DDT and Endrin.
%D> ± 20%, J det/J ND on a per column basis. % Resolution < 90.0% qualify data based on professional judgment.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<30%, J det/ J NDs; %Rec >150%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters (or 30% solids), J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multicomponents), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multicomponents) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8081B

Date: ***10/26/12***
Data Reviewer: ***Deborah A. Loring***

RDWP - Davis Liquid Waste Superfund Site
EPA Region I Tier II-type DV Checklist - Metals

Lab: TestAmerica-Westfield, Westfield, MA
Date Sampled: 5/31/12 & 6/01/12
Analysis: Metals by EPA SW-846 Method 6010C & 7471A

Lab Project # 360-40862-1
No. Samples: 6
Matrix: Soil

QC Met Criteria?		HT and Preserve	RL QAPP PALs	Tune 6020 criteria	Calibration ICV/CCV 90-110%R	CRI RL Check 70-130%R	EB MB < RL	LCS/LCSD SRM limits RPD ≤ 30%	ICSA/AB 80-120% R	MS / MSD 75-125% R	MSD RPD	FD RPD	IS 6020 70-130% R	Serial Dilution ± 15% D
Yes		√	√	NA	√	√	√	√	√			NA	NA	√
No										Estimate (J/UJ) all results for antimony, manganese, potassium	Estimate (UJ) all results for mercury			

Soils for Target Analyte List (TAL) of 23 Metals: Mercury by CVAA SW846 Method 7471A; and Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, & Zinc by ICP-AES Method 6010C.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data for Tier II level in accordance with the Davis QAPP (ESS 2012) & EPA Region 1 present in the data package? ***Yes.***

2. Were all result forms for all samples listed on the chain-of-custody present in data package? ***Yes***.

Chain-of-Custody (COC): 6 soil samples received for Total TAL Metals - received at lab on 6/01/12 and intact. Documentation acceptable.

Preservation: Samples received at 0.6 and 1.2°C on ice. Acceptable preservation for soils even though temperature < lower acceptance limit of 2°C since samples received intact.

Holding Time (HT): ICP-AES 6010C analysis 6/06/12; CVAA 7471A analysis 6/05/12. Acceptable HT.

Calibration Criteria: ICV/CCV and CRI (RL check standard supporting the level of the RL reported) met acceptance criteria for all Metals. Note CRI not required by Davis QAPP but reviewed as additional support of the lab RLs (criteria set at 70-130%). Tune criteria not applicable for Method 6010C. ICSA/AB met recovery criteria for all ICP metals.

Date: *10/28/12*
Data Reviewer: *Susan D. Chapnick*

New Environmental Horizons, Inc.

Lab: TestAmerica Lab Project #: 360-40862-1

Blanks: No EB included with samples in this SDG. Method blank (MB) & instrument blanks (ICB/CCB) were non-detected for all metals except for Calcium in the method blank detected at 11 µg/L. This calculates to: 11 x 100mL/2g x 1/1000 = 0.55 mg/Kg soil-equivalent value. Blank action level = 5x blank level = ~ 2.8 mg/Kg. No action required for Calcium since all soil sample results were > 5x the blank level. Lab qualified all Calcium results "B" for detection in an associated blank; however, since no action was required, these flags were removed during validation in the EDD for the final qualification of data.

LCS/LCSD: Lab performed both LCS and LCS duplicate (LCSD), though LCSD not required in Davis QAPP. LCS/LCSD met acceptance criteria for all Metals for accuracy (based on soil SRM control limits listed by lab on Form 7, consistent with QAPP criteria for this media) and precision (RPD <30% lab criteria).

MS/MSD: Performed on site sample SB-FS-PC-6-20.0-22.5 (360-40862-15) as requested on COC. All recoveries and RPDs acceptable except as follows. Antimony, Manganese, and Potassium showed low MS recoveries at 61%, 56%, and 45%, respectively. Antimony and Manganese also showed low MSD recoveries at 54% and 69%, respectively. Post-digest spikes showed acceptable recoveries for all Metals indicating that there was a matrix effect in the field sample for low MS/MSD recoveries (not caused during instrument analysis). Mercury showed high MSD recovery (143%) and MS/MSD imprecision with RPD 46%. Aluminum and Iron showed MS/MSD recoveries outside control limits, but spikes were swamped out (sample concentrations > 4x spike level); therefore, no action was required.

**ACTION: Estimate (J or UJ) all results for Antimony, Manganese, and Potassium due to low MS and/or MSD recoveries; potential low bias.*

**ACTION: Estimate (UJ) all results for Mercury due to high MSD recovery and MS/MSD imprecision; indeterminate bias and evidence of potential sample heterogeneity for Mercury.*

Serial Dilution: Performed on site sample SB-FS-PC-6-20.0-22.5 (360-40862-15) - all % difference results were acceptable compared to DV acceptance criteria of %D = 15%. Note that the lab qualified Barium for exceedance of serial dilution with 12%D; however, since this met DV criteria, no action was required.

IS: IS not applicable for Method 6010C.

Sensitivity: All RLs for non-detects met Davis QAPP Table 4-5C for Soil requirements for sensitivity (RL) based on being lower than the PALs (even though some, for example antimony, were > PQLs they were still lower than the PALs). Therefore, sensitivity met project DQOs.

Professional Judgment - Other: Data users are cautioned that the detected Metals results for selenium reported from ICP-AES Method 6010C (ranging from 0.88 mg/Kg to 1.6 mg/Kg) may be false positives based on professional judgment knowledge of positive interference for selenium on ICP-AES in some matrices. Since the reported selenium results were orders-of-magnitude below the PAL and since all QC criteria were met, no action was taken other than to note this issue.

Date: *10/28/12*
Data Reviewer: *Susan D. Chapnick*

Lab: TestAmerica Lab Project #: 360-40862-1

FD pair samples: No FD was collected with this set of samples.

FD Precision:

Analyte	Sample	Qual	FD	Qual	Precision RPD* %	Action	Comment
Aluminum					#DIV/0!	none	
Antimony					#DIV/0!	none	
Arsenic					#DIV/0!	none	
Barium					#DIV/0!	none	
Beryllium					#DIV/0!	none	
Cadmium					#DIV/0!	none	
Calcium					#DIV/0!	none	
Chromium					#DIV/0!	none	
Cobalt					#DIV/0!	none	
Copper					#DIV/0!	none	
Iron					#DIV/0!	none	
Lead					#DIV/0!	none	
Magnesium					#DIV/0!	none	
Manganese					#DIV/0!	none	
Mercury					#DIV/0!	none	
Nickel					#DIV/0!	none	
Potassium					#DIV/0!	none	
Selenium					#DIV/0!	none	
Silver					#DIV/0!	none	
Sodium					#DIV/0!	none	
Thallium					#DIV/0!	none	
Vanadium					#DIV/0!	none	
Zinc					#DIV/0!	none	

Laboratory Narrative: No further issues noted.

Date: *10/28/12*
Data Reviewer: *Susan D. Chapnick*

QC & DV Action Criteria for Davis Superfund Site Metals [based on Davis QAPP 2012 & EPA Region I DV guidance]:

Pres./HT:	HT exceedance: J detects; Non-detects: R or UJ based on professional judgment. pH >2 use professional judgment to J detects; UJ non-detects.
Blanks:	Method Blanks and instrument blanks: Metals < RL unless all sample results are > 10 blank level. Detected results < matrix-matched blank level report as "U" (non-detected at level found). Equipment Blank: EB > RL for any metals; qualify associated detected results < 5x EB level as "EB" - potential high bias based on EB contamination.
Tune:	Mass calibration (amu) > QC limit: J/UJ. Mass resolution/peak width (amu) > QC limit: J/UJ. %RSD > QC limit: J/UJ. See EPA SW-846 Method 6020A for Tune criteria. Tune not performed: R all associated data.
ICV/CCV:	Recoveries < 90%: J / UJ; recoveries > 110%: J detects; if severe exceedance <75%: R non-detects; > 160%: R detects.
CRI:	Low-level standard at the level of the RL: % recovery <70%: J / UJ; >130%: J detects.
LCS:	Aqueous: %Recoveries < 80%: J / UJ. %Recoveries > 120%: J detects. %Recoveries < 50%, may R non-detects & J detects but use professional judgment to accept results if MS is in-control indicating acceptable accuracy in sample matrix. Solids: SRM control limits are criteria; J/UJ outside these limits; use professional judgment for severe exceedances of control limits.
ICSA/AB:	Recoveries > 120% or < 80%: J / UJ unless extremely low for ICSAB at <50%: R non-detects / J detects.
MS:	%Recoveries < 75%: J / UJ. %Recoveries > 125%: J detects. %Recoveries < 30%, may R non-detects & J detects but use professional judgment if sample concentration > 2x spike level.
MD:	Groundwater/Surface Water: Results >5xRL: RPD >20%: J/UJ associated results in batch. Results < 5xRL: difference > ±RL, J/UJ associated results. Soil/Sed: Results >5xRL: RPD >35%: J/UJ associated results in batch. Results < 5xRL: difference > ±2xRL, J / UJ associated results.
FD:	Groundwater/Surface Water: Results > 5xRL: RPD > 30%: J/UJ FD results only. Results < 5xRL: difference > ±2xRL,, J/UJ FD results only. Soil/Sed: Results >5xRL: RPD > 50%: J/UJ FD results only. Results <5xRL: use professional judgment.
IS:	Recoveries < 70%: J / UJ; recoveries > 130%: J detects; use professional judgment for severe exceedances.
Serial Dil:	Results > 50xRL: % Difference > 15%: J detects. EPA guidance UJ non-detects; however, use professional judgment on whether it is a suppression or enhancement to qualify associated non-detects.

Qualifiers: U = analyte is non-detect at the sample-specific Reporting Limit (RL) (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.

References: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island;* prepared by ESS Group, Inc., March 23, 2012 (Davis QAPP); Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996, including Part IV – Inorganic Data Validation Functional Guidelines, November 2008; Region I T*iered Organic and Inorganic Data Validation Guidelines* , July 1, 1993 draft; & USEPA SW846 Methods 6010C, 6020, & 7470A/7471A.

Date: *10/28/12*
Data Reviewer: *Susan D. Chapnick*

environmental chemistry consultants

DATA VALIDATION REPORT
EPA Region I Tier II-Type for VOCs, TCL SVOCs, TCL Pesticides, TCL PCBs, & TAL Metals

Client: ESS Group, Inc., East Providence, Rhode Island

Site: Davis Liquid Waste Superfund Site, Smithfield, Rhode Island
Soil Sampling - 2012

Laboratory: TestAmerica Westfield, Westfield, Massachusetts

Lab Project/SDG #: 360-40915-1

Number of Samples: 5 soil samples + 1 Trip Blank for project-specific list of 52 Volatile Organic Compounds (VOCs)
5 soil samples for Target Compound List (TCL) Semivolatile Organic Compounds (SVOCs), TCL Pesticides, TCL Polychlorinated Biphenyls (PCBs), Target Analyte List (TAL) Metals and Percent Solids

Data Reviewers: Nancy C. Rothman, Ph.D., New Environmental Horizons, Inc.
Susan D. Chapnick, M.S., New Environmental Horizons, Inc.

Date: September 20, 2012

EPA Tier II-type Data Validation Review was performed on the data included in this SDG with the following intentions: 1) to determine if the data were generated and reported in accordance with the following documents: *Remedial Design Work Plan and Pre-Design Investigation Plan* (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996 and updates including Part II, III, and IV (Volatile/Semivolatile, Pesticide/PCB, and Inorganic Data Validation Functional Guidelines); EPA *Region I Tiered Organic and Inorganic Data Validation Guidelines*, July 1993, and USEPA SW846 Method 8260C, 8270D, 8081B, 8082A, 6010C, and 7471A 2) to determine if the data met the project data quality objectives for acceptable accuracy, precision, sensitivity; and technical usability; and 3) to update the project database with validated results and appropriate data validation qualifiers.

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The Data Validation Report consists of three parts:

- This Data Validation Report letter summarizing the actions taken;
- The spreadsheet of validated sample results with validation qualifiers based on actions taken; and
- The Data Validation Checklists to document the Tier II-type validations. These Checklists are an integral part of the validation report as they contain comprehensive details of all QC reviewed, the acceptance criteria used, professional judgment and actions taken.

I. Sample Descriptions and Analytical Parameters

The sample IDs, date of sampling, matrix, and sample type (e.g. Field Sample, Field Duplicate, etc., as applicable) and the analytical parameters reviewed are listed below in Table 1.

Table 1. Sample Descriptions and Analytical Parameters

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-FS-PC-14-10.0-12.0	6/4/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-20-18.0-18.5	6/4/12	Soil	VOCs	Field Sample
SB-FS-PC-20-14.0-16.0	6/4/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-20-15.5-16.0	6/4/12	Soil	VOCs	Field Sample
SB-FS-PC-20-25.0-25.5	6/4/12	Soil	VOCs	Field Sample
SB-FS-PC-20-24.0-25.5	6/4/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-13-10.0-10.5	6/4/12	Soil	VOCs	Field Sample
SB-FS-PC-13-10.0-12.0	6/4/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-9-14.0-16.0	6/5/12	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-9-15.5-16.0	6/5/12	Soil	VOCs	Field Sample
TB-060512-1	6/5/12	Water	VOCs	Trip Blank

Analytical method references:

Volatiles:	52 project-specific VOCs by USEPA SW846 Method 8260C that includes the TCL plus diethyl ether and tetrahydrofuran. and minus 1,4-dioxane (not required for soils).
Semivolatiles:	TCL SVOCs by USEPA SW846 Method 8270D
Pesticides:	TCL Pesticides by USEPA SW846 Method 8081B
PCBs:	TCL PCB Aroclors by USEPA SW846 Method 8082A
Metals:	TAL Metals by USEPA SW846 Method 6010C (ICP-AES), which includes 22 Metals, plus Mercury by USEPA SW846 Method 7471A Cold Vapor Atomic Absorption (CVAA)

Percent Moisture / Percent Solids were performed and reported for all samples to convert results to dry-weight units.

II. Quality Control Reviewed during Data Validation

The following QC elements, as applicable to the analytical methods, were reviewed during the Tier II-type validation of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals:

- Data package completeness and reporting protocols
- Sample receipt, holding times and preservation criteria
- Blank results including Method Blanks, Equipment Blanks, & Trip blanks
- Laboratory Control Sample (LCS) recoveries / LCS Duplicate Recoveries
- Standard Reference Material (SRM) Recoveries, if applicable
- Surrogate Recoveries
- Matrix Spike (MS) / Matrix Spike Duplicate (MSD) Recoveries
- MS/MSD, LCS/LCSD, and sample/Field Duplicate (FD) Relative Percent Differences (RPDs)
- Sample result reporting (including compound lists, reporting limits, and units)
- Calibration criteria (including tune criteria, initial calibration and continuing calibration verification)
- Internal Standard (IS) Recoveries
- Retention Time windows
- Other method-specific QC if applicable and reported in Summary QC
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

III. Data Validation Report Summary

During the Tier II-type data validation review of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals, no data were rejected. Several results were negated (U) or estimated (J or UJ) due to QC issues. Table 2 summarizes the actions taken during this data validation review. NEH generated a validated data spreadsheet based on the electronic project database file (EDD) received from ESS for this SDG. All results were considered usable for project decisions compared to the Davis RDWP QAPP requirements with the understanding of the potential uncertainty (bias) in the qualified results presented in Table 2.

The remainder of this report documents "exceptions" to method or QAPP criteria or clarifications of data reported. QC elements not discussed below met all QAPP criteria. The full documentation of all QC elements reviewed during the Tier II-type validations are presented in the attached Data Validation Checklists. Data users should also reference the full Tier III-type data validation performed on soil samples included in SDG 360-40815-1 for additional information on general reporting issues and calculation verification from review of raw data (which is not performed in a Tier II-type validation).

Exceptions from Davis QAPP or Method QC Criteria

- The method blanks for VOCs reported detected results below the Reporting Limit (RL) for methylene chloride. A comparison of the level in the blanks with the levels reported for this compound in the associated samples resulted in the following blank actions:
  - Methylene chloride was negated (U) in four VOC samples, as shown in Table 2, and the results raised to the sample specific RL.
- Exceedances of Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) recoveries or RPD were as follows:
  - <u>VOCs</u> – 2-Butanone, 2-hexanone, and acetone showed recoveries outside of criteria. Actions taken to estimate (UJ) affected sample results due to VOC LCS/LCSD exceedances are listed in Table 2.
- No site sample in this SDG was identified for Matrix Spike (MS), Matrix Spike Duplicate (MSD), or Matrix Duplicate (MD) analyses for VOCs, SVOCs, Pesticides, PCBs, or Metals; therefore, MS/MSD/MD analyses were not performed.
- A Field Duplicate (FD) pair was not included in this SDG.
- Various initial and continuing calibrations reported results that were outside of criteria for VOCs and SVOCs. Actions to estimate (UJ) results and the potential bias are listed in Table 2.
- For PCBs, samples SB-FS-PC-14-10.0-12.0, SB-FS-PC-13-10.0-12.0, and SB-FS-PC-9-14.0-16.0 show complex mixtures in the chromatograms; however, none were matched to a specific Aroclor pattern.

Sensitivity & Reporting

- The laboratory flagged all results for VOCs and SVOCs that were less than the RL (supported by the low-level standard in the calibration curve) as "J". The "J" qualifier was maintained during validation to indicate that these results were estimated due to uncertainty in quantitation below the calibration range. Affected samples/analytes are listed in Table 2.
- All non-detects for VOCs, SVOCs, and PCBs were below the Project Action Limit (PAL) given in QAPP Tables 4-1C, 4-2C and 4-4B for soils except for 1,2-dibromo-3-chloropropane and ethylene dibromide, as expected, due to method limitations. Therefore, sensitivity data quality objectives (DQOs) were met for these analyses.
- The laboratory reported results for all 21 target Pesticides required, except technical-chlordane was reported instead of alpha-chlordane. The technical-chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. All RLs for Pesticides were less than or equal to the PALs given in QAPP Table 4-3B and therefore met sensitivity requirements with the exception of toxaphene (due to raising the RL during validation). No PAL was defined for technical-chlordane in the site QAPP. The data user will need to evaluate usability of the non-detected toxaphene results with elevated RLs for project uses.
- All non-detects for Metals were below the PALs given in QAPP Table 4-5C for soil. Therefore, sensitivity DQOs were met for Metals.

- Data users are cautioned that the detected Metals results for selenium reported from ICP-AES Method 6010C may be false positives based on professional judgment knowledge of positive interference for selenium on ICP-AES in some matrices. Since the reported selenium results were orders-of-magnitude below the PAL and since all QC criteria were met, no action was taken other than to note this issue.

Table 2. Summary of Data Validation Actions

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
All Pesticide soil samples	Chlordane (technical) Toxaphene	U		Raised RL
All VOC soil samples	Tetrahydrofuran	UJ	L	Initial Calibration outside criteria + Low Calibration verification
All VOC soil samples	2-Butanone (MEK) 2-Hexanone Acetone	UJ	L	Low LCS/LCSD recoveries
SB-FS-PC-13-10.0-10.5 SB-FS-PC-20-15.5-16.0 SB-FS-PC-20-18.0-18.5 SB-FS-PC-20-25.0-25.5	Methylene Chloride	U		Negated due to Blank Action
SB-FS-PC-13-10.0-10.5	1,3-Dichlorobenzene o-Xylene Xylenes, Total	J	I	Result uncertain below the calibration range
SB-FS-PC-20-15.5-16.0	Chloroethane Ethylbenzene	J	I	Result uncertain below the calibration range
SB-FS-PC-20-18.0-18.5	1,1-Dichloroethane Vinyl chloride	J	I	Result uncertain below the calibration range
SB-FS-PC-20-25.0-25.5	trans-1,2-Dichloroethene	J	I	Result uncertain below the calibration range
SB-FS-PC-13-10.0-12.0 SB-FS-PC-9-14.0-16.0	2,4-Dinitrophenol 4,6-Dinitro-2-methylphenol	UJ	I	Initial Calibration outside criteria
SB-FS-PC-14-10.0-12.0 SB-FS-PC-20-14.0-16.0 SB-FS-PC-20-24.0-25.5	2,4-Dinitrophenol 4,6-Dinitro-2-methylphenol	UJ	I	Initial Calibration outside criteria + Low Calibration verification
SB-FS-PC-13-10.0-12.0 SB-FS-PC-14-10.0-12.0	Benzaldehyde	J	I	Result uncertain below the calibration range
SB-FS-PC-9-14.0-16.0	1,2,4,5-Tetrachlorobenzene	J	I	Result uncertain below the calibration range

Qualifiers: U = Analyte is non-detect at the "LIMIT2" value in the EDD, which is the sample-specific reporting limit (RL); UJ = Non-detect is estimated; J = Result is estimated; R = Result is rejected and is unusable for project decisions.

Bias: L = Low; H = High; I = Indeterminate

Acronyms used in Table 2:
LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample Duplicate
RL = Reporting Limit

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Volatile Tier II-type Data Review Checklist

Lab Project: 360-40915-1

Lab: TestAmerica Westfield
Date Sampled: 6/4/12 & 6/5/12
Method of Analysis: 8260C - EI only (no SIM)

No. Samples: 5
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 70-130%	LCS/LCSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	MS/MSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√		NA	NA		√		NA	
No			Estimate (UJ) 3 results in all samples			Estimate (UJ) 1 result in all samples		Accept 8 "J" results		Negate (U) 4 results due to Blank Action

% solids OK? Y
Other Issues: No

Comments:

Method 8260C used for reporting of project-specific list of VOCs. TB sample results were reviewed for potential blank actions (see below); however, full data review of this field QC sample was not performed as these results are not directly used for project decisions.

Samples were received intact at TestAmerica on 6/5/12, the day after collection at 4±2°C - there were no COC issues noted by the lab. Samples were properly preserved.

Samples were all analyzed by 6/18/12 - HT met for all samples, No Action required.

Surrogates : All 3 VOC surrogates were recovered within 70-130% in all samples and QC - no Action required

LCS/LCSD: LCS 360-91928/1-A & 2-A. Lab spiked all 53 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable except: 2-butanone, 2-hexanone, and acetone (LCS/LCSD rec. low).

***ACTION: Estimate (UJ) 2-butanone, 2-hexanone, and acetone in all soil samples due to low LCS/LCSD sensitivity.*

Date: ***9/18/12***

Data Reviewer: ***Deborah A. Loring***

New Environmental Horizons, Inc.

Lab: TestAmerica Westfield

Lab Project: 360-40915-1

Blank Action: Blanks Reviewed: MB: Water - MB 360-91642/6 Soil - MB 360-91928/3-A
TB: TB060512-1

Blank ID	Contaminant / Level	Matrix Related?	Action Level / Action	Sample and Reported Result		Corrected Result
MB 360-91928/3-A	methylene chloride 5.14 J µg/kg	Y	51.4 µg/kg	SB-FS-PC-13-10.0-10.5	4.0 JB	10
				SB-FS-PC-20-15.5-16.0	2.9 JB	9.6
				SB-FS-PC-20-18.0-18.5	3.0 JB	11
				SB-FS-PC-20-25.0-25.5	2.9 JB	10
MB 360-91642/6	None			No Blank Action required		
TB-060512-1	None			No Blank Action required		

MS/MSD: No MS/MSD analyses were run with this SDG.

FD pair: There was no field duplicate pair submitted with this SDG.

Tunes: Instrument HP#3 GC/MS. 6/12/12 11:06, 6/14/12 14:14. All tune abundances were acceptable and all samples and standards were analyzed within 12 hours of BFB tune.

ICAL : HP#3 6/12/12 5-7 level ICAL for all Targets + several non-target compounds. All calibrations met QAPP criteria for Target Compounds (ICAL from 0.5, 1 or 5 up to 160 µg/L. %RSD $\leq$ 20% or r2 $\geq$ 0.99 and all RRFs $\geq$ 0.05 except tetrahydrofuran RRF < 0.05.

***ACTION: Estimate (UJ) tetrahydrofuran with low bias in all samples due to low sensitivity in initial calibration.*

CCAL: HP#3 06/14/2012 14:37 %D (or %Drift) $\leq \pm$ 20% for all target compounds and RRF $\geq$ 0.05 except Tetrahydrofuran RRF < 0.05.

***ACTION: Estimate (UJ) tetrahydrofuran with low bias in all samples due to low calibration verification.*

IS: All 4 IS Areas and RTs were in criteria - No Action required.

Date: ***9/18/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40915-1

Additional Notes:

Lab reported results for m- Xylene & p-Xylene (reported as a single entry due to coelution) and o-Xylene in addition to Xylenes, total, as requested in the QAPP. All 53 project-specific VOCs were reported so with the added Xylenes, a total of 55 VOC results reported per sample. Note that bromodichloromethane, as listed in Table 4-1C, is called dichlorobromomethane in EDD and data and Dibromochloromethane, as listed in Table 4-1C, is called chlorodibromomethane in EDD and data.

8 results were reported at levels < RL and were flagged "J" by the lab (not including the 4 results negated due to blank action). These 8 "J" results were accepted for reporting with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

All RLs were at or below the PQLs and PALs required in the QAPP Table 4-1C for all samples except 1,2-dibromo-3-chloropropane and ethylene dibromide, as expected, due to method limitations.

Narrative did not raise any issues not already addressed.

Date: ***9/18/12***

Data Reviewer: ***Deborah A. Loring***

8260C and Project Action Summary:

Preservation:	Waters - headspace present or received at > 10°C, J det / J NDs or R ND Soils/Sediment - EnCore extrusion and sample preservation unacceptable or received at > 10°C, J det / J NDs or R ND Waters - pH < 2; 14d <HT≤ 28d; J det/ J NDs; HT >28d, J det/R ND Soils/Sediment - 14d <HT< 28d; J det/ J NDs; HT >28d, J det/R ND
Surrogates:	Surr. %Rec > 130%, J det/Accept ND; 10% ≤ %Rec < 70%, J det/J NDs;
LCS	%Rec<10%, J det/ R NDs; 10% <%Rec<70, J det/ J NDs; %Rec >130, J det/Accept NDs. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. LCS must contain all targets.
Tunes:	Samples analyzed within 12-hrs and criteria met per Method 8260C. If out, use professional judgment.
ICAL:	minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs. If avg. RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
CCAL:	%D (or %Drift) > - 20% , J det/J ND; %D (or %Drift) > +20%, J det/Accept ND. If RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
Blanks:	Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for acetone, 2-butanone, and methylene chloride which are 10 x value in blank.
MS/MSD:	%Rec<10%, J det/ R NDs; 10% <%Rec<70%, J det/ J NDs; %Rec >130%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. MS/MSD must contain all targets.
FD:	Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data
IS:	20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs
QLs:	Verify RLs met RLs and PALs given in QAPP; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.
TICs:	Not required
% solids:	If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs
Narrative:	If there are any issues raised in narrative not previously addressed, take appropriate action
Reference:	*Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8260C

Date: ***9/18/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Semivolatile Tier II-type Data Review Checklist

Lab Project: 360-40915

Lab: TestAmerica Westfield
Date Sampled: 6/4/12 & 6/5/12
Method of Analysis: 8270D

No. Samples: 5
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates w: 30-130%BN 15-110% Acid s: 30-130%	LCS 40-140%BN 30-130%Acid	MS/MSD 40-140%BN 30-130%Acid w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√	√	NA	NA		√		NA	-
No						Estimate (UJ) 2 results in all samples		Accept 3 "J" results		

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 6/5/12, the day after and of sample collection, at 4±2°C - there were no COC issues noted by the lab.

All samples were extracted on 6/11/12 and analyzed by 6/15/12. Holding times met - no action required.

Surrogates : All 3BN and 3 Acid Surrogates were recovered within QAPP Criteria in all field and QC samples. No action required.

LCS/LCSD : LCS 360-91774/2-A & 3-A. Lab spiked all 67 target analytes requested in LCS. All spiked target compounds reported acceptable %Rec and LCS/LCSD RPD except carbazole and di-n-butylphthalate (LCS/LCSD rec. high). Carbazole and di-n-butylphthalate were not detected in associated samples so qualification of data was not necessary for these compounds.

MS/MSD: MS/MSD analyses were not performed in this SDG.

FD pair: An FD was not submitted with this SDG.

Date: ***9/18/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40915

Blank Action:

Blanks Reviewed: MB: MB 360-91774/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91774/1-A	di-n-Butylphthalate 158 J µg/kg	Y		1580 µg/kg		All associated samples were ND - No Action required	

Tunes: Instrument B 6/11/12, 6/14/12, 6/15/12. All abundances were acceptable and all samples were analyzed within 12 hours of tune - No Action required

ICAL : 6/11/12 Inst. B, 8- to 10- level ICAL performed from 0.2 to 25 µg/mL (for full 10-level) for all Targets + several non-target compounds. Form VI flagged several results as not meeting minimum RRF criteria; however, lab used CLP criteria and not QAPP criteria. %RSD $\leq$ 20% or r2 $\geq$ 0.99 for all and all RRFs $\geq$ 0.05 except: 2,4-dinitrophenol % RSD = 46.0% and 4,6-dinitro-2-methylphenol %RSD = 39.0%.

**ACTION: 2,4-Dinitrophenol and 4,6-dinitro-2-methylphenol estimated (UJ) with indeterminate bias in all samples due to high RSD.*

CCALs: Inst. B 06/14/2012 13:19 %D or %Drift $\leq \pm$ 20% and RRF $\geq$ 0.05 for all target compounds except: n-nitroso-di-n-propylamine (+21.9%), 4-chloroaniline (+25.0%), 3-nitroaniline (+32.5%), 2,4-dinitrophenol (-23.1%), 4,6-dinitro-2-methylphenol (-23.1%) and hexachlorocyclopentadiene (+20.9%). No action required for compounds with increased sensitivity as these compounds were non-detect in the associated samples.

***ACTION: Estimate (UJ) 2,4-dinitrophenol and 4,6-dinitro-2-methylphenol in samples SB-FS-PC-14-10.0-12.0, SB-FS-PC-20-14.0-16.0, and SB-FS-PC-20-24.0-25.5 (-1, -3 & -6 - bias indeterminate due to ICAL RSD).*

CCALs: Inst. B 06/15/2012 13:05 %D or %Drift $\leq \pm$ 20% and RRF $\geq$ 0.05 for all target compounds except: 4-chloroaniline (+29.0%), Hexachlorocyclopentadiene (+30.9%), 3-nitroaniline (+77.9%), 4-Nitrophenol (+22.4%), 4-Nitroaniline (+42.3%) and Carbazole (+77.5%). No action required for increased sensitivity as these analytes are not detected in the associated samples.

IS: All 6 IS Areas and RTs were in criteria for all analyses.

Lab reported results for all 67 target SVOCs required. The lab reported 3&4-methylphenol rather than 4-methylphenol as the two co-elute. All RLs reported were less than or equal to the PQLs given in QAPP Table 4-2C except di-n-butylphthalate and bis-2-ethylhexylphthalate in all samples.

Date: ***9/18/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40915

Additional Notes:

3 results were reported at levels < RL and were flagged "J" by the lab. These 3 results were accepted for reporting with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

All non-detects were reported at levels below the PALs given in Table 4-2C for all samples.

Narrative did not raise any issues not already addressed.

Date: ***9/18/12***

Data Reviewer: ***Deborah A. Loring***

8270D and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: waters: BN 30 - 130%, acids 15-110%; solids: all surrogates 30-130%
2 BN or 2 Acids Recovery > Criteria, J det/Accept ND; 10% ≤ 2 or more surrogates < Criteria, J det/J NDs;
Recovery < 10%, J det/R NDs. Action taken on Acid and/or BN analytes based on Surrogates out.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs.

Tunes: Samples analyzed within 12-hrs and criteria met per Table 3 or Method 8270C. If out, use professional judgment.

ICAL: minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs; min. RRF < 0.05, J det/UJ NDs.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank

Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for phthalates which are 10 x value in blank.

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs- Unspiked Sample only. RPD > Limit, J det/UJ NDs.
MS/MSD must contain all targets.

FD: Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data

IS: 20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs

QLs: Verify RLs met QAPP QLs ; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

TICs: Not required

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8270D

Date: ***9/18/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
PCB Tier II-type Data Review Checklist

Lab Project # 360-40915

Lab: TestAmerica Westfield
Date Sampled: 6/4/12 & 6/5/12
Method of Analysis: 8082A

No. Samples: 5
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 40-140% RPD ≤ 30%	FD w:RPD≤30% s:RPD≤50%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)	Other (pattern match, etc.)
Yes	√	√	√	NA	NA	√	√	√	----
No									

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 6/5/12, the day of and after collection at 4±2°C - there were no COC issues noted by the lab.

Samples were extracted on 6/8/12 - HT met for extraction. All extracts were analyzed by 6/11/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - No Action required. Note, lab used in-house criteria for recovery of surrogates; QAPP criteria used to determine data acceptance.

LCS/LCSD: LCS 360-91700/2-A & 3-A Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec for AR1016 & AR1260 in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD: MS/MSD analyses were not performed in this SDG.

Date: ***9/19/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40915

Blank Action: Blanks Reviewed: MB: MB 360-91700/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91700/1-A	None					No Blank Action required	

Additional Notes:

FD pair: An FD was not submitted with this SDG.

ICAL: Instrument M 4/13/12 6-level calibration from 50 to 2000 µg/L for Ar 1016/1260 and a single point calibration at 1000 µg/L for Ar-1221/1254, Ar-1232, Ar-1242, Ar-1248, Ar-1262, Ar-1268. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), linear regression performed for Ar-1016 & 1260 on both columns, and r2 > 0.99. Valid ICAL - no action required.

CCALs : CCV 360-91735/17 on 06/11/2012 15:36 (Opening CCV): All %D ≤ ± 20% on both GC columns for all Aroclor peaks except Ar-1016-4 (-25.9%), Ar-1016-5 (-33.2%), Average (-21.5%) and Ar-1260-1 (-29.7%), Ar-1260-2 (-21.5%), Ar-1260-3 (-25.5%), Ar-1260-4 (-29.5%), Ar-1260-5 (-31.7%) Average (-27.6%) on GC Column 1; OK on GC Column 2. CCV 360-91735/37 on 006/12/2012 00:28: All %D < ± 20% on both GC columns for all Aroclor peaks except Ar-1016-4 (-24.9%), Ar-1016-5 (-35.7%) Average OK, Ar-1260-1 (-28.8%), Ar-1260-2 (-23.7%), Ar-1260-3 (26.1%), Ar-1260-4 (-26.8%), Ar-1260-5 (-27.9%) Average (-26.7%) , and Ar-1016-5 (-40.0%) Average OK, Ar-1260-2 (-29.1%) Average OK on GC Column 2. No action required.

Lab reported the lowest of the two column values. Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. No PCBs reported in samples - no action required.

All RLs reported except SB-FS-PC-14-10.0-12.0 were slightly above the PQLs given in QAPP Table 4-C (RLs 110 µg/kg vs. 100 µg/kg), due to % solids.

All RLs reported were less than or equal to the PALs given in QAPP Table 4-C.

All chromatograms for all samples visually inspected and appear to have been reported correctly. Samples SB-FS-PC-14-10.0-12.0, SB-FS-PC-13-10.0-12.0, and SB-FS-PC-9-14.0-16.0 show complex mixtures, however, none were matched to a specific Aroclor pattern.

Date: ***9/19/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40915

Additional Notes:

Narrative did not raise any issues not already addressed.

Date: *9/19/12*

Data Reviewer: *Deborah A. Loring*

8082A and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs- Unspiked Sample only. RPD > 30% solids, J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multi-components), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multi-components) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8082A

Date: ***9/19/12***
Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Pesticide Tier II-type Data Review Checklist

Lab Project # 360-40915

Lab: TestAmerica Westfield
Date Sampled: 6/4/12 & 6/5/12
Method of Analysis: 8081B

No. Samples: 5
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 30-150% w: RPD≤20% sr:RPD≤30%	FD w:RPD≤30% s:RPD≤50%	RCM (Resolve. > 60%)	PEMs Brkdwn< 15% %D ≤ ± 15%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)
Yes	√	√	√	NA	NA	√	√	√	√	√
No										

% solids OK? Y
Other Issues: No Technical chlordane was reported instead of alpha-chlordane. Low-level initial calibration for Toxaphene and Technical chlordane did not support the lab-reported RL - action taken to raise RL for Toxaphene and Technical chlordane (see page 2).

Comments:

Samples were received intact at TestAmerica on 6/5/12, the day after and of collection, at 4±2°C - there were no COC issues noted by the lab.

Samples were extracted on 6/8/12 and analyzed by 6/13/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - No Action required. Note, lab used in-house criteria for recovery of surrogates; QAPP criteria used to determine data acceptance.

LCS/LCSD: LCS 360-91700/4-A & 5-A. Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD : MS/MSD analyses were not performed in this SDG.

FD pair: An FD was not submitted with this SDG.

Resolution Check : RCM not analyzed per se; however, CCALs reviewed and all peaks appear to be adequately resolved - No Action required

Date: ***9/19/12***
Data Reviewer: ***Deborah A. Loring***

New Environmental Horizons, Inc.

Lab Project # 360-40915

Lab: TestAmerica Westfield

Blank Action: Blanks Reviewed: MB: MB 360-91700/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91700/1-A	None					No Blank Action required	

Additional Notes:

PEM DDT and Endrin Breakdown evaluations: PEM 360-91842/1 06/13/2012 09:26 - %Breakdown for DDT and Endrin ≤ 15% + Combined Breakdown was ≤ 30% on each GC Column. No Action required.

ICAL: Instrument H 6/7/12 7-level from 1 to 100 µg/L for single-component Pesticides (some extras not required for project) + surrogates and 3-level from 500 to 2,500 µg/L for Toxaphene and Technical Chlordane. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), %RSD ≤ 20% or r2 ≥ 0.99 for all compounds. Several compounds used regression analysis for calibration on Columns 1 & 2. Valid ICAL - no action required.

CCALs : CCVRT 360-91842/2 on 06/13/2012 09:47 (Opening CCV for single-components), CCVRT 360-91842/3 on 06/13/2012 10:09 (Technical Chlordane), and CCVRT 360-91842/4 on 06/13/2012 10:30 (Toxaphene) - all %D ≤ ±20% on both GC columns for all Pesticides except Endrin aldehyde (+21.0%) on GC Column 2. CCV 360-91842/24 on 06/13/2012 18:00 all %D ≤ ±20% on both GC columns for all Pesticides except DDD (+28.7%) and Endrin aldehyde (+26.6%) on GC Column 2. A positive %D indicates increased sensitivity to detection during CCAL as compared to sensitivity during ICAL; therefore, since all samples were non-detect for these compounds, no action for enhanced sensitivity in CCVs (i.e. non-detects accurate as reported).

Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. Since Form X used to express LCS results only, since all samples were non-detect for all Pesticides, no action required.

The narrative did not raise any issues not already addressed.

All RLs reported were less than or equal to the PQLs given in QAPP Table 4-3B except dieldrin, aldrin in all samples except sample SB-FS-PC-14-10.0-12.0 and toxaphene in all samples. No PQL was defined for Technical chlordane in the QAPP.

Lab reported results for all 21 target Pesticides required, except technical chlordane was reported instead of alpha-chlordane. The technical chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. The resulting RL was slightly the PAL for Toxaphene in all samples. All other RLs reported were less than or equal to the PALs given in QAPP Table 4-3B. No PAL was defined for Technical chlordane in the site QAPP.

Date: ***9/19/12***
Data Reviewer: ***Deborah A. Loring***

8081B and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

RCM: RCM < 60% resolution, J detects based on technical judgment

PEM: 4,4'-DDT breakdown > 15%, J detected DDT, DDE, DDD; R ND 4,4'-DDT and accept ND DDE & DDD
Endrin breakdown > 15%, J detected Endrin, Endrin Aldehyde & Endrin Ketone; R ND Endrin and accept ND Endrin Aldehyde & Endrin Ketone
4,4'-DDT and Endrin > 30%, accept NDs of breakdown products and J detects for 4,4'-DDT and Endrin; J detects of breakdown products and reject (R) non-detects for 4,4'-DDT and Endrin.
%D> ± 20%, J det/J ND on a per column basis. % Resolution < 90.0% qualify data based on professional judgment.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<30%, J det/ J NDs; %Rec >150%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters (or 30% solids), J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multicomponents), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multicomponents) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8081B

Date: ***9/19/12***
Data Reviewer: ***Deborah A. Loring***

RDWP - Davis Liquid Waste Superfund Site
EPA Region I Tier II-type DV Checklist - Metals

Lab: TestAmerica-Westfield, Westfield, MA
Date Sampled: 6/04/12 & 6/05/12
Analysis: Metals by EPA SW-846 Method 6010C & 7471A

Lab Project # 360-40915-1
No. Samples: 5
Matrix: Soil

QC Met Criteria?		HT and Preserve	RL QAPP PALs	Tune 6020 criteria	Calibration ICV/CCV 90-110%R	CRI RL Check 70-130%R	EB MB < RL	LCS/LCSD SRM limits RPD ≤ 30%	ICSA/AB 80-120% R	MS / MSD 75-125% R	MD RPD ≤ 20%	FD RPD ≤ 30%	IS 6020 70-130% R	Serial Dilution ± 15% D
Yes		√	√	NA	√	√	√	√	√	NA	NA	NA	NA	NA
No														

Soils for Target Analyte List (TAL) of 23 Metals: Mercury by CVAA SW846 Method 7471A; and Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, & Zinc by ICP-AES Method 6010C.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data for Tier II level in accordance with the Davis QAPP (ESS 2012) & EPA Region 1 present in the data package? ***Yes.***

2. Were all result forms for all samples listed on the chain-of-custody present in data package? ***Yes***.

Chain-of-Custody (COC): 5 soil samples received for Total TAL Metals - received at lab on 6/05/12 and intact. Documentation acceptable.

Preservation: Samples received at 2.8°C on ice. Acceptable preservation for soils.

Holding Time (HT): ICP-AES 6010C analysis 6/06/12; CVAA 7471A analysis 6/13/12 & 6/18/12. Acceptable HT.

Calibration Criteria: ICV/CCV and CRI (RL check standard supporting the level of the RL reported) met acceptance criteria for all Metals. Note CRI not required by Davis QAPP but reviewed as additional support of the lab RLs (criteria set at 70-130%). Tune criteria not applicable for Method 6010C. ICSA/AB met recovery criteria for all ICP metals.

Date: *9/20/12*
Data Reviewer: *Susan D. Chapnick*

New Environmental Horizons, Inc.

Lab: TestAmerica Lab Project #: 360-40915-1

Blanks: No EB included with samples in this SDG. Method blank (MB) & instrument blanks (ICB/CCB) were non-detected for all metals; therefore, no blank actions were required.

LCS/LCSD: Lab performed both LCS and LCS duplicate (LCSD), though LCSD not required in Davis QAPP. LCS/LCSD met acceptance criteria for all Metals for accuracy (based on soil SRM control limits listed by lab on Form 7, consistent with QAPP criteria for this media) and precision (RPD <30% lab criteria).

MS/MD: No site-sample MS/MD was identified to be performed in this SDG.

Serial Dilution: No serial dilution on a site sample was performed in this SDG.

IS: IS not applicable for Method 6010C.

Sensitivity: All RLs for non-detects met Davis QAPP Table 4-5C for Soil requirements for sensitivity (RL) based on being lower than the PALs (even though some, for example antimony, were > PQLs they were still lower than the PALs). Sample SB-FS-PC-20-24.0-25.5 (360-40915-6) was analyzed at a 2x dilution during analysis (sample had high levels of aluminum and iron) but all non-detects were still < PALs. Therefore, sensitivity met project DQOs.

Professional Judgment - Other: Data users are cautioned that the detected Metals results for selenium reported from ICP-AES Method 6010C (ranges from 1.1 mg/Kg to 3.1 mg/Kg) may be false positives based on professional judgment knowledge of positive interference for selenium on ICP-AES in some matrices. Since the reported selenium results were orders-of-magnitude below the PAL and since all QC criteria were met, no action was taken other than to note this issue.

Date: *9/20/12*
Data Reviewer: *Susan D. Chapnick*

Lab: TestAmerica Lab Project #: 360-40915-1

FD pair samples: No FD was collected with this set of samples.

FD Precision:

Analyte	Sample	Qual	FD	Qual	Precision RPD* %	Action	Comment
Aluminum					#DIV/0!	none	
Antimony					#DIV/0!	none	
Arsenic					#DIV/0!	none	
Barium					#DIV/0!	none	
Beryllium					#DIV/0!	none	
Cadmium					#DIV/0!	none	
Calcium					#DIV/0!	none	
Chromium					#DIV/0!	none	
Cobalt					#DIV/0!	none	
Copper					#DIV/0!	none	
Iron					#DIV/0!	none	
Lead					#DIV/0!	none	
Magnesium					#DIV/0!	none	
Manganese					#DIV/0!	none	
Mercury					#DIV/0!	none	
Nickel					#DIV/0!	none	
Potassium					#DIV/0!	none	
Selenium					#DIV/0!	none	
Silver					#DIV/0!	none	
Sodium					#DIV/0!	none	
Thallium					#DIV/0!	none	
Vanadium					#DIV/0!	none	
Zinc					#DIV/0!	none	

Laboratory Narrative: No further issues noted.

Date: *9/20/12*
Data Reviewer: *Susan D. Chapnick*

QC & DV Action Criteria for Davis Superfund Site Metals [based on Davis QAPP 2012 & EPA Region I DV guidance]:

Pres./HT:	HT exceedance: J detects; Non-detects: R or UJ based on professional judgment. pH >2 use professional judgment to J detects; UJ non-detects.
Blanks:	Method Blanks and instrument blanks: Metals < RL unless all sample results are > 10 blank level. Detected results < matrix-matched blank level report as "U" (non-detected at level found). Equipment Blank: EB > RL for any metals; qualify associated detected results < 5x EB level as "EB" - potential high bias based on EB contamination.
Tune:	Mass calibration (amu) > QC limit: J/UJ. Mass resolution/peak width (amu) > QC limit: J/UJ. %RSD > QC limit: J/UJ. See EPA SW-846 Method 6020A for Tune criteria. Tune not performed: R all associated data.
ICV/CCV:	Recoveries < 90%: J / UJ; recoveries > 110%: J detects; if severe exceedance <75%: R non-detects; > 160%: R detects.
CRI:	Low-level standard at the level of the RL: % recovery <70%: J / UJ; >130%: J detects.
LCS:	Aqueous: %Recoveries < 80%: J / UJ. %Recoveries > 120%: J detects. %Recoveries < 50%, may R non-detects & J detects but use professional judgment to accept results if MS is in-control indicating acceptable accuracy in sample matrix. Solids: SRM control limits are criteria; J/UJ outside these limits; use professional judgment for severe exceedances of control limits.
ICSA/AB:	Recoveries > 120% or < 80%: J / UJ unless extremely low for ICSAB at <50%: R non-detects / J detects.
MS:	%Recoveries < 75%: J / UJ. %Recoveries > 125%: J detects. %Recoveries < 30%, may R non-detects & J detects but use professional judgment if sample concentration > 2x spike level.
MD:	Groundwater/Surface Water: Results >5xRL: RPD >20%: J/UJ associated results in batch. Results < 5xRL: difference > ±RL, J/UJ associated results. Soil/Sed: Results >5xRL: RPD >35%: J/UJ associated results in batch. Results < 5xRL: difference > ±2xRL, J / UJ associated results.
FD:	Groundwater/Surface Water: Results > 5xRL: RPD > 30%: J/UJ FD results only. Results < 5xRL: difference > ±2xRL,, J/UJ FD results only. Soil/Sed: Results >5xRL: RPD > 50%: J/UJ FD results only. Results <5xRL: use professional judgment.
IS:	Recoveries < 70%: J / UJ; recoveries > 130%: J detects; use professional judgment for severe exceedances.
Serial Dil:	Results > 50xRL: % Difference > 15%: J detects. EPA guidance UJ non-detects; however, use professional judgment on whether it is a suppression or enhancement to qualify associated non-detects.

Qualifiers: U = analyte is non-detect at the sample-specific Reporting Limit (RL) (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.

References: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island;* prepared by ESS Group, Inc., March 23, 2012 (Davis QAPP); Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996, including Part IV – Inorganic Data Validation Functional Guidelines, November 2008; Region I T*iered Organic and Inorganic Data Validation Guidelines* , July 1, 1993 draft; & USEPA SW846 Methods 6010C, 6020, & 7470A/7471A.

Date: *9/20/12*
Data Reviewer: *Susan D. Chapnick*

environmental chemistry consultants

DATA VALIDATION REPORT
EPA Region I Tier II-Type for VOCs, TCL SVOCs, TCL Pesticides, TCL PCBs, & TAL Metals

Client: ESS Group, Inc., East Providence, Rhode Island

Site: Davis Liquid Waste Superfund Site, Smithfield, Rhode Island
Soil Sampling - 2012

Laboratory: TestAmerica Westfield, Westfield, Massachusetts

Lab Project/SDG #: 360-40941-1

Number of Samples: 9 soil samples + 1 Trip Blank + 1 Field Duplicate (FD) for project-specific list of 52 Volatile Organic Compounds (VOCs)
4 soil samples for Target Compound List (TCL) Semivolatile Organic Compounds (SVOCs), TCL Pesticides, TCL Polychlorinated Biphenyls (PCBs), Target Analyte List (TAL) Metals and Percent Solids

Data Reviewers: Nancy C. Rothman, Ph.D., New Environmental Horizons, Inc.
Susan D. Chapnick, M.S., New Environmental Horizons, Inc.

Date: September 27, 2012

EPA Tier II-type Data Validation Review was performed on the data included in this SDG with the following intentions: 1) to determine if the data were generated and reported in accordance with the following documents: *Remedial Design Work Plan and Pre-Design Investigation Plan* (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996 and updates including Part II, III, and IV (Volatile/Semivolatile, Pesticide/PCB, and Inorganic Data Validation Functional Guidelines); EPA *Region I Tiered Organic and Inorganic Data Validation Guidelines*, July 1993, and USEPA SW846 Method 8260C, 8270D, 8081B, 8082A, 6010C, and 7471A 2) to determine if the data met the project data quality objectives for acceptable accuracy, precision, sensitivity; and technical usability; and 3) to update the project database with validated results and appropriate data validation qualifiers.

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The Data Validation Report consists of three parts:

- This Data Validation Report letter summarizing the actions taken;
- The spreadsheet of validated sample results with validation qualifiers based on actions taken; and
- The Data Validation Checklists to document the Tier II-type validations. These Checklists are an integral part of the validation report as they contain comprehensive details of all QC reviewed, the acceptance criteria used, professional judgment and actions taken.

I. Sample Descriptions and Analytical Parameters

The sample IDs, date of sampling, matrix, and sample type (e.g. Field Sample, Field Duplicate, etc., as applicable) and the analytical parameters reviewed are listed below in Table 1.

Table 1. Sample Descriptions and Analytical Parameters

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-FS-PC-19-21.0-21.5	6/5/2012	Soil	VOCs	Field Sample
SB-FS-PC-19-24.5-25.0	6/5/2012	Soil	VOCs	Field Sample
SB-FS-PC-19-15.5-16.0	6/5/2012	Soil	VOCs	Field Sample [used for VOC MS/MSD]
SB-FS-PC-17-23.5-24.0	6/5/2012	Soil	VOCs	Field Sample
SB-FS-PC-17-19.0-19.5	6/5/2012	Soil	VOCs	Field Sample
SB-FS-PC-17-16.0-16.5	6/5/2012	Soil	VOCs	Field Sample
SB-FS-PC-17-21.0-21.5	6/5/2012	Soil	VOCs	Field Sample
SB-PCB-6	6/5/2012	Soil	VOCs	Field Duplicate of SB-FS-PC-17-21.0-21.5
TB-060612-1	6/5/2012	Water	VOCs	Trip Blank
SB-FS-PC-19-11.0-14.0	6/5/2012	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-17-14.0-17.0	6/5/2012	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample

Table 1. Sample Descriptions and Analytical Parameters

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-FS-PC-17-21.0-24.0	6/5/2012	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-19-23.0-25.0	6/5/2012	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-FS-PC-26-19.5-20.0	6/6/2012	Soil	VOCs	Field Sample
SB-FS-PC-26-10.0-10.5	6/6/2012	Soil	VOCs	Field Sample

Analytical method references:

Volatiles: 52 project-specific VOCs by USEPA SW846 Method 8260C that includes the TCL plus diethyl ether and tetrahydrofuran and minus 1,4-dioxane (not required for soils; note 1,4-dioxane was reported in the TB).

Semivolatiles: TCL SVOCs by USEPA SW846 Method 8270D

Pesticides: TCL Pesticides by USEPA SW846 Method 8081B

PCBs: TCL PCB Aroclors by USEPA SW846 Method 8082A

Metals: TAL Metals by USEPA SW846 Method 6010C (ICP-AES), which includes 22 Metals, plus Mercury by USEPA SW846 Method 7471A Cold Vapor Atomic Absorption (CVAA)

Percent Moisture / Percent Solids were performed and reported for all samples to convert results to dry-weight units.

II. Quality Control Reviewed during Data Validation

The following QC elements, as applicable to the analytical methods, were reviewed during the Tier II-type validation of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals:

- Data package completeness and reporting protocols
- Sample receipt, holding times and preservation criteria
- Blank results including Method Blanks, Equipment Blanks, & Trip blanks
- Laboratory Control Sample (LCS) recoveries / LCS Duplicate Recoveries
- Standard Reference Material (SRM) Recoveries, if applicable
- Surrogate Recoveries
- Matrix Spike (MS) / Matrix Spike Duplicate (MSD) Recoveries
- MS/MSD, LCS/LCSD, and sample/Field Duplicate (FD) Relative Percent Differences (RPDs)
- Sample result reporting (including compound lists, reporting limits, and units)
- Calibration criteria (including tune criteria, initial calibration and continuing calibration verification)

- Internal Standard (IS) Recoveries
- Retention Time windows
- Other method-specific QC if applicable and reported in Summary QC
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

III. Data Validation Report Summary

During the Tier II-type data validation review of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals, no data were rejected. Several results were negated (U) or estimated (J or UJ) due to QC issues. Table 2 summarizes the actions taken during this data validation review. NEH generated a validated data spreadsheet based on the electronic project database file (EDD) received from ESS for this SDG. All results were considered usable for project decisions compared to the Davis RDWP QAPP requirements with the understanding of the potential uncertainty (bias) in the qualified results presented in Table 2.

The remainder of this report documents "exceptions" to method or QAPP criteria or clarifications of data reported. QC elements not discussed below met all QAPP criteria. The full documentation of all QC elements reviewed during the Tier II-type validations are presented in the attached Data Validation Checklists. Data users should also reference the full Tier III-type data validation performed on soil samples included in SDG 360-40815-1 for additional information on general reporting issues and calculation verification from review of raw data (which is not performed in a Tier II-type validation).

Exceptions from Davis QAPP or Method QC Criteria

- The method blank for VOCs reported results above the Reporting Limit (RL) for methylene chloride. A comparison of the level in the blank with the levels reported for this compound in the associated samples resulted in the following actions:
  - Methylene chloride was negated (U) in all VOC samples, as shown in Table 2, and the results raised to the sample-specific RL.
- Exceedances of Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) recoveries or RPD were as follows:
  - <u>VOCs</u> – 2-butanone, 2-hexanone, and acetone showed recoveries outside of criteria. Actions taken to estimate (UJ) affected associated sample results due to VOC LCS/LCSD exceedances are listed in Table 2.
- A Matrix Spike (MS) and Matrix Spike Duplicate (MSD) were performed for VOCs on site sample SB-FS-PC-19-15.5-16.0. Exceedances of the MS/MSD recoveries or RPD are as follows:
  - 2-butanone, acetone, and 2-hexanone showed recoveries outside of criteria. Actions taken to estimate (UJ) affected sample results due to VOC MS/MSD exceedances are listed in Table 2.
- No site sample in this SDG was identified for Matrix Spike (MS), Matrix Spike Duplicate (MSD), or Matrix Duplicate (MD) analyses for SVOCs, Pesticides, PCBs, or Metals; therefore, MS/MSD/MD analyses were not performed for these parameters. Note that lab included in the narrative that mercury exceeded MS/MSD batch QC precision; however, no action was required during validation as the sample used for MS/MSD was not applicable to this SDG.
- There was one Field Duplicate (FD) pair included in this SDG for VOC analysis only: FS-PC-17-21.0-21.5 and SB-PCB-6. The FD results indicate acceptable overall precision and representativeness in the site soil matrix at the FD location for VOCs.

- Various initial and continuing calibrations reported results that were outside of criteria for VOCs and SVOCs. Actions to estimate (UJ) results and the potential bias are listed in Table 2.
- For PCBs, samples SB-FS-PC-19-11.0-14.0 and SB-FS-PC-17-14.0-17.0 show complex mixtures in the chromatogram; however, none were matched to a specific Aroclor pattern.

Sensitivity & Reporting

- The laboratory flagged all results for VOCs that were less than the RL (supported by the low-level standard in the calibration curve) as "J". The "J" qualifier was maintained during validation to indicate that these results were estimated due to uncertainty in quantitation below the calibration range. Affected samples/analytes are listed in Table 2.
- All non-detects for VOCs, SVOCs, and PCBs were below the Project Action Limit (PAL) given in QAPP Tables 4-1C, 4-2C and 4-4B for soils except for 1,2-dibromo-3-chloropropane and ethylene dibromide, as expected, due to method limitations. Therefore, sensitivity data quality objectives (DQOs) were met for these analyses.
- The laboratory reported results for all 21 target Pesticides required, except technical-chlordane was reported instead of alpha-chlordane. The technical-chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. All RLs for Pesticides were less than or equal to the PALs given in QAPP Table 4-3B and therefore met sensitivity requirements with the exception of toxaphene (due to raising the RL during validation). No PAL was defined for technical-chlordane in the site QAPP. The data user will need to evaluate usability of the non-detected toxaphene results with elevated RLs for project uses.
- All non-detects for Metals were below the PALs given in QAPP Table 4-5C for soil. Therefore, sensitivity DQOs were met for Metals.

Table 2. Summary of Data Validation Actions

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
All Pesticide soil samples	Chlordane (technical) Toxaphene	U		Raised RL
All VOC soil samples	Tetrahydrofuran	UJ	L	Initial calibration outside criteria + Low calibration verification
All VOC samples except SB-FS-PC-19-15.5-16.0, SB-FS-PC-26-10.0-10.5 & SB-FS-PC-26-19.5-20.0	2-Butanone (MEK) 2- Hexanone Acetone	UJ	L	Low LCS/LCSD recoveries
SB-FS-PC-19-15.5-16.0	2-Butanone (MEK) 2-Hexanone Acetone	UJ	L	Low LCS/LCSD recoveries + Low MS/MSD recoveries
All VOC soil samples	Methylene Chloride	U		Negated due to Blank Action
SB-FS-PC-17-16.0-16.5	Tetrachloroethene	J	I	Result uncertain below the calibration range

Table 2. Summary of Data Validation Actions - *continued*

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
SB-FS-PC-17-19.0-19.5	m-Xylene & p-Xylene o-Xylene	J	I	Result uncertain below the calibration range
SB-FS-PC-17-23.5-24.0	Ethylbenzene Vinyl chloride	J	I	Result uncertain below the calibration range
SB-FS-PC-19-15.5-16.0	cis-1,2-Dichloroethene	J	I	Result uncertain below the calibration range
SB-FS-PC-19-21.0-21.5	Chloroethane trans-1,2-Dichloroethene	J	I	Result uncertain below the calibration range
SB-FS-PC-26-19.5-20.0	1,1,1-Trichloroethane Ethylbenzene	J	I	Result uncertain below the calibration range
SB-FS-PC-17-14.0-17.0 SB-FS-PC-17-21.0-24.0 SB-FS-PC-19-23.0-25.0	2,4-Dinitrophenol 4,6-Dinitro-2-methylphenol	UJ	I	Initial calibration outside criteria
SB-FS-PC-19-11.0-14.0	2,4-Dinitrophenol	UJ	I	Initial calibration outside criteria + Low Calibration verification
SB-FS-PC-19-11.0-14.0	4,6-Dinitro-2-methylphenol	UJ	I	Initial calibration outside criteria

Qualifiers: U = Analyte is non-detect at the "LIMIT2" value in the EDD, which is the sample-specific reporting limit (RL); UJ = Non-detect is estimated; J = Result is estimated; R = Result is rejected and is unusable for project decisions.

Bias: L = Low; H = High; I = Indeterminate

Acronyms used in Table 2:

LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample Duplicate
MS = Matrix Spike
MSD = Matrix Spike Duplicate
RL = Reporting Limit

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Volatile Tier II-type Data Review Checklist

Lab Project: 360-40941-1

Lab: TestAmerica Westfield
Date Sampled: 6/5/12 & 6/6/12
Method of Analysis: 8260C - EI only (no SIM)

No. Samples: 9 + 1 FD + 1 TB
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 70-130%	LCS/LCSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	MS/MSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√			√		√		NA	
No			Estimate (UJ) 24 results	Estimate (UJ) 3 results in SB-FS-PC-19-15.5-16.0		Estimate (UJ) 10 results		Accept 10 "J" results		Negate (U) 10 results due to Blank Action

% solids OK? Y
Other Issues: No

Comments:

Method 8260C used for reporting of project-specific list of VOCs. TB sample results were reviewed for potential blank actions (see below); however, full data review of this field QC sample was not performed as these results are not directly used for project decisions.

Samples were received intact at TestAmerica on 6/6/12, the day of and after collection at 4±2°C - there were no COC issues noted by the lab. Samples were properly preserved.

Samples were all analyzed by 6/18/12 - HT met for all samples, No Action required.

Surrogates : All 3 VOC surrogates were recovered within 70-130% in all samples and QC - no Action required

LCS/LCSD: LCS 360-91928/1-A & 2-A. Lab spiked all 53 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable except: 2-butanone, 2-hexanone, and acetone (LCS/LCSD rec. low).

***ACTION: Estimate (UJ) 2-butanone, 2-hexanone, and acetone in associated soil samples (Samples SB-FS-PC-17-16.0-16.5, SB-FS-PC-17-19.0-19.5, SB-FS-PC-17-21.0-21.5, SB-FS-PC-17-23.5-24.0, SB-FS-PC-19-15.5-16.0, SB-FS-PC-19-21.0-21.5, SB-FS-PC-19-24.5-25.0 and SB-PCB-6 [-6, -5, -7, -4, -3, -1, -2, and -8]) due to low LCS/LCSD sensitivity.*

Date: ***9/21/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40941-1

Blank Action: Blanks Reviewed: MB: Water - MB 360-91642/6 Soil - MB 360-91928/3-A, MB 360-92022/4-A
TB: TB060612-1

Blank ID	Contaminant / Level	Matrix Related?	Action Level / Action	Sample and Reported Result		Corrected Result
MB 360-91642/6	None Detected	Y		No Blank Action required		
MB 360-91928/3-A	methylene chloride 5.14 J µg/kg	Y	51.4 µg/kg	SB-FS-PC-17-16.0-16.5	4.3 JB	13 U
				SB-FS-PC-17-19.0-19.5	2.4 JB	8 U
				SB-FS-PC-17-21.0-21.5	4.7 JB	13 U
				SB-FS-PC-17-23.5-24.0	3.0 JB	9.6 U
				SB-FS-PC-19-15.5-16.0	1.7 JB	8 U
				SB-FS-PC-19-21.0-21.5	3.9 JB	11 U
				SB-FS-PC-19-24.5-25.0	2.3 JB	9.3 U
				SB-PCB-6	3.0 JB	9.6 U
MB 360-92022/4-A	methylene chloride 9.43 J µg/kg	Y	94.3 µg/kg	SB-FS-PC-26-10.0-10.5	3.5 JB	11 U
				SB-FS-PC-26-19.5-20.0	2.6 JB	10 U
TB-060612-1	None Detected	N		No Blank Action required		

LCS/LCSD: LCS 360-92022/1-A & 2-A. Lab spiked all 53 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable. No action required.

MS/MSD: MS/MSD analyses were on sample SB-FS-PC-19-15.5-16.0. All %recoveries and RPDs were within limits except 2-butanone, 2-hexanone and acetone (MS/MSD rec. low) and toluene (MS/MSD rec. high). No action required for high sensitivity (toluene) as it is not detected in the associated sample.

***ACTION: Estimate (UJ) 2-butanone, 2-hexanone, acetone in sample SB-FS-PC-19-15.5-16.0 due to low MS/MSD recoveries.*

Date: ***9/21/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40941-1

Additional Notes:

FD pair: FS-PC-17-21.0-21.5 / SB-PCB-6. A comparison of detected results shown below.

Field Duplicate Evaluation_ Sample IDs: Sample = FS-PC-17-21.0-21.5 FD = SB-PCB-6

Analyte Name	DF= 1 RL (µg/Kg)	Sample µg/Kg	Q	Sample Result Level	FD µg/Kg	Q	FD Result Level	RPD	Action
1,1,1-Trichloroethane	2.2	3.5		< 2 X RL	3.4		< 2 X RL	3	None
cis-1,2-Dichloroethene	2.2	3.6		< 2 X RL	3.5		< 2 X RL	3	None
Ethylbenzene	2.2	4.9		< 2 X RL	4.9		< 2 X RL	0	None
Vinyl chloride	2.2	7.6		> 2 X RL	8.4		> 2 X RL	10	None

FD: FD precision is considered acceptable for all analytes.

Tunes: Instrument HP#3 GC/MS. 6/12/12 11:06, 6/14/12 14:14, 6/18/12 13:21. All tune abundances were acceptable and all samples and standards were analyzed within 12 hours of BFB tune.

ICAL : HP#3 6/12/12 5-7 level ICAL for all Targets + several non-target compounds. All calibrations met QAPP criteria for Target Compounds (ICAL from 0.5, 1 or 5 up to 160 µg/L. %RSD $\leq$ 20% or r2 $\geq$ 0.99 and all RRFs $\geq$ 0.05 except tetrahydrofuran RRF < 0.05.

***ACTION: Estimate (UJ) tetrahydrofuran with low bias in all samples due to low sensitivity in initial calibration.*

CCAL: HP#3 06/14/2012 14:37 %D (or %Drift) $\leq \pm$ 20% for all target compounds and RRF $\geq$ 0.05 except Tetrahydrofuran RRF < 0.05.

***ACTION: Estimate (UJ) tetrahydrofuran with low bias in all samples due to low calibration verification.*

CCAL: HP#3 06/18/2012 13:44 %D (or %Drift) $\leq \pm$ 20% for all target compounds and RRF $\geq$ 0.05 except Tetrahydrofuran RRF < 0.05.

***ACTION: Estimate (UJ) tetrahydrofuran with low bias in all samples due to low calibration verification.*

IS: All 4 IS Areas and RTs were in criteria - No Action required.

Date: ***9/21/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40941-1

Additional Notes:

Lab reported results for m- Xylene & p-Xylene (reported as a single entry due to coelution) and o-Xylene in addition to Xylenes, total, as requested in the QAPP. All 53 project-specific VOCs were reported so with the added Xylenes, a total of 55 VOC results reported per sample. Note that bromodichloromethane, as listed in Table 4-1C, is called dichlorobromomethane in EDD and data and Dibromochloromethane, as listed in Table 4-1C, is called chlorodibromomethane in EDD and data.

10 results were reported at levels < RL and were flagged "J" by the lab (not including the 10 results negated due to blank action). These 10 "J" results were accepted for reporting with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

All RLs were at or below the PQLs and PALs required in the QAPP Table 4-1C for all samples except 1,2-dibromo-3-chloropropane and ethylene dibromide, as expected, due to method limitations.

Narrative did not raise any issues not already addressed.

Date: ***9/21/12***

Data Reviewer: ***Deborah A. Loring***

8260C and Project Action Summary:

Preservation:	Waters - headspace present or received at > 10°C, J det / J NDs or R ND Soils/Sediment - EnCore extrusion and sample preservation unacceptable or received at > 10°C, J det / J NDs or R ND Waters - pH < 2; 14d <HT≤ 28d; J det/ J NDs; HT >28d, J det/R ND Soils/Sediment - 14d <HT< 28d; J det/ J NDs; HT >28d, J det/R ND
Surrogates:	Surr. %Rec > 130%, J det/Accept ND; 10% ≤ %Rec < 70%, J det/J NDs;
LCS	%Rec<10%, J det/ R NDs; 10% <%Rec<70, J det/ J NDs; %Rec >130, J det/Accept NDs. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. LCS must contain all targets.
Tunes:	Samples analyzed within 12-hrs and criteria met per Method 8260C. If out, use professional judgment.
ICAL:	minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs. If avg. RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
CCAL:	%D (or %Drift) > - 20% , J det/J ND; %D (or %Drift) > +20%, J det/Accept ND. If RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
Blanks:	Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for acetone, 2-butanone, and methylene chloride which are 10 x value in blank.
MS/MSD:	%Rec<10%, J det/ R NDs; 10% <%Rec<70%, J det/ J NDs; %Rec >130%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. MS/MSD must contain all targets.
FD:	Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data
IS:	20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs
QLs:	Verify RLs met RLs and PALs given in QAPP; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.
TICs:	Not required
% solids:	If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs
Narrative:	If there are any issues raised in narrative not previously addressed, take appropriate action
Reference:	*Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8260C

Date: ***9/21/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Semivolatile Tier II-type Data Review Checklist

Lab Project: 360-40941

Lab: TestAmerica Westfield
Date Sampled: 6/5/12
Method of Analysis: 8270D

No. Samples: 4
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates w: 30-130%BN 15-110% Acid s: 30-130%	LCS 40-140%BN 30-130%Acid	MS/MSD 40-140%BN 30-130%Acid w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√	√	NA	NA		√	√	NA	-
No						Estimate (UJ) 8 results				

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 6/6/12, the day after sample collection, at 4±2°C - there were no COC issues noted by the lab.

All samples were extracted on 6/11/12 and analyzed by 6/16/12. Holding times met - no action required.

Surrogates : All 3BN and 3 Acid Surrogates were recovered within QAPP Criteria in all field and QC samples. No action required.

LCS/LCSD : LCS 360-91774/2-A & 3-A. Note that Method Blank and LCS/LCSD were not included in the laboratory's data package, however, the samples were extracted in a batch with samples from SDG J40915, so QC data was available for review in that data package. Lab spiked all 67 target analytes requested in LCS. All spiked target compounds reported acceptable %Rec and LCS/LCSD RPD except carbazole and di-n-butylphthalate (LCS/LCSD rec. high). Carbazole and di-n-butylphthalate were not detected in associated samples so qualification of data was not necessary for these compounds.

MS/MSD: MS/MSD analyses were not performed in this SDG.

FD pair: An FD was not submitted with this SDG.

Date: ***9/21/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40941

Blank Action:

Blanks Reviewed: MB: MB 360-91774/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91774/1-A	di-n-Butylphthalate 158 J µg/kg	Y		1580 µg/kg		All associated samples were ND - No Action required	

Tunes: Instrument B 6/11/12, 6/15/12, 6/18/12. All abundances were acceptable and all samples were analyzed within 12 hours of tune - No Action required

ICAL : 6/11/12 Inst. B, 8- to 10- level ICAL performed from 0.2 to 25 µg/mL (for full 10-level) for all Targets + several non-target compounds. Form VI flagged several results as not meeting minimum RRF criteria; however, lab used CLP criteria and not QAPP criteria. %RSD $\leq$ 20% or r2 $\geq$ 0.99 for all and all RRFs $\geq$ 0.05 except: 2,4-dinitrophenol % RSD = 46.0% and 4,6-dinitro-2-methylphenol %RSD = 39.0%.

**ACTION: 2,4-Dinitrophenol and 4,6-dinitro-2-methylphenol estimated (UJ) with indeterminate bias in all samples due to high RSD.*

CCALs: Inst. B 06/15/2012 13:05 %D or %Drift $\leq \pm$ 20% and RRF $\geq$ 0.05 for all target compounds except: 4-chloroaniline (+29.0%), Hexachlorocyclopentadiene (+30.9%), 3-nitroaniline (+77.9%), 4-Nitrophenol (+22.4%), 4-Nitroaniline (+42.3%) and Carbazole (+77.5%). No action required for increased sensitivity as these analytes are not detected in the associated samples.

CCALs: Inst. B 06/18/2012 14:48 %D or %Drift $\leq \pm$ 20% and RRF $\geq$ 0.05 for all target compounds except: 3-nitroaniline (+53.4%), 2,4-dinitrophenol (-27.2%), carbazole(+44.3%), 4-Nitroaniline (+42.3%) and Carbazole (+77.5%). No action required for increased sensitivity as these analytes are not detected in the associated samples. No action required for increased sensitivity as these analytes are not detected in the associated samples.

***ACTION: 2,4-dinitrophenol estimated (UJ) with indeterminate bias in sample SB-FS-PC-19-11.0-14.0, note bias indeterminate due to ICAL.*

IS: All 6 IS Areas and RTs were in criteria for all analyses.

Lab reported results for all 67 target SVOCs required. The lab reported 3&4-methylphenol rather than 4-methylphenol as the two co-elute. All RLs reported were less than or equal to the PQLs given in QAPP Table 4-2C except di-n-butylphthalate and bis-2-ethylhexylphthalate in all samples.

Date: ***9/21/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40941

Additional Notes:

No results were reported at levels < RL.

All non-detects were reported at levels below the PALs given in Table 4-2C for all samples.

Narrative did not raise any issues not already addressed.

Date: ***9/21/12***

Data Reviewer: ***Deborah A. Loring***

8270D and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: waters: BN 30 - 130%, acids 15-110%; solids: all surrogates 30-130%
2 BN or 2 Acids Recovery > Criteria, J det/Accept ND; 10% ≤ 2 or more surrogates < Criteria, J det/J NDs;
Recovery < 10%, J det/R NDs. Action taken on Acid and/or BN analytes based on Surrogates out.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs.

Tunes: Samples analyzed within 12-hrs and criteria met per Table 3 or Method 8270C. If out, use professional judgment.

ICAL: minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs; min. RRF < 0.05, J det/UJ NDs.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank

Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for phthalates which are 10 x value in blank.

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs- Unspiked Sample only. RPD > Limit, J det/UJ NDs.
MS/MSD must contain all targets.

FD: Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data

IS: 20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs

QLs: Verify RLs met QAPP QLs ; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

TICs: Not required

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8270D

Date: ***9/21/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
PCB Tier II-type Data Review Checklist

Lab Project # 360-40941

Lab: TestAmerica Westfield
Date Sampled: 6/5/12
Method of Analysis: 8082A

No. Samples: 4
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 40-140% RPD ≤ 30%	FD w:RPD≤30% s:RPD≤50%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)	Other (pattern match, etc.)
Yes	√	√	√	NA	NA	√	√	√	----
No									

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 6/6/12, the day after collection at 4±2°C - there were no COC issues noted by the lab.

Samples were extracted on 6/8/12 - HT met for extraction. All extracts were analyzed by 6/11/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC except DCB recovery high (183%) on Column 1 for sample SB-FS-PC-17-14.0-17.0 (360-40941-11). No Action required for high surrogate as recovery was within limits on Column 2 and no Aroclors were detected. Note, lab used in-house criteria for recovery of surrogates; QAPP criteria used to determine data acceptance.

LCS/LCSD: LCS 360-91700/2-A & 3-A Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec for AR1016 & AR1260 in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD: MS/MSD analyses were not performed in this SDG.

Date: ***9/24/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40941

Blank Action: Blanks Reviewed: MB: MB 360-91700/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91700/1-A	None					No Blank Action required	

Additional Notes:

FD pair: An FD was not submitted with this SDG.

ICAL: Instrument M 4/13/12 6-level calibration from 50 to 2000 µg/L for Ar 1016/1260 and a single point calibration at 1000 µg/L for Ar-1221/1254, Ar-1232, Ar-1242, Ar-1248, Ar-1262, Ar-1268. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), linear regression performed for Ar-1016 & 1260 on both columns, and r2 > 0.99. Valid ICAL - no action required.

CCALs : CCV 360-91735/17 on 06/11/2012 15:36 (Opening CCV): All %D ≤ ± 20% on both GC columns for all Aroclor peaks except Ar-1016-4 (-25.9%), Ar-1016-5 (-33.2%), Average (-21.5%) and Ar-1260-1 (-29.7%), Ar-1260-2 (-21.5%), Ar-1260-3 (-25.5%), Ar-1260-4 (-29.5%), Ar-1260-5 (-31.7%) Average (-27.6%) on GC Column 1; OK on GC Column 2. CCV 360-91735/37 on 006/12/2012 00:28: All %D < ± 20% on both GC columns for all Aroclor peaks except Ar-1016-4 (-24.9%), Ar-1016-5 (-35.7%) Average OK, Ar-1260-1 (-28.8%), Ar-1260-2 (-23.7%), Ar-1260-3 (26.1%), Ar-1260-4 (-26.8%), Ar-1260-5 (-27.9%) Average (-26.7%) , and Ar-1016-5 (-40.0%) Average OK, Ar-1260-2 (-29.1%) Average OK on GC Column 2. No action required.

Lab reported the lowest of the two column values. Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. No PCBs reported in samples - no action required.

All RLs reported were slightly above the PQLs given in QAPP Table 4-C (RLs 110 µg/kg vs. 100 µg/kg), due to % solids.

All RLs reported were less than or equal to the PALs given in QAPP Table 4-C.

All chromatograms for all samples visually inspected and appear to have been reported correctly. Samples SB-FS-PC-19-11.0-14.0 and SB-FS-PC-17-14.0-17.0 show complex mixtures, however, none were matched to a specific Aroclor pattern.

Date: ***9/24/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-40941

Additional Notes:

Narrative did not raise any issues not already addressed.

Date: *9/24/12*

Data Reviewer: *Deborah A. Loring*

8082A and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs- Unspiked Sample only. RPD > 30% solids, J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multi-components), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multi-components) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8082A

Date: ***9/24/12***
Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Pesticide Tier II-type Data Review Checklist

Lab Project # 360-40941

Lab: TestAmerica Westfield
Date Sampled: 6/5/12
Method of Analysis: 8081B

No. Samples: 4
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 30-150% w: RPD≤20% sr:RPD≤30%	FD w:RPD≤30% s:RPD≤50%	RCM (Resolve. > 60%)	PEMs Brkdwn< 15% %D ≤ ± 15%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)
Yes	√	√	√	NA	NA	√	√	√	√	√
No										

% solids OK? Y
Other Issues: No Technical chlordane was reported instead of alpha-chlordane. Low-level initial calibration for Toxaphene and Technical chlordane did not support the lab-reported RL - action taken to raise RL for Toxaphene and Technical chlordane (see page 2).

Comments:

Samples were received intact at TestAmerica on 6/6/12, the day after collection, at 4±2°C - there were no COC issues noted by the lab.

Samples were extracted on 6/8/12 and analyzed by 6/13/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - No Action required. Note, lab used in-house criteria for recovery of surrogates; QAPP criteria used to determine data acceptance.

LCS/LCSD: LCS 360-91700/4-A & 5-A. Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD : MS/MSD analyses were not performed in this SDG.

FD pair: An FD was not submitted with this SDG.

Resolution Check : RCM not analyzed per se; however, CCALs reviewed and all peaks appear to be adequately resolved - No Action required

Date: ***9/24/12***
Data Reviewer: ***Deborah A. Loring***

New Environmental Horizons, Inc.

Lab Project # 360-40941

Lab: TestAmerica Westfield

Blank Action: Blanks Reviewed: MB: MB 360-91700/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91700/1-A	None					No Blank Action required	

Additional Notes:

PEM DDT and Endrin Breakdown evaluations: PEM 360-91842/1 06/13/2012 09:26 - %Breakdown for DDT and Endrin ≤ 15% + Combined Breakdown was ≤ 30% on each GC Column. No Action required.

ICAL: Instrument H 6/7/12 7-level from 1 to 100 µg/L for single-component Pesticides (some extras not required for project) + surrogates and 3-level from 500 to 2,500 µg/L for Toxaphene and Technical Chlordane. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), %RSD ≤ 20% or r2 ≥ 0.99 for all compounds. Several compounds used regression analysis for calibration on Columns 1 & 2. Valid ICAL - no action required.

CCALs : CCVRT 360-91842/2 on 06/13/2012 09:47 (Opening CCV for single-components), CCVRT 360-91842/3 on 06/13/2012 10:09 (Technical Chlordane), and CCVRT 360-91842/4 on 06/13/2012 10:30 (Toxaphene) - all %D ≤ ±20% on both GC columns for all Pesticides except Endrin aldehyde (+21.0%) on GC Column 2. CCV 360-91842/24 on 06/13/2012 18:00 all %D ≤ ±20% on both GC columns for all Pesticides except DDD (+28.7%) and Endrin aldehyde (+26.6%) on GC Column 2. A positive %D indicates increased sensitivity to detection during CCAL as compared to sensitivity during ICAL; therefore, since all samples were non-detect for these compounds, no action for enhanced sensitivity in CCVs (i.e. non-detects accurate as reported).

Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. Since Form X used to express LCS results only, since all samples were non-detect for all Pesticides, no action required.

The narrative did not raise any issues not already addressed.

All RLs reported were less than or equal to the PQLs given in QAPP Table 4-3B except for aldrin, dieldrin and toxaphene in all samples. No PQL was defined for Technical chlordane in the QAPP.

Lab reported results for all 21 target Pesticides required, except technical chlordane was reported instead of alpha-chlordane. The technical chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. The resulting RL was above the PAL for Toxaphene in all samples. All other RLs reported were less than or equal to the PALs given in QAPP Table 4-3B. No PAL was defined for Technical chlordane in the site QAPP.

Date: ***9/24/12***
Data Reviewer: ***Deborah A. Loring***

8081B and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

RCM: RCM < 60% resolution, J detects based on technical judgment

PEM: 4,4'-DDT breakdown > 15%, J detected DDT, DDE, DDD; R ND 4,4'-DDT and accept ND DDE & DDD
Endrin breakdown > 15%, J detected Endrin, Endrin Aldehyde & Endrin Ketone; R ND Endrin and accept ND Endrin Aldehyde & Endrin Ketone
4,4'-DDT and Endrin > 30%, accept NDs of breakdown products and J detects for 4,4'-DDT and Endrin; J detects of breakdown products and reject (R) non-detects for 4,4'-DDT and Endrin.
%D> ± 20%, J det/J ND on a per column basis. % Resolution < 90.0% qualify data based on professional judgment.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<30%, J det/ J NDs; %Rec >150%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters (or 30% solids), J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multicomponents), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multicomponents) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8081B

Date: ***9/24/12***
Data Reviewer: ***Deborah A. Loring***

RDWP - Davis Liquid Waste Superfund Site
EPA Region I Tier II-type DV Checklist - Metals

Lab: TestAmerica-Westfield, Westfield, MA
Date Sampled: 6/05/12
Analysis: Metals by EPA SW-846 Method 6010C & 7471A

Lab Project # 360-40941-1
No. Samples: 4
Matrix: Soil

QC Met Criteria?		HT and Preserve	RL QAPP PALs	Tune 6020 criteria	Calibration ICV/CCV 90-110%R	CRI RL Check 70-130%R	EB MB < RL	LCS/LCSD SRM limits RPD ≤ 30%	ICSA/AB 80-120% R	MS / MSD 75-125% R	MD RPD ≤ 20%	FD RPD ≤ 30%	IS 6020 70-130% R	Serial Dilution ± 15% D
Yes		√	√	NA	√	√	√	√	√	NA	NA	NA	NA	NA
No														

Soils for Target Analyte List (TAL) of 23 Metals: Mercury by CVAA SW846 Method 7471A; and Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, & Zinc by ICP-AES Method 6010C.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data for Tier II level in accordance with the Davis QAPP (ESS 2012) & EPA Region 1 present in the data package? ***Yes.***

2. Were all result forms for all samples listed on the chain-of-custody present in data package? ***Yes***.

Chain-of-Custody (COC): 4 soil samples received for Total TAL Metals - received at lab on 6/06/12 (one day after sample collection) and intact. Documentation acceptable.

Preservation: Samples received at 5.1°C on ice. Acceptable preservation for soils.

Holding Time (HT): ICP-AES 6010C analysis 6/15/12; CVAA 7471A analysis 6/13/12. Acceptable HT.

Calibration Criteria: ICV/CCV and CRI (RL check standard supporting the level of the RL reported) met acceptance criteria for all Metals. Note CRI not required by Davis QAPP but reviewed as additional support of the lab RLs (criteria set at 70-130%). Tune criteria not applicable for Method 6010C. ICSA/AB met recovery criteria for all ICP metals.

Date: *9/21/12*
Data Reviewer: *Susan D. Chapnick*

New Environmental Horizons, Inc.

Lab: TestAmerica Lab Project #: 360-40941-1

Blanks: No EB included with samples in this SDG. Method blank (MB) & instrument blanks (ICB/CCB) were non-detected for all metals; therefore, no blank actions were required.

LCS/LCSD: Lab performed both LCS and LCS duplicate (LCSD), though LCSD not required in Davis QAPP. LCS/LCSD met acceptance criteria for all Metals for accuracy (based on soil SRM control limits listed by lab on Form 7, consistent with QAPP criteria for this media) and precision (RPD <30% lab criteria).

MS/MD: No site-sample MS/MD was identified to be performed in this SDG.

Serial Dilution: No serial dilution on a site sample was performed in this SDG.

IS: IS not applicable for Method 6010C.

Sensitivity: All RLs for non-detects met Davis QAPP Table 4-5C for Soil requirements for sensitivity (RL) based on being lower than the PALs (even though some, for example antimony, were > PQLs they were still lower than the PALs). Samples SB-FS-PC-17-14.0-17.0 (360-40941-11), SB-FS-PC-17-21.0-24.0 (360-40941-12), and SB-FS-PC-19-23.0-25.0 (360-40941-13) were analyzed at a 2x dilutions during analysis (samples had high levels of aluminum and iron) but all non-detects were still < PALs. Therefore, sensitivity met project DQOs.

Professional Judgment - Other: None.

Laboratory Narrative: Mercury exceeded the lab RPD criteria for MS/MSD in batch QC sample 360-40968-3 (not reported in QC forms in this SDG); the lab further explained that the mercury in this sample exceeded the spike level by 4x. See further explanation in SDG 360-40941-1 about this issue; however, this RPD is applicable to this SDG 360-40941-1. No further issues noted.

Date: *9/21/12*
Data Reviewer: *Susan D. Chapnick*

Lab: TestAmerica Lab Project #: 360-40941-1

FD pair samples: No FD was collected with this set of samples.

FD Precision:

Analyte	Sample	Qual	FD	Qual	Precision RPD* %	Action	Comment
Aluminum					#DIV/0!	none	
Antimony					#DIV/0!	none	
Arsenic					#DIV/0!	none	
Barium					#DIV/0!	none	
Beryllium					#DIV/0!	none	
Cadmium					#DIV/0!	none	
Calcium					#DIV/0!	none	
Chromium					#DIV/0!	none	
Cobalt					#DIV/0!	none	
Copper					#DIV/0!	none	
Iron					#DIV/0!	none	
Lead					#DIV/0!	none	
Magnesium					#DIV/0!	none	
Manganese					#DIV/0!	none	
Mercury					#DIV/0!	none	
Nickel					#DIV/0!	none	
Potassium					#DIV/0!	none	
Selenium					#DIV/0!	none	
Silver					#DIV/0!	none	
Sodium					#DIV/0!	none	
Thallium					#DIV/0!	none	
Vanadium					#DIV/0!	none	
Zinc					#DIV/0!	none	

Date: *9/21/12*
Data Reviewer: *Susan D. Chapnick*

QC & DV Action Criteria for Davis Superfund Site Metals [based on Davis QAPP 2012 & EPA Region I DV guidance]:

Pres./HT:	HT exceedance: J detects; Non-detects: R or UJ based on professional judgment. pH >2 use professional judgment to J detects; UJ non-detects.
Blanks:	Method Blanks and instrument blanks: Metals < RL unless all sample results are > 10 blank level. Detected results < matrix-matched blank level report as "U" (non-detected at level found). Equipment Blank: EB > RL for any metals; qualify associated detected results < 5x EB level as "EB" - potential high bias based on EB contamination.
Tune:	Mass calibration (amu) > QC limit: J/UJ. Mass resolution/peak width (amu) > QC limit: J/UJ. %RSD > QC limit: J/UJ. See EPA SW-846 Method 6020A for Tune criteria. Tune not performed: R all associated data.
ICV/CCV:	Recoveries < 90%: J / UJ; recoveries > 110%: J detects; if severe exceedance <75%: R non-detects; > 160%: R detects.
CRI:	Low-level standard at the level of the RL: % recovery <70%: J / UJ; >130%: J detects.
LCS:	Aqueous: %Recoveries < 80%: J / UJ. %Recoveries > 120%: J detects. %Recoveries < 50%, may R non-detects & J detects but use professional judgment to accept results if MS is in-control indicating acceptable accuracy in sample matrix. Solids: SRM control limits are criteria; J/UJ outside these limits; use professional judgment for severe exceedances of control limits.
ICSA/AB:	Recoveries > 120% or < 80%: J / UJ unless extremely low for ICSAB at <50%: R non-detects / J detects.
MS:	%Recoveries < 75%: J / UJ. %Recoveries > 125%: J detects. %Recoveries < 30%, may R non-detects & J detects but use professional judgment if sample concentration > 2x spike level.
MD:	Groundwater/Surface Water: Results >5xRL: RPD >20%: J/UJ associated results in batch. Results < 5xRL: difference > ±RL, J/UJ associated results. Soil/Sed: Results >5xRL: RPD >35%: J/UJ associated results in batch. Results < 5xRL: difference > ±2xRL, J / UJ associated results.
FD:	Groundwater/Surface Water: Results > 5xRL: RPD > 30%: J/UJ FD results only. Results < 5xRL: difference > ±2xRL,, J/UJ FD results only. Soil/Sed: Results >5xRL: RPD > 50%: J/UJ FD results only. Results <5xRL: use professional judgment.
IS:	Recoveries < 70%: J / UJ; recoveries > 130%: J detects; use professional judgment for severe exceedances.
Serial Dil:	Results > 50xRL: % Difference > 15%: J detects. EPA guidance UJ non-detects; however, use professional judgment on whether it is a suppression or enhancement to qualify associated non-detects.

Qualifiers: U = analyte is non-detect at the sample-specific Reporting Limit (RL) (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.

References: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island;* prepared by ESS Group, Inc., March 23, 2012 (Davis QAPP); Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996, including Part IV – Inorganic Data Validation Functional Guidelines, November 2008; Region I T*iered Organic and Inorganic Data Validation Guidelines* , July 1, 1993 draft; & USEPA SW846 Methods 6010C, 6020, & 7470A/7471A.

Date: *9/21/12*
Data Reviewer: *Susan D. Chapnick*

environmental chemistry consultants

DATA VALIDATION REPORT
EPA Region I Tier II-Type for VOCs, TCL SVOCs, TCL Pesticides, TCL PCBs, & TAL Metals

Client: ESS Group, Inc., East Providence, Rhode Island

Site: Davis Liquid Waste Superfund Site, Smithfield, Rhode Island
Soil Sampling - 2012

Laboratory: TestAmerica Westfield, Westfield, Massachusetts

Lab Project/SDG #: 360-40968-1

Number of Samples: 3 soil samples + 1 Trip Blank for project-specific list of 52 Volatile Organic Compounds (VOCs)
2 soil samples for Target Compound List (TCL) Semivolatile Organic Compounds (SVOCs), TCL Pesticides, TCL Polychlorinated Biphenyls (PCBs), Target Analyte List (TAL) Metals and Percent Solids

Data Reviewers: Nancy C. Rothman, Ph.D., New Environmental Horizons, Inc.
Susan D. Chapnick, M.S., New Environmental Horizons, Inc.

Date: October 1, 2012

EPA Tier II-type Data Validation Review was performed on the data included in this SDG with the following intentions: 1) to determine if the data were generated and reported in accordance with the following documents: *Remedial Design Work Plan and Pre-Design Investigation Plan* (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996 and updates including Part II, III, and IV (Volatile/Semivolatile, Pesticide/PCB, and Inorganic Data Validation Functional Guidelines); EPA *Region I Tiered Organic and Inorganic Data Validation Guidelines*, July 1993, and USEPA SW846 Method 8260C, 8270D, 8081B, 8082A, 6010C, and 7471A 2) to determine if the data met the project data quality objectives for acceptable accuracy, precision, sensitivity; and technical usability; and 3) to update the project database with validated results and appropriate data validation qualifiers.

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The Data Validation Report consists of three parts:

- This Data Validation Report letter summarizing the actions taken;
- The spreadsheet of validated sample results with validation qualifiers based on actions taken; and
- The Data Validation Checklists to document the Tier II-type validations. These Checklists are an integral part of the validation report as they contain comprehensive details of all QC reviewed, the acceptance criteria used, professional judgment and actions taken.

I. Sample Descriptions and Analytical Parameters

The sample IDs, date of sampling, matrix, and sample type (e.g. Field Sample, Field Duplicate, etc., as applicable) and the analytical parameters reviewed are listed below in Table 1.

Table 1. Sample Descriptions and Analytical Parameters

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
SB-FS-PC-26-32.5-33.0	6/6/2012	Soil	VOCs	Field Sample
SB-FS-PC-26-14.0-14.5	6/6/2012	Soil	VOCs	Field Sample
SB-FS-PC-26-14.0-18.0	6/6/2012	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample [used for MS/MSD/MD for VOCs, SVOCs, Pesticides, PCBs, and Metals]
SB-FS-PC-26-27.0-27.5	6/6/2012	Soil	VOCs	Field Sample
SB-FS-PC-26-32.0-35.0	6/6/2012	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
TB-060712-1	6/7/2012	Water	VOCs	Trip Blank

Analytical method references:

Volatiles: 52 project-specific VOCs by USEPA SW846 Method 8260C that includes the TCL plus diethyl ether and tetrahydrofuran and minus 1,4-dioxane (not required for soils; note 1,4-dioxane was reported in the TB).

Semivolatiles: TCL SVOCs by USEPA SW846 Method 8270D

Pesticides: TCL Pesticides by USEPA SW846 Method 8081B

PCBs: TCL PCB Aroclors by USEPA SW846 Method 8082A

Metals: TAL Metals by USEPA SW846 Method 6010C (ICP-AES), which includes 22 Metals, plus Mercury by USEPA SW846 Method 7471A Cold Vapor Atomic Absorption (CVAA)

Percent Moisture / Percent Solids were performed and reported for all samples to convert results to dry-weight units.

II. Quality Control Reviewed during Data Validation

The following QC elements, as applicable to the analytical methods, were reviewed during the Tier II-type validation of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals:

- Data package completeness and reporting protocols
- Sample receipt, holding times and preservation criteria
- Blank results including Method Blanks, Equipment Blanks, & Trip blanks
- Laboratory Control Sample (LCS) recoveries / LCS Duplicate Recoveries
- Standard Reference Material (SRM) Recoveries, if applicable
- Surrogate Recoveries
- Matrix Spike (MS) / Matrix Spike Duplicate (MSD) Recoveries
- MS/MSD, LCS/LCSD, and sample/Field Duplicate (FD) Relative Percent Differences (RPDs)
- Sample result reporting (including compound lists, reporting limits, and units)
- Calibration criteria (including tune criteria, initial calibration and continuing calibration verification)
- Internal Standard (IS) Recoveries
- Retention Time windows
- Other method-specific QC if applicable and reported in Summary QC
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

III. Data Validation Report Summary

During the Tier II-type data validation review of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals, no data were rejected. Several results were negated (U) or estimated (UJ) due to QC issues. Table 2 summarizes the actions taken during this data validation review. NEH generated a validated data spreadsheet based on the electronic project database file (EDD) received from ESS for this SDG. All results were considered usable for project decisions compared to the Davis RDWP QAPP requirements with the understanding of the potential uncertainty (bias) in the qualified results presented in Table 2.

The remainder of this report documents "exceptions" to method or QAPP criteria or clarifications of data reported. QC elements not discussed below met all QAPP criteria. The full documentation of all QC elements reviewed during the Tier II-type validations are presented in the attached Data Validation Checklists. Data users should also reference the full Tier III-type data validation performed on soil samples included in SDG 360-40815-1 for additional information on general reporting issues and calculation verification from review of raw data (which is not performed in a Tier II-type validation).

Exceptions from Davis QAPP or Method QC Criteria

- The method blank for VOCs reported results above the Reporting Limit (RL) for methylene chloride. A comparison of the level in the blank with the levels reported for this compound in the associated samples resulted in the following actions:
  - Methylene chloride was negated (U) in two VOC samples, as shown in Table 2, and the results raised to the sample specific RL.

- Matrix Spike (MS) and Matrix Spike Duplicate (MSD) were performed for SVOCs, Pesticides, PCBs, and Metals on site sample SB-FS-PC-26-14.0-18.0, as requested on the Chain-of-Custody (COC). Note that the COC has separate sample IDs for the MS and MSD; however, the lab used the standard format to report matrix QC as the parent sample ID. Exceedances of the MS/MSD recoveries or relative percent differences (RPD) are as follows:
  - 4,6-dinitro-2-methylphenol showed precision (RPD) outside of criteria and hexachlorocyclopentadiene showed recovery outside of criteria. Actions taken to estimate (UJ) affected sample results due to SVOC MS/MSD exceedances are listed in Table 2.
  - Antimony showed low recoveries in the MS and MSD. Actions taken to estimate (UJ) the two antimony results due to MS/MSD exceedances are listed in Table 2.
- Mercury RPD was reported as exceeding criteria and the lab narrated that the mercury concentration in the sample was > 4x the spike level; however, it looks like the lab may have erred in reporting the mercury matrix QC results for the MSD since the native level of mercury in the parent sample SB-FS-PC-26-14.0-18.0 is actually non-detected. Professional judgment was used to take no action for mercury based on acceptable MS and MSD recoveries in the site sample.
- No site sample in this SDG was identified for MS/MSD analyses for VOCs; therefore, MS/MSD analyses were not performed.
- A Field Duplicate (FD) pair was not included in this SDG.
- Tetrahydrofuran results were outside of initial and continuing calibration criteria for VOCs. Actions to estimate (UJ) results and the potential bias are listed in Table 2.

Sensitivity & Reporting

- The laboratory flagged all results for VOCs and SVOCs that were less than the RL (supported by the low-level standard in the calibration curve) as "J". The "J" qualifiers were reported for methylene chloride only and were changed to "U" due to blank actions as listed in Table 2.
- All non-detects for VOCs, SVOCs, and PCBs were below the Project Action Limit (PAL) given in QAPP Tables 4-1C, 4-2C and 4-4B for soils except for 1,2-dibromo-3-chloropropane and ethylene dibromide, as expected, due to method limitations. Therefore, sensitivity data quality objectives (DQOs) were met for these analyses.
- The laboratory reported results for all 21 target Pesticides required, except technical-chlordane was reported instead of alpha-chlordane. The technical-chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. All RLs for Pesticides were less than or equal to the PALs given in QAPP Table 4-3B and therefore met sensitivity requirements with the exception of toxaphene (due to raising the RL during validation). No PAL was defined for technical-chlordane in the site QAPP. The data user will need to evaluate usability of the non-detected toxaphene results with elevated RLs for project uses.
- All non-detects for Metals were below the PALs given in QAPP Table 4-5C for soil. Therefore, sensitivity DQOs were met for Metals.

Table 2. Summary of Data Validation Actions

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
All Pesticide samples	Chlordane (technical) Toxaphene	U		Raised RL
All VOC samples except	Tetrahydrofuran	UJ	L	Initial Calibration outside criteria + Low Calibration verification
SB-FS-PC-26-14.0-14.5 SB-FS-PC-26-32.5-33.0	Methylene Chloride	U		Negated due to Blank Action
SB-FS-PC-26-14.0-18.0	Hexachlorocyclopentadiene	UJ	L	Low MS recovery
SB-FS-PC-26-14.0-18.0	4,6-Dinitro-2-methylphenol	UJ	I	MS/MSD imprecision
SB-FS-PC-26-14.0-18.0 SB-FS-PC-26-32.0-35.0	Antimony	UJ	L	Low MS/MSD recoveries

Qualifiers: U = Analyte is non-detect at the "LIMIT2" value in the EDD, which is the sample-specific reporting limit (RL); UJ = Non-detect is estimated; J = Result is estimated; R = Result is rejected and is unusable for project decisions.

Bias: L = Low; H = High; I = Indeterminate

Acronyms used in Table 2:
MS = Matrix Spike
MSD = Matrix Spike Duplicate
RL = Reporting Limit

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Volatile Tier II-type Data Review Checklist

Lab Project: 360-40968-1

Lab: TestAmerica Westfield
Date Sampled: 6/6/12
Method of Analysis: 8260C - EI only (no SIM)

No. Samples: 3 + 1 TB
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 70-130%	LCS/LCSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	MS/MSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√	√	NA	NA		√	√	NA	
No						Estimate (UJ) 3 results				Negate 2 results due to Blank Action

% solids OK? Y
Other Issues: No.

Comments:

Method 8260C used for reporting of project-specific list of VOCs. TB sample results were reviewed for potential blank actions (see below); however, full data review of this field QC sample was not performed as these results are not directly used for project decisions.

Samples were received intact at TestAmerica on 6/7/12, the day after collection at 4±2°C - there were no COC issues noted by the lab. Samples were properly preserved.

Samples were all analyzed by 6/18/12 - HT met for all samples, No Action required.

Surrogates : All 3 VOC surrogates were recovered within 70-130% in all samples and QC - no Action required

LCS/LCSD: LCS 360-92022/1-A & 2-A. Lab spiked all 53 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable.

MS/MSD: MS/MSD analyses were not performed with this SDG.

Date: ***9/25/12***

Data Reviewer: ***Deborah A. Loring***

Lab Project: 360-40968-1

Lab: TestAmerica Westfield

Blank Action: Blanks Reviewed: MB: Water - MB 360-91820/6 Soil - MB 360-92022/4-A
TB: TB060712-1

Blank ID	Contaminant / Level	Matrix Related?	Action Level / Action	Sample and Reported Result	Corrected Result
MB 360-91820/6	None Detected	Y		No Blank Action required	
MB 360-92022/4-A	methylene chloride 9.43 J µg/kg	Y	94.3 µg/kg	SB-FS-PC-26-14.0-14.5 3.3 JB	12 U
				SB-FS-PC-26-32.5-33.0 2.1 JB	8.2 U
TB-060712-1	None Detected	N		No Blank Action required	

FD pair: An FD pair was not submitted with this SDG.

Tunes: Instrument HP#3 GC/MS. 6/12/12 11:06, 6/18/12 13:21. All tune abundances were acceptable and all samples and standards were analyzed within 12 hours of BFB tune.

ICAL : HP#3 6/12/12 5-7 level ICAL for all Targets + several non-target compounds. All calibrations met QAPP criteria for Target Compounds (ICAL from 0.5, 1 or 5 up to 160 µg/L. %RSD $\leq$ 20% or r2 $\geq$ 0.99 and all RRFs $\geq$ 0.05 except tetrahydrofuran RRF < 0.05.

***ACTION: Estimate (UJ) tetrahydrofuran with low bias in all samples due to low sensitivity in initial calibration.*

CCAL: HP#3 06/18/2012 13:44 %D (or %Drift) $\leq \pm$ 20% for all target compounds and RRF $\geq$ 0.05 except Tetrahydrofuran RRF < 0.05.

***ACTION: Estimate (UJ) tetrahydrofuran with low bias in all samples due to low calibration verification.*

IS: All 4 IS Areas and RTs were in criteria - No Action required.

Lab reported results for m- Xylene & p-Xylene (reported as a single entry due to coelution) and o-Xylene in addition to Xylenes, total, as requested in the QAPP. All 52 project-specific VOCs were reported so with the added Xylenes, a total of 54 VOC results reported per soil sample. Note that bromodichloromethane, as listed in Table 4-1C, is called dichlorobromomethane in EDD and data and Dibromochloromethane, as listed in Table 4-1C, is called chlorodibromomethane in EDD and data.

Date: ***9/25/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40968-1

Additional Notes:

There were no results were reported at levels < RL with the exception of the methylene chloride results, which were negated due to blank action.

All RLs were at or below the PQLs and PALs required in the QAPP Table 4-1C for all samples except 1,2-dibromo-3-chloropropane and ethylene dibromide, as expected, due to method limitations.

Lab Narrative: included a note that two samples were received with a "significantly different initial weight than that required by the reference method" according to the lab narrative. The method requires a 1:1 ratio of soil to DI Water. No action required as calculations included all samples-specific weights.

Date: ***9/25/12***

Data Reviewer: ***Deborah A. Loring***

8260C and Project Action Summary:

Preservation:	Waters - headspace present or received at > 10°C, J det / J NDs or R ND Soils/Sediment - EnCore extrusion and sample preservation unacceptable or received at > 10°C, J det / J NDs or R ND Waters - pH < 2; 14d <HT≤ 28d; J det/ J NDs; HT >28d, J det/R ND Soils/Sediment - 14d <HT< 28d; J det/ J NDs; HT >28d, J det/R ND
Surrogates:	Surr. %Rec > 130%, J det/Accept ND; 10% ≤ %Rec < 70%, J det/J NDs;
LCS	%Rec<10%, J det/ R NDs; 10% <%Rec<70, J det/ J NDs; %Rec >130, J det/Accept NDs. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. LCS must contain all targets.
Tunes:	Samples analyzed within 12-hrs and criteria met per Method 8260C. If out, use professional judgment.
ICAL:	minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs. If avg. RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
CCAL:	%D (or %Drift) > - 20% , J det/J ND; %D (or %Drift) > +20%, J det/Accept ND. If RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
Blanks:	Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for acetone, 2-butanone, and methylene chloride which are 10 x value in blank.
MS/MSD:	%Rec<10%, J det/ R NDs; 10% <%Rec<70%, J det/ J NDs; %Rec >130%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. MS/MSD must contain all targets.
FD:	Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data
IS:	20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs
QLs:	Verify RLs met RLs and PALs given in QAPP; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.
TICs:	Not required
% solids:	If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs
Narrative:	If there are any issues raised in narrative not previously addressed, take appropriate action
Reference:	*Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8260C

Date: ***9/25/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Semivolatile Tier II-type Data Review Checklist

Lab Project: 360-40968

Lab: TestAmerica Westfield
Date Sampled: 6/6/12
Method of Analysis: 8270D

No. Samples: 2
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates w: 30-130%BN 15-110% Acid s: 30-130%	LCS 40-140%BN 30-130%Acid	MS/MSD 40-140%BN 30-130%Acid w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√	√		NA	√	√	√	NA	-
No				Estimate (UJ) 2 results in sample SB-FS-PC-26-14.0-18.0						

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 6/7/12, the day after sample collection, at 4±2°C - there were no COC issues noted by the lab.

All samples were extracted on 6/18/12 and analyzed by 6/21/12. Holding times met - no action required.

Surrogates : All 3BN and 3 Acid Surrogates were recovered within QAPP Criteria in all field and QC samples. No action required.

LCS/LCSD : LCS 360-92057/2-A & 3-A. Lab spiked all 67 target analytes requested in LCS. All spiked target compounds reported acceptable %Rec and LCS/LCSD RPD. No action required.

MS/MSD: MS/MSD analyses were performed on sample SB-FS-PC-26-14.0-18.0. All spiked target compounds reported acceptable %Rec and MS/MSD RPD except 4,6-dinitro-2-methylphenol RPD high and hexachlorocyclopentadiene LCS rec. low.

***ACTION: Estimate (UJ) 4,6-dinitro-2-methylphenol with indeterminate bias and hexachlorocyclopentadiene with low bias in sample SB-FS-PC-26-14.0-18.0.*

FD pair: An FD was not submitted with this SDG.

Date: ***9/25/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-40968

Blank Action:

Blanks Reviewed: MB: MB 360-92057/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-92057/1-A	di-n-butylphthalate 18 J µg/kg	Y		1380 µg/kg		All associated samples were ND - No Action required	

Tunes: Instrument B 6/19/12 15:43, 6/20/12 13:55. All abundances were acceptable and all samples were analyzed within 12 hours of tune - No Action required

ICAL : 6/19/12 Inst. B, 7- to 10- level ICAL performed from 0.2 to 25 µg/mL (for full 10-level) for all Targets + several non-target compounds. Form VI flagged several results as not meeting minimum RRF criteria; however, lab used CLP criteria and not QAPP criteria. %RSD $\leq$ 20% or r2 $\geq$ 0.99 for all and all RRFs $\geq$ 0.05.

CCALs: Inst. B 06/20/2012 14:27 %D or %Drift $\leq \pm$ 20% and RRF $\geq$ 0.05 for all target compounds.

IS: All 6 IS Areas and RTs were in criteria for all analyses.

Lab reported results for all 67 target SVOCs required. The lab reported 3&4-methylphenol rather than 4-methylphenol as the two co-elute. All RLs reported were less than or equal to the PQLs given in QAPP Table 4-2C except di-n-butylphthalate and bis-2-ethylhexylphthalate in all samples.

No results were reported at levels < RL.

All non-detects were reported at levels below the PALs given in Table 4-2C for all samples.

Narrative did not raise any issues not already addressed.

Date: ***9/25/12***

Data Reviewer: ***Deborah A. Loring***

8270D and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: waters: BN 30 - 130%, acids 15-110%; solids: all surrogates 30-130%
2 BN or 2 Acids Recovery > Criteria, J det/Accept ND; 10% ≤ 2 or more surrogates < Criteria, J det/J NDs;
Recovery < 10%, J det/R NDs. Action taken on Acid and/or BN analytes based on Surrogates out.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs.

Tunes: Samples analyzed within 12-hrs and criteria met per Table 3 or Method 8270C. If out, use professional judgment.

ICAL: minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs; min. RRF < 0.05, J det/UJ NDs.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank

Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for phthalates which are 10 x value in blank.

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs- Unspiked Sample only. RPD > Limit, J det/UJ NDs.
MS/MSD must contain all targets.

FD: Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data

IS: 20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs

QLs: Verify RLs met QAPP QLs ; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

TICs: Not required

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8270D

Date: ***9/25/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
PCB Tier II-type Data Review Checklist

Lab Project # 360-40968

Lab: TestAmerica Westfield
Date Sampled: 6/6/12
Method of Analysis: 8082A

No. Samples: 2
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 40-140% RPD ≤ 30%	FD w:RPD≤30% s:RPD≤50%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)	Other (pattern match, etc.)
Yes	√	√	√	√	NA	√	√	√	----
No									

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 6/7/12, the day after collection at 4±2°C - there were no COC issues noted by the lab.

Samples were extracted on 6/8/12 - HT met for extraction. All extracts were analyzed by 6/12/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all sample. Note, lab used in-house criteria for recovery of surrogates; QAPP criteria used to determine data acceptance.

LCS/LCSD: LCS 360-91700/2-A & 3-A Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec for AR1016 & AR1260 in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD: MS/MSD analyses were performed on sample SB-FS-PC-26-14.0-18.0. All percent recoveries and RPD were acceptable - no action required.

Date: ***9/26/12***
Data Reviewer: ***Deborah A. Loring***

New Environmental Horizons, Inc.

Lab: TestAmerica Westfield

Lab Project # 360-40968

Blank Action:

Blanks Reviewed: MB: MB 360-91700/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91700/1-A	None					No Blank Action required	

Additional Notes:

FD pair: An FD was not submitted with this SDG.

ICAL: Instrument M 4/13/12 6-level calibration from 50 to 2000 µg/L for Ar 1016/1260 and a single point calibration at 1000 µg/L for Ar-1221/1254, Ar-1232, Ar-1242, Ar-1248, Ar-1262, Ar-1268. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), linear regression performed for Ar-1016 & 1260 on both columns, and r2 > 0.99. Valid ICAL - no action required.

CCALs : CCV 360-91735/17 on 06/11/2012 15:36 (Opening CCV): All %D ≤ ± 20% on both GC columns for all Aroclor peaks except Ar-1016-4 (-25.9%), Ar-1016-5 (-33.2%), Average (-21.5%) and Ar-1260-1 (-29.7%), Ar-1260-2 (-21.5%), Ar-1260-3 (-25.5%), Ar-1260-4 (-29.5%), Ar-1260-5 (-31.7%) Average (-27.6%) on GC Column 1; OK on GC Column 2. CCV 360-91735/37 on 6/12/2012 00:28: All %D < ± 20% on both GC columns for all Aroclor peaks except Ar-1016-4 (-24.9%), Ar-1016-5 (-35.7%) Average OK, Ar-1260-1 (-28.8%), Ar-1260-2 (-23.7%), Ar-1260-3 (26.1%), Ar-1260-4 (-26.8%), Ar-1260-5 (-27.9%) Average (-26.7%) , and Ar-1016-5 (-40.0%) Average OK, Ar-1260-2 (-29.1%) Average OK on GC Column 2. No action required.

Lab reported the lowest of the two column values. Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. No PCBs reported in samples - no action required.

All RLs reported were slightly above the PQLs given in QAPP Table 4-C (RLs 110-120 µg/kg vs. 100 µg/kg), due to % solids.

All RLs reported were less than or equal to the PALs given in QAPP Table 4-C.

All chromatograms for all samples visually inspected and appear to have been reported correctly.

Narrative did not raise any issues not already addressed.

Date: ***9/26/12***
Data Reviewer: ***Deborah A. Loring***

8082A and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs- Unspiked Sample only. RPD > 30% solids, J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multi-components), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multi-components) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8082A

Date: ***9/26/12***
Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Pesticide Tier II-type Data Review Checklist

Lab Project # 360-40968

Lab: TestAmerica Westfield
Date Sampled: 6/6/12
Method of Analysis: 8081B

No. Samples: 2
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 30-150% w: RPD≤20% sr:RPD≤30%	FD w:RPD≤30% s:RPD≤50%	RCM (Resolve. > 60%)	PEMs Brkdwn< 15% %D ≤ ± 15%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)
Yes	√	√	√	√	NA	√	√	√	√	√
No										

% solids OK? Y
Other Issues: No Technical chlordane was reported instead of alpha-chlordane. Low-level initial calibration for Toxaphene and Technical chlordane did not support the lab-reported RL - action taken to raise RL for Toxaphene and Technical chlordane (see page 2).

Comments:

Samples were received intact at TestAmerica on 6/7/12, the day after collection, at 4±2°C - there were no COC issues noted by the lab.

Samples were extracted on 6/8/12 and analyzed by 6/13/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - No Action required. Note, lab used in-house criteria for recovery of surrogates; QAPP criteria used to determine data acceptance.

LCS/LCSD: LCS 360-91700/4-A & 5-A. Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD : MS/MSD analyses were performed on sample SB-FS-PC-26-14.0-18.0. All recoveries and RPDs were within criteria. No action required.

FD pair: An FD was not submitted with this SDG.

Resolution Check : RCM not analyzed per se; however, CCALs reviewed and all peaks appear to be adequately resolved - No Action required

Date: ***9/26/12***
Data Reviewer: ***Deborah A. Loring***

New Environmental Horizons, Inc.

Lab Project # 360-40968

Lab: TestAmerica Westfield

Blank Action:

Blanks Reviewed: MB: MB 360-91700/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91700/1-A	None					No Blank Action required	

Additional Notes:

PEM DDT and Endrin Breakdown evaluations: PEM 360-91842/1 06/13/2012 09:26 - %Breakdown for DDT and Endrin ≤ 15% + Combined Breakdown was ≤ 30% on each GC Column. No Action required.

ICAL: Instrument H 6/7/12 7-level from 1 to 100 µg/L for single-component Pesticides (some extras not required for project) + surrogates and 3-level from 500 to 2,500 µg/L for Toxaphene and Technical Chlordane. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), %RSD ≤ 20% or r2 ≥ 0.99 for all compounds. Several compounds used regression analysis for calibration on Columns 1 & 2. Valid ICAL - no action required.

CCALs : CCVRT 360-91842/2 on 06/13/2012 09:47 (Opening CCV for single-components), CCVRT 360-91842/3 on 06/13/2012 10:09 (Technical Chlordane), and CCVRT 360-91842/4 on 06/13/2012 10:30 (Toxaphene) - all %D ≤ ±20% on both GC columns for all Pesticides except Endrin aldehyde (+21.0%) on GC Column 2. CCV 360-91842/24 on 06/13/2012 18:00 all %D ≤ ±20% on both GC columns for all Pesticides except DDD (+28.7%) and Endrin aldehyde (+26.6%) on GC Column 2. A positive %D indicates increased sensitivity to detection during CCAL as compared to sensitivity during ICAL; therefore, since all samples were non-detect for these compounds, no action for enhanced sensitivity in CCVs (i.e. non-detects accurate as reported).

Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. Since Form X used to express LCS results only, since all samples were non-detect for all Pesticides, no action required.

The narrative did not raise any issues not already addressed.

All RLs reported were less than or equal to the PQLs given in QAPP Table 4-3B except for aldrin, dieldrin and toxaphene in all samples. No PQL was defined for Technical chlordane in the QAPP.

Lab reported results for all 21 target Pesticides required, except technical chlordane was reported instead of alpha-chlordane. The technical chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. The resulting RL was above the PAL for Toxaphene in all samples. All other RLs reported were less than or equal to the PALs given in QAPP Table 4-3B. No PAL was defined for Technical chlordane in the site QAPP.

Date: ***9/26/12***
Data Reviewer: ***Deborah A. Loring***

8081B and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

RCM: RCM < 60% resolution, J detects based on technical judgment

PEM: 4,4'-DDT breakdown > 15%, J detected DDT, DDE, DDD; R ND 4,4'-DDT and accept ND DDE & DDD
Endrin breakdown > 15%, J detected Endrin, Endrin Aldehyde & Endrin Ketone; R ND Endrin and accept ND Endrin Aldehyde & Endrin Ketone
4,4'-DDT and Endrin > 30%, accept NDs of breakdown products and J detects for 4,4'-DDT and Endrin; J detects of breakdown products and reject (R) non-detects for 4,4'-DDT and Endrin.
%D> ± 20%, J det/J ND on a per column basis. % Resolution < 90.0% qualify data based on professional judgment.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<30%, J det/ J NDs; %Rec >150%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters (or 30% solids), J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multicomponents), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multicomponents) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8081B

Date: ***9/26/12***
Data Reviewer: ***Deborah A. Loring***

RDWP - Davis Liquid Waste Superfund Site
EPA Region I Tier II-type DV Checklist - Metals

Lab: TestAmerica-Westfield, Westfield, MA
Date Sampled: 5/06/12
Analysis: Metals by EPA SW-846 Method 6010C & 7471A

Lab Project # 360-40968-1
No. Samples: 2
Matrix: Soil

QC Met Criteria?		HT and Preserve	RL QAPP PALs	Tune 6020 criteria	Calibration ICV/CCV 90-110%R	CRI RL Check 70-130%R	EB MB < RL	LCS/LCSD SRM limits RPD ≤ 30%	ICSA/AB 80-120% R	MS / MSD 75-125% R	MD RPD ≤ 20%	FD RPD ≤ 30%	IS 6020 70-130% R	Serial Dilution ± 15% D
Yes		√	√	NA	√	√	√	√	√		√	NA	NA	√
No										Estimate (UJ) 2 antimony results				

Soils for Target Analyte List (TAL) of 23 Metals: Mercury by CVAA SW846 Method 7471A; and Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, & Zinc by ICP-AES Method 6010C.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data for Tier II level in accordance with the Davis QAPP (ESS 2012) & EPA Region 1 present in the data package? ***Yes.***

2. Were all result forms for all samples listed on the chain-of-custody present in data package? ***Yes***.

Chain-of-Custody (COC): 2 soil samples received for Total TAL Metals - received at lab on 6/07/12 (1 day after sample collection) and intact. Documentation acceptable.

Preservation: Samples received at 2.0°C on ice. Acceptable preservation for soils.

Holding Time (HT): ICP-AES 6010C analysis 6/15/12; CVAA 7471A analysis 6/13/12. Acceptable HT.

Calibration Criteria: ICV/CCV and CRI (RL check standard supporting the level of the RL reported) met acceptance criteria for all Metals. Note CRI not required by Davis QAPP but reviewed as additional support of the lab RLs (criteria set at 70-130%). Tune criteria not applicable for Method 6010C. ICSA/AB met recovery criteria for all ICP metals.

Date: *9/18/12*
Data Reviewer: *Susan D. Chapnick*

New Environmental Horizons, Inc.

Lab: TestAmerica Lab Project #: 360-40968-1

Blanks: No EB included with samples in this SDG. Method blank (MB) & instrument blanks (ICB/CCB) were non-detected for all Metals. No Blank Action required.

LCS/LCSD: Lab performed both LCS and LCS duplicate (LCSD), though LCSD not required in Davis QAPP. LCS/LCSD met acceptance criteria for all Metals for accuracy (based on soil SRM control limits listed by lab on Form 7, consistent with QAPP criteria for this media) and precision (RPD <30% lab criteria).

MS/MSD/MD: Performed on site sample SB-FS-PC-26-14.0-18.0 (360-40968-3) as requested on COC. Note that the COC has separate sample IDs for the MS and MSD; however, the lab used the standard format to report matrix QC as the parent sample ID. All recoveries and RPDs acceptable except as follows. Antimony low MS and MSD recoveries at 52% and 45%, respectively. Post-digest spikes showed acceptable recoveries for all Metals indicating that there was a matrix effect in the field sample for low MS/MSD for antimony (not caused during instrument analysis). Calcium showed slightly high MSD recovery at 129%; however MS recovery was acceptable as was MS/MSD RPD so no action taken based on professional judgment. Aluminum and Iron high MS and MSD recoveries but spikes swamped out (sample concentrations > 4x spike level); therefore, no action required. Mercury RPD exceeded criteria; the lab reported that the mercury concentration in the sample was > 4x the spike level; however, it looks like the lab may have erred in reporting the mercury matrix QC results for the MSD since the native level of mercury in the parent sample SB-FS-PC-26-14.0-18.0 is actually non-detected. Professional judgment was used to take no action for mercury based on acceptable MS recovery of 81% and MSD recovery of 78%.

**ACTION: Estimate (UJ) antimony results in both soil samples due to low MS/MSD recoveries; potential low bias.*

Serial Dilution: Performed on site sample SB-FS-PC-26-14.0-18.0 (360-40968-3) - all % difference results were acceptable.

IS: IS not applicable for Method 6010C.

Sensitivity: All RLs for non-detects met Davis QAPP Table 4-5C for Soil requirements for sensitivity (RL) based on being lower than the PALs (even though some, for example antimony, were > PQLs they were still lower than the PALs). Therefore, sensitivity met project DQOs.

Professional Judgment - Other: None.

Laboratory Narrative: No further issues noted.

Date: *9/18/12*
Data Reviewer: *Susan D. Chapnick*

Lab: TestAmerica Lab Project #: 360-40968-1

FD pair samples: No FD was collected with this set of samples.

FD Precision:

Analyte	Sample	Qual	FD	Qual	Precision RPD* %	Action	Comment
Aluminum					#DIV/0!	none	
Antimony					#DIV/0!	none	
Arsenic					#DIV/0!	none	
Barium					#DIV/0!	none	
Beryllium					#DIV/0!	none	
Cadmium					#DIV/0!	none	
Calcium					#DIV/0!	none	
Chromium					#DIV/0!	none	
Cobalt					#DIV/0!	none	
Copper					#DIV/0!	none	
Iron					#DIV/0!	none	
Lead					#DIV/0!	none	
Magnesium					#DIV/0!	none	
Manganese					#DIV/0!	none	
Mercury					#DIV/0!	none	
Nickel					#DIV/0!	none	
Potassium					#DIV/0!	none	
Selenium					#DIV/0!	none	
Silver					#DIV/0!	none	
Sodium					#DIV/0!	none	
Thallium					#DIV/0!	none	
Vanadium					#DIV/0!	none	
Zinc					#DIV/0!	none	

Date: *9/18/12*
Data Reviewer: *Susan D. Chapnick*

QC & DV Action Criteria for Davis Superfund Site Metals [based on Davis QAPP 2012 & EPA Region I DV guidance]:

Pres./HT:	HT exceedance: J detects; Non-detects: R or UJ based on professional judgment. pH >2 use professional judgment to J detects; UJ non-detects.
Blanks:	Method Blanks and instrument blanks: Metals < RL unless all sample results are > 10 blank level. Detected results < matrix-matched blank level report as "U" (non-detected at level found). Equipment Blank: EB > RL for any metals; qualify associated detected results < 5x EB level as "EB" - potential high bias based on EB contamination.
Tune:	Mass calibration (amu) > QC limit: J/UJ. Mass resolution/peak width (amu) > QC limit: J/UJ. %RSD > QC limit: J/UJ. See EPA SW-846 Method 6020A for Tune criteria. Tune not performed: R all associated data.
ICV/CCV:	Recoveries < 90%: J / UJ; recoveries > 110%: J detects; if severe exceedance <75%: R non-detects; > 160%: R detects.
CRI:	Low-level standard at the level of the RL: % recovery <70%: J / UJ; >130%: J detects.
LCS:	Aqueous: %Recoveries < 80%: J / UJ. %Recoveries > 120%: J detects. %Recoveries < 50%, may R non-detects & J detects but use professional judgment to accept results if MS is in-control indicating acceptable accuracy in sample matrix. Solids: SRM control limits are criteria; J/UJ outside these limits; use professional judgment for severe exceedances of control limits.
ICSA/AB:	Recoveries > 120% or < 80%: J / UJ unless extremely low for ICSAB at <50%: R non-detects / J detects.
MS:	%Recoveries < 75%: J / UJ. %Recoveries > 125%: J detects. %Recoveries < 30%, may R non-detects & J detects but use professional judgment if sample concentration > 2x spike level.
MD:	Groundwater/Surface Water: Results >5xRL: RPD >20%: J/UJ associated results in batch. Results < 5xRL: difference > ±RL, J/UJ associated results. Soil/Sed: Results >5xRL: RPD >35%: J/UJ associated results in batch. Results < 5xRL: difference > ±2xRL, J / UJ associated results.
FD:	Groundwater/Surface Water: Results > 5xRL: RPD > 30%: J/UJ FD results only. Results < 5xRL: difference > ±2xRL,, J/UJ FD results only. Soil/Sed: Results >5xRL: RPD > 50%: J/UJ FD results only. Results <5xRL: use professional judgment.
IS:	Recoveries < 70%: J / UJ; recoveries > 130%: J detects; use professional judgment for severe exceedances.
Serial Dil:	Results > 50xRL: % Difference > 15%: J detects. EPA guidance UJ non-detects; however, use professional judgment on whether it is a suppression or enhancement to qualify associated non-detects.

Qualifiers: U = analyte is non-detect at the sample-specific Reporting Limit (RL) (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.

References: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island;* prepared by ESS Group, Inc., March 23, 2012 (Davis QAPP); Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996, including Part IV – Inorganic Data Validation Functional Guidelines, November 2008; Region I T*iered Organic and Inorganic Data Validation Guidelines* , July 1, 1993 draft; & USEPA SW846 Methods 6010C, 6020, & 7470A/7471A.

Date: *9/18/12*
Data Reviewer: *Susan D. Chapnick*

environmental chemistry consultants

DATA VALIDATION REPORT
EPA Region I Tier II-Type for VOCs, TCL SVOCs, TCL Pesticides, TCL PCBs, & TAL Metals

Client: ESS Group, Inc., East Providence, Rhode Island

Site: Davis Liquid Waste Superfund Site, Smithfield, Rhode Island
Soil Sampling - 2012

Laboratory: TestAmerica Westfield, Westfield, Massachusetts

Lab Project/SDG #: 360-41025-1

Number of Samples: 5 soil samples + 1 Trip Blank for project-specific list of 52 Volatile Organic Compounds (VOCs)
2 soil samples for Target Compound List (TCL) Semivolatile Organic Compounds (SVOCs), TCL Pesticides, TCL Polychlorinated Biphenyls (PCBs), Target Analyte List (TAL) Metals and Percent Solids

Data Reviewers: Nancy C. Rothman, Ph.D., New Environmental Horizons, Inc.
Susan D. Chapnick, M.S., New Environmental Horizons, Inc.

Date: October 2, 2012

EPA Tier II-type Data Validation Review was performed on the data included in this SDG with the following intentions: 1) to determine if the data were generated and reported in accordance with the following documents: *Remedial Design Work Plan and Pre-Design Investigation Plan* (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996 and updates including Part II, III, and IV (Volatile/Semivolatile, Pesticide/PCB, and Inorganic Data Validation Functional Guidelines); EPA *Region I Tiered Organic and Inorganic Data Validation Guidelines*, July 1993, and USEPA SW846 Method 8260C, 8270D, 8081B, 8082A, 6010C, and 7471A 2) to determine if the data met the project data quality objectives for acceptable accuracy, precision, sensitivity; and technical usability; and 3) to update the project database with validated results and appropriate data validation qualifiers.

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The Data Validation Report consists of three parts:

- This Data Validation Report letter summarizing the actions taken;
- The spreadsheet of validated sample results with validation qualifiers based on actions taken; and
- The Data Validation Checklists to document the Tier II-type validations. These Checklists are an integral part of the validation report as they contain comprehensive details of all QC reviewed, the acceptance criteria used, professional judgment and actions taken.

I. Sample Descriptions and Analytical Parameters

The sample IDs, date of sampling, matrix, and sample type (e.g. Field Sample, Field Duplicate, etc., as applicable) and the analytical parameters reviewed are listed below in Table 1.

Table 1. Sample Descriptions and Analytical Parameters

Sample ID	Collection Date	Matrix	Analytical Parameters*	Sample Type
SB-FS-PC-21-11.0-13.0	6/7/2012	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Sample
SB-PCB-7	6/7/2012	Soil	TCL SVOCs, TCL Pesticides, TCL PCBs, TAL Metals	Field Duplicate of SB-FS-PC-21-11.0-13.0
SB-FS-PC-21-12.5-13.0	6/7/2012	Soil	VOCs	Field Sample
SB-FS-PC-21-11.0-11.5	6/8/2012	Soil	VOCs	Field Sample
SB-FS-PC-28-12.5-13.0	6/8/2012	Soil	VOCs	Field Sample
SB-FS-PC-10-17.5-18.0	6/8/2012	Soil	VOCs	Field Sample
SB-FS-PC-24-18.0-18.5	6/8/2012	Soil	VOCs	Field Sample
TB-060812-1	6/8/2012	Water	VOCs	Trip Blank

** Several soil samples were also received in this SDG for Total Organic Carbon (TOC), Particle Size/In Place Density/Particle Density/Porosity, and Cation Exchange Capacity (CEC) analysis. These analyses did not require Tier II-type DV and are not listed herein.*

Analytical method references:

Volatiles:	52 project-specific VOCs by USEPA SW846 Method 8260C that includes the TCL plus diethyl ether and tetrahydrofuran and minus 1,4-dioxane (not required for soils; note 1,4-dioxane was reported in the TB).
Semivolatiles:	TCL SVOCs by USEPA SW846 Method 8270D
Pesticides:	TCL Pesticides by USEPA SW846 Method 8081B
PCBs:	TCL PCB Aroclors by USEPA SW846 Method 8082A
Metals:	TAL Metals by USEPA SW846 Method 6010C (ICP-AES), which includes 22 Metals, plus Mercury by USEPA SW846 Method 7471A Cold Vapor Atomic Absorption (CVAA)

Percent Moisture / Percent Solids were performed and reported for all samples to convert results to dry-weight units.

II. Quality Control Reviewed during Data Validation

The following QC elements, as applicable to the analytical methods, were reviewed during the Tier II-type validation of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals:

- Data package completeness and reporting protocols
- Sample receipt, holding times and preservation criteria
- Blank results including Method Blanks, Equipment Blanks, & Trip blanks
- Laboratory Control Sample (LCS) recoveries / LCS Duplicate Recoveries
- Standard Reference Material (SRM) Recoveries, if applicable
- Surrogate Recoveries
- Matrix Spike (MS) / Matrix Spike Duplicate (MSD) Recoveries
- MS/MSD, LCS/LCSD, and sample/Field Duplicate (FD) Relative Percent Differences (RPDs)
- Sample result reporting (including compound lists, reporting limits, and units)
- Calibration criteria (including tune criteria, initial calibration and continuing calibration verification)
- Internal Standard (IS) Recoveries
- Retention Time windows
- Other method-specific QC if applicable and reported in Summary QC
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

III. Data Validation Report Summary

During the Tier II-type data validation review of VOCs, TCL SVOCs, TCL Pesticides, TCL PCB Aroclors, and TAL Metals, no data were rejected. Several results were negated (U) or estimated (J or UJ) due to QC issues. Table 2 summarizes the actions taken during this data validation review. NEH generated a validated data spreadsheet based on the electronic project database file (EDD) received from ESS for this SDG. All results were considered usable for project decisions compared to the Davis RDWP QAPP requirements with the understanding of the potential uncertainty (bias) in the qualified results presented in Table 2.

The remainder of this report documents "exceptions" to method or QAPP criteria or clarifications of data reported. QC elements not discussed below met all QAPP criteria. The full documentation of all QC elements reviewed during the Tier II-type validations are presented in the attached Data Validation Checklists. Data users should also reference the full Tier III-type data validation performed on soil samples included in SDG 360-40815-1 for additional information on general reporting issues and calculation verification from review of raw data (which is not performed in a Tier II-type validation).

Exceptions from Davis QAPP or Method QC Criteria

- The method blank for VOCs and SVOCs reported results below the Reporting Limit (RL) for methylene chloride and di-n-butylphthalate, respectively. A comparison of the levels in the blank with the levels reported for this compound in the associated samples resulted in the following actions:
  - Methylene chloride was negated (U) in four VOC soil samples, as shown in Table 2, and the results raised to the sample-specific RL.
  - Di-n-butylphthalate was negated (U) in one SVOC sample, as shown in Table 2 and the result was raised to the sample-specific RL.
- The trip blank for VOCs reported a result above the Reporting Limit (RL) for trans-1,2-dichloroethene. A comparison of the levels in the blank with the levels reported for this compound in the associated samples resulted in the following action:
  - Trans-1,2-dichloroethene was negated (U) in one VOC sample, as shown in Table 2, and the result was raised to the sample-specific RL.
- Exceedances of Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) recoveries or RPD were as follows:
  - <u>VOCs</u> – acetone and showed recoveries outside of criteria. Actions taken to estimate (UJ) affected sample result due to VOC LCS/LCSD exceedances are listed in Table 2.
- No site sample in this SDG was identified for Matrix Spike (MS) or Matrix Spike Duplicate (MSD) analyses for VOCs, SVOCs, Pesticides, PCBs, or Metals; therefore, MS/MSD analyses were not performed.
- There was one Field Duplicate (FD) pair included in this SDG for SVOC, Pesticides, PCBs, and Metals analyses: SB-FS-PC-21-11.0-13.0 and SB-PCB-7. All SVOCs, Pesticides, and PCBs were non-detect in both samples; therefore, while these results are consistent with one another, FD precision could not be quantitatively evaluated. FD precision met criteria for the detected Metals results. Therefore, FD precision is considered acceptable for this FD pair for SVOC, Pesticides, PCBs, and Metals. A Field Duplicate (FD) pair was not included in this SDG for VOCs.
- Tetrahydrofuran results were outside of initial and continuing calibration criteria for four VOC samples. Actions to estimate (UJ) results and the potential bias are listed in Table 2.

Sensitivity & Reporting

- The laboratory flagged all results for VOCs that were less than the RL (supported by the low-level standard in the calibration curve) as "J". The "J" qualifier was maintained during validation to indicate that these results were estimated due to uncertainty in quantitation below the calibration range. Affected samples/analytes are listed in Table 2.
- All non-detects for VOCs, SVOCs, and PCBs were below the Project Action Limit (PAL) given in QAPP Tables 4-1C, 4-2C and 4-4B for soils except for 1,2-dibromo-3-chloropropane and ethylene dibromide, as expected, due to method limitations. Therefore, sensitivity data quality objectives (DQOs) were met for these analyses.

- The laboratory reported results for all 21 target Pesticides required, except technical-chlordane was reported instead of alpha-chlordane. The technical-chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. All RLs for Pesticides were less than or equal to the PALs given in QAPP Table 4-3B and therefore met sensitivity requirements with the exception of toxaphene (due to raising the RL during validation). No PAL was defined for technical-chlordane in the site QAPP. The data user will need to evaluate usability of the non-detected toxaphene results with elevated RLs for project uses.
- All non-detects for Metals were below the PALs given in QAPP Table 4-5C for soil. Therefore, sensitivity DQOs were met for Metals.

Table 2. Summary of Data Validation Actions

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
All Pesticide samples	Chlordane (technical) Toxaphene	U		Raised RL
SB-FS-PC-10-17.5-18.0 SB-FS-PC-21-11.0-11.5 SB-FS-PC-24-18.0-18.5 SB-FS-PC-28-12.5-13.0	Tetrahydrofuran	UJ	L	Initial Calibration outside criteria + Low Calibration verification
SB-FS-PC-21-12.5-13.0	Acetone	UJ	L	Low LCS/LCSD recoveries
SB-FS-PC-10-17.5-18.0 SB-FS-PC-21-11.0-11.5 SB-FS-PC-24-18.0-18.5 SB-FS-PC-28-12.5-13.0	Methylene Chloride	U		Negated due to Blank Action
SB-FS-PC-28-12.5-13.0	trans-1,2-Dichloroethene	U		Negated due to Blank Action
SB-FS-PC-21-11.0-11.5 SB-FS-PC-21-12.5-13.0	1,1, 1-Trichloroethane 1,2-Dichlorobenzene	J	I	Result uncertain below the calibration range
SB-FS-PC-24-18.0-18.5	Vinyl chloride	J	I	Result uncertain below the calibration range
SB-FS-PC-28-12.5-13.0	1,2-Dichlorobenzene Chloroethane Trichloroethene	J	I	Result uncertain below the calibration range
SB-FS-PC-21-11.0-13.0	Di-n-butyl phthalate	U		Negated due to Blank Action

Qualifiers: U = Analyte is non-detect at the "LIMIT2" value in the EDD, which is the sample-specific reporting limit (RL); UJ = Non-detect is estimated; J = Result is estimated; R = Result is rejected and is unusable for project decisions.

Bias: L = Low; H = High; I = Indeterminate

Acronyms used in Table 2:
LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample Duplicate
RL = Reporting Limit

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Volatile Tier II-type Data Review Checklist

Lab Project: 360-41025-1

Lab: TestAmerica Westfield
Date Sampled: 6/7/12 & 6/8/12
Method of Analysis: 8260C - EI only (no SIM)

No. Samples: 5 + 1 TB
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 70-130%	LCS/LCSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	MS/MSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√		NA	NA		√		NA	
No			Estimate (UJ) 1 result			Estimate (UJ) 4 results		Accept 8 "J" results		Negate (U) 5 results due to Blank Action

% solids OK? Y
Other Issues: No

Comments:

Method 8260C used for reporting of project-specific list of VOCs. TB sample results were reviewed for potential blank actions (see below); however, full data review of this field QC sample was not performed as these results are not directly used for project decisions.

Samples were received intact at TestAmerica on 6/8/12, the day of and after collection at 4±2°C - there were no COC issues noted by the lab. Samples were properly preserved.

Samples were all analyzed by 6/21/12 - HT met for all samples, No Action required.

Surrogates : All 3 VOC surrogates were recovered within 70-130% in all samples and QC - no Action required

LCS/LCSD: LCS 360-92022/1-A & 2-A. Lab spiked all 52 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable. No action required.

Date: ***9/26/12***

Data Reviewer: ***Deborah A. Loring***

New Environmental Horizons, Inc.

Lab: TestAmerica Westfield

Lab Project: 360-41025-1

Blank Action:

Blanks Reviewed: MB: Water - MB 360-91873/6 Soil - MB 360-92022/4-A
TB: TB060612-1

Blank ID	Contaminant / Level	Matrix Related?	Action Level / Action	Sample and Reported Result		Corrected Result
MB 360-91873/6	None Detected	Y		No Blank Action required		
MB 360-92022/4-A	methylene chloride 9.43 J µg/kg	Y	94.3 µg/kg	SB-FS-PC-10-17.5-18.0	2.8 JB	8.7 U
				SB-FS-PC-21-11.0-11.5	4.3 JB	10 U
				SB-FS-PC-24-18.0-18.5	3.4 JB	9.8 U
				SB-FS-PC-28-12.5-13.0	3.3 JB	11 U
MB 360-92188/3-A	None Detected	Y		No Blank Action required		
TB-060612-1	trans-1,2-dichloroethene 6.2 µg/L	N	31 µg/kg	SB-FS-PC-28-12.5-13.0	2.6 JB	2.8 U

LCS/LCSD:LCS 360-92188/1-A & 2-A. Lab spiked all 52 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). All %Rec and LCS/LCSD RPDs were acceptable except acetone (LCS/LCSD rec. low) and carbon disulfide (LCS/LCSD high). No action required for high sensitivity (carbon disulfide) as it is not detected in the associated sample.

***ACTION: Estimate (UJ) acetone with low bias in the associated sample (SB-FS-PC-21-12.5-13.0).*

MS/MSD: MS/MSD analyses were not performed with this SDG.

FD pair: An FD was not submitted with this SDG.

Tunes: Instrument HP#1 GC/MS. 6/19/12 16:33, 6/21/12 11:08. All tune abundances were acceptable and all samples and standards were analyzed within 12 hours of BFB tune.

Tunes: Instrument HP#3 GC/MS. 6/12/12 11:06, 6/18/12 13:21. All tune abundances were acceptable and all samples and standards were analyzed within 12 hours of BFB tune.

Date: ***9/26/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-41025-1

Additional Notes:

ICAL : HP#1 6/19/12 5-7 level ICAL for all Targets + several non-target compounds. All calibrations met QAPP criteria for Target Compounds (ICAL from 0.5, 1 or 5 up to 160 µg/L. %RSD ≤ 20% or r2 ≥ 0.99 and all RRFs ≥ 0.05. No action required.

CCAL: HP#1 6/21/12 11:31 %D (or %Drift) ≤ ± 20% for all target compounds and RRF > 0.05. No action required.

ICAL : HP#3 6/12/12 5-7 level ICAL for all Targets + several non-target compounds. All calibrations met QAPP criteria for Target Compounds (ICAL from 0.5, 1 or 5 up to 160 µg/L. %RSD ≤ 20% or r2 ≥ 0.99 and all RRFs ≥ 0.05 except tetrahydrofuran RRF < 0.05.

***ACTION: Estimate (UJ) tetrahydrofuran with low bias in associated samples (SB-FS-PC-10-17.5-18.0, SB-FS-PC-21-11.0-11.5, SB-FS-PC-24-18.0-18.5, and SB-FS-PC-28-12.5-13.0) due to low sensitivity in initial calibration.*

CCAL: HP#3 06/18/2012 13:44 %D (or %Drift) ≤ ± 20% for all target compounds and RRF ≥ 0.05 except Tetrahydrofuran RRF < 0.05.

***ACTION: Estimate (UJ) tetrahydrofuran with low bias in associated samples (SB-FS-PC-10-17.5-18.0, SB-FS-PC-21-11.0-11.5, SB-FS-PC-24-18.0-18.5, and SB-FS-PC-28-12.5-13.0) due to low sensitivity in calibration verification.*

IS: All 4 IS Areas and RTs were in criteria - No Action required.

Lab reported results for m- Xylene & p-Xylene (reported as a single entry due to coelution) and o-Xylene in addition to Xylenes, total, as requested in the QAPP. All 52 project-specific VOCs were reported so with the added Xylenes, a total of 54 VOC results reported per soil sample. Note that bromodichloromethane, as listed in Table 4-1C, is called dichlorobromomethane in EDD and data and Dibromochloromethane, as listed in Table 4-1C, is called chlorodibromomethane in EDD and data.

8 results were reported at levels < RL and were flagged "J" by the lab (not including the 5 results negated due to blank action). These 8 "J" results were accepted for reporting with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

All RLs were at or below the PQLs and PALs required in the QAPP Table 4-1C for all samples except 1,2-dibromo-3-chloropropane and ethylene dibromide, as expected, due to method limitations.

Lab Narrative: included a note that one sample was received with a "significantly different initial weight than that required by the reference method" according to the lab narrative. The method requires a 1:1 ratio of soil to DI Water. No action required as calculations included all sample-specific weights.

Date: ***9/26/12***

Data Reviewer: ***Deborah A. Loring***

8260C and Project Action Summary:

Preservation:	Waters - headspace present or received at > 10°C, J det / J NDs or R ND Soils/Sediment - EnCore extrusion and sample preservation unacceptable or received at > 10°C, J det / J NDs or R ND Waters - pH < 2; 14d <HT≤ 28d; J det/ J NDs; HT >28d, J det/R ND Soils/Sediment - 14d <HT< 28d; J det/ J NDs; HT >28d, J det/R ND
Surrogates:	Surr. %Rec > 130%, J det/Accept ND; 10% ≤ %Rec < 70%, J det/J NDs;
LCS	%Rec<10%, J det/ R NDs; 10% <%Rec<70, J det/ J NDs; %Rec >130, J det/Accept NDs. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. LCS must contain all targets.
Tunes:	Samples analyzed within 12-hrs and criteria met per Method 8260C. If out, use professional judgment.
ICAL:	minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs. If avg. RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
CCAL:	%D (or %Drift) > - 20% , J det/J ND; %D (or %Drift) > +20%, J det/Accept ND. If RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
Blanks:	Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for acetone, 2-butanone, and methylene chloride which are 10 x value in blank.
MS/MSD:	%Rec<10%, J det/ R NDs; 10% <%Rec<70%, J det/ J NDs; %Rec >130%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. MS/MSD must contain all targets.
FD:	Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data
IS:	20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs
QLs:	Verify RLs met RLs and PALs given in QAPP; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.
TICs:	Not required
% solids:	If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs
Narrative:	If there are any issues raised in narrative not previously addressed, take appropriate action
Reference:	*Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8260C

Date: ***9/26/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Semivolatile Tier II-type Data Review Checklist

Lab Project: 360-41025

Lab: TestAmerica Westfield
Date Sampled: 6/7/12
Method of Analysis: 8270D

No. Samples: 1 + 1 FD
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates w: 30-130%BN 15-110% Acid s: 30-130%	LCS 40-140%BN 30-130%Acid	MS/MSD 40-140%BN 30-130%Acid w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√	√	NA	√	√	√	√	NA	
No										Negate (U) 1 result due to Blank Action

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 6/8/12, the day after sample collection, at 4±2°C - there were no COC issues noted by the lab.

All samples were extracted on 6/18/12 and analyzed by 6/21/12. Holding times met - no action required.

Surrogates : All 3BN and 3 Acid Surrogates were recovered within QAPP Criteria in all field and QC samples. No action required.

LCS/LCSD :LCS 360-92057/2-A & 3-A. Lab spiked all 67 target analytes requested in LCS. All spiked target compounds reported acceptable %Rec and LCS/LCSD RPD - no action required.

MS/MSD: MS/MSD analyses were not performed in this SDG.

FD pair: SB-FS-PC-21-11.0-13.0 / SB-PCB-7. All SVOCs were non-detect in both samples; therefore, while these results are consistent with one another, unable to quantitatively evaluate FD precision based on calculation of RPD. FD precision considered acceptable for this FD pair.

Date: ***9/27/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-41025

Blank Action:

Blanks Reviewed: MB: MB 360-92057/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-92057/1-A	di-n-butylphthalate 138 J µg/kg	Y		1380 µg/kg		SB-FS-PC-21-11.0-13.0 64 JB	180 U

Tunes: Instrument B 6/19/12 15:43, 6/20/12 13:55. All abundances were acceptable and all samples were analyzed within 12 hours of tune - No Action required

ICAL : 6/19/12 Inst. B, 7- to 10- level ICAL performed from 0.2 to 25 µg/mL (for full 10-level) for all Targets + several non-target compounds. Form VI flagged several results as not meeting minimum RRF criteria; however, lab used CLP criteria and not QAPP criteria. %RSD $\leq$ 20% or r2 $\geq$ 0.99 for all and all RRFs $\geq$ 0.05.

CCALs: Inst. B 06/20/2012 14:27 %D or %Drift $\leq \pm$ 20% and RRF $\geq$ 0.05 for all target compounds.

IS: All 6 IS Areas and RTs were in criteria for all analyses.

Lab reported results for all 67 target SVOCs required. The lab reported 3&4-methylphenol rather than 4-methylphenol as the two co-elute. All RLs reported were less than or equal to the PQLs given in QAPP Table 4-2C except di-n-butylphthalate and bis-2-ethylhexylphthalate in all samples.

No results were reported at levels < RL.

All non-detects were reported at levels below the PALs given in Table 4-2C for all samples.

Date: ***9/27/12***

Data Reviewer: ***Deborah A. Loring***

8270D and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: waters: BN 30 - 130%, acids 15-110%; solids: all surrogates 30-130%
2 BN or 2 Acids Recovery > Criteria, J det/Accept ND; 10% ≤ 2 or more surrogates < Criteria, J det/J NDs;
Recovery < 10%, J det/R NDs. Action taken on Acid and/or BN analytes based on Surrogates out.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs.

Tunes: Samples analyzed within 12-hrs and criteria met per Table 3 or Method 8270C. If out, use professional judgment.

ICAL: minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs; min. RRF < 0.05, J det/UJ NDs.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank

Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for phthalates which are 10 x value in blank.

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs- Unspiked Sample only. RPD > Limit, J det/UJ NDs.
MS/MSD must contain all targets.

FD: Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data

IS: 20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs

QLs: Verify RLs met QAPP QLs ; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

TICs: Not required

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8270D

Date: ***9/27/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
PCB Tier II-type Data Review Checklist

Lab Project # 360-41025

Lab: TestAmerica Westfield
Date Sampled: 6/7/12
Method of Analysis: 8082A

No. Samples: 1 + 1 FD
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 40-140% RPD ≤ 30%	FD w:RPD≤30% s:RPD≤50%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)	Other (pattern match, etc.)
Yes	√	√	√	NA	√	√	√	√	----
No									

% solids OK? Y
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 6/8/12, the day after collection at 4±2°C - there were no COC issues noted by the lab.

Samples were extracted on 6/13/12 - HT met for extraction. All extracts were analyzed by 6/14/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - no action required. Note, lab used in-house criteria for recovery of surrogates; QAPP criteria used to determine data acceptance.

LCS/LCSD: LCS 360-91886/2-A & 3-A Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec for AR1016 & AR1260 in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD: MS/MSD analyses were not performed in this SDG.

Date: ***9/27/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-41025

Blank Action:

Blanks Reviewed: MB: MB 360-91886/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91886/1-A	None					No Blank Action required	

Additional Notes:

FD pair: SB-FS-PC-21-11.0-13.0 / SB-PCB-7. All PCBs were non-detect in both samples; therefore, while these results are consistent with one another, unable to quantitatively evaluate FD precision based on calculation of RPD. FD precision considered acceptable for this FD pair.

ICAL: Instrument U 6/13/12 6-level calibration from 50 to 2000 µg/L for Ar 1016/1260 and a single point calibration at 1000 µg/L for Ar-1221/1254, Ar-1232, Ar-1242, Ar-1248, Ar-1262, Ar-1268. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), linear regression performed for Ar-1016 & 1260 on both columns, and r2 > 0.99. Valid ICAL - no action required.

CCALs : CCVRT 360-91901/1 on 06/14/2012 09:11 (Opening CCV): All %D $\leq \pm$ 20% on both GC columns for all Aroclor peaks CCV 360-91901/15 on 06/14/2012 14:55: All %D < $\pm$ 20% on both GC columns for all Aroclor peaks except Ar-1016-2 (+22.3%) Average OK on GC Column 1, and all peaks high (Average Ar-1016 +32.8%, Ar-1260 +28.2%) on GC Column 2. A positive %D indicates increased sensitivity to detection during CCAL as compared to sensitivity during ICAL; therefore, since all samples were non-detect for these compounds, no action for enhanced sensitivity in CCVs (i.e. non-detects accurate as reported).

Lab reported the lowest of the two column values. Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. No PCBs reported in samples - no action required.

RLs for field duplicate SB-PCB-7 reported were slightly above the PQLs given in QAPP Table 4-C (RLs 110 µg/kg vs. 100 µg/kg), due to % solids.

All RLs reported were less than or equal to the PALs given in QAPP Table 4-C.

All chromatograms for all samples visually inspected and appear to have been reported correctly.

Date: ***9/27/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-41025

Additional Notes:

Narrative did not raise any issues not already addressed.

Date: *9/27/12*

Data Reviewer: *Deborah A. Loring*

8082A and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs- Unspiked Sample only. RPD > 30% solids, J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multi-components), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multi-components) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8082A

Date: ***9/27/12***
Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Pesticide Tier II-type Data Review Checklist

Lab Project # 360-41025

Lab: TestAmerica Westfield
Date Sampled: 6/7/12
Method of Analysis: 8081B

No. Samples: 1 + 1 FD
Matrix: Soil

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 30-150% w: RPD≤20% sr:RPD≤30%	FD w:RPD≤30% s:RPD≤50%	RCM (Resolve. > 60%)	PEMs Brkdwn< 15% %D ≤ ± 15%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)
Yes	√	√	√	NA	√	√	√	√	√	√
No										

% solids OK? Y
Other Issues: No

Technical chlordane was reported instead of alpha-chlordane. Low-level initial calibration for Toxaphene and Technical chlordane did not support the lab-reported RL - action taken to raise RL for Toxaphene and Technical chlordane (see page 2).

Comments:

Samples were received intact at TestAmerica on 6/8/12, the day after collection, at 4±2°C - there were no COC issues noted by the lab.

Samples were extracted on 6/13/12 and analyzed by 6/15/12 within 40 days of extraction; therefore, No Action required.

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC - No Action required. Note, lab used in-house criteria for recovery of surrogates; QAPP criteria used to determine data acceptance.

LCS/LCSD: LCS 360-91886/4-A & 5-A. Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD : MS/MSD analyses were not performed in this SDG.

FD pair: SB-FS-PC-21-11.0-13.0 / SB-PCB-7. All Pesticides were non-detect in both samples; therefore, while these results are consistent with one another, unable to quantitatively evaluate FD precision based on calculation of RPD. FD precision considered acceptable for this FD pair.

Date: ***9/27/12***
Data Reviewer: ***Deborah A. Loring***

Lab Project # 360-41025

Lab: TestAmerica Westfield

Blank Action: Blanks Reviewed: MB: MB 360-91886/1-A
No EB

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-91886/1-A	None					No Blank Action required	

Additional Notes:

Resolution Check : RCM not analyzed per se; however, CCALs reviewed and all peaks appear to be adequately resolved - No Action required

PEM DDT and Endrin Breakdown evaluations: PEM 360-91842/1 06/15/2012 16:06, 6/20/12 12:17 - %Breakdown for DDT and Endrin ≤ 15% + Combined Breakdown was ≤ 30% on each GC Column. No Action required.

ICAL: Instrument H 6/7/12 7-level from 1 to 100 µg/L for single-component Pesticides (some extras not required for project) + surrogates and 3-level from 500 to 2,500 µg/L for Toxaphene and Technical Chlordane. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), %RSD ≤ 20% or r2 ≥ 0.99 for all compounds. Several compounds used regression analysis for calibration on Columns 1 & 2. Valid ICAL - no action required.

CCALs : CCVRT 360-91992/2 on 06/15/2012 16:27 (Opening CCV for single-components), CCVRT 360-91992/3 on 06/15/2012 16:48 (Technical Chlordane), and CCVRT 360-91992/4 on 06/15/2012 17:10 (Toxaphene) - all %D ≤ ±20% on both GC columns for all Pesticides except Endrin aldehyde (+21.0%) on GC Column 2. CCV 360-91992/21 on 6/15/2012 23:45 all %D ≤ ±20% on both GC columns for all Pesticides except DDD (+24.7%) on GC Column 1 and DDD (+22.7%), d-BHC (+23.6%), DDE (+23.6%) and Endrin aldehyde (+28.2%) on GC Column 2. CCVRT 360-92153/2 on 06/20/2012 (Opening CCV for single-components), 12:38 CCVRT 360-92153/3 06/20/2012 13:00 (Technical chlordane), and CCVRT 360-92153/4 06/20/2012 13:21 (Toxaphene) : all %D ≤ ±20% on both GC columns for all Pesticides except Endrin (+32.7%) and Technical Chlordane (-25.3%) on GC Column 1. CCV 360-92153/10 06/20/2012 16:38: all %D ≤ ±20% on both GC columns for all Pesticides except Endrin (+32.7%), DDT (-32.4%), and methoxychlor (-23.8%) on GC Column 1 and Endosulfan I (+24.2%) on GC Column 2. A positive %D indicates increased sensitivity to detection during CCAL as compared to sensitivity during ICAL; therefore, since all samples were non-detect for these compounds, no action for enhanced sensitivity in CCVs (i.e. non-detects accurate as reported). No action required for negative %Ds as in all cases one column was within limits, and none of the compounds were detected in the samples.

Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. Since Form X used to express LCS results only, since all samples were non-detect for all Pesticides, no action required.

The narrative did not raise any issues not already addressed.

Date: ***9/27/12***
Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project # 360-41025

Additional Notes:

All RLs reported were less than or equal to the PQLs given in QAPP Table 4-3B except for aldrin, dieldrin and toxaphene in all samples. No PQL was defined for Technical chlordane in the QAPP.

Lab reported results for all 21 target Pesticides required, except technical chlordane was reported instead of alpha-chlordane. The technical chlordane and toxaphene RLs were raised by a factor of 2.5 as the lowest calibration standards did not support the reported RLs. The resulting RL was above the PAL for Toxaphene in all samples. All other RLs reported were less than or equal to the PALs given in QAPP Table 4-3B. No PAL was defined for Technical chlordane in the site QAPP.

Date: *9/27/12*
Data Reviewer: ***Deborah A. Loring***

8081B and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

RCM: RCM < 60% resolution, J detects based on technical judgment

PEM: 4,4'-DDT breakdown > 15%, J detected DDT, DDE, DDD; R ND 4,4'-DDT and accept ND DDE & DDD
Endrin breakdown > 15%, J detected Endrin, Endrin Aldehyde & Endrin Ketone; R ND Endrin and accept ND Endrin Aldehyde & Endrin Ketone
4,4'-DDT and Endrin > 30%, accept NDs of breakdown products and J detects for 4,4'-DDT and Endrin; J detects of breakdown products and reject (R) non-detects for 4,4'-DDT and Endrin.
%D> ± 20%, J det/J ND on a per column basis. % Resolution < 90.0% qualify data based on professional judgment.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<30%, J det/ J NDs; %Rec >150%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters (or 30% solids), J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multicomponents), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multicomponents) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8081B

Date: ***9/27/12***
Data Reviewer: ***Deborah A. Loring***

RDWP - Davis Liquid Waste Superfund Site
EPA Region I Tier II-type DV Checklist - Metals

Lab: TestAmerica-Westfield, Westfield, MA
Date Sampled: 6/07/12
Analysis: Metals by EPA SW-846 Method 6010C & 7471A

Lab Project # 360-41025-1
No. Samples: 2
Matrix: Soil

QC Met Criteria?		HT and Preserve	RL QAPP PALs	Tune 6020 criteria	Calibration ICV/CCV 90-110%R	CRI RL Check 70-130%R	EB MB < RL	LCS/LCSD SRM limits RPD ≤ 30%	ICSA/AB 80-120% R	MS / MSD 75-125% R	MD RPD ≤ 20%	FD RPD ≤ 30%	IS 6020 70-130% R	Serial Dilution ± 15% D
Yes		√	√	NA	√	√	√	√	√	NA	NA	√	NA	NA
No														

Soils for Target Analyte List (TAL) of 23 Metals: Mercury by CVAA SW846 Method 7471A; and Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, & Zinc by ICP-AES Method 6010C.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data for Tier II level in accordance with the Davis QAPP (ESS 2012) & EPA Region 1 present in the data package? ***Yes.***

2. Were all result forms for all samples listed on the chain-of-custody present in data package? ***Yes***.

Chain-of-Custody (COC): 2 soil samples received for Total TAL Metals - received at lab on 6/08/12 (one day after sample collection) and intact. Documentation acceptable.

Preservation: Samples received at 2.2°C on ice. Acceptable preservation for soils.

Holding Time (HT): ICP-AES 6010C analysis 6/15/12; CVAA 7471A analysis 6/18/12. Acceptable HT.

Calibration Criteria: ICV/CCV and CRI (RL check standard supporting the level of the RL reported) met acceptance criteria for all Metals. Note CRI not required by Davis QAPP but reviewed as additional support of the lab RLs (criteria set at 70-130%). Tune criteria not applicable for Method 6010C. ICSA/AB met recovery criteria for all ICP metals.

Date: *10/01/12*
Data Reviewer: *Susan D. Chapnick*

New Environmental Horizons, Inc.

Lab: TestAmerica Lab Project #: 360-41025-1

Blanks: No EB included with samples in this SDG. Method blank (MB) & instrument blanks (ICB/CCB) were non-detected for all metals; therefore, no blank actions were required.

LCS/LCSD: Lab performed both LCS and LCS duplicate (LCSD), though LCSD not required in Davis QAPP. LCS/LCSD met acceptance criteria for all Metals for accuracy (based on soil SRM control limits listed by lab on Form 7, consistent with QAPP criteria for this media) and precision (RPD <30% lab criteria).

MS/MD: No site-sample MS/MD was identified to be performed in this SDG.

Serial Dilution: No serial dilution on a site sample was performed in this SDG.

IS: IS not applicable for Method 6010C.

Sensitivity: All RLs for non-detects met Davis QAPP Table 4-5C for Soil requirements for sensitivity (RL) based on being lower than the PALs (even though some, for example antimony, were > PQLs they were still lower than the PALs). Both samples SB-FS-PC-21-11.0-13.0 and SB-PCB-7 were analyzed at 2x dilutions during analysis (samples had high levels of iron) but all non-detects were still < PALs. Therefore, sensitivity met project DQOs.

Professional Judgment - Other: None.

Laboratory Narrative: No further issues noted.

Lab: TestAmerica Lab Project #: 360-41025-1

FD pair samples: The two samples in this SDG were FDs: SB-FS-PC-21-11.0-13.0 and SB-PCB-7. FD precision met criteria. See following table for calculations.

FD Precision (concentration units = mg/Kg dry-weight):

Analyte	Sample SB-FS-PC-21-11.0-13.0	Qual	FD SB-PCB-7	Qual	Precision RPD* %	Action	Comment
Aluminum	8700		6300		32	none	
Antimony	1.1	U	1.2	U	NC	none	
Arsenic	2.2	U	2.4	U	NC	none	
Barium	98		62		45	none	
Beryllium	0.44	U	0.48	U	NC	none	
Cadmium	0.44	U	0.48	U	NC	none	
Calcium	2300		1900		19	none	
Chromium	7.4		8.4		13	none	
Cobalt	4.9		3.4		36	none	
Copper	10		5.4		60	none	Result <5xRL and difference <2xRL; no action taken
Iron	20000		14000		35	none	
Lead	1.6		1.6		0	none	
Magnesium	2800		2200		24	none	
Manganese	270		190		35	none	
Mercury	0.082	U	0.12	U	NC	none	
Nickel	5.3		4.2		23	none	
Potassium	3700		2400		43	none	
Selenium	1.1	U	1.2	U	NC	none	
Silver	1.1	U	1.2	U	NC	none	
Sodium	220	U	240	U	NC	none	
Thallium	2.2	U	2.4	U	NC	none	
Vanadium	15		12		22	none	
Zinc	60		43		33	none	

Date: *10/01/12*
Data Reviewer: *Susan D. Chapnick*

QC & DV Action Criteria for Davis Superfund Site Metals [based on Davis QAPP 2012 & EPA Region I DV guidance]:

Pres./HT:	HT exceedance: J detects; Non-detects: R or UJ based on professional judgment. pH >2 use professional judgment to J detects; UJ non-detects.
Blanks:	Method Blanks and instrument blanks: Metals < RL unless all sample results are > 10 blank level. Detected results < matrix-matched blank level report as "U" (non-detected at level found). Equipment Blank: EB > RL for any metals; qualify associated detected results < 5x EB level as "EB" - potential high bias based on EB contamination.
Tune:	Mass calibration (amu) > QC limit: J/UJ. Mass resolution/peak width (amu) > QC limit: J/UJ. %RSD > QC limit: J/UJ. See EPA SW-846 Method 6020A for Tune criteria. Tune not performed: R all associated data.
ICV/CCV:	Recoveries < 90%: J / UJ; recoveries > 110%: J detects; if severe exceedance <75%: R non-detects; > 160%: R detects.
CRI:	Low-level standard at the level of the RL: % recovery <70%: J / UJ; >130%: J detects.
LCS:	Aqueous: %Recoveries < 80%: J / UJ. %Recoveries > 120%: J detects. %Recoveries < 50%, may R non-detects & J detects but use professional judgment to accept results if MS is in-control indicating acceptable accuracy in sample matrix. Solids: SRM control limits are criteria; J/UJ outside these limits; use professional judgment for severe exceedances of control limits.
ICSA/AB:	Recoveries > 120% or < 80%: J / UJ unless extremely low for ICSAB at <50%: R non-detects / J detects.
MS:	%Recoveries < 75%: J / UJ. %Recoveries > 125%: J detects. %Recoveries < 30%, may R non-detects & J detects but use professional judgment if sample concentration > 2x spike level.
MD:	Groundwater/Surface Water: Results >5xRL: RPD >20%: J/UJ associated results in batch. Results < 5xRL: difference > ±RL, J/UJ associated results. Soil/Sed: Results >5xRL: RPD >35%: J/UJ associated results in batch. Results < 5xRL: difference > ±2xRL, J / UJ associated results.
FD:	Groundwater/Surface Water: Results > 5xRL: RPD > 30%: J/UJ FD results only. Results < 5xRL: difference > ±2xRL,, J/UJ FD results only. Soil/Sed: Results >5xRL: RPD > 50%: J/UJ FD results only. Results <5xRL: use professional judgment.
IS:	Recoveries < 70%: J / UJ; recoveries > 130%: J detects; use professional judgment for severe exceedances.
Serial Dil:	Results > 50xRL: % Difference > 15%: J detects. EPA guidance UJ non-detects; however, use professional judgment on whether it is a suppression or enhancement to qualify associated non-detects.

Qualifiers: U = analyte is non-detect at the sample-specific Reporting Limit (RL) (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.

References: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island;* prepared by ESS Group, Inc., March 23, 2012 (Davis QAPP); Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996, including Part IV – Inorganic Data Validation Functional Guidelines, November 2008; Region I T*iered Organic and Inorganic Data Validation Guidelines* , July 1, 1993 draft; & USEPA SW846 Methods 6010C, 6020, & 7470A/7471A.

Date: *10/01/12*
Data Reviewer: *Susan D. Chapnick*

environmental chemistry consultants

DATA VALIDATION REPORT
EPA Region I Tier II-Type for VOCs, TCL SVOCs, TCL Pesticides, & TAL Metals

Client: ESS Group, Inc., East Providence, Rhode Island

Site: Davis Liquid Waste Superfund Site, Smithfield, Rhode Island
Groundwater Sampling - 2012

Laboratory: TestAmerica Westfield, Westfield, Massachusetts

Lab Project/SDG #: 360-42131-1

Number of Samples: 15 groundwater samples + 3 Trip Blanks + 1 Equipment Blank (EB) for project-specific list of 53 Volatile Organic Compounds (VOCs)
4 groundwater samples + 1 EB for Target Compound List (TCL) Semivolatile Organic Compounds (SVOCs), TCL Pesticides, & Target Analyte List (TAL) Metals

Data Reviewers: Nancy C. Rothman, Ph.D., New Environmental Horizons, Inc.
Susan D. Chapnick, M.S., New Environmental Horizons, Inc.

Date: November 29, 2012

EPA Tier II-type Data Validation Review was performed on the data included in this SDG with the following intentions: 1) to determine if the data were generated and reported in accordance with the following documents: *Remedial Design Work Plan and Pre-Design Investigation Plan* (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996 and updates including Part II, III, and IV (Volatile/Semivolatile, Pesticide/PCB, and Inorganic Data Validation Functional Guidelines); EPA *Region I Tiered Organic and Inorganic Data Validation Guidelines*, July 1993, and USEPA SW846 Method 8260C, 8270D, 8081B, 6010C, 6020, and 7470A 2) to determine if the data met the project data quality objectives for acceptable accuracy, precision, sensitivity; and technical usability; and 3) to update the project database with validated results and appropriate data validation qualifiers.

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The Data Validation Report consists of three parts:

- This Data Validation Report letter summarizing the actions taken;
- The spreadsheet of validated sample results with validation qualifiers based on actions taken; and
- The Data Validation Checklists to document the Tier II-type validations. These Checklists are an integral part of the validation report as they contain comprehensive details of all QC reviewed, the acceptance criteria used, professional judgment and actions taken.

I. Sample Descriptions and Analytical Parameters

The sample IDs, date of sampling, matrix, and sample type (e.g. Field Sample, Field Duplicate, etc., as applicable) and the analytical parameters reviewed are listed below in Table 1.

Table 1. Sample Descriptions and Analytical Parameters

Sample ID	Collection Date	Matrix	Analytical Parameters*	Sample Type
GW-FS-OW-094-O-080912	8/9/2012	GW	VOCs, TCL SVOCs, TCL Pesticides, & TAL Metals	Field Sample
GW-FS-OW-094-R-080912	8/9/2012	GW	VOCs, TCL SVOCs, TCL Pesticides, & TAL Metals	Field Sample
GW-FS-OW-093-O-080912	8/9/2012	GW	VOCs, TCL SVOCs, TCL Pesticides, & TAL Metals	Field Sample
GW-FS-OW-300-080912	8/9/2012	GW	VOCs, TCL SVOCs, TCL Pesticides, & TAL Metals	Field Sample
TB-081012-1	8/9/2012	Water	VOCs	Trip Blank
EB-081012	8/10/2012	Water	VOCs, TCL SVOCs, TCL Pesticides, & TAL Metals	Equipment Blank
GW-FS-PCD-3-081012	8/10/2012	GW	VOCs	Field Sample
GW-FS-PC-3(S)-081012	8/10/2012	GW	VOCs	Field Sample
GW-FS-PC-2(S)-081012	8/10/2012	GW	VOCs	Field Sample
GW-FS-OWD-3	8/10/2012	GW	VOCs	Field Duplicate of GW-FS-PC-2(S)-081012
GW-FS-PCD-2-081012	8/10/2012	GW	VOCs	Field Sample

Table 1. Sample Descriptions and Analytical Parameters - *continued*

Sample ID	Collection Date	Matrix	Analytical Parameters*	Sample Type
GW-FS-PCD-1-081012	8/10/2012	GW	VOCs	Field Sample
GW-FS-PC-8(S)-081012	8/10/2012	GW	VOCs	Field Sample
TB-081312-1	8/10/2012	Water	VOCs	Trip Blank
GW-FS-PC-20(D)-081312	8/13/2012	GW	VOCs	Field Sample
GW-FS-PC-20(S)-081312	8/13/2012	GW	VOCs	Field Sample [used for VOC MS/MSD]
GW-FS-PC-11(D)-081312	8/13/2012	GW	VOCs	Field Sample [used for VOC MS/MSD]
GW-FS-PC-11(S)-081312	8/13/2012	GW	VOCs	Field Sample
TB-081312-2	8/13/2012	Water	VOCs	Trip Blank

*Non-target parameters including alkalinity, chloride, nitrate, nitrite, sulfate, sulfide, and total organic carbon (TOC) were also reported in this SDG. These parameters were not formally validated by NEH; however, see the report section "Non-Target Parameters" below for further information.

Analytical method references:

Volatiles: 53 project-specific VOCs by USEPA SW846 Method 8260C that includes the TCL plus diethyl ether and tetrahydrofuran. 1,4-Dioxane reported from Selected Ion Monitoring (SIM) analysis and all other VOCs from full scan Electron Impact (EI) analysis.

Semivolatiles: TCL SVOCs by USEPA SW846 Method 8270D

Pesticides: TCL Pesticides by USEPA SW846 Method 8081B

Metals: TAL Metals by USEPA SW846 Method 6010C (ICP-AES) and 6020 (ICP-MS), which includes 22 Metals, plus Mercury by USEPA SW846 Method 7470A Cold Vapor Atomic Absorption (CVAA)

II. Quality Control Reviewed during Data Validation

The following QC elements, as applicable to the analytical methods, were reviewed during the Tier II-type validation of VOCs, TCL SVOCs, TCL Pesticides, and TAL Metals:

- Data package completeness and reporting protocols
- Sample receipt, holding times and preservation criteria
- Blank results including Method Blanks, Equipment Blanks, & Trip blanks
- Laboratory Control Sample (LCS) recoveries / LCS Duplicate Recoveries
- Standard Reference Material (SRM) Recoveries, if applicable
- Surrogate Recoveries
- Matrix Spike (MS) / Matrix Spike Duplicate (MSD) Recoveries
- MS/MSD, LCS/LCSD, and sample/Field Duplicate (FD) Relative Percent Differences (RPDs)
- Sample result reporting (including compound lists, reporting limits, and units)
- Calibration criteria (including tune criteria, initial calibration and continuing calibration verification)
- Internal Standard (IS) Recoveries
- Retention Time windows
- Other method-specific QC if applicable and reported in Summary QC
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

III. Data Validation Report Summary

During the Tier II-type data validation review of VOCs, TCL SVOCs, TCL Pesticides, and TAL Metals, no data were rejected. Several results were negated (U) or estimated (J or UJ) due to QC issues. Table 2 summarizes the actions taken during this data validation review. NEH generated a validated data spreadsheet based on the electronic project database file (EDD) received from ESS for this SDG. All results were considered usable for project decisions compared to the Davis RDWP QAPP requirements with the understanding of the potential uncertainty (bias) in the qualified results presented in Table 2.

The remainder of this report documents "exceptions" to method or QAPP criteria or clarifications of data reported. QC elements not discussed below met all QAPP criteria. The full documentation of all QC elements reviewed during the Tier II-type validations are presented in the attached Data Validation Checklists. Data users should also reference the full Tier III-type data validation performed on groundwater samples included in SDG 360-40379-1 for additional information on general reporting issues and calculation verification from review of raw data (which is not performed in a Tier II-type validation).

Exceptions from Davis QAPP or Method QC Criteria

- One sample cooler was received with temperature exceeding 6°C, which is the upper acceptance limit in the QAPP. However, all samples were received on-ice; therefore, professional judgment was used to consider the temperature preservation acceptable and no action was taken.
- Chloroform was detected in the equipment blank (EB-081012), di-n-butylphthalate was detected in the SVOC method blank, and barium was detected in a Metals instrument blank. A

comparison of the levels in the blanks with the levels reported for these compounds in the associated samples resulted in the following actions (as listed in Table 2):
  - Chloroform was negated (U) in 2 samples and the results raised to the sample-specific reporting limits.
  - di-n-Butylphthalate was negated (U) in all samples and the results raised to the sample-specific reporting limits.
  - Barium was negated (U) in one sample at the level found.
- Exceedances of Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) recoveries or RPD are as follows:
  - VOCs – carbon disulfide, 2-butanone and cis-1,2-dichloroethene showed recoveries outside of criteria in various samples. Actions taken to estimate (J or UJ) affected sample results due to VOC LCS/LCSD exceedances are listed in Table 2.
  - SVOC – 1,2,4,5-tetrachlorobenzene, hexachloroethane, hexachlorocyclopentadiene, hexachlorobutadiene, caprolactam, and phenol showed recoveries and/or precision outside of criteria in various samples. Actions taken to estimate (J or UJ) affected sample results due to SVOC LCS/LCSD exceedances are listed in Table 2.
- Matrix Spike (MS) and Matrix Spike Duplicate (MSD) analyses for VOCs were performed on sample GW-FS-PC-20(S)-081312, identified for matrix QC on the chain-of-custody (COC) and on sample GW-FS-PC-11(D)-081312. Note that the lab did not use the field sample ID listed on the chain-of-custody for the MS or MSD samples; instead they used the "parent" sample ID for these matrix QC so that all three sets of results have the same field sample IDs. Accuracy (based on % recovery) and precision (based on RPD) were acceptable for all compounds/analytes except as follows:
  - VOCs – 2-butanone, bromoform, and cis-1,2-dichloroethene showed MS/MSD recovery exceedances in GW-FS-PC-20(S)-081312. Actions taken to estimate (J or UJ) affected sample results are listed in Table 2.
  - VOCs – 2-butanone, acetone, carbon disulfide, cyclohexane and methylcyclohexane showed MS/MSD % recovery and/or RPD exceedances in GW-FS-PC-11(D)-081312. Actions taken to estimate (J or UJ) affected sample results are listed in Table 2.
- MS and MSD analyses were not performed on site samples in this SDG for SVOCs, Pesticides, or Metals.
- Various initial and continuing calibrations reported results which were outside of criteria for VOCs and SVOCs. Actions to estimate (J or UJ) results and the potential bias are listed in Table 2.
- There was one Field Duplicate (FD) pair included in this SDG for VOCs only: GW-FS-PC-2(S)-081012 and GW-FS-OWD-3. The FD results indicate acceptable overall precision and representativeness for VOCs in the site groundwater matrix at the FD location sampled.
- There was no FD included in this SDG for SVOCs, Pesticides, or Metals.

Sensitivity & Reporting

- The laboratory flagged all results for VOCs and SVOCs that were less than the RL (supported by the low-level standard in the calibration curve) as "J". The "J" qualifier was maintained during validation to indicate that these results were estimated due to uncertainty in quantitation below the calibration range. Affected samples/analytes are listed in Table 2.
- All non-detects for VOCs were below the Project Action Limit (PAL) given in QAPP Table 4-1A except for the following compounds:
  - All samples: 1,2-dibromo-3-chloropropane and ethylene dibromide due to method limitations.

- GW-FS-OW-094-R-080912 (360-42131-2): 1,1,2-trichloroethane, 1,2-dichloroethane, 1,2-dichloropropane, benzene, bromoform, carbon tetrachloride, dibromochloromethane, bromodichloromethane, methyl-t-butyl ether (MTBE), methylene chloride, and tetrachloroethene.
- GW-FS-OW-093-O-080912 (360-42131-3): 1,1,2-trichloroethane, 1,2-dichloroethane, 1,2-dichloropropane, benzene, bromoform, carbon tetrachloride, methylene chloride and 1,4-dioxane.
- GW-FS-OW-300-080912 (360-42131-4): 1,1,2-trichloroethane, 1,1-dichloroethene, 1,2-dichloroethane, 1,2-dichloropropane, benzene, bromoform, carbon tetrachloride, dibromochloromethane, bromodichloromethane, methylene chloride, tetrachloroethene, trichloroethene, and 1,4-dioxane.
- GW-FS-PC-20(D)-081312 (360-42131-15): 1,1,2-trichloroethane, 1,2,4-trichlorobenzene, 1,2-dichloroethane, 1,2-dichloropropane, 1,4-dichlorobenzene, benzene, bromoform, carbon tetrachloride, dibromochloromethane, chloroform, bromodichloromethane, methyl-t-butyl ether (MTBE), tetrachloroethene and 1,4-dioxane.
- GW-FS-PC-20(S)-081312 (360-42131-16): 1,12-trichloroethane, 1,1-dichloroethene, 1,2-dichloroethane, 1,2-dichloropropane, benzene, bromoform, carbon tetrachloride, dibromochloromethane, bromodichloromethane, methylene chloride, tetrachloroethene, trichloroethene, and 1,4-dioxane.
- GW-FS-PC-11(D)-081312 (360-42131-19): 1,1,2-trichloroethane, 1,2-dichloroethane, 1,2-dichloropropane, benzene, bromoform, carbon tetrachloride, methylene chloride and 1,4-dioxane.

The data user will need to evaluate usability of non-detected results with elevated RLs for project uses.

- All non-detects for SVOCs were below the PAL given in QAPP Table 4-2A. Therefore, all data met sensitivity requirements for SVOCs.
- All pesticide RLs reported were below the PAL given in QAPP Table 4-3A. Therefore, all data met sensitivity requirements for Pesticides.
- All non-detects for Metals were below the PAL given in QAPP Table 4-5A. Therefore, all data met sensitivity requirements for Metals.
- The SIM analysis for 1,4-dioxane reported relative response factors (RRFs) that were < 0.05 (QAPP Table 4-7A minimum RRF criteria) but > 0.010 (average RRF by SIM was 0.0294). Since the minimum acceptable RRF for 1,4-dioxane from USEPA Contract Laboratory Program (CLP) and National Functional Guidelines for Superfund Organic Methods Data Review, June 2008 is 0.010; professional judgment was used to accept the 1,4-dioxane calibration if RRF $\geq$ 0.010 rather than using QAPP criteria of 0.05 for this one compound. Additionally, LCS/LCSD and MS/MSD recoveries were acceptable for 1,4-dioxane indicating acceptable sensitivity for analysis of this compound for the samples in the SDG.
- NEH did not perform a formal validation for non-target parameters; however, laboratory issues noted in the narrative and/or qualified in the EDD were evaluated. Data users should note the following issues:
    - The nitrate and nitrite results at site OW-094-R were estimated (UJ) due to method holding time exceedances. These estimated results have a potential low bias.
    - TOC was performed in duplicate for each groundwater sample. The lab reported three results for each sample in the EDD: 1) TOC from the initial analysis, 2) TOC from the duplicate analysis, and 3) the average TOC recorded as "Total Organic Carbon - Duplicates". NEH recommends that only the average TOC result be retained in the validated EDD for groundwater data such that only one result is in the project database for each sample for this parameter.

Table 2. Summary of Data Validation Actions

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
GW-FS-PC-8(S)-081012 GW-FS-PCD-3-081012	Carbon disulfide	J	I	High LCS/LCSD recovery + High Calibration verification + Result uncertain below the calibration range
GW-FS-PC-11(D)-081312	Carbon disulfide	J	I	High LCS/LCSD recovery + High MS recovery + Result uncertain below the calibration range
GW-FS-PC-11(S)-081312	cis-1,2-Dichloroethene	J	I	LCS/LCSD imprecision
GW-FS-PC-20(S)-081312	cis-1,2-Dichloroethene	J	H	High MS recovery
GW-FS-PC-11(S)-081312 GW-FS-PC-20(D)-081312 TB-081312-2	Acetone	UJ	L	Low Calibration verification
GW-FS-PC-11(D)-081312	Acetone	UJ	L	Low MS/MSD recoveries + Low Calibration verification
GW-FS-PC-11(S)-081312 GW-FS-PC-20(D)-081312 TB-081312-2	2-Butanone (MEK)	UJ	L	Low LCS/LCSD recoveries + Low Calibration verification
GW-FS-PC-20(S)-081312	2-Butanone (MEK) Bromoform	UJ	L	Low MS/MSD recoveries
GW-FS-PC-11(D)-081312	2-Butanone (MEK)	UJ	L	Low LCS/LCSD recoveries + Low MS/MSD recoveries + Low Calibration verification
GW-FS-PC-11(D)-081312	Benzene	UJ	L	Low MS/MSD recoveries
GW-FS-PC-11(D)-081312	Cyclohexane Methylcyclohexane	UJ	I	MS/MSD imprecision
GW-FS-OW-094-O-080912 GW-FS-PC-11(S)-081312	Chloroform	U		Negated due to Equipment Blank Action
EB-081012	Chloroform	J	I	Result uncertain below the calibration range
GW-FS-OW-093-O-080912	1,1-Dichloroethene m-Xylene & p-Xylene o-Xylene Tetrachloroethene Toluene trans-1,2-Dichloroethene Trichloroethene Xylenes, Total	J	I	Result uncertain below the calibration range
GW-FS-OW-300-080912	Methylcyclohexane Vinyl chloride	J	I	Result uncertain below the calibration range

Table 2. Summary of Data Validation Actions - *continued*

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
GW-FS-OW-094-O-080912	1,1,2-Trichloroethane 1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene Benzene Methylcyclohexane m-Xylene & p-Xylene	J	I	Result uncertain below the calibration range
GW-FS-OW-094-R-080912	Ethylbenzene o-Xylene Tetrachloroethene Toluene trans-1,2-Dichloroethene	J	I	Result uncertain below the calibration range
GW-FS-OWD-3	1,1-Dichloroethene cis-1,2-Dichloroethene Trichlorofluoromethane	J	I	Result uncertain below the calibration range
GW-FS-PC-11(D)-081312	1,1-Dichloroethene 1,2-Dichlorobenzene Ethylbenzene trans-1,2-Dichloroethene	J	I	Result uncertain below the calibration range
GW-FS-PC-11(S)-081312	1,1,2-Trichloroethane 1,4-Dioxane (SIM)	J	I	Result uncertain below the calibration range
GW-FS-PC-2(S)-081012	1,1-Dichloroethene cis-1,2-Dichloroethene	J	I	Result uncertain below the calibration range
GW-FS-PC-20(D)-081312	1,1-Dichloroethene 1,2-Dichlorobenzene Chloroethane trans-1,2-Dichloroethene Trichloroethene Methylene Chloride	J	I	Result uncertain below the calibration range
GW-FS-PC-20(S)-081312	Chloroethane m-Xylene & p-Xylene o-Xylene trans-1,2-Dichloroethene Xylenes, Total	J	I	Result uncertain below the calibration range
GW-FS-PC-3(S)-081012	1,1-Dichloroethene Chloroethane Chloromethane trans-1,2-Dichloroethene	J	I	Result uncertain below the calibration range
GW-FS-PC-8(S)-081012	1,1-Dichloroethene 1,2,3-Trichlorobenzene 1,4-Dichlorobenzene Benzene Chloroethane Chloromethane Isopropylbenzene m-Xylene & p-Xylene Toluene	J	I	Result uncertain below the calibration range

Table 2. Summary of Data Validation Actions – *continued*

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
GW-FS-PCD-1-081012	Tetrachloroethene Chloromethane Tetrachloroethene Trichloroethene	J	I	Result uncertain below the calibration range
All SVOC samples	1,2,4,5-Tetrachlorobenzene Hexachloroethane	UJ	I	LCS/LCSD imprecision
EB-081012	2,4-Dinitrophenol 4,6-Dinitro-2-methylphenol	UJ	L	Low Calibration verification
All SVOC samples	Phenol	UJ	L	Low LCS recovery
All SVOC samples	Hexachlorobutadiene Hexachlorocyclopentadiene	UJ	I	Low LCS recovery + LCS/LCSD imprecision
All SVOC samples	Caprolactam	UJ	L	Low LCS/LCSD recoveries
All SVOC samples	Di-n-butyl phthalate	U		Negated due to Blank Action
GW-FS-OW-093-O-080912	1,1'-Biphenyl 2-Methylnaphthalene Naphthalene	J	I	Result uncertain below the calibration range
GW-FS-OW-094-O-080912	2-Methylnaphthalene Naphthalene	J	I	Result uncertain below the calibration range
GW-FS-OW-094-R-080912	Acetophenone Diethyl phthalate	J	I	Result uncertain below the calibration range
GW-FS-OW-300-080912	1,1'-Biphenyl 2-Methylnaphthalene Acenaphthene Acetophenone Benzaldehyde Butyl benzyl phthalate Naphthalene	J	I	Result uncertain below the calibration range
GW-FS-OW-300-080912	Barium	U		Negated due to Blank Action
Non-Target Parameters				
GW-FS-OW-094-R-080912	Nitrate as N Nitrite as N	UJ	L	HT exceedance

Qualifiers: U = Analyte is non-detect at the "Limit_2" value in the EDD, which is the sample-specific reporting limit (RL); UJ = Non-detect is estimated; J = Result is estimated; R = Result is rejected and is unusable for project decisions.

Bias: L = Low; H = High; I = Indeterminate

Acronyms used in Table 2:

HT = Holding Time
LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample Duplicate
MS = Matrix Spike
MSD = Matrix Spike Duplicate

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Volatile Tier II-type Data Review Checklist

Lab Project: 360-42131-1

Lab: TestAmerica Westfield
Date Sampled: 8/9/12 - 8/13/12
Method of Analysis: 8260C - EI & 8260C - SIM

No. Samples: 14 + 1 FD + 3 TB + 1 EB
Matrix: Groundwater

Data Element Acceptable	Preservation & HT	Surrogates 70-130%	LCS/LCSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	MS/MSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√			√		√		NA	
No			Estimate (J, UJ) 8 results	Estimate (J, UJ) 8 results		Estimate (J / UJ) 9 results		Accept 64 "J" results		Negate 2 results due to EB action

% solids OK? NA
Other Issues: No

Comments:

Method 8260C-EI used for reporting of project-specific list of VOCs except 1,4-Dioxane, which was reported from an 8260C-SIM analysis as required by Table 4-1A of QAPP.

Samples were received intact at TestAmerica on several days (from 1 to 4 days after sample collection) at 4±2°C except that one of the coolers received on 8/10/12 was received outside of the temperature range at 14.2°C, but did have ice present. There were no other COC issues noted by the lab . No action required.

Samples were all analyzed by 8/23/12 - HT met for all samples, No Action required.

Surrogates : All 3 VOC surrogates were recovered within 70-130% in all samples and QC for EI and SIM analysis - no Action required

LCS/LCSD: EI LCS/LCSD 360-94409/3 & 4. Lab spiked all 53 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). EI evaluated for all compounds except 1,4-dioxane, which was evaluated by SIM. All %Rec and LCS/LCSD RPDs were acceptable except Carbon Disulfide (LCS/LCSD rec. high).

Date: ***11/23/12***

Data Reviewer: ***Deborah A. Loring***

Lab Project: 360-42131-1

Lab: TestAmerica Westfield

Blank Action: Blanks Reviewed: MB EI: MB 360-94409/6 (assoc. with samples -1 to -14 & -16), MB 360-94525/6 (assoc. with samples -15, and -19 to -21), MB 360-94592/6 (assoc. with samples -15, -19 & -20)
MB SIM: MB 360-94410/6 (assoc. with samples -1 to -14 & -16) & MB 360-94526/6 (assoc. with samples -15 and -19 to -21)
TB: TB-081012-1, TB-081312-1, TB-081312-2, EB-081012

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-94409/6	None					No Blank Action required	
MB 360-94525/6	None					No Blank Action required	
MB 360-94592/6	None					No Blank Action required	
MB 360-94410/6	None					No Blank Action required	
MB 360-94526/6	None					No Blank Action required	
TB-081012-1	None					No Blank Action required	
TB-081312-1	None					No Blank Action required	
TB-081312-2	None					No Blank Action required	
EB-081012-1	chloroform 0.22 µg/L	Y		1.1 µg/L		GW-FS-OW-094-O-080912 0.42 JB	1.0 U
						GW-FS-PC-11(S)-081312 0.43 JB	1.0 U

***ACTION: Estimate positive detects for (J) carbon disulfide in associated samples (360-42131-7 & -13) due to high recovery. Bias is indeterminate for all samples as carbon disulfide is reported at less than the calibration range in all samples.*

LCS/LCSD: EI LCS/LCSD 360-94525/3 & 4. Lab spiked all 53 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). EI evaluated for all compounds except 1,4-dioxane, which was evaluated by SIM. All %Rec and LCS/LCSD RPDs were acceptable except 2-butanone (LCS/ LCSD rec. low) & Carbon disulfide (LCS/LCSD rec. high).

***ACTION: Estimate (UJ) 2-butanone with low bias in associated samples (360-42131-15, -19, -20 & -21) due to low LCS/LCSD recoveries and positive detect for carbon disulfide (J) in sample 360-42131-19 with high bias due to high LCS/LCSD recoveries.*

LCS/LCSD: EI LCS/LCSD 360-94592/3 & 4 -evaluated for methylene chloride and cis-1,2-dichloroethene only, as this LCS was only used for those compounds. All %Rec and LCS/LCSD RPDs were acceptable except cis-1,2-dichloroethene RPD high.

***ACTION: Estimate (J) cis-1,2-dichloroethene in associated sample (360-42131-20).*

Date: ***11/23/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-42131-1

Additional Notes:

LCS/LCSD: SIM LCS/LCSD 360-94410/3 & 4 and LCS/LCSD 60-94526/3 & 4 for 1,4-dioxane . All SIM %Rec and LCS/LCSD RPDs were acceptable. No action required.

MS/MSD: MS/MSD analyses were performed on sample GW-FS-PC-20(S)-081312 for all EI and SIM compounds. All %Rec and RPDs were within limits except 2-butanone & bromoform (MS, MSD rec. low), carbon disulfide & ethyl ether (MS, MSD rec. high), and cis-1,2-dichloroethene (MS rec. high). As carbon disulfide and ethyl ether were not detected in the sample, no action required for this compound due to increased sensitivity.

***ACTION: Estimate (J, UJ) 2-butanone, bromoform with low bias due to low MS/MSD recoveries, and cis-1,2-dichloroethene with high bias due to high MS recovery in sample GW-FS-PC-20(S)-081312 .*

MS/MSD: MS/MSD analyses were performed on sample GW-FS-PC-11(D)-081312 for EI compounds only. All %Rec and RPDs were within limits except 2-butanone & acetone (MS/MSD rec. low), carbon disulfide (MS rec. high), cyclohexane & methylcyclohexane (RPD high).

***ACTION: Estimate (UJ) 2-butanone & acetone with low bias , estimate (J) positive detect for carbon disulfide with indeterminate bias due to high recovery (bias indeterminate because result<RL), and estimate (UJ) cyclohexane and methylcyclohexane with indeterminate bias in sample GW-FS-PC-11(D)-081312.*

FD pair: GW-FS-PC-2(S)-081012 / GW-FS-OWD-3. A comparison of detected results shown below

Field Duplicate Evaluation_ Sample IDs: Sample = GW-FS-PC-2(S)-081012 FD = GW-FS-OWD-3

Analyte Name	DF= 1 RL (µg/L)	Sample µg/L	Q	Sample Result Level	FD µg/L	Q	FD Result Level	RPD	Action
1,1,1-Trichloroethane	1	9.4			9.6			2	None
1,1-Dichloroethene	1	0.39	J	< RL	0.31	J	< RL	23	None
cis-1,2-Dichloroethene	1	0.52	J	< RL	0.53	J	< RL	2	None
Tetrachloroethene	1	96			97			1	None
Trichloroethene	1	1		< 2XRL	1		< 2XRL	0	None
Trichlorofluoromethane	1	ND		< RL	0.24	J	< RL	NC	None

NC = not calculated

FD pair: GW-FS-PC-2(S)-081012 / GW-FS-OWD-3. FD precision considered acceptable for this FD pair.

Date: ***11/23/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-42131-1

Additional Notes:

Tunes: Instrument Agilent #2 GC/MS used for Full Scan and SIM analysis – single injection with dual detection systems (EI and SIM). Tunes Full Scan & SIM GCMS Agilent #2 7/25/12 12:30 (ICAL), 8/20/12 10:38, 8/22/12 12:39 HP #3 6/5/12 12:16 (ICAL) & 8/23/12 17:31 . All tune abundances were acceptable and all samples and standards were analyzed within 12 hours of BFB tune.

ICAL : Agilent#2 7/25/12 6-9 level ICAL for all Targets + several non-target compounds. All calibrations met QAPP criteria for Target Compounds (ICAL 5 to 8 level from 0.5, 1 or 5 up to 1600 µg/L. SIM 9-level 3 to 1600 µg/L). %RSD ≤ 20% or r2 ≥ 0.99 and all RRFs ≥ 0.05 except SIM analysis for 1,4-Dioxane reported RRF ≥ 0.010 (average RRF by SIM was 0.0294). Valid ICAL - No Action required.

CCAL : Agilent#2 08/20/2012 11:59- %D (or %Drift) ≤ ± 20% for all target compounds and RRF ≥ 0.05 (1,4-dioxane ≥ 0.010) except carbon disulfide (%D=+21.1%)& acetone %D=+22.4. A positive %D indicates increased sensitivity on day of analysis, so no action required for positive %D for acetone as all associated samples were non-detect.

***ACTION: Estimate (J) positive detects for carbon disulfide (360-42131-7 & -13) with indeterminate bias (all detects are < RL).*

CCAL: Agilent#2 08/22/2012 13:01 %D (or %Drift) ≤ ± 20% for all target compounds and RRF > 0.05 (1,4-dioxane > 0.010) except acetone %D=-23.4%, 2-butanone % D = -33.2%.

***ACTION: Estimate (UJ) 2-butanone and acetone with low bias in associated samples (360-42131-15, -19, -20 & -21).*

ICAL : HP#3 6/5/12 6-9 level ICAL, evaluated for methylene chloride and cis-1,2-dichloroethene only. Calibrations met QAPP criteria for Target Compounds (ICAL 9 level from 0.4 to 160 µg/L). %RSD ≤ 20% or r2 ≥ 0.99 and all RRFs ≥ 0.05. Valid ICAL - No Action required.

CCAL: HP#3 08/23/2012 17:57 (used for dilution analysis for sample 360-42131-15 & 19 methylene chloride, and 360-42131-20 cis-1,2-dichloroethene) - %D (or %Drift) ≤ ± 20% and RRF > 0.05 for both compounds. No action required.

IS: All 4 IS Areas and RTs were in criteria for EI and SIM analyses - No Action required.

Lab reported results for m- Xylene & p-Xylene (reported as a single entry due to coelution) and o-Xylene in addition to Xylenes, total, as requested in the QAPP. All 53 project-specific VOCs were reported so with the added Xylenes, a total of 55 VOC results reported per sample. Note that bromodichloromethane, as listed in Table 4-1A, is called dichlorobromomethane in EDD and data and Dibromochloromethane, as listed in Table 4-1A, is called chlorodibromomethane in EDD and data.

64 results were reported at levels < RL and were flagged "J" by the lab. These 64 "J" results were accepted for reporting with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

Date: ***11/23/12***

Data Reviewer: ***Deborah A. Loring***

Lab Project: 360-42131-1

Lab: TestAmerica Westfield

Additional Notes:

All RLs were at or below the PQLs required by the QAPP Table 4-1A for all samples with the exception of Methyl acetate, which was reported at a PQL above the required PQL in all samples, and for several analytes in samples 360-41997-2, -3, -4, -15, -16 & -19 , all of which were run at dilutions

All non-detects were reported at levels at or below the PALs given in QAPP Table 4-1A with the exception of 1,2-dibromo-3-chloropropane and ethylene dibromide in all samples, due to method limitations and the following compounds:

GW-FS-OW-094-R-080912 (360-42131-2): 1,1,2-trichloroethane, 1,2-dichloroethane, 1,2-dichloropropane, benzene, bromoform, carbon tetrachloride, dibromochloromethane, bromodichloromethane, methyl-t-butyl ether (MTBE), methylene chloride, and tetrachloroethene.

GW-FS-OW-093-O-080912 (360-42131-3): 1,1,2-trichloroethane, 1,2-dichloroethane, 1,2-dichloropropane, benzene, bromoform, carbon tetrachloride, methylene chloride and 1,4-dioxane

GW-FS-OW-300-080912 (360-42131-4): 1,1,2-trichloroethane, 1,1-dichloroethene, 1,2-dichloroethane, 1,2-dichloropropane, benzene, bromoform, carbon tetrachloride, dibromochloromethane, bromodichloromethane, methylene chloride, tetrachloroethene, trichloroethene, and 1,4-dioxane

GW-FS-PC-20(D)-081312 (360-42131-15): 1,1,2-trichloroethane, 1,2,4-trichlorobenzene, 1,2-dichloroethane, 1,2-dichloropropane, 1,4-dichlorobenzene, benzene, bromoform, carbon tetrachloride, dibromochloromethane, chloroform, bromodichloromethane, methyl-t-butyl ether (MTBE), tetrachloroethene and 1,4-dioxane.

GW-FS-PC-20(S)-081312 (360-42131-16): 1,12-trichloroethane, 1,1-dichloroethene, 1,2-dichloroethane, 1,2-dichloropropane, benzene, bromoform, carbon tetrachloride, dibromochloromethane, bromodichloromethane, methylene chloride, tetrachloroethene, trichloroethene, and 1,4-dioxane.

GW-FS-PC-11(D)-081312 (360-42131-19): 1,1,2-trichloroethane, 1,2-dichloroethane, 1,2-dichloropropane, benzene, bromoform, carbon tetrachloride, methylene chloride and 1,4-dioxane.

Narrative did not raise any issues not already addressed.

Date: ***11/23/12***

Data Reviewer: ***Deborah A. Loring***

8260C and Project Action Summary:

Preservation:	Waters - headspace present or received at > 10°C, J det / J NDs or R ND Soils/Sediment - EnCore extrusion and sample preservation unacceptable or received at > 10°C, J det / J NDs or R ND
HT:	Waters - pH > 2; preserved 7d <HT≤ 14 d; J det/ J NDs; HT >14 d, J det/R ND Waters - pH < 2; 14d <HT≤ 28d; J det/ J NDs; HT >28d, J det/R ND Soils/Sediment - 14d <HT< 28d; J det/ J NDs; HT >28d, J det/R ND
Surrogates:	Surr. %Rec > 130%, J det/Accept ND; 10% ≤ %Rec < 70%, J det/J NDs;
LCS	%Rec<10%, J det/ R NDs; 10% <%Rec<70, J det/ J NDs; %Rec >130, J det/Accept NDs. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. LCS must contain all targets.
Tunes:	Samples analyzed within 12-hrs and criteria met per Method 8260C. If out, use professional judgment.
ICAL:	minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs. If avg. RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
CCAL:	%D (or %Drift) > - 20% , J det/J ND; %D (or %Drift) > +20%, J det/Accept ND. If RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
Blanks:	Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for acetone, 2-butanone, and methylene chloride which are 10 x value in blank.
MS/MSD:	%Rec<10%, J det/ R NDs; 10% <%Rec<70%, J det/ J NDs; %Rec >130%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. MS/MSD must contain all targets.
FD:	Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data
IS:	20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs
QLs:	Verify RLs met RLs and PALs given in QAPP; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.
TICs:	Not required
% solids:	If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs
Narrative:	If there are any issues raised in narrative not previously addressed, take appropriate action
Reference:	*Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8260C

Date: ***11/23/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Semivolatile Tier II-type Data Review Checklist

Lab Project: 360-42131

Lab: TestAmerica Westfield
Date Sampled: 8/9/12 - 8/10/12
Method of Analysis: 8270D

No. Samples: 4 + 1 EB
Matrix: Groundwater

Data Element Acceptable	Preservation & HT	Surrogates w: 30-130%BN 15-110% Acid s: 30-130%	LCS 40-140%BN 30-130%Acid	MS/MSD 40-140%BN 30-130%Acid w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√		NA	NA		√		NA	
No			Estimate (UJ) 6 results in all samples			Estimate (UJ) 2 results		Accept 14 "J" results		Negate (U) 5 results due to Blank Action

% solids OK? NA
Other Issues: No

Comments:

Samples were received intact at TestAmerica on 8/10/12 (the day after sample collection) at 4±2°C except that one of the coolers received on 8/10/12 was received outside of the temperature range at 14.2°C, but did have ice present; therefore, no action taken. There were no other COC issues noted by the lab.

Samples were extracted on 8/14/12 in QC batch 360-94270. Extracts were all analyzed by 8/17/12. All extraction and analytical holding times were met, no action required.

Surrogates : All 3BN and 3 Acid Surrogates were recovered within QAPP Criteria in all samples and QC, no action required.

LCS/LCSD : LCS/LCSS 360-94208/2-A & 3-A. Lab spiked all 67 target analytes requested in LCS. All spiked target compounds reported acceptable %Rec and LCS/LCSD RPD except: 1,2,4,5-tetrachlorobenzene & hexachloroethane RPD high, caprolactam LCS/LCSD rec. low, di-n-octyl phthalate LCSD rec. high, hexachlorobutadiene, hexachlorocyclopentadiene LCS rec. low, RPD high & phenol LCSD low. No action required for high di-n-octyl phthalate recovered as it was not detected in associated samples.

**ACTION: 1,2,4,5-tetrachlorobenzene, hexachloroethane, hexachlorocyclopentadiene & hexachlorobutadiene estimate (UJ) with indeterminate bias and caprolactam & phenol estimated (UJ) with low bias due to low LCS/LCSD recoveries in all samples.*

Date: ***11/24/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-42131

Blank Action: Blanks Reviewed: MB 360-94208/1-A
EB-081012

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-94208/1-A	bis-2-ethylhexylphthalate 0.556 J µg/L	Y		5.56 µg/L		Not Detected - No Blank Action required	
	di-n-butylphthalate 2.27 J µg/L	Y		22.7 µg/L		EB-081012 0.97 JB	4.7 U
						GW-FS-OW-093-O-080912 1 JB	4.8 U
						GW-FS-OW-094-O-080912 1 JB	4.9 U
						GW-FS-OW-094-R-080912 1.3 JB	4.9 U
						GW-FS-OW-300-080912 1 JB	4.7 U

MS/MSD: MS/MSD analyses were not performed with this SDG.

FD pair: An FD was not submitted with this SDG.

Tunes: Instrument B 08/15/2012 16:10 (ICAL), 08/15/12 22:58 8/17/12 12:59. All abundances were acceptable and all samples were analyzed within 12 hours of tune. For DFTPP analyzed on 08/15/2012 22:58 m/e 198 not the base peak - 442 was the base peak. This is allowable by Method 8270D criteria but not noted on Form. Peak summing for 8/15/2012 16:10 not consistent (2 peaks averaged without background subtraction rather than average of 3 peaks with background subtraction). No Action required.

ICAL : 8/15/12 Inst. B, 8- to 10- level ICAL performed from 0.2 to 25 µg/mL (for full 10-level) for all Targets + several non-target compounds. Form VI flagged several results as not meeting minimum RRF criteria; however, lab used CLP criteria and not QAPP criteria. %RSD $\leq$ 20% or r2 $\geq$ 0.99 for all and all RRFs $\geq$ 0.05. No action required.

CCALs : Inst. B 8/15/12 23:30 - %D or %Drift $\leq \pm$ 20% and RRF > 0.05 for all target compounds. No action required.

CCALs : Inst. B 08/17/2012 13:30 - %D or %Drift $\leq \pm$ 20% and RRF > 0.05 for all target compounds except 2,4-dinitrophenol %D = -20.8%, 4,6-Dinitro-2-methylphenol %D = -25.9%, and Di-n-octyl phthalate %D = +34.7%. No action required for increased sensitivity for di-n-octyl phthalate as it was not detected in the associated sample (EB-081012).

**ACTION: Estimate (UJ) 2,4-dinitrophenol and 4,6-dinitro-2-methylphenol in associated sample (EB-081012).*

Date: ***11/24/12***

Data Reviewer: ***Deborah A. Loring***

Lab: TestAmerica Westfield

Lab Project: 360-42131

Additional Notes:

IS: All 6 IS Areas and RTs were in criteria for all analyses.

Lab reported results for all 67 target SVOCs required. All RLs reported were less than or equal to the PQLs given in QAPP Table 4-2A.

14 results were reported at levels < RL and were flagged "J" by the lab (excluding those results below the calibration range that were negated due to blank action). These 14 "J" results were accepted for reporting with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

All non-detects were reported at levels below the PALs given in Table 4-2A, no action required.

Narrative did not raise any issues not already addressed.

Date: ***11/24/12***

Data Reviewer: ***Deborah A. Loring***

8270D and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: waters: BN 30 - 130%, acids 15-110%; solids: all surrogates 30-130%
2 BN or 2 Acids Recovery > Criteria, J det/Accept ND; 10% ≤ 2 or more surrogates < Criteria, J det/J NDs;
Recovery < 10%, J det/R NDs. Action taken on Acid and/or BN analytes based on Surrogates out.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs.
RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. LCS must contain all targets.

Tunes: Samples analyzed within 12-hrs and criteria met per Table 3 or Method 8270C. If out, use professional judgment.

ICAL: minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs; min. RRF < 0.05, J det/UJ NDs.

CCAL: %D > - 20% , J det/J ND; %D > +20%, J det/Accept ND.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank

Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for phthalates which are 10 x value in blank.

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<LCL, J det/ J NDs; %Rec >UCL, J det/Accept NDs- Unspiked Sample only. RPD > Limit, J det/UJ NDs.
MS/MSD must contain all targets.

FD: Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data

IS: 20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs

QLs: Verify RLs met QAPP QLs ; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

TICs: Not required

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8270D

Date: ***11/24/12***

Data Reviewer: ***Deborah A. Loring***

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Pesticide Tier II-type Data Review Checklist

Lab Project # 360-42131

Lab: TestAmerica Westfield
Date Sampled: 8/9/12 - 8/10/12
Method of Analysis: 8081B

No. Samples: 4 + 1 EB
Matrix: Groundwater

Data Element Acceptable	Preservation & HT	Surrogates 30-150%	LCS 40-140%	MS/MSD %Rec 30-150% w: RPD≤20% sr:RPD≤30%	FD w:RPD≤30% s:RPD≤50%	RCM (Resolve. > 60%)	PEMs Brkdwn< 15% %D ≤ ± 15%	ICALs %RSD< 20%	CCAL %D ≤ ± 20%	Col. 1 & 2 Precision (%D ≤ 40%)
Yes	√	√	√	√	√	√	√	√	√	NA
No										

% solids OK? NA
Other Issues: Yes

Comments:

Samples were received intact at TestAmerica on 8/10/12 (the day after sample collection) at 4±2°C except that one of the coolers received on 8/10/12 was received outside of the temperature range at 14.2°C, but did have ice present. There were no other COC issues noted by the lab . No action required.

Samples were extracted in 3 batches as follows: 8/3/12 (samples 360-41997-1 to -4 with QC batch 360-93888), 8/13/12 (samples 360-41977-6 to -11 & -13 to -16 & -18 to -19 with QC batch 360-94159), 8/14/12 (samples 360-41932-21, to-25 with QC batch 360-94189) - HT met for extraction. All extracts were analyzed by 8/22/12 within 40 days of extraction, no action required

Surrogates: TCM and DCB recovered within QAPP criteria on both GC columns for all samples and QC. Note, lab used in-house criteria for recovery of surrogates but here, QAPP criteria used to judge data acceptance. No action required.

LCS/LCSD: LCS/LCSD 360-94189/4-A & 5-A. Lab used in-house criteria - for this DV, QAPP criteria used to judge acceptability of results. All %Rec in LCS and LCSDs as well as RPD between LCS and LCSD acceptable - No Action required.

MS/MSD: MS/MSD analyses were not performed with this SDG.

Date: ***11/24/12***
Data Reviewer: ***Deborah A. Loring.***

Lab: TestAmerica Westfield

Lab Project # 360-42131

Blank Action: Blanks Reviewed: MB: MB 360-94189/1-A
EB: EB-081012

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-94189/1-A	None					No Blank Action required	
EB: EB-081012	None					No Blank Action required	

Additional Notes:

FD pair: An FD was not submitted with this SDG.

Resolution Check : RCM not analyzed per se; however, CCALs looked at and all peaks appear to be adequately resolved - No Action required

PEM DDT and Endrin Breakdown evaluations: PEM 360-94250/1 (08/15/2012 10:21) & PEM 360-94250/17 (08/15/2012 16:16) - %Breakdown for DDT and Endrin ≤ 15% + Combined Breakdown was ≤ 30% on each GC Column. No Action required.

ICAL: Instrument H 8/8/12 7-level from 1 to 100 µg/L for single-component Pesticides (some extras not required for project) + surrogates and 3-level from 100 to 2,500 µg/L for Toxaphene. For GC Column 1 (RTX-CLPPest1) and 2 (RTX-CLPPest2), %RSD < 20% or r2 > 0.99 (regression analysis for several analytes). Note that 40 µg/L standard was excluded for Endrin aldehyde on Column 2. The effect of adding that standard to the curve was checked, and the correlation coefficient was still within limits. As no analytes were detected in the samples, this had no effect on the data. Valid ICAL - No Action

CCALs : CCV RT360-94250/2 (singles) & 4 (toxaphene) 8/15/12 10:42 & 11:25, CCVRT 360-94250/18 (singles) & 20 (toxaphene) & CCVRT 360-94250/31 8/15/12 21:13 (singles) all %D ≤ ±20% on both GC columns for all Pesticides. A positive %D indicates increased sensitivity to detection during CCAL as compared to sensitivity during ICAL; therefore, since all samples were non-detect compounds with a high %D, no action for enhanced sensitivity on days of analysis (i.e., non-detect accurate as reported).

Form X (GC Column 1 & 2 precision evaluation) - Lab reported precision as RPD rather than %D. Since Form X used to express LCS and MS results only, since all samples were non-detect for all Pesticides, no action required.

The narrative did not raise any issues not already addressed.

Lab reported results for all 21 target Pesticides required. All RLs reported were less than or equal to the PQLs and PALs given in QAPP Table 4-3A.

Date: ***11/24/12***
Data Reviewer: ***Deborah A. Loring.***

Lab Project # 360-42131

Lab: TestAmerica Westfield

8081B and Project Action Summary:

HT: Waters - Extraction: 7d <HT≤ 28 d; J det/ J NDs; HT >28 d, J det/R ND
Solids - Extraction: 14d <HT< 28 d, J det/ J NDs; HT >28 d, J det/R ND (freezing arrests HT)
Analysis of extract: 40d < Extract HT < 60d, J det/ J NDs; Extract HT > 60d; J det/ R NDs

Surrogates: Recovery > 150%, J det/Accept ND; 10% ≤ Surrogate < 30%, J det/J NDs;
Recovery < 10%, J det/R NDs. Professional judgment for action based on which GC columns are out/in criteria.

LCS %Rec<10%, J det/ R NDs; 10% <%Rec<40%, J det/ J NDs; %Rec >140%, J det/Accept NDs.

RCM: RCM < 60% resolution, J detects based on technical judgment

PEM: 4,4'-DDT breakdown > 15%, J detected DDT, DDE, DDD; R ND 4,4'-DDT and accept ND DDE & DDD
Endrin breakdown > 15%, J detected Endrin, Endrin Aldehyde & Endrin Ketone; R ND Endrin and accept ND Endrin Aldehyde & Endrin Ketone
4,4'-DDT and Endrin > 30%, accept NDs of breakdown products and J detects for 4,4'-DDT and Endrin; J detects of breakdown products and reject (R) non-detects for 4,4'-DDT and Endrin.
%D> ± 20%, J det/J ND on a per column basis. % Resolution < 90.0% qualify data based on professional judgment.

ICAL: 5-Level for single-component Pest; if %RSD > 20%, J det/J ND.

CCAL: %D> ± 20%, J det/J ND on a per column basis, as technically reasonable.

Blanks: Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank
Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank

MS/MSD: %Rec<10%, J det/ R NDs; 10% <%Rec<30%, J det/ J NDs; %Rec >150%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters (or 30% solids), J det / J ND

FD: Both Conc. > 2xQL, RPD >Limit, J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD >Limit, LCS OK, Accept data

Col. 1&2 Precision: 40.0%< %D < 100% (single-component) or 40.0%< %D < 500% (multi-components), J det/Accept ND; %D > 100% (single-component) or %D > 500% (multi-components) R detects. If one value < QL and the other value > QL, J and UJ results.

QLs: Verify RLs met QAPP QLs; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.

% solids: If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs

Reference: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Pesticide/PCB Data Validation Functional Guidelines - Part III* , Draft February 2004; and USEPA SW846 Method 8081B

Date: ***11/24/12***
Data Reviewer: ***Deborah A. Loring.***

RDWP - Davis Liquid Waste Superfund Site
EPA Region I Tier II-type DV Checklist - Metals

Lab: TestAmerica-Westfield, Westfield, MA
Date Sampled: 8/09/12 & 8/10/12
Analysis: Metals by EPA SW-846 Method 6010C, 6020, & 7470A

Lab Project # 360-42131-1
No. Samples: 4 + 1EB
Matrix: Groundwater

QC Met Criteria?		HT & Preserve pH <2	RL QAPP PQLs?	Tune met 6020 criteria?	Calibration ICV/CCV 90-110%R	CRI RL Check 70-130%R	EB MB < RL	LCS/LCSD 80-120%R RPD ≤ 20%	ICSA/AB 80-120% R	MS / MSD 75-125% R	MSD / MD RPD ≤ 20%	FD RPD ≤ 30%	IS 70-130% R	Serial Dilution ± 15% D
Yes		√	√	√	√	√		√	√	NA	NA	NA	√	NA
No							Negate (U) Barium in 1 sample							

Groundwaters for Target Analyte List (TAL) of 23 Metals: Mercury by CVAA SW846 Method 7470A; Arsenic, Antimony, & Thallium by ICP-MS Method 6020; and Aluminum, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Vanadium, & Zinc by ICP-AES Method 6010C.

Data Package Completeness:

1. Were all required forms (results, summary QC, COC), as required to validate the data for Tier II level in accordance with the Davis QAPP (ESS 2012) & EPA Region 1 present in the data package? ***Yes.***

2. Were all result forms for all samples listed on the chain-of-custody present in data package? ***Yes***. However, the lab did not use the sample ID listed on the COC for the MS/MSD or MD samples (they used the "parent" sample ID for these matrix QC - so all 3 sets of results have the same field sample ID). The EDD and the laboratory data report were not changed.

Chain-of-Custody (COC): 4 groundwater samples plus 1EB received for Total TAL Metals - received at lab for TAL Metals on 8/10/12 and intact. COC Documentation acceptable.

Preservation: Samples received preserved at pH < 2 @ 9 & 14.2°C on ice. There is no QAPP requirement for temperature for Metals since the acid preservation is sufficient to maintain sample integrity (see Davis QAPP Tables 4-11A & 5-4). Therefore, No Action required.

Holding Time (HT): ICP-AES 6010C analysis 8/16/12 through 8/20/12; ICP-MS 6020 analysis on 8/20/12; CVAA 7470A analysis on 8/21/12. Acceptable HT.

Calibration Criteria: ICV/CCV and CRI (RL check standard supporting the level of the RL reported) met acceptance criteria for all Metals. Note CRI not required by Davis QAPP but reviewed as additional support of the lab RLs (criteria set at 70-130%). Some CRI results listed as "ND" but with acceptable % recovery; this is due to the fact that results are not reported < RL, so this is acceptable (CRI was at the level of the RL for all metals). Tune criteria for ICP-MS met. ICSA/AB met recovery criteria for all ICP metals. Note lab did not report Aluminum (QC Form shows 0% recovery) in ICSA/B on ICP-MS because Aluminum was not reported on this instrument. This is acceptable since Aluminum was reported from the ICP-AES (6010C) analysis for these groundwater samples and the ICSA/AB for Aluminum by method 6010C met criteria.

Date: *11/20/12*
Data Reviewer: *Susan D. Chapnick*

Lab: TestAmerica Lab Project #: 360-42131-1

Blanks: One EB included in this SDG: EB-081012. The EB was non-detect for all TAL Metals. All other blanks, method blank (MB) & instrument blanks (ICB/CCB) were also non-detected for all TAL Metals except for one continuing calibration blank (CCB) for Barium at 35 µg/L. Blank action level for Barium = 35 x 5 = 175 µg/L. One GW sample was associated with this CCB: GW-FS-OW-300-080912. Blank action was taken for Barium in this sample.
ACTION: Negate (U) Barium in sample GW-FS-OW-300-080912 at the level found (21 U µg/L) due to contamination observed in an associated CCB.

LCS/LCSD: Lab performed both LCS and LCS duplicate (LCSD), though LCSD not required in Davis QAPP. LCS/LCSD met acceptance criteria for all Metals for accuracy (% recovery 80-120% QAPP criteria) and precision (RPD <20% lab criteria) in all LCS/LCSD batches.

MS/MSD/MD site sample used for QC: Lab performed MS as batch QC on a non-site sample (Lab ID #360-42183-3). Lab reported exceedance of MS % recovery (>125%) for Calcium, Magnesium, Potassium, and Sodium in this non-site sample used as batch QC. Non-site sample matrix QC results are not applicable to Davis groundwater and therefore were not used to qualify GW results in this SDG. No Action required.

Serial Dilution: Serial dilution results were not reported on summary QC form in this SDG. Presumed that lab performed serial dilution as batch QC on the same non-site sample used for MS/MD (Lab ID #360-42183-3). Non-site sample matrix QC results are not applicable to Davis groundwater; therefore, lack of reporting batch QC for the serial dilution does not affect data quality. No Action required.

IS: All IS relative intensities were 70%-130% (Davis QAPP acceptance criteria) for field samples and QC. No action required.

Sensitivity: All RLs for non-detects met Davis QAPP Table 4-5A for Groundwater requirements for sensitivity (RL) based on being lower than the PALs. Barium negated at an elevated RL in sample GW-FS-OW-300-080912 still was < PQL of 200 µg/L; therefore, sensitivity met.

Database EDD: Limit_1 values, which are the RLs, were also copied into the Limit_2 field for use by ESS as the sample-specific RLs.
Non-target parameters including alkalinity, chloride, sulfate, sulfide, nitrate, nitrite, and TOC were also reported in EDD and lab data package - these results were not validated by NEH, since a Tier I-type validation (completeness check) will be performed by ESS Group for all non-target results. Data users should note that TOC was performed in duplicate for each GW sample and the lab reported 3 results for each sample (TOC from initial analysis, TOC from duplicate analysis, & avg TOC recorded as "Total Organic Carbon - Duplicates"). Recommend that only the avg TOC result be retained in the validated EDD for GW data such that only one result is in the project database for each GW sample for this parameter. Qualified 2 non-target results UJ due to HT exceeded as noted in the laboratory narrative (see below in lab narrative issues).

Laboratory Narrative: No further issues noted for target parameters. Data users should note that the lab reported 2 non-target parameters were analyzed outside of the holding time (HT) and qualified these nondetected results "H" in the EDD. These were changed to "UJ" and a note placed in the EDD to indicate "Bias L: HT exceeded" with a potential low bias.

Lab: TestAmerica

Lab Project #: 360-42131-1

FD pair samples: No FD samples were included in this SDG.

FD Precision:

Analyte	Sample µg/L	Qual	FD: µg/L	Qual	Precision RPD* %	Action	Comment
Aluminum					NC	none	
Antimony					NC	none	
Arsenic					NC	none	
Barium					#DIV/0!	none	
Beryllium					NC	none	
Cadmium					NC	none	
Calcium					#DIV/0!	none	
Chromium					NC	none	
Cobalt					NC	none	
Copper					NC	none	
Iron					#DIV/0!	none	
Lead					NC	none	
Magnesium					#DIV/0!	none	
Manganese					#DIV/0!	none	
Mercury					NC	none	
Nickel					NC	none	
Potassium					NC	none	
Selenium					NC	none	
Silver					NC	none	
Sodium					#DIV/0!	none	
Thallium					NC	none	
Vanadium					NC	none	
Zinc					NC	none	

Date: *11/20/12*
Data Reviewer: *Susan D. Chapnick*

QC & DV Action Criteria for Davis Superfund Site Metals [based on Davis QAPP 2012 & EPA Region I DV guidance]:

Pres./HT:	HT exceedance: J detects; Non-detects: R or UJ based on professional judgment. pH >2 use professional judgment to J detects; UJ non-detects.
Blanks:	Method Blanks and instrument blanks: Metals < RL unless all sample results are > 10 blank level. Detected results < matrix-matched blank level report as "U" (non-detected at level found). Equipment Blank: EB > RL for any metals; qualify associated detected results < 5x EB level as "EB" - potential high bias based on EB contamination.
Tune:	Mass calibration (amu) > QC limit: J/UJ. Mass resolution/peak width (amu) > QC limit: J/UJ. %RSD > QC limit: J/UJ. See EPA SW-846 Method 6020A for Tune criteria. Tune not performed: R all associated data.
ICV/CCV:	Recoveries < 90%: J / UJ; recoveries > 110%: J detects; if severe exceedance <75%: R non-detects; > 160%: R detects.
CRI:	Low-level standard at the level of the RL: % recovery <70%: J / UJ; >130%: J detects.
LCS:	%Recoveries < 80%: J / UJ. %Recoveries > 120%: J detects. %Recoveries < 50%, may R non-detects & J detects but use professional judgment to accept results if MS is in-control indicating acceptable accuracy in sample matrix.
ICSA/AB:	Recoveries > 120% or < 80%: J / UJ unless extremely low for ICSAB at <50%: R non-detects / J detects.
MS:	%Recoveries < 75%: J / UJ. %Recoveries > 125%: J detects. %Recoveries < 30%, may R non-detects & J detects but use professional judgment if sample concentration > 2x spike level.
MD:	Groundwater/Surface Water: Results >5xRL: RPD >20%: J/UJ associated results in batch. Results < 5xRL: difference > ±RL, J/UJ associated results. Soil/Sed: Results >5xRL: RPD >35%: J/UJ associated results in batch. Results < 5xRL: difference > ±2xRL, J / UJ associated results.
FD:	Groundwater/Surface Water: Results > 5xRL: RPD > 30%: J/UJ FD results only. Results < 5xRL: difference > ±2xRL,, J/UJ FD results only. Soil/Sed: Results >5xRL: RPD > 50%: J/UJ FD results only. Results <5xRL: use professional judgment.
IS:	Recoveries < 70%: J / UJ; recoveries > 130%: J detects; use professional judgment for severe exceedances.
Serial Dil:	Results > 50xRL: % Difference > 15%: J detects. EPA guidance UJ non-detects; however, use professional judgment on whether it is a suppression or enhancement to qualify associated non-detects.

Qualifiers: U = analyte is non-detect at the sample-specific Reporting Limit (RL) (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value; R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.

References: *Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island;* prepared by ESS Group, Inc., March 23, 2012 (Davis QAPP); Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996, including Part IV – Inorganic Data Validation Functional Guidelines, November 2008; Region I T*iered Organic and Inorganic Data Validation Guidelines* , July 1, 1993 draft; & USEPA SW846 Methods 6010C, 6020, & 7470A.

Date: *11/20/12*
Data Reviewer: *Susan D. Chapnick*

DATA VALIDATION REPORT
EPA Region I Tier II-Type for VOCs

Client: ESS Group, Inc., East Providence, Rhode Island

Site: Davis Liquid Waste Superfund Site, Smithfield, Rhode Island
Groundwater Sampling - 2012

Laboratory: TestAmerica Westfield, Westfield, Massachusetts

Lab Project/SDG #: 360-42220-1

Number of Samples: 5 groundwater samples + 1 Trip Blank for project-specific list of 53 Volatile Organic Compounds (VOCs)

Data Reviewers: Nancy C. Rothman, Ph.D., New Environmental Horizons, Inc.
Susan D. Chapnick, M.S., New Environmental Horizons, Inc.

Date: November 30, 2012

EPA Tier II-type Data Validation Review was performed on the data included in this SDG with the following intentions: 1) to determine if the data were generated and reported in accordance with the following documents: *Remedial Design Work Plan and Pre-Design Investigation Plan* (RDWP), Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, EPA-NE *Data Validation Functional Guidelines for Evaluating Environmental Analyses,* December 1996 and updates including Part II (Volatile/Semivolatile Data Validation Functional Guidelines); EPA *Region I Tiered Organic and Inorganic Data Validation Guidelines*, July 1993, and USEPA SW846 Method 8260C 2) to determine if the data met the project data quality objectives for acceptable accuracy, precision, sensitivity; and technical usability; and 3) to update the project database with validated results and appropriate data validation qualifiers.

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The Data Validation Report consists of three parts:

- This Data Validation Report letter summarizing the actions taken;
- The spreadsheet of validated sample results with validation qualifiers based on actions taken; and
- The Data Validation Checklists to document the Tier II-type validations. These Checklists are an integral part of the validation report as they contain comprehensive details of all QC reviewed, the acceptance criteria used, professional judgment and actions taken.

I. Sample Descriptions and Analytical Parameters

The sample IDs, date of sampling, matrix, and sample type (e.g. Field Sample, Field Duplicate, etc., as applicable) and the analytical parameters reviewed are listed below in Table 1.

Table 1. Sample Descriptions and Analytical Parameters

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
GW-FS-PC-17(D)-081412	8/14/12	GW	VOCs	Field Sample
GW-FS-OWD-4	8/14/12	GW	VOCs	Field Duplicate of GW-FS-PC-17(D)-081412
GW-FS-PC-23(D)-081412	8/14/12	GW	VOCs	Field Sample [used for MS/MSD]
GW-FS-PC-28(D)-081412	8/14/12	GW	VOCs	Field Sample
GW-FS-PC-25(D)-081412	8/14/12	GW	VOCs	Field Sample
TB-081512-1	8/14/12	Water	VOCs	Trip Blank

Analytical method references:

Volatiles: 53 project-specific VOCs by USEPA SW846 Method 8260C that includes the TCL plus diethyl ether and tetrahydrofuran. 1,4-Dioxane reported from Selected Ion Monitoring (SIM) analysis and all other VOCs from full scan Electron Impact (EI) analysis.

II. Quality Control Reviewed during Data Validation

The following QC elements, as applicable to the analytical methods, were reviewed during the Tier II-type validation of VOCs:

- Data package completeness and reporting protocols
- Sample receipt, holding times and preservation criteria
- Blank results including Method Blanks, Equipment Blanks, & Trip blanks
- Laboratory Control Sample (LCS) recoveries / LCS Duplicate Recoveries
- Standard Reference Material (SRM) Recoveries, if applicable
- Surrogate Recoveries
- Matrix Spike (MS) / Matrix Spike Duplicate (MSD) Recoveries
- MS/MSD, LCS/LCSD, and sample/Field Duplicate (FD) Relative Percent Differences (RPDs)
- Sample result reporting (including compound lists, reporting limits, and units)
- Calibration criteria (including tune criteria, initial calibration and continuing calibration verification)
- Internal Standard (IS) Recoveries
- Other method-specific QC if applicable and reported in Summary QC
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

III. Data Validation Report Summary

During the Tier II-type data validation review of VOCs, no data were rejected. Several results were estimated (J or UJ) due to QC issues. Table 2 summarizes the actions taken during this data validation review. NEH generated a validated data spreadsheet based on the electronic project database file (EDD) received from ESS for this SDG. All results were considered usable for project decisions compared to the Davis RDWP QAPP requirements with the understanding of the potential uncertainty (bias) in the qualified results presented in Table 2.

The remainder of this report documents "exceptions" to method or QAPP criteria or clarifications of data reported. QC elements not discussed below met all QAPP criteria. The full documentation of all QC elements reviewed during the Tier II-type validations are presented in the attached Data Validation Checklists. Data users should also reference the full Tier III-type data validation performed on groundwater samples included in SDG 360-40379-1 for additional information on general reporting issues and calculation verification from review of raw data (which is not performed in a Tier II-type validation).

Exceptions from Davis QAPP or Method QC Criteria

- Matrix Spike (MS) and Matrix Spike Duplicate (MSD) analyses for VOCs were performed on sample GW-FS-PC-23(D)-081412. Note that the lab did not use the field sample ID listed on the chain-of-custody for the MS or MSD samples; instead they used the "parent" sample ID for these matrix QC so that all three sets of results have the same field sample IDs. Accuracy (based on % recovery) and precision (based on RPD) were acceptable for all compounds/analytes except as follows:

  - Styrene recovered low (but > 10% recovery) in both the MS and MSD. An action was taken to estimate (UJ) styrene in sample GW-FS-PC-23(D)-081412 due to the MS/MSD exceedance as listed in Table 2.
- There was one Field Duplicate (FD) pair included in this SDG: GW-FS-PC-17(D)-081412 and GW-FS-OWD-4. The FD results indicate acceptable overall precision and representativeness for VOCs in the site groundwater matrix at the FD location sampled.

Sensitivity & Reporting

- The laboratory flagged all results for VOCs that were less than the RL (supported by the low-level standard in the calibration curve) as "J". The "J" qualifier was maintained during validation to indicate that these results were estimated due to uncertainty in quantitation below the calibration range. Affected samples/analytes are listed in Table 2.
- All non-detects for VOCs were below the Project Action Limit (PAL) given in QAPP Table 4-1A except for the following compounds:
  - All samples: 1,2-dibromo-3-chloropropane and ethylene dibromide due to method limitations.
  - GW-FS-PC-17(D)-081412: 1,1,2-trichloroethane and methylene chloride.
  - GW-FS-OWD-4: 1,1,2-trichloroethane and methylene chloride.
  - GW-FS-PC-28(D)-081412: 1,1,2-trichloroethane, 1,2-dichloroethane, 1,2-dichloropropane, benzene, bromoform, carbon tetrachloride and methylene chloride.
  - GW-FS-PC-25(D)-081412: 1,1,2-trichloroethane and methylene chloride.

  The data user will need to evaluate usability of non-detected results with elevated RLs for project uses.
- The SIM analysis for 1,4-dioxane reported relative response factors (RRFs) that were < 0.05 (QAPP Table 4-7A minimum RRF criteria) but > 0.010 (average RRF by SIM was 0.0294). Since the minimum acceptable RRF for 1,4-dioxane from USEPA Contract Laboratory Program (CLP) and National Functional Guidelines for Superfund Organic Methods Data Review, June 2008 is 0.010; professional judgment was used to accept the 1,4-dioxane calibration if RRF $\geq$ 0.010 rather than using QAPP criteria of 0.05 for this one compound. Additionally, LCS/LCSD and MS/MSD recoveries were acceptable for 1,4-dioxane indicating acceptable sensitivity for analysis of this compound for the samples in the SDG.

Table 2. Summary of Data Validation Actions

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
GW-FS-PC-23(D)-081412	Styrene	UJ	L	Low MS/MSD recoveries
GW-FS-OWD-4	1,1-Dichloroethene 1,2-Dichlorobenzene Isopropylbenzene Methylcyclohexane o-Xylene trans-1,2-Dichloroethene 1,4-Dioxane (SIM)	J	I	Result uncertain below the calibration range
GW-FS-PC-23(D)-081412	1,1-Dichloroethane cis-1,2-Dichloroethene	J	I	Result uncertain below the calibration range

Table 2. Summary of Data Validation Actions - *continued*

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
GW-FS-PC-17(D)-081412	1,1-Dichloroethene Ethylbenzene Isopropylbenzene Methylcyclohexane o-Xylene Tetrachloroethene trans-1,2-Dichloroethene 1,4-Dioxane (SIM)	J	I	Result uncertain below the calibration range
GW-FS-PC-25(D)-081412	1,2-Dichlorobenzene Benzene Chlorobenzene cis-1,2-Dichloroethene Methylcyclohexane o-Xylene Toluene Trichloroethene Xylenes, Total	J	I	Result uncertain below the calibration range
GW-FS-PC-28(D)-081412	1,1-Dichloroethene 1,2-Dichlorobenzene Isopropylbenzene Tetrachloroethene 1,4-Dioxane (SIM)	J	I	Result uncertain below the calibration range

Qualifiers: U = Analyte is non-detect at the "Limit_2" value in the EDD, which is the sample-specific reporting limit (RL); UJ = Non-detect is estimated; J = Result is estimated; R = Result is rejected and is unusable for project decisions.

Bias: L = Low; H = High; I = Indeterminate

Acronyms used in Table 2:
MS = Matrix Spike
MSD = Matrix Spike Duplicate

RDWP; Davis Liquid Waste Superfund Site
ESS 2012 Sampling
Volatile Tier II-type Data Review Checklist

Lab Project: 360-42220-1

Lab: TestAmerica Westfield
Date Sampled: 8/14/12
Method of Analysis: 8260C - EI & 8260C - SIM

No. Samples: 4+ 1 FD + 1 TB
Matrix: Groundwater

Data Element Acceptable	Preservation & HT	Surrogates 70-130%	LCS/LCSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	MS/MSD 70-130% w: RPD≤ 20% s: RPD≤ 30%	FD w: RPD < 30% s: RPD < 50%	Tunes ICALs CCALs	IS'	QL & Quant. Correct	TICs	Other
Yes	√	√	√		√	√	√		NA	NA
No				Estimate (UJ) 1 result in GW-FS-PC-23(D)-081412				Accept 31 "J" results		

% solids OK? NA
Other Issues: No

Comments:

Method 8260C-EI used for reporting of project-specific list of VOCs except 1,4-Dioxane, which was reported from an 8260C-SIM analysis as required by Table 4-1A of QAPP.

Samples were received intact at TestAmerica on the day after sample collection at 4±2°C. There were no COC issues noted by the lab . No action required.

Samples were all analyzed by 8/28/12 - HT met for all samples, No Action required.

Surrogates : All 3 VOC surrogates were recovered within 70-130% in all samples and QC for EI and SIM analysis - no Action required

LCS/LCSD: EI LCS/LCSD 360-94756/3& 4. Lab spiked all 53 target analytes requested in LCS/LCSD (xylenes (total) spiked as the isomers m&p-xylene and o-xylene). EI evaluated for all compounds except 1,4-dioxane, which was evaluated by SIM. All %Rec and LCS/LCSD RPDs were acceptable except Carbon Disulfide (LCSD rec. high). No action required for increased sensitivity as carbon disulfide was not detected in any of the samples.

LCS/LCSD: SIM LCS/LCSD 360-94602/3 & 4 and LCS/LCSD 60-94526/3 & 4 for 1,4-dioxane . All SIM %Rec and LCS/LCSD RPDs were acceptable. No action required.

Date: ***11/24/12***

Data Reviewer: ***Deborah A. Loring***

Lab Project: 360-42220-1

Lab: TestAmerica Westfield

Blank Action: Blanks Reviewed: MB EI: MB 360-94756/6
MB SIM: MB 360-94602/6
TB: TB-081512-1

Blank ID	Contaminant / Level	Matrix Related?		Action Level / Action		Sample and Reported Result	Corrected Result
MB 360-94756/6	None					No Blank Action required	
MB 360-94602/6	None					No Blank Action required	
TB-081512-1	None					No Blank Action required	

MS/MSD: MS/MSD analyses were performed on sample GW-FS-PC-23(D)-081412 for all EI and SIM compounds. All %Rec and RPDs were within limits except styrene (MS/MSD rec. low bu > 10%R).

**ACTION: Estimate (UJ) styrene in sample GW-FS-PC-23(D)-081412 due to low MS/MSD recoveries.*

FD pair: GW-FS-PC-17(D)-081412 / GW-FS-OWD-4. A comparison of detected results shown below

Field Duplicate Evaluation_ Sample IDs: Sample = GW-FS-PC-17(D)-081412 FD = GW-FS-OWD-4

Analyte Name	DF= 1 RL (µg/L)	Sample µg/L	Q	Sample Result Level	FD µg/L	Q	FD Result Level	RPD	Action
1,1,1-Trichloroethane	4	15		>2xRL	16		>2xRL	6	None
1,1-Dichloroethane	4	8.4		>2xRL	9.2		>2xRL	9	None
1,1-Dichloroethene	4	1.2	J	< RL	0.93	J	< RL	25	None
1,2-Dichlorobenzene	4	ND		ND	0.91	J	< RL	NC	None
Chloroform	4	8.8		>2xRL	9.2		>2xRL	4	None
cis-1,2-Dichloroethene	4	47		>2xRL	50		>2xRL	6	None
Ethylbenzene	4	3.7	J	< RL	4.2		< 2xRL	13	None
Isopropylbenzene	4	2.5	J	< RL	2.5	J	< RL	0	None

NC = Not Calculated

Date: *11/24/12*

Data Reviewer: *Deborah A. Loring*

FD Evaluation - *continued*

Sample = GW-FS-PC-17(D)-081412 FD = GW-FS-OWD-4

Analyte Name	DF= 1 RL (µg/L)	Sample µg/L	Q	Sample Result Level	FD µg/L	Q	FD Result Level	RPD	Action
Methylcyclohexane	4	1.8	J	< RL	2	J	< RL	11	None
o-Xylene	4	1.1	J	< RL	1.3	J	< RL	17	None
Tetrachloroethene	4	3.5	J	< RL	4		< 2XRL	13	None
trans-1,2-Dichloroethene	4	1.9	J	< RL	2.2	J	<RL	15	None
Trichloroethene	4	10		>2xRL	11		>2xRL	10	None
Vinyl chloride	2	160		>2xRL	180		>2xRL	12	None
1,4-Dioxane (SIM)	3	2.2	J	< RL	2	J	< RL	10	None

FD pair: GW-FS-PC-17(D)-081412 / GW-FS-OWD-4. FD precision considered acceptable for this FD pair.

Tunes: Instrument Agilent #2 GC/MS used for Full Scan and SIM analysis – single injection with dual detection systems (EI and SIM). Tunes Full Scan GCMS Agilent #2 8/27/12 17:11 (ICAL), 8/28/12 07:58. All tune abundances were acceptable and all samples and standards were analyzed within 12 hours of BFB tune. SIM GCMS 7/25/12 12:39, 8/24/12 09:31. 8/24/12 BFB was outside Method 8260 criteria (m/e 174 rather than 95 was the base peak). As this is allowable by current CLP methodology, the data was accepted without qualification. All other tune abundances were acceptable and all samples and standards were analyzed within 12 hours of BFB tune.

ICAL : Agilent#2 8/27/12 (EI) and 7/25/12 (SIM) 5-9 level ICAL for all Targets + several non-target compounds (from 0.5, 1, 5 or 25 up to 1600 µg/L SIM 9-level 3 to 1600 µg/L). All calibrations met QAPP criteria for Target Compounds %RSD $\leq$ 20% or r2 $\geq$ 0.99 and all RRFs $\geq$ 0.05 except SIM analysis for 1,4-Dioxane reported RRF $\geq$ 0.010 (average RRF by SIM was 0.0294). Valid ICAL - No Action required.

CCAL: Agilent#2 (SIM) 08/24/2012 09:53 - %D (or %Drift) $\leq \pm$ 20% for 1,4-dioxane and RRF > 0.010. No action required.

CCAL : Agilent#2 (EI) 08/28/2012 08:19 - %D (or %Drift) $\leq \pm$ 20% for all target compounds and RRF $\geq$ 0.05 (1,4-dioxane $\geq$ 0.010) acetone %D= +29.6%. A positive %D indicates increased sensitivity on day of analysis, so no action required for positive %D for acetone as all associated samples were non-detect.

IS: All 4 IS Areas and RTs were in criteria for EI and SIM analyses - No Action required.

Date: ***11/24/12***

Data Reviewer: ***Deborah A. Loring***

Additional Notes:

Lab reported results for m- Xylene & p-Xylene (reported as a single entry due to coelution) and o-Xylene in addition to Xylenes, total, as requested in the QAPP. All 53 project-specific VOCs were reported so with the added Xylenes, a total of 55 VOC results reported per sample. Note that bromodichloromethane, as listed in Table 4-1A, is called dichlorobromomethane in EDD and data and Dibromochloromethane, as listed in Table 4-1A, is called chlorodibromomethane in EDD and data.

31 results were reported at levels < RL and were flagged "J" by the lab. These 31 "J" results were accepted for reporting with indeterminate bias due to uncertainty in quantitation at a level below the instrument calibration range.

All RLs were at or below the PQLs required by the QAPP Table 4-1A for all samples with the exception of Methyl acetate, which was reported at a PQL above the required PQL in all samples, and for several analytes in samples 360-41997-2, -3, -4, -15, -16 & -19 , all of which were run at dilutions

All non-detects were reported at levels at or below the PALs given in QAPP Table 4-1A with the exception of 1,2-dibromo-3-chloropropane and ethylene dibromide in all samples, due to method limitations and the following compounds:

GW-FS-PC-17(D)-081412: 1,1,2-trichloroethane & methylene chloride.

GW-FS-OWD-4: 1,1,2-trichloroethane & methylene chloride.

GW-FS-PC-28(D)-081412: 1,1,2-trichloroethane, 1,2-dichloroethane, 1,2-dichloropropane, benzene, bromoform, carbon tetrachloride & methylene chloride.

GW-FS-PC-25(D)-081412: 1,1,2-trichloroethane & methylene chloride.

Narrative did not raise any issues not already addressed.

Date: ***11/24/12***

Data Reviewer: ***Deborah A. Loring***

8260C and Project Action Summary:

Preservation:	Waters - headspace present or received at > 10°C, J det / J NDs or R ND Soils/Sediment - EnCore extrusion and sample preservation unacceptable or received at > 10°C, J det / J NDs or R ND
HT:	Waters - pH > 2; preserved 7d <HT≤ 14 d; J det/ J NDs; HT >14 d, J det/R ND Waters - pH < 2; 14d <HT≤ 28d; J det/ J NDs; HT >28d, J det/R ND Soils/Sediment - 14d <HT< 28d; J det/ J NDs; HT >28d, J det/R ND
Surrogates:	Surr. %Rec > 130%, J det/Accept ND; 10% ≤ %Rec < 70%, J det/J NDs;
LCS	%Rec<10%, J det/ R NDs; 10% <%Rec<70, J det/ J NDs; %Rec >130, J det/Accept NDs. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. LCS must contain all targets.
Tunes:	Samples analyzed within 12-hrs and criteria met per Method 8260C. If out, use professional judgment.
ICAL:	minimum 5-Level, lowest level ≤ RL; %RSD > 20%, J det/UJ NDs, or if "r" < 0.99; J det/UJ NDs. If avg. RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
CCAL:	%D (or %Drift) > - 20% , J det/J ND; %D (or %Drift) > +20%, J det/Accept ND. If RRF < 0.05 for all compounds except 1,4-dioxane (SIM), J det/ J ND; if 1,4-Dioxane RRF < 0.01, J det / R NDs.
Blanks:	Non-Matrix related Blank contamination, EB or TB contaminant in all samples associated with Blank Matrix-matched blank: If contamination in blank(s) exist, if Result < RL, U result at RL; RL<Result<Blank Action Level, U result at level reported; if Result > Blank Action Level, no action required. Blank Action Level = 5 x value in Blank except for acetone, 2-butanone, and methylene chloride which are 10 x value in blank.
MS/MSD:	%Rec<10%, J det/ R NDs; 10% <%Rec<70%, J det/ J NDs; %Rec >130%, J det/Accept NDs- Unspiked Sample only. RPD > 20% waters, or RPD > 30% solids, J det/ UJ NDs. MS/MSD must contain all targets.
FD:	Both Conc. > 2xQL, RPD >Limit; J det; One result ND, other >2 x QL, J det/J NDs; Both Conc. < 2xQL; RPD > Limit, LCS OK, Accept data
IS:	20% ≤ Area < 50% of IS in CCAL , J det/ J NDs; Area < 20% of CCAL, J det / R NDs; Area > 200% IS in CCAL, J det / Accept NDs
QLs:	Verify RLs met RLs and PALs given in QAPP; if result > upper calibration range, J result, if result < lowest calibration standard, J result. Verify all J data reported properly, if applicable. Note any non-detects at values > PALs.
TICs:	Not required
% solids:	If % solids < 30% J det/ J NDs, %solids < 10%, J det/R NDs
Narrative:	If there are any issues raised in narrative not previously addressed, take appropriate action
Reference:	*Remedial Design Work Plan and Pre-Design Investigation Plan (RDWP)* , Davis Liquid Waste Superfund Site, Smithfield, Rhode Island; prepared by ESS Group, Inc., March 23, 2012; Region I, *EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses* , December 1996, including Part I & Part II (Volatile/Semivolatile Data Validation Functional Guidelines); and USEPA SW846 Method 8260C

Date: ***11/24/12***

Data Reviewer: ***Deborah A. Loring***

Appendix E

Treatability Analyte Testing Results – Soil

Date: 02/08/2013

Plume Core Soil Sampling
Physical Testing Parameters
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

PERIOD: From 05/18/2012 thru 08/20/2012 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE SAMPLE ID DATE DEPTH (ft)	PC-10 SB-FS-PC-10-S&G 06/08/2012 15.50	PC-24 SB-FS-PC-24-PEAT 06/08/2012 12.75	PC-24 SB-FS-PC-24-SILT 06/08/2012 14.75	PC-24 SB-FS-PC-24-S&G 06/08/2012 22.00
Starting Depth	(feet)	13.00	12.00	13.50	20.00
Ending Depth	(feet)	18.00	13.50	16.00	24.00
TOC	(mg/kg)	1100U	400000	2300	1200U
In Place Density	(g/cc)	2.03	0.447	1.65	1.84
Gravel	(%)	21.7	3.4	0.9	0
Coarse Sand	(%)	13.5	3.7	1.2	3.4
Medium Sand	(%)	20.5	21.1	1.3	22.7
Fine Sand	(%)	23.2	23.4	8.9	63.9
Sand	(%)	57.2	48.2	11.4	90
Silt	(%)	17.5	40.2	76.3	9.1
Clay	(%)	3.7	8.2	11.4	0.9
Sieve Size #4 - Percent Finer	(%pass)	78.3	96.6	99.1	100
Sieve Size #10 - Percent Finer	(%pass)	64.8	92.9	97.9	96.6
Sieve Size #20 - Percent Finer	(%pass)	53.9	85.8	97.2	88.4
Sieve Size #40 - Percent Finer	(%pass)	44.3	71.8	96.6	73.9
Sieve Size #60 - Percent Finer	(%pass)	36.5	62.7	95.9	53.7
Sieve Size #80 - Percent Finer	(%pass)	32.3	58	95.3	40.6
Sieve Size #100 - Percent Finer	(%pass)	29.4	55.1	94.7	31.3
Sieve Size #200 - Percent Finer	(%pass)	21.1	48.4	87.7	10
Sieve Size 0.375 inch - Percent Finer	(%pass)	87.9	98	100	100
Sieve Size 0.75 inch - Percent Finer	(%pass)	100	100	100	100
Sieve Size 1 inch - Percent Finer	(%pass)	100	100	100	100
Sieve Size 1.5 inch - Percent Finer	(%pass)	100	100	100	100
Sieve Size 2 inch - Percent Finer	(%pass)	100	100	100	100
Sieve Size 3 inch - Percent Finer	(%pass)	100	100	100	100
Hydrometer Reading 1 - Particle Size	(um)	33.7	33.3	22.9	36.8
Hydrometer Reading 2 - Particle Size	(um)	22.1	21.9	17.4	23.5
Hydrometer Reading 3 - Particle Size	(um)	13	13.3	11.5	13.6
Hydrometer Reading 4 - Particle Size	(um)	9.3	9.3	8.5	9.3
Hydrometer Reading 5 - Particle Size	(um)	6.5	6.7	6.4	6.8
Hydrometer Reading 6 - Particle Size	(um)	3.3	3.5	3.1	3.3
Hydrometer Reading 7 - Particle Size	(um)	1.4	1.4	1.4	1.4
Hydrometer Reading 1 - Percent Finer	(%pass)	11	33.5	43.8	2.3
Hydrometer Reading 2 - Percent Finer	(%pass)	7.8	24.2	32.5	1.4
Hydrometer Reading 3 - Percent Finer	(%pass)	5.9	10.9	21	1.4
Hydrometer Reading 4 - Percent Finer	(%pass)	4.6	9.5	15	1.3
Hydrometer Reading 5 - Percent Finer	(%pass)	3.7	8.2	11.4	0.9
Hydrometer Reading 6 - Percent Finer	(%pass)	2.3	4	6.6	0.4
Hydrometer Reading 7 - Percent Finer	(%pass)	1.4	2.7	4.2	0.4

Prepared by KP: 02/08/13

The following qualifier(s) exist: CLP C: U NA=Not analyzed

Date: 02/08/2013

Plume Core Soil Sampling
Physical Testing Parameters
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

PERIOD: From 05/18/2012 thru 08/20/2012 - Inclusive
SAMPLE TYPE: Soil

CONSTITUENT	SITE SAMPLE ID DATE DEPTH (ft)	PC-28 SB-FS-PC-28-PEAT 06/07/2012 5.00	PC-28 SB-FS-PC-28-SILT 06/07/2012 7.00	PC-28 SB-FS-PC-28-S&G 06/07/2012 12.50
Starting Depth	(feet)	4.50	5.50	10.00
Ending Depth	(feet)	5.50	8.50	15.00
TOC	(mg/kg)	420000	12000	2100
In Place Density	(g/cc)	0.359	1.78	1.79
Gravel	(%)	0.4	1.3	0
Coarse Sand	(%)	1.5	2.7	1.1
Medium Sand	(%)	7.9	12.9	12.6
Fine Sand	(%)	15.5	48.5	54.3
Sand	(%)	24.9	64.1	68
Silt	(%)	48.6	30.6	27.9
Clay	(%)	26.1	4	4.1
Sieve Size #4 - Percent Finer	(%pass)	99.6	98.7	100
Sieve Size #10 - Percent Finer	(%pass)	98.1	96	98.9
Sieve Size #20 - Percent Finer	(%pass)	95.3	91.1	95.1
Sieve Size #40 - Percent Finer	(%pass)	90.2	83.1	86.3
Sieve Size #60 - Percent Finer	(%pass)	85.9	72.4	71.4
Sieve Size #80 - Percent Finer	(%pass)	83.5	64.2	60.5
Sieve Size #100 - Percent Finer	(%pass)	81.5	57.7	52.9
Sieve Size #200 - Percent Finer	(%pass)	74.7	34.6	32
Sieve Size 0.375 inch - Percent Finer	(%pass)	100	100	100
Sieve Size 0.75 inch - Percent Finer	(%pass)	100	100	100
Sieve Size 1 inch - Percent Finer	(%pass)	100	100	100
Sieve Size 1.5 inch - Percent Finer	(%pass)	100	100	100
Sieve Size 2 inch - Percent Finer	(%pass)	100	100	100
Sieve Size 3 inch - Percent Finer	(%pass)	100	100	100
Hydrometer Reading 1 - Particle Size	(um)	33.5	31.4	32.4
Hydrometer Reading 2 - Particle Size	(um)	21.8	21.3	21.7
Hydrometer Reading 3 - Particle Size	(um)	12.7	12.8	13
Hydrometer Reading 4 - Particle Size	(um)	9.3	9.4	9.1
Hydrometer Reading 5 - Particle Size	(um)	6.7	6.4	6.7
Hydrometer Reading 6 - Particle Size	(um)	3.3	3.3	3.4
Hydrometer Reading 7 - Particle Size	(um)	1.4	1.4	1.4
Hydrometer Reading 1 - Percent Finer	(%pass)	57.4	15.5	15.8
Hydrometer Reading 2 - Percent Finer	(%pass)	45.5	10.2	10.7
Hydrometer Reading 3 - Percent Finer	(%pass)	40.8	6.7	7.1
Hydrometer Reading 4 - Percent Finer	(%pass)	31.3	4.9	5.6
Hydrometer Reading 5 - Percent Finer	(%pass)	26.1	4	4.1
Hydrometer Reading 6 - Percent Finer	(%pass)	19	2.7	3.1
Hydrometer Reading 7 - Percent Finer	(%pass)	11.9	1.8	2

Prepared by KP: 02/08/13

NA=Not analyzed

Date: 02/08/2013

Plume Core Soil Sampling
Treatability Parameters
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

PERIOD: From 05/18/2012 thru 08/20/2012 - Inclusive

SAMPLE TYPE: Soil

CONSTITUENT	SITE SAMPLE ID DATE DEPTH (ft)	PC-10 SB-FS-PC-10-S&G 06/08/2012 15.50	PC-10 SB-FS-PC-10-S&G 08/20/2012 15.50	PC-24 SB-FS-PC-24-PEAT 06/08/2012 12.75	PC-24 SB-FS-PC-24-SILT 06/08/2012 14.75
Starting Depth	(feet)	13.00	13.00	12.00	13.50
Ending Depth	(feet)	18.00	18.00	13.50	16.00
Bioavailable Ferric Iron	(mg/kg)	NA	100	NA	NA
Cation Exchange Capacity	(meq/100g)	1.3	NA	160	6.3
Acid Volatile Sulfide	(mg/kg)	NA	55U	NA	NA
Chromium Extractable Sulfide	(mg/kg)	NA	55U	NA	NA
Strong Acid Soluble Ferric Iron	(mg/kg)	NA	960	NA	NA
Weak Acid Soluble Ferric Iron	(mg/kg)	NA	1400	NA	NA
Strong Acid Soluble Divalent Mn	(mg/kg)	NA	85	NA	NA
Weak Acid Soluble Divalent Mn	(mg/kg)	NA	38	NA	NA
Strong Acid Soluble Ferrous Iron	(mg/kg)	NA	5100	NA	NA
Weak Acid Soluble Ferrous Iron	(mg/kg)	NA	1300	NA	NA

Prepared by KP: 02/08/13

The following qualifier(s) exist: CLP C: U NA=Not analyzed

Date: 02/08/2013

Plume Core Soil Sampling
Treatability Parameters
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

PERIOD: From 05/18/2012 thru 08/20/2012 - Inclusive

SAMPLE TYPE: Soil

CONSTITUENT	SITE SAMPLE ID DATE DEPTH (ft)	PC-24 SB-FS-PC-24-S&G 06/08/2012 22.00	PC-24 SB-FS-PC-24-PEAT 08/20/2012 12.75	PC-24 SB-FS-PC-24-SILT 08/20/2012 14.75	PC-28 SB-FS-PC-28-PEAT 06/07/2012 5.00
Starting Depth	(feet)	20.00	12.00	13.50	4.50
Ending Depth	(feet)	24.00	13.50	16.00	5.50
Bioavailable Ferric Iron	(mg/kg)	NA	180	430	NA
Cation Exchange Capacity	(meq/100g)	0.96	NA	NA	160
Acid Volatile Sulfide	(mg/kg)	NA	200U	50J	NA
Chromium Extractable Sulfide	(mg/kg)	NA	180J	210	NA
Strong Acid Soluble Ferric Iron	(mg/kg)	NA	82U	51000	NA
Weak Acid Soluble Ferric Iron	(mg/kg)	NA	900	8000	NA
Strong Acid Soluble Divalent Mn	(mg/kg)	NA	82U	660	NA
Weak Acid Soluble Divalent Mn	(mg/kg)	NA	82U	80	NA
Strong Acid Soluble Ferrous Iron	(mg/kg)	NA	3800	6900	NA
Weak Acid Soluble Ferrous Iron	(mg/kg)	NA	2600	1600	NA

Prepared by KP: 02/08/13

The following qualifier(s) exist: CLP C: U, J NA=Not analyzed

Date: 02/08/2013

Plume Core Soil Sampling
Treatability Parameters
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

PERIOD: From 05/18/2012 thru 08/20/2012 - Inclusive

SAMPLE TYPE: Soil

CONSTITUENT	SITE SAMPLE ID DATE DEPTH (ft)	PC-28 SB-FS-PC-28-SILT 06/07/2012 7.00	PC-28 SB-FS-PC-28-S&G 06/07/2012 12.50
Starting Depth	(feet)	5.50	10.00
Ending Depth	(feet)	8.50	15.00
Bioavailable Ferric Iron	(mg/kg)	NA	NA
Cation Exchange Capacity	(meq/100g)	7.3	1.7
Acid Volatile Sulfide	(mg/kg)	NA	NA
Chromium Extractable Sulfide	(mg/kg)	NA	NA
Strong Acid Soluble Ferric Iron	(mg/kg)	NA	NA
Weak Acid Soluble Ferric Iron	(mg/kg)	NA	NA
Strong Acid Soluble Divalent Mn	(mg/kg)	NA	NA
Weak Acid Soluble Divalent Mn	(mg/kg)	NA	NA
Strong Acid Soluble Ferrous Iron	(mg/kg)	NA	NA
Weak Acid Soluble Ferrous Iron	(mg/kg)	NA	NA

Prepared by KP: 02/08/13

NA=Not analyzed

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SITE LOGIC Report

pH Buffering and Acidity Testing Report

Contact:	Kevin Purdy	**Phone:**	401.434.5560
Address:	ESS Group 401 Wampanoag Trail Suite 400 East Providence, RI 02915	**Email:**	kpurdy@essgroup.com

MI Identifier:	**025JF**	**Report Date:**	06/14/2012

Project: Davis Liquid Superfund D164-002.01

Comments:

NOTICE: This report is intended only for the addressee shown above and may contain confidential or privileged information. If the recipient of this material is not the intended recipient or if you have received this in error, please notify Microbial Insights, Inc. immediately. The data and other information in this report represent only the sample(s) analyzed and are rendered upon condition that it is not to be reproduced without approval from Microbial Insights, Inc. Thank you for your cooperation.

Role of Subsurface pH

Every organism has a pH range within which growth is possible and typically a well-defined optimum pH for maximum growth rates and activity. Although organisms that thrive in low pH (acidophiles) and high pH (alkaliphiles) environments have been isolated, most microorganisms are classified as neutrophiles with pH optimums between pH 6 and 8. Many important bacterial groups responsible for biodegradation of chlorinated solvents belong to this neutrophile category. For example, the pH for optimal growth of *Dehalococcoides ethenogenes* strain 195, the only known bacterium capable of complete reductive dechlorination of PCE to ethene, is between pH 6.8 and 7.5 (Maymo-Gatell, 1997). Likewise, optimal pH ranges for several *Desulfitobacterium* species capable of reductive dechlorination of chlorinated ethenes and ethanes are near neutral (Gerritse et al, 1999; Suyama et al, 2001). Thus maintenance of a circum neutral pH subsurface environment can be an important factor in promoting reductive dechlorination.

What is required for the test?

It is recommended that both soil and groundwater be collected from three locations at the site. For each sample, two 250mL jars containing site aquifer material or site groundwater are submitted to Microbial Insights for testing. Ground water samples are analyzed using Standard Methods 2310 B for total acidity. Sediment samples are analyzed using sodium hydroxide to calculate the sediment base requirement. Values are reported as meq/L. This data can then be entered into the AquaBupH program available through EOS remediation.

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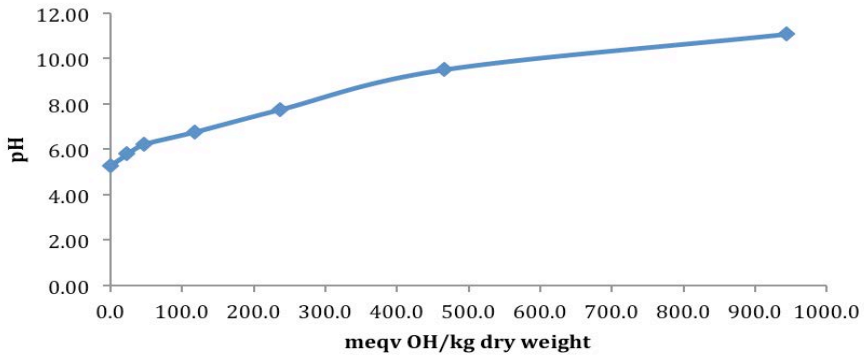
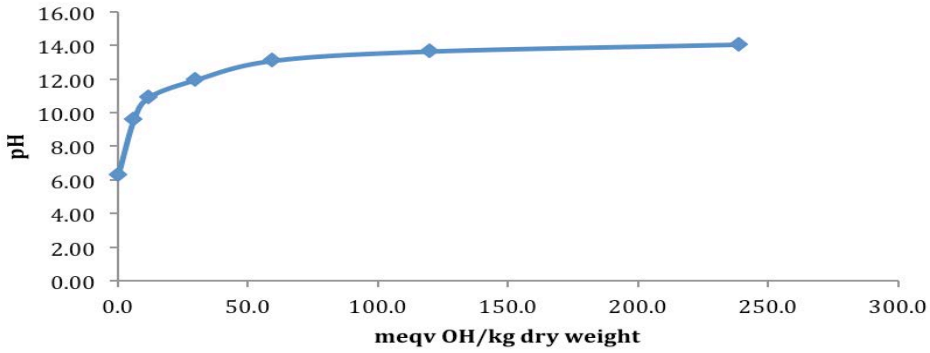
Results—pH Buffering and Acidity Testing

SB-FS-PC-24-PEAT	
meqv/kg	pH
0.0	5.30
23.3	5.80
47.3	6.24
117.9	6.78
237.2	7.77
466.9	9.53
943.8	11.09



SB-FS-PC-24-SILT	
meqv/kg	pH
0.0	6.32
6.0	9.62
11.9	10.96
29.9	12.00
59.4	13.13
120.0	13.69
238.5	14.10



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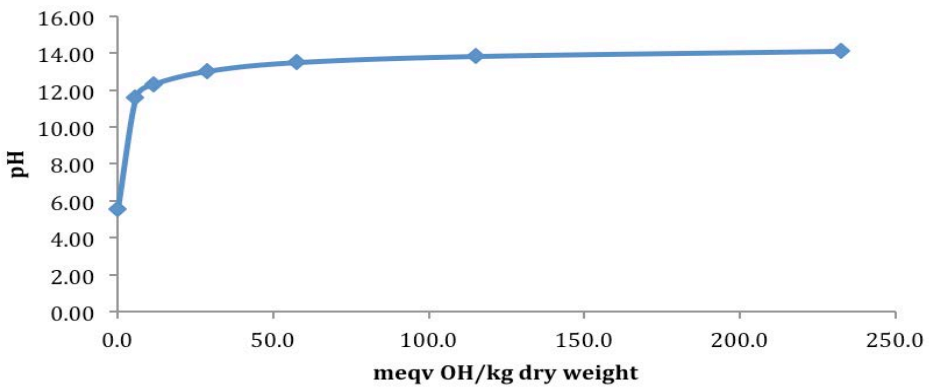
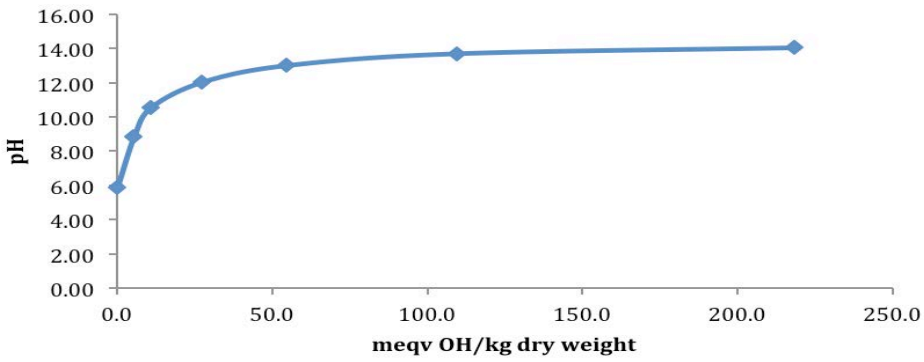
SB-FS-PC-24-S&G	
meqv/kg	pH
0.0	5.56
5.8	11.63
11.6	12.34
29.0	13.05
57.8	13.52
115.2	13.85
232.4	14.13



SB-FS-PC-10-S&G	
meqv/kg	pH
0.0	5.86
5.4	8.88
10.9	10.56
27.3	12.04
54.8	13.02
109.6	13.71
218.4	14.06



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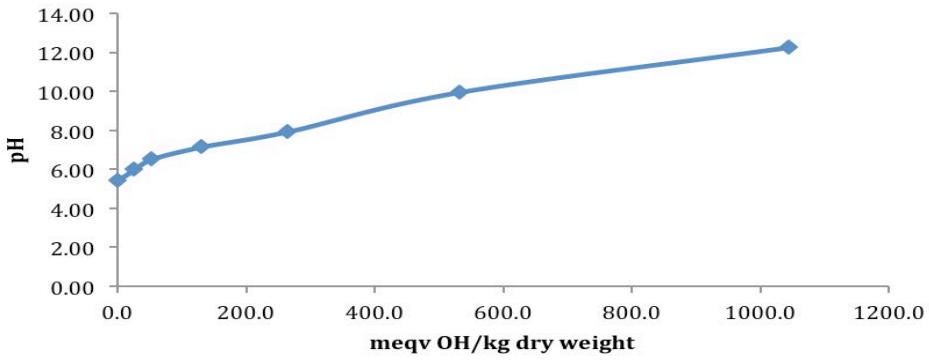
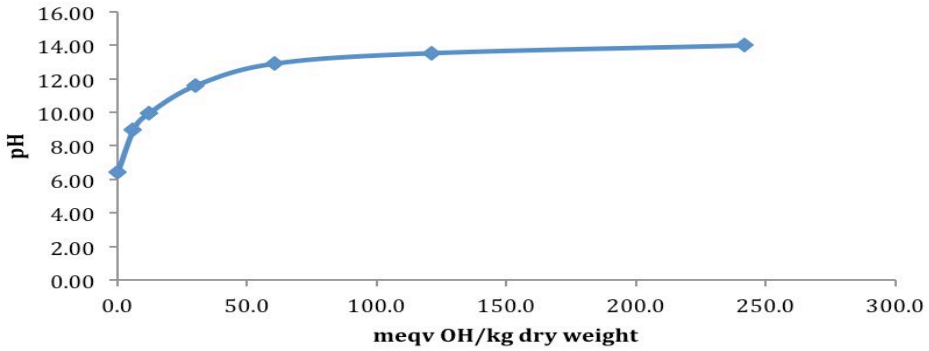
SB-FS-PC-28-PEAT	
meqv/kg	pH
0.0	5.43
26.6	6.01
53.2	6.53
131.2	7.16
264.6	7.94
532.8	9.97
1044.6	12.27



SB-FS-PC-28-SILT	
meqv/kg	pH
0.0	6.43
6.1	8.98
12.1	9.97
30.2	11.63
60.7	12.93
121.1	13.55
241.7	14.01



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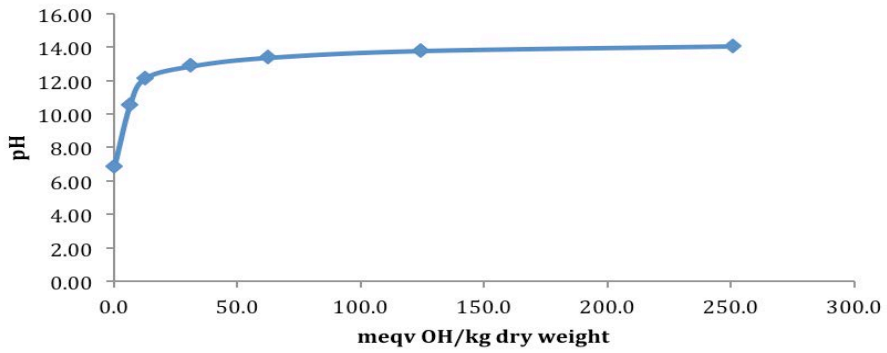
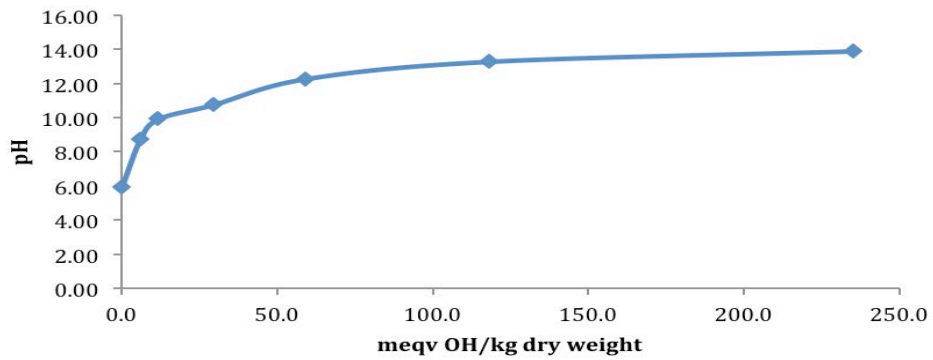
SB-FS-PC-28-S&G	
meqv/kg	pH
0.0	6.89
6.2	10.55
12.5	12.18
31.1	12.90
62.3	13.41
124.5	13.82
250.7	14.10



SB-FS-PC-BG-S&G	
meqv/kg	pH
0.0	5.92
5.9	8.72
11.8	9.93
29.5	10.77
59.0	12.28
118.3	13.30
235.1	13.91



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References Cited

Gerritse et al. 1999. Influence of different electron donors and acceptors on dehalorespiration of tetrachloroethene by *Desulfitobacterium frappieri* TCE1. Appl. Environ. Microbiol. 65(12): 5212-5221.

Maymo-Gatell, X. 1997. *Dehalococcoides ethenogenes* Strain 195, A novel eubacterium that reductively dechlorinates tetrachloroethene (PCE) to ethene. Report No. AL/EQ-TR-1997-0029.

Suyama et al. 2001. Isolation and characterization of *Desulfitobacterium* sp. strain Y51 capable of efficient dehalogenation of tetrachlorethene and polychloroethanes. Biosci. Biotechnol. Biochem. 65(7): 1474-1481.

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Appendix F

Initial VOC and Treatability Results – Groundwater

Date: 02/08/2013

Initial Groundwater Treatability Sampling
Volatile Organic Compounds
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island
June 2012

PERIOD: From 06/20/2012 thru 06/20/2012 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE	OW-054 06/20/2012	PC-11S 06/20/2012	PC-24PS 06/20/2012	PC-28D 06/20/2012
1,1,1-Trichloroethane	(ug/l)	100	60	1.0U	130
1,1,2,2-Tetrachloroethane	(ug/l)	5.0U	0.50U	0.50U	10U
1,1,2-Trichloroethane	(ug/l)	10U	0.51J	1.0U	20U
1,1-Dichloroethane	(ug/l)	31	5.5	0.50J	81
1,1-Dichloroethylene	(ug/l)	3.1J	0.67J	1.0U	8.5J
1,2,3-Trichlorobenzene	(ug/l)	10U	1.0U	1.0U	20U
1,2,4-Trichlorobenzene	(ug/l)	10U	1.0U	1.0U	20U
1,2-Dichlorobenzene	(ug/l)	7.4J	1.0U	1.0U	11J
1,2-Dichloroethane	(ug/l)	10U	1.0U	1.0U	20U
1,2-Dichloropropane	(ug/l)	10U	1.0U	1.0U	20U
1,3-Dichlorobenzene	(ug/l)	10U	1.0U	1.0U	20U
1,4-Dichlorobenzene	(ug/l)	10U	1.0U	1.0U	20U
1,4-Dioxane	(ug/l)	30U	3.0U	3.0U	60U
2-Hexanone	(ug/l)	100U	10U	10U	200U
Acetone	(ug/l)	500U	50U	50U	1000U
Benzene	(ug/l)	10U	1.0U	1.0U	20U
Bromochloromethane	(ug/l)	10U	1.0U	1.0U	20U
Bromodichloromethane	(ug/l)	5.0U	0.50U	0.50U	10U
Bromoform	(ug/l)	10U	1.0U	1.0U	20U
Carbon disulfide	(ug/l)	100U	10U	0.63J	200U
Carbon tetrachloride	(ug/l)	10U	1.0U	1.0U	20U
Chlorobenzene	(ug/l)	10U	1.0U	1.0U	20U
Chloroethane	(ug/l)	20U	2.0U	2.0U	39J
Chloroform	(ug/l)	10U	0.28J	0.40J	20U
cis-1,2-Dichloroethylene	(ug/l)	460	190E	160E	910
cis-1,3-Dichloropropene	(ug/l)	4.0U	0.40U	0.40U	8.0U
Cyclohexane	(ug/l)	10U	1.0U	1.0U	20U
DBCP	(ug/l)	50U	5.0U	5.0U	100U
Dibromochloromethane	(ug/l)	5.0U	0.50U	0.50U	10U
Dichlorodifluoromethane	(ug/l)	10U	1.0U	1.0U	20U
Diethyl ether	(ug/l)	10U	1.0U	1.0U	20U
EDB	(ug/l)	10U	1.0U	1.0U	20U
Ethylbenzene	(ug/l)	56	1.0U	1.0U	20U
Freon 113	(ug/l)	10U	1.0U	1.0U	20U
Isopropylbenzene	(ug/l)	3.4J	1.0U	1.0U	20U
Methyl Acetate	(ug/l)	200U	20U	20U	400U
Methyl bromide	(ug/l)	20U	2.0U	2.0U	40U
Methyl chloride	(ug/l)	20U	2.0U	2.0U	40U
Methyl ethyl ketone (MEK)	(ug/l)	100U	10U	1.9J	200U

Prepared by KP: 02/08/13

The following qualifier(s) exist: CLP C: U, CLP Q: J, E NA=Not analyzed

Date: 02/08/2013

Initial Groundwater Treatability Sampling
Volatile Organic Compounds
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island
June 2012

PERIOD: From 06/20/2012 thru 06/20/2012 - Inclusive

SAMPLE TYPE: Water

CONSTITUENT	SITE DATE	OW-054 06/20/2012	PC-11S 06/20/2012	PC-24PS 06/20/2012	PC-28D 06/20/2012
Methyl isobutyl ketone	(ug/l)	100U	10U	10U	200U
Methyl tert-butyl ether	(ug/l)	10U	1.0U	1.0U	20U
Methylcyclohexane	(ug/l)	10U	1.0U	1.0U	20U
Methylene chloride	(ug/l)	20U	2.0U	2.0U	40U
Styrene	(ug/l)	10U	1.0U	1.0U	20U
Tetrachloroethylene	(ug/l)	2.4J	43	1.0U	20U
Tetrahydrofuran	(ug/l)	100U	10U	10U	200U
Toluene	(ug/l)	4.9J	1.0U	34	20U
Trans-1,2-Dichloroethene	(ug/l)	9.2J	2.6	7.4	28
trans-1,3-Dichloropropene	(ug/l)	4.0U	0.40U	0.40U	8.0U
Trichloroethylene	(ug/l)	3.4J	17	0.78J	5.2J
Trichlorofluoromethane	(ug/l)	10U	1.0U	1.0U	20U
Vinyl chloride	(ug/l)	240	0.50U	27	760
Xylene (total)	(ug/l)	14J	2.0U	2.0U	40U
Sum of Constituents	(ug/l)	934.80	319.56	232.61	1972.70

Prepared by KP: 02/08/13

The following qualifier(s) exist: CLP C: U, CLP Q: J NA=Not analyzed

Date: 02/08/2013

Initial Groundwater Treatability Sampling
Volatile Organic Compounds
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island
June 2012

PERIOD: From 06/20/2012 thru 06/20/2012 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE	PC-28PS 06/20/2012	PCD-3 06/20/2012
1,1,1-Trichloroethane	(ug/l)	1.0U	0.29J
1,1,2,2-Tetrachloroethane	(ug/l)	0.50U	0.50U
1,1,2-Trichloroethane	(ug/l)	1.0U	1.0U
1,1-Dichloroethane	(ug/l)	73	1.0U
1,1-Dichloroethylene	(ug/l)	1.0U	1.0U
1,2,3-Trichlorobenzene	(ug/l)	1.0U	1.0U
1,2,4-Trichlorobenzene	(ug/l)	1.0U	1.0U
1,2-Dichlorobenzene	(ug/l)	0.42J	1.0U
1,2-Dichloroethane	(ug/l)	0.36J	1.0U
1,2-Dichloropropane	(ug/l)	1.0U	1.0U
1,3-Dichlorobenzene	(ug/l)	1.0U	1.0U
1,4-Dichlorobenzene	(ug/l)	1.0U	1.0U
1,4-Dioxane	(ug/l)	130	3.0U
2-Hexanone	(ug/l)	10U	10U
Acetone	(ug/l)	50U	50U
Benzene	(ug/l)	15	1.0U
Bromochloromethane	(ug/l)	1.0U	1.0U
Bromodichloromethane	(ug/l)	0.50U	0.50U
Bromoform	(ug/l)	1.0U	1.0U
Carbon disulfide	(ug/l)	0.44J	1.9J
Carbon tetrachloride	(ug/l)	1.0U	1.0U
Chlorobenzene	(ug/l)	1.0U	1.0U
Chloroethane	(ug/l)	23	2.0U
Chloroform	(ug/l)	1.0U	0.78J
cis-1,2-Dichloroethylene	(ug/l)	22	0.46J
cis-1,3-Dichloropropene	(ug/l)	0.40U	0.40U
Cyclohexane	(ug/l)	0.27J	1.0U
DBCP	(ug/l)	5.0U	5.0U
Dibromochloromethane	(ug/l)	0.50U	0.50U
Dichlorodifluoromethane	(ug/l)	1.0U	1.0U
Diethyl ether	(ug/l)	24	1.0U
EDB	(ug/l)	1.0U	1.0U
Ethylbenzene	(ug/l)	8.0	1.0U
Freon 113	(ug/l)	1.0U	1.0U
Isopropylbenzene	(ug/l)	0.63J	1.0U
Methyl Acetate	(ug/l)	20U	20U
Methyl bromide	(ug/l)	2.0U	2.0U
Methyl chloride	(ug/l)	2.0U	2.0U
Methyl ethyl ketone (MEK)	(ug/l)	1.5J	10U

Prepared by KP: 02/08/13

The following qualifier(s) exist: CLP C: U, CLP Q: J NA=Not analyzed

Date: 02/08/2013

Initial Groundwater Treatability Sampling
Volatile Organic Compounds
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island
June 2012

PERIOD: From 06/20/2012 thru 06/20/2012 - Inclusive
SAMPLE TYPE: Water

CONSTITUENT	SITE DATE	PC-28PS 06/20/2012	PCD-3 06/20/2012
Methyl isobutyl ketone	(ug/l)	10U	10U
Methyl tert-butyl ether	(ug/l)	1.0U	1.0U
Methylcyclohexane	(ug/l)	1.0U	1.0U
Methylene chloride	(ug/l)	2.0U	2.0U
Styrene	(ug/l)	1.0U	1.0U
Tetrachloroethylene	(ug/l)	1.0U	1.3
Tetrahydrofuran	(ug/l)	46	10U
Toluene	(ug/l)	70	1.0U
Trans-1,2-Dichloroethene	(ug/l)	2.3	1.0U
trans-1,3-Dichloropropene	(ug/l)	0.40U	0.40U
Trichloroethylene	(ug/l)	1.0U	0.38J
Trichlorofluoromethane	(ug/l)	1.0U	1.0U
Vinyl chloride	(ug/l)	6.8	0.50U
Xylene (total)	(ug/l)	24	2.0U
Sum of Constituents	(ug/l)	447.72	5.11

Prepared by KP: 02/08/13

The following qualifier(s) exist: CLP C: U, CLP Q: J NA=Not analyzed

Date: 02/08/2013

Initial Groundwater Treatability Sampling

Treatability Parameters

Davis Liquid Waste Superfund Site

Smithfield, Rhode Island

June 2012

PERIOD: From 06/20/2012 thru 06/20/2012 - Inclusive

SAMPLE TYPE: Water

CONSTITUENT	SITE DATE	OW-054 06/20/2012	PC-11S 06/20/2012	PC-24PS 06/20/2012	PC-28D 06/20/2012
Alkalinity	(mg/l)	56	12	82	110
Ammonia (as N)	(mg/l)	0.35	0.10U	3.3	0.53
Hardness(as CaCO3)	(mg/l)	49	25	64	93
Iron	(mg/l)	7.2	0.1U	31	11
Manganese	(mg/l)	1.5	0.02	1.1	5.6
Nitrate	(mg/l)	0.050U	0.54	0.050U	0.050U
Nitrite (as N)	(mg/l)	0.010U	0.010U	0.010U	0.010U
Phosphorus	(mg/l)	0.10U	0.10U	1.7	0.10U
Sulfate	(mg/l)	2.0U	18	2.0U	18
Sulfide	(mg/l)	1.1UH	1.1U	1.1U	1.1U
Total dissolved solids (TDS)	(mg/l)	88	71	150	160
Ferric iron	(mg/l)	0.60	0.50U	1.3	1.1
Ferrous iron	(mg/l)	7.0	0.50U	22	10
Divalent Manganese	(mg/l)	1.6	0.50U	1.1	6.0

Prepared by KP: 02/08/13

The following qualifier(s) exist: CLP C: U, CLP Q: H NA=Not analyzed

Date: 02/08/2013

Initial Groundwater Treatability Sampling

Treatability Parameters

Davis Liquid Waste Superfund Site

Smithfield, Rhode Island

June 2012

PERIOD: From 06/20/2012 thru 06/20/2012 - Inclusive

SAMPLE TYPE: Water

CONSTITUENT	SITE DATE	PC-28PS 06/20/2012	PCD-3 06/20/2012
Alkalinity	(mg/l)	170	17
Ammonia (as N)	(mg/l)	4.9	0.10U
Hardness(as CaCO3)	(mg/l)	190	15
Iron	(mg/l)	27	3.5
Manganese	(mg/l)	0.48	1.2
Nitrate	(mg/l)	0.050U	0.050U
Nitrite (as N)	(mg/l)	0.010U	0.010U
Phosphorus	(mg/l)	0.10U	0.10U
Sulfate	(mg/l)	4.2	12
Sulfide	(mg/l)	1.1U	1.1U
Total dissolved solids (TDS)	(mg/l)	220	60
Ferric iron	(mg/l)	0.69	0.36J
Ferrous iron	(mg/l)	7.9	2.8
Divalent Manganese	(mg/l)	0.27J	1.3

Prepared by KP: 02/08/13

The following qualifier(s) exist: CLP C: U, J NA=Not analyzed

2340 Stock Creek Blvd.
Rockford, TN 37853-3044
Phone: 865.573.8188
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Web: www.microbe.com

SITE LOGIC Report

pH Buffering and Acidity Testing Report

Contact:	Kevin Purdy	**Phone:**	401.434.5560
Address:	ESS Group 401 Wampanoag Trail Suite 400 East Providence, RI 02915	**Email:**	kpurdy@essgroup.com

MI Identifier:	**063JF**	**Report Date:**	07/ 02/2012

Project: Davis Liquid Superfund D164-002.01

Comments:

NOTICE: This report is intended only for the addressee shown above and may contain confidential or privileged information. If the recipient of this material is not the intended recipient or if you have received this in error, please notify Microbial Insights, Inc. immediately. The data and other information in this report represent only the sample(s) analyzed and are rendered upon condition that it is not to be reproduced without approval from Microbial Insights, Inc. Thank you for your cooperation.

Role of Subsurface pH

Every organism has a pH range within which growth is possible and typically a well-defined optimum pH for maximum growth rates and activity. Although organisms that thrive in low pH (acidophiles) and high pH (alkaliphiles) environments have been isolated, most microorganisms are classified as neutrophiles with pH optimums between pH 6 and 8. Many important bacterial groups responsible for biodegradation of chlorinated solvents belong to this neutrophile category. For example, the pH for optimal growth of *Dehalococcoides ethenogenes* strain 195, the only known bacterium capable of complete reductive dechlorination of PCE to ethene, is between pH 6.8 and 7.5 (Maymo-Gatell, 1997). Likewise, optimal pH ranges for several *Desulfitobacterium* species capable of reductive dechlorination of chlorinated ethenes and ethanes are near neutral (Gerritse et al, 1999; Suyama et al, 2001). Thus maintenance of a circum neutral pH subsurface environment can be an important factor in promoting reductive dechlorination.

What is required for the test?

It is recommended that both soil and groundwater be collected from three locations at the site. For each sample, two 250mL jars containing site aquifer material or site groundwater are submitted to Microbial Insights for testing. Ground water samples are analyzed using Standard Methods 2310 B for total acidity. Sediment samples are analyzed using sodium hydroxide to calculate the sediment base requirement. Values are reported as meq/L. This data can then be entered into the AquaBupH program available through EOS remediation.

2340 Stock Creek Blvd.
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Results—pH Buffering and Acidity Testing

Groundwater Acidity Results	meq/L
GW-FS-PC-28-D-062012	<0.2
GW-FS-OW-54-0-062012	<0.2
GW-FS-PC-28-P/S-062012	<0.2
GW-FS-PC-11-S-062012	<0.2
GW-FS-PW-3-062012	<0.2
GW-FS-PC-24-P/S-062012	<0.2

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References Cited

Gerritse et al. 1999. Influence of different electron donors and acceptors on dehalorespiration of tetrachloroethene by *Desulfitobacterium frappieri* TCE1. Appl. Environ. Microbiol. 65(12): 5212-5221.

Maymo-Gatell, X. 1997. *Dehalococcoides ethenogenes* Strain 195, A novel eubacterium that reductively dechlorinates tetrachloroethene (PCE) to ethene. Report No. AL/EQ-TR-1997-0029.

Suyama et al. 2001. Isolation and characterization of *Desulfitobacterium* sp. strain Y51 capable of efficient dehalogenation of tetrachlorethene and polychloroethanes. Biosci. Biotechnol. Biochem. 65(7): 1474-1481.

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Appendix G

Groundwater Sampling Forms and Calibration Forms (Provided on CD)

GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name:	DAVIS	Date:	6/26/12
Well ID:	PC-11 (S)	Project #:	
Depth to Water:	14.28 (ft)	Measuring Point:	PVC
Depth to Bottom:	18.80 (ft)	ESS Personnel:	L. FOHBERG
Screen Interval:	13.8 - 18.8 (ft - ft)	Weather:	98°F SUNNY
Well Diameter:	1.5 (inches)	Additional Notes:	
Water Column:	4.52 (ft)		
Well Volume:	0.415 (gals)		

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

DTW WATER @ 4.6 pH BEFORE RECIRC

7.04 - AFTER CAL

REGAL pH *

Parameter Monitoring Results

Time	Vol. Purged (units:)	D.T.W. (feet)	Temp. (°F / °C) +\- 3%	Sp. Cond (us/cm) +\- 3%	D.O. (mg/l) +\- 10%	pH +\-0.1	Orp (mV) +\- 10	Turb. (NTUs) +\- 10%
~~12:05~~ 12:05	CELC	14.25	—	—	—	—	—	—
12:10	0.5	14.27	16.46	83	5.72	2.40	521.2	7.45
12:15	1.5	14.25	16.00	79	5.27	1.92	559.0	2.58
12:20 *			15.91	77	4.50	1.98	571.0	
12:30	CELC	14.25						
12:35	~~1.9~~ 1.9	~~14.25~~ 14.25	17.26	76	5.61	3.08	537.8	0.77
~~12:40~~ 12:40	2.8	14.25	16.01	74	5.00	2.40	585.9	1.37
12:45	3.8	14.25	15.90	73	4.82	2.34	608.9	0.93
12:50	4.8	14.25	16.20	76	4.58	2.40	696.9	—

3 WELL VOLUMES REMOVED / PARAMETERS STABLE EXCEPT DO/ORP

BEHIND THE WELL? ACIDIC ~~SOIL~~ GAS! SAMPLED BELOW SCREEN

Comments:

Well purged/sampled with PERISTALTIC PUMP ~~STARTING~~ @ 16.3FT

SAMPLE ~~1~~ (STORE ENCLOSED AS PC-28(D)) | HACH 2100Q 11090C0122,34

TSF 656 NO3: ~~#~~ 61D1391A1 / YSI 600XLM 99K101YAC

Note: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
13:00		N	~~OK~~ 1L AMBER	2	—
			1L PLASTIC	1	—
			500mL PLASTIC	1	HNO3
			~~2~~ 40mL VOA	7	HCL
			1L PLASTIC	1	250mL ACETATE / ~~NaOH~~ SODIUM HYDROXIDE

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

ESS Group Inc.

GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name: Davis Site
Well ID: OW-54(0)
Depth to Water: 10.98 (ft)
Depth to Bottom: 23.51 (ft)
Screen Interval: 11.55 - 21.55 (ft - ft)
Well Diameter: 2 (inches)
Water Column: (ft)
Well Volume: (gals)

Date: 6-20-12
Project #:
Measuring Point: PVC
ESS Personnel: Alvarez
Weather: 90° F, Clear
Additional Notes:

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged (units: L)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\- 0.1 pH	+\- 10 Orp (mV)	+\- 10% Turb. (NTUs)
1048		10.98	PUMP STARTED					
1050	CELL	11.10	17.50	181	1.43	6.55	-66.6	36.9
1055	1.3	11.05	15.41	165	0.42	6.42	-77.6	19.4
1100	2.7	11.05	15.57	166	0.32	6.36	-91.0	4.74
1105	4.1	11.05	15.37	152	0.3	6.37	-95.1	8.41
1110	5.5	11.05	15.13	144	0.3	6.35	-99.3	5.34
1115	6.8	11.05	16.03	139	0.3	6.34	-101.7	6.70
1120	8.1	11.05	16.15	134	0.31	6.31	-100.6	6.41
1125	9.5	11.05	16.20	135	0.31	6.33	-101.9	4.91

Parameters Stable @ 1130

Comments:
Well purged/sampled with Peristaltic
GW-FS-OW-54(0)-062012

Note: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
1135					

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

ESS Group Inc.

GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name:	BALDES	Date:	6/20/12
Well ID:	PCD-3	Project #:	D164
Depth to Water:	9.90 (ft)	Measuring Point:	PVC
Depth to Bottom:	15.80 (ft)	ESS Personnel:	LSF
Screen Interval:	10.80 - 15.80 (ft - ft)	Weather:	90°F Sunny
Well Diameter:	1.5 (inches)	Additional Notes:	
Water Column:	5.9 (ft)		
Well Volume:	0.5428 (gals) ~2 Gallons		

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged (units:)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\0.1 pH	+\- 10 Orp (mV)	+\- 10% Turb. (NTUs)
1400	CEL	9.90	-	-	—	-	—	—
1405	0.5	10.05	15.39	101	1.75	2.50	241.1	7.59
1410	1.7	10.05	15.06	91	1.06	2.19	254.7	5.70
1415	2.8	10.05	15.25	86	0.98	2.57	256.0	4.40
1420	3.6	10.05	15.08	83	0.88	2.83	253.6	2.35
1425	4.4	10.05	15.05	79	0.82	2.94	254.6	-
1430	5.1	10.05	15.03	78	0.83	2.94	258.2	-

ALL PARAMETERS STABLE @ 1430

Comments:

Well purged/sampled with PERISTALTIC 12.3 INTAKE

HACH 2100Q #11090C012234,

YSI 650 MDS #01D1391A1 / YSI 600XLM 99K1014AC

Note: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

Sample Parameters: TRCA ALKALINITY + VOCs

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
1430			1L AMBER	2	-
			1L PLASTIC	1	-
			500mL		
			250mL		
			40mL VOA	7	HCL

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

ESS Group Inc.

1 gal = 3.785 L

GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name:	PC-28-D	Date:	6/20
Well ID:	DAVIS	Project #:	
Depth to Water:	7.23 (ft)	Measuring Point:	PVC
Depth to Bottom:	37.08 (ft)	ESS Personnel:	LSF
Screen Interval:	32-37.08 (ft - ft)	Weather:	90's
Well Diameter:	1.5 (inches)	Additional Notes:	
Water Column:	29.85 (ft)		
Well Volume:	2.7462 (gals) 10.4 L		

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged (units:)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\0.1 pH	+\- 10 Orp (mV)	+\- 10% Turb. (NTUs)
0950	CEL	7.23	—	—	—	—	—	—
0955	1.2	7.23	13.57	222	0.91	5.06	-92.7	23.1
1000	3.2	7.23	13.01	233	0.61	5.00	-78.7	3.75
1005	5.2	7.23	12.95	229	1.22	4.92	-49.7	1.74
1010	7.2	7.23	12.99	225	2.32	4.86	-26.1	—
1015	9.2	7.23	12.99	224	2.62	4.82	-11.1	—
1020		7.23		224	1.12	5.09	-1.4	—
1030	10.0	7.23	15.06	234	0.82	5.09	9.3	—
1035	11.0	7.23	15.55	236	0.43	4.93	21.0	—
1040	11.5	7.23	15.73	237	0.42	4.87	24.8	—
1045	12.0	7.23	15.67	237	0.41	4.86	26.8	—

Slow RATE ADJUSTMENT

HANDSOM FABRIC POSSIBLE

PARAMETERS STABLE @ 1045

Comments:

Well purged/sampled with 34.58 DMTAME

HACH 2100Q #11090C012234 /

YSI 650 MDS 01D1391A1 / YSI 600XLM 99K10 14AC

Note: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
10:45			1L AMBER GLASS	2	—
			~~500ml~~ 1L PLASTIC	1	ZINC ACETATE/SODIUM
			500ML PLASTIC	1	—
			40ML VOA	7	HCL
			500ML PLASTIC	1	HNO_3
			250ML PLASTIC	1	H_2SO_4

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

ESS Group Inc. GW-FS-PC-28-D-062012

GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name: Davis Liquid Superfund
Well ID: PC-28-P/S
Depth to Water: 6.91 (ft)
Depth to Bottom: 9.72 (ft)
Screen Interval: 7.72-9.72 (ft - ft)
Well Diameter: 2.0" (inches)
Water Column: (ft)
Well Volume: (gals)

Date: 6-20-12
Project #: D164
Measuring Point: PVC
ESS Personnel: Alvarez
Weather:
Additional Notes:

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged (units: L)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\0.1 pH	+\- 10 Orp (mV)	+\- 10% Turb. (NTUs)
935	Ø	6.91		PUMP	STARTED			
0940	CELL	7.88	19.73	318	4.33	6.15	-64.2	9.34
0945	0.45	7.90	20.85	328	3.99	6.11	-65.4	7.90
0950	1.10	7.88	21.53	335	4.21	6.12	-63.8	5.31

GW-FS-PC-28-P-S-062012

Comments:
Well purged/sampled with

Note: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
1300	VOCs				

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

ESS Group Inc.

GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name: Davis Liquid Superfund
Well ID: PC-24 D/S
Depth to Water: 13.10 (ft)
Depth to Bottom: 18.01 (ft)
Screen Interval: 16.01-18.01 (ft - ft)
Well Diameter: 2.0 (inches)
Water Column: (ft)
Well Volume: (gals)

Date: 6-20-12
Project #:
Measuring Point: pvc
ESS Personnel: Alvarez
Weather: 90°F, Clear
Additional Notes:

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged (units: L)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\0.1 pH	+\- 10 Orp (mV)	+\- 10% Turb. (NTUs)
1016		13.10	PUMP STARTED					
1023	CELL	13.70	23.11	312	2.00	6.17	-82.2	19.7
1028	0.50	14.35	20.62	275	1.09	6.11	-86.9	4.97
1033	1.10	15.15	20.52	272	0.85	6.09	-86.5	3.71
1038	1.65	16.0	20.84	274	0.85	6.10	-86.7	3.91

Comments:
Well purged/sampled with

Note: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
	VOCs	N			

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

ESS Group Inc.

ess group

LOW FLOW GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name: Davis Liquid Superfund
Well ID: PCD-1
Depth to Water: 13.77 (ft)
Depth to Bottom: 20.61 (ft)
Screen Interval: 15.61 - 20.61 (ft - ft)
Well Diameter: 1.25 (inches)
Water Column: 6.84 (ft)
Well Volume: 0.41 (gals)

Date: 8-10-12
Project #: D164-007.01
Measuring Point: PVC
ESS Personnel: Patterson
Weather: Overcast, Showers, 79°F
Additional Notes:

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged[2] (units:)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\- 0.1 pH	+\- 10 Orp (mV)	+\- 10%[1] Turb. (NTUs)
1230	PUMP STARTED							
1233	CELL	13.88						
1238	0.85	13.88	15.98	60	1.63	5.71	146.0	20.9
1243	1.70	13.88	16.20	60	1.54	5.71	155.9	11.8
1248	2.55	13.88	16.11	59	1.40	5.70	167.8	7.49
1253	3.40	13.88	15.96	58	1.34	5.70	173.5	6.93
1258	4.30	13.88	16.02	56	1.39	5.69	180.7	4.21
PARAMETERS STABLE 8/10/12 1304								

Comments:

Well purged/sampled with peristaltic / bladder pump. Intake Set to 18.11 feet below MP.

Bladder pump controller settings: Refill/Discharge/PSI -> / / .

Equipment Specifications:

Sonde: YSI 600 XL 04C3884AA
Data Reader: YSI 650 MDS 01H0711 AB
Turbidity: Hach 2100 Q 11090C012234

Notes: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

[1] - When values are greater than 5 NTU (All readings <5 NTU are considered stablilized for sampling)

[2] - The final purge volume MUST be greater than the stablized drawdown volume (drawdown volume = volume between static water level and drawdown water level plus tubing volumes)

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
1304	VOCs	N	VOA 40mL	4	HCl

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

ess group

LOW FLOW GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name: Davis Liquid Superfund
Well ID: PCD-2
Depth to Water: 10.32 (ft)
Depth to Bottom: 19.70 (ft)
Screen Interval: 14.71-19.71 (ft - ft)
Well Diameter: 1.25 (inches)
Water Column: 9.39 (ft)
Well Volume: 0.56 (gals)

Date: 08/10/12
Project #: D164-007.01
Measuring Point: PVC
ESS Personnel: Gosciminski
Weather: Sunny Cloudy Humid 80's
Additional Notes:

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged[2] (units:)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\- 0.1 pH	+\- 10 Orp (mV)	+\- 10%[1] Turb. (NTUs)
11:03		10.32						
11:04	Cell	10.39	15.27	41	2.70	5.81	152.1	31.6
11:09	1.5	10.37	14.56	41	1.93	5.63	176.0	24.9
11:14	3.4	10.37	14.54	38	1.86	5.61	181.1	8.00
11:19	5.2	10.37	14.50	38	1.83	5.60	185.0	3.39
11:24	7.0	10.37	14.29	38	1.82	5.61	188.9	3.20
11:29	8.8	10.37	14.33	38	1.80	5.61	192.7	3.19
11:34	10.7	10.37	14.26	38	1.80	5.63	191.0	1.49
Parameters		Stable		Roger E. Gosciminski				
							08/10/12	

Comments:
Well purged/sampled with peristaltic / bladder pump. Intake Set to 17.21 feet below MP.
Bladder pump controller settings: Refill/Discharge/PSI -> / / .

Equipment Specifications:
Data Reader YSI 600XL 04C3884AA
Sonde YSI 650 MDS 01H0711 AB
Turbidity Hach 2100Q 110900012234

Notes: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.
[1] - When values are greater than 5 NTU (All readings <5 NTU are considered stablilized for sampling)
[2] - The final purge volume MUST be greater than the stablized drawdown volume (drawdown volume = volume between static water level and drawdown water level plus tubing volumes)

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
1134	VOC	N	40 mL VOA	4	HCl

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

ess group

LOW FLOW GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name:	Davis Liquid Superfund	Date:	8/10/12
Well ID:	PCD-3	Project #:	D164-007.01
Depth to Water:	10.48 (ft)	Measuring Point:	PVC
Depth to Bottom:	15.74 (ft)	ESS Personnel:	AHP
Screen Interval:	10.75 - 15.75 (ft - ft)	Weather:	Sunny 80s
Well Diameter:	1.25 (inches)	Additional Notes:	
Water Column:	5.26 (ft)		
Well Volume:	0.31 (gals)		

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged[2] (units:)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\- 0.1 pH	+\- 10 Orp (mV)	+\- 10%[1] Turb. (NTUs)
0943	PUMP STARTED							
0946	CELL	10.54						
0951	0.60	10.54	17.46	102	0.76	5.66	57.6	38.5
0956	1.25	10.54	17.38	99	0.58	5.68	58.0	15.0
1001	1.93	10.55	17.30	95	0.55	5.67	65.1	11.6
1006	2.63	10.55	17.12	89	0.51	5.64	73.3	10.8
1011	3.33	10.56	17.21	88	0.47	5.62	79.6	9.43
1016	4.03	10.56	16.79	81	0.41	5.59	87.7	5.88
1021	4.78	10.57	17.06	80	0.39	5.58	94.4	5.17
1026	5.53	10.58	17.11	79	0.38	5.56	98.9	4.52
PARAMETERS STABLE			8/10/12	1030	[signature]			
GW-FS-PCD-3-081012								

Comments:

Well purged/sampled with peristaltic / bladder pump. Intake Set to 13.25 feet below MP.

Bladder pump controller settings: Refill/Discharge/PSI -> / / .

Equipment Specifications:

Sonde: YSI 600 XLM 01L0702AA

Data Reader: YSI 650 MDS 02G1124 AK

Turbidity: Hach 2100Q 11090C012234

Notes: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

[1] - When values are greater than 5 NTU (All readings <5 NTU are considered stablilized for sampling)

[2] - The final purge volume MUST be greater than the stablized drawdown volume (drawdown volume = volume between static water level and drawdown water level plus tubing volumes)

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
1030	VOCs	N	VOA 40mL	4	HCl

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

ess group

LOW FLOW GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name: Davis Liquid Superfund
Well ID: PC-2(S)
Depth to Water: 11.80 (ft)
Depth to Bottom: 19.80 (ft)
Screen Interval: 14.80 - 19.80 (ft - ft)
Well Diameter: 1.25 (inches)
Water Column: 8 (ft)
Well Volume: 1.304 (gals)

Date: 8-10-12
Project #: D164-007.01
Measuring Point: PVC
ESS Personnel: Patterson
Weather: Sunny 80s
Additional Notes:

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged[2] (units:)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\- 0.1 pH	+\- 10 Orp (mV)	+\- 10%[1] Turb. (NTUs)
1056	PUMP STARTED							
1059	CELL	11.91						
1104	0.70	11.91	18.57	44	1.45	5.93	154.3	*
1109	1.40	11.91	18.25	43	1.37	5.92	178.2	*
1114	2.15	11.92	18.25	41	1.32	5.90	193.6	66.1
1119	2.95	11.92	17.89	41	1.31	5.87	203.1	30.7
1124	3.70	11.92	17.81	40	1.24	5.86	202.6	21.6
1129	4.40	11.92	17.97	39	1.22	5.86	202.7	17.0
1134	5.15	11.92	17.54	39	1.22	5.85	200.2	14.9
1139	5.90	11.92	17.21	39	1.23	5.85	197.8	13.5
1144	6.65	11.92	17.34	39	1.22	5.86	196.6	12.3
PARAMETERS STABLE 8/10/12 1148								
GW-FS-DWD-3								
GW-FS-PC-2(S)-081012								

Comments:

Well purged/sampled with peristaltic / bladder pump. Intake Set to 17.3 feet below MP.

Bladder pump controller settings: Refill/Discharge/PSI -> / /

Equipment Specifications:

Sonde: YSI 600 XLM 01L0702 AA
Data Reader: YSI 650 MDS 02G1124 AK
Turbidity: Hach 2100Q 110900012245

Notes: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.
[1] - When values are greater than 5 NTU (All readings <5 NTU are considered stablilized for sampling)
[2] - The final purge volume MUST be greater than the stablized drawdown volume (drawdown volume = volume between static water level and drawdown water level plus tubing volumes)

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
1148	VOCs	Y	VOA 40mL	8	HCl

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

* Turbidity over range of meter

ess group

LOW FLOW GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name:	Davis Liquid Superfund	Date:	8-10-12
Well ID:	PC-3(S)	Project #:	D164-007.01
Depth to Water:	13.63 (ft)	Measuring Point:	PVC
Depth to Bottom:	20.21 (ft)	ESS Personnel:	Gosciminski
Screen Interval:	15.21-20.21 (ft - ft)	Weather:	Sunny Humid 80's
Well Diameter:	1.25 (inches)	Additional Notes:	
Water Column:	36.58 (ft)		
Well Volume:	1.07 (gals)		

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged[2] (units:)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\- 0.1 pH	+\- 10 Orp (mV)	+\- 10%[1] Turb. (NTUs)
09:52		13.63	Pump	Started				
09:53	Cell	13.64	17.50	136	1.27	5.92	6.1	22.3
09:58	0.8	13.64	15.69	125	0.60	5.84	19.2	14.7
1003	1.8	13.64	15.43	95	0.38	5.87	31.9	9.94
1008	3.0	13.64	15.35	81	0.32	5.88	41.5	6.64
1013	4.1	13.64	15.31	79	0.28	5.86	46.5	5.64
1018	5.1	13.64	15.12	72	0.26	5.84	53.4	4.74
1023	6.3	13.64	15.29	69	0.25	5.85	56.4	4.62
1028	7.5	13.64	15.28	67	0.23	5.83	60.3	3.57
1033	8.6	13.64	15.20	65	0.23	5.83	63.9	3.06
1038	9.7	13.64	15.21	67	0.22	5.82	65.1	2.35
Parameters	Stable	Roger E. Gosciminski			08/10/12			

Comments:

Well purged/sampled with peristaltic / bladder pump. Intake Set to 17.71 feet below MP.

Bladder pump controller settings: Refill/Discharge/PSI -> / / .

Equipment Specifications:

Sonde: YSI 650 MDS 01H0711 AB

Turbidity: Hach 2100Q 1109000012245

Data Logger: YSI 600XL 04C3884AA

Notes: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

[1] - When values are greater than 5 NTU (All readings <5 NTU are considered stablilized for sampling)

[2] - The final purge volume MUST be greater than the stablized drawdown volume (drawdown volume = volume between static water level and drawdown water level plus tubing volumes)

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
1038	VOCs	N	40 mL VOA	4	HCl

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

ess group

LOW FLOW GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name:	Davis Liquid Superfund	Date:	8-10-12
Well ID:	PC-8(S)	Project #:	D164-007.01
Depth to Water:	15.6 (ft)	Measuring Point:	PVC
Depth to Bottom:	19.07 (ft)	ESS Personnel:	Gosciminski
Screen Interval:	14.07-19.07 (ft - ft)	Weather:	Cloudy, Showers 80's
Well Diameter:	1.25 (inches)	Additional Notes:	
Water Column:	3.47 (ft)		
Well Volume:	0.56 (gals)		

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged[2] (units:)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\- 0.1 pH	+\- 10 Orp (mV)	+\- 10%[1] Turb. (NTUs)
1226		15.6	Pump Started					
1228	Cell	15.97	17.96	211	1.77	5.86	77.6	64.3
1233	1.0	16.21	16.46	314	0.51	6.36	-29.0	24.5
1238	2.0	16.24	16.43	505	0.34	6.62	-75.9	18.1
1243	3.3	16.26	16.69	527	0.26	6.68	-87.0	8.56
1248	4.3	16.28	16.60	531	0.23	6.70	-92.3	11.0
1253	5.3	16.30	16.37	528	0.20	6.72	-96.8	8.23
1258	6.3	16.25	16.50	530	0.18	6.74	-101.4	3.11
1303	7.3	16.25	16.61	522	0.17	6.73	-101.6	2.05
1308	8.3	16.25	16.82	518	0.17	6.73	-102.6	2.64
1313	9.3	16.25	16.96	516	0.17	6.73	-104.2	3.84
1318	10.3	16.25	16.96	515	0.17	6.72	-103.2	3.50

Parameters Stable Roger E. Gosciminski 08/10/12

Comments: Slight odor in purge water

Well purged/sampled with (peristaltic) / bladder pump. Intake Set to 16.6 feet below MP.

Bladder pump controller settings: Refill/Discharge/PSI -> / / .

Equipment Specifications:

YSI 600 XLM 01L0702AA
YSI 650 MDS 0261124 AK
Hach 2100 Q 11090C012245

Notes: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

[1] - When values are greater than 5 NTU (All readings <5 NTU are considered stablilized for sampling)

[2] - The final purge volume MUST be greater than the stablized drawdown volume (drawdown volume = volume between static water level and drawdown water level plus tubing volumes)

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
1318	VOC	N	40 ml VOA	4	HCl

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

ess group

LOW FLOW GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name:	Davis Liquid Superfund	Date:	08/13/12
Well ID:	PC-11(S)	Project #:	D164-007.01
Depth to Water:	14.72 (ft)	Measuring Point:	PVC
Depth to Bottom:	18.77 (ft)	ESS Personnel:	REG
Screen Interval:	13.77-18.77 (ft - ft)	Weather:	Sunny 80's
Well Diameter:	1.25 (inches)	Additional Notes:	
Water Column:	4.05 (ft)		
Well Volume:	0.24 (gals)		

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged[2] (units:)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\- 0.1 pH	+\- 10 Orp (mV)	+\- 10%[1] Turb. (NTUs)
12:24		14.72	Pump Started					
12:28	Cell	14.72	20.75	125	3.74	5.74	115.9	11.5
12:33	0.7	14.72	18.06	110	2.59	5.48	162.8	2.78
12:38	1.4	14.72	17.48	108	2.58	5.49	179.0	1.16
12:43	2.1	14.72	17.10	107	2.42	5.48	184.0	0.86
12:48	2.8	14.72	16.85	107	2.40	5.49	190.5	0.94
12:53	3.5	14.72	16.65	106	2.50	5.49	192.5	1.02
12:58	4.3	14.72	16.68	106	2.46	5.50	195.7	0.63
1303	5.0	14.72	16.92	106	2.42	5.49	198.2	1.13
1308	5.8	14.72	16.94	105	2.44	5.49	200.5	0.79
1313	6.6	14.72	16.74	105	2.47	5.49	202.4	0.74
Parameters Stable Roger E. Gourmier 08/13/12								

Comments:

Well purged/sampled with peristaltic / bladder pump. Intake Set to 16.20 feet below MP. (16.20)

Bladder pump controller settings: Refill/Discharge/PSI -> / / .

Equipment Specifications:

Hach 2100 Q 11090C012245 - Turbidity
YST 650 MDS 01H0711 AB - Data Logger
YSI 600 XL 04C3884AA - Sonde

Notes: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

[1] - When values are greater than 5 NTU (All readings <5 NTU are considered stablilized for sampling)

[2] - The final purge volume MUST be greater than the stablized drawdown volume (drawdown volume = volume between static water level and drawdown water level plus tubing volumes)

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
1313	VOC	N	40 mL VOA	4	HCl

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

ess group

LOW FLOW GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name:	Davis Liquid Superfund	Date:	8/13/12
Well ID:	PC-11 (D)	Project #:	D164-007.01
Depth to Water:	14.97 (ft)	Measuring Point:	PVC
Depth to Bottom:	24.36 (ft)	ESS Personnel:	AHP
Screen Interval:	19.36 - 24.36 (ft - ft)	Weather:	Partly cloudy 80s
Well Diameter:	1.25 (inches)	Additional Notes:	
Water Column:	9.39 (ft)		
Well Volume:	0.56 (gals)		

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged[2] (units:)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\- 0.1 pH	+\- 10 Orp (mV)	+\- 10%[1] Turb. (NTUs)
1238	PUMP	STARTED						
1235	CELL	15.26						*
1240	0.70	15.21	16.70	273	1.23	5.85	49.2	21.5
1245	1.40	15.22	16.07	274	0.88	5.89	50.2	18.0
1250	2.15	15.22	15.76	269	0.70	5.90	50.8	9.50
1255	2.90	15.22	15.79	260	0.59	5.91	51.1	11.6
1300	3.60	15.22	16.29	255	0.54	5.90	52.5	8.84
1305	4.35	15.22	16.02	255	0.51	5.91	53.6	8.61
1310	5.10	15.22	15.88	251	0.49	5.91	52.8	4.67
PARAMETERS STABLE 8/13/12 13:13								
GW-FS-PC-11(D)-081312								

Comments:

Well purged/sampled with (peristaltic) / bladder pump. Intake Set to 21.86 feet below MP. (21.86)

Bladder pump controller settings: Refill/Discharge/PSI -> / / .

Equipment Specifications:

Sonde: YSI 600 XLM 01L0702AA

Data Reader: YSI 650 MDS 02G1124 AK

Turbidity: Hach 2100 Q 11090C012234

Notes: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

[1] - When values are greater than 5 NTU (All readings <5 NTU are considered stablilized for sampling)

[2] - The final purge volume MUST be greater than the stablized drawdown volume (drawdown volume = volume between static water level and drawdown water level plus tubing volumes)

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
1313	VOCs	N	VOA 40mL	4	HCl

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

* Lowered pump rate

ess group

LOW FLOW GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name:	Davis Liquid Superfund	Date:	08/14/12
Well ID:	PC-17(D)	Project #:	D164-007.01
Depth to Water:	16.88 (ft)	Measuring Point:	PVC
Depth to Bottom:	26.88 (ft)	ESS Personnel:	Gosciminski
Screen Interval:	21.88 - 26.88 (ft - ft)	Weather:	Sunny 80's
Well Diameter:	2 (inches)	Additional Notes:	
Water Column:	10 (ft)		
Well Volume:	1.63 (gals)		

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged[2] (units:)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\- 0.1 pH	+\- 10 Orp (mV)	+\- 10%[1] Turb. (NTUs)
0918		16.88	Pump Started					
0922	Cell	16.90	16.96	571	1.37	6.80	-60.6	45.1
0927	0.8	16.90	15.19	516	0.72	6.71	-59.4	46.3
0932	1.8	16.90	15.38	507	0.55	6.70	-52.7	27.0
0937	3.0	16.90	15.19	466	0.42	6.64	-44.7	21.0
0942	3.8	16.90	14.96	436	0.36	6.62	-47.9	38.0
0947	4.8	16.90	14.93	426	0.33	6.62	-49.8	57.8
0952	5.8	16.90	14.93	415	0.31	6.62	-50.4	59.2
0957	6.8	16.90	15.12	410	0.30	6.61	-50.5	59.4
1002	7.8	16.90	14.93	403	0.30	6.61	-51.2	59.3
1007	8.8	16.90	14.76	397	0.29	6.61	-51.3	59.9
1012	9.8	16.90	14.77	391	0.28	6.60	-51.5	58.4
1017	10.8	16.90	14.67	387	0.28	6.60	-52.1	56.0
1022	11.8	16.90	14.68	387	0.28	6.61	-51.8	56.4
Parameters Stable				Roger E. Gosciminski			08/14/12	
GW-FS-PC-17(D)-081412								
GW-FS-OWD-4								

Comments:

Well purged/sampled with peristaltic / bladder pump. Intake Set to 24.38 feet below MP. (24.38)

Bladder pump controller settings: Refill/Discharge/PSI -> / / .

Equipment Specifications:

Data Logger YSI 650 MDS 01H0711 AB
Sonde 600 XL 04C3884AA
Turbidity Hach 2100Q 11090C012234

Notes: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

[1] - When values are greater than 5 NTU (All readings <5 NTU are considered stablilized for sampling)

[2] - The final purge volume MUST be greater than the stablized drawdown volume (drawdown volume = volume between static water level and drawdown water level plus tubing volumes)

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
1024	VOC	Y	40 mL VOA	8	HCl

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

ess group

LOW FLOW GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name:	Davis Liquid Superfund	Date:	08/13/12
Well ID:	PC-20(5)	Project #:	D164-007.01
Depth to Water:	12.09 (ft)	Measuring Point:	PVC
Depth to Bottom:	19.17 (ft)	ESS Personnel:	REG
Screen Interval:	14.17-19.17 (ft - ft)	Weather:	Sunny 80's
Well Diameter:	1.25 (inches)	Additional Notes:	
Water Column:	7.08 (ft)		
Well Volume:	1.15 (gals)		

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged[2] (units:)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\- 0.1 pH	+\- 10 Orp (mV)	+\- 10%[1] Turb. (NTUs)
10:01		12.09	Pump Started					
10:03	Cell	12.12	19.80	408	1.85	5.99	-40.5	56.0
10:08	0.9	12.11	17.22	351	0.80	6.01	-46.0	21.9
10:13	2.1	12.11	16.56	345	0.45	6.02	-50.5	7.74
10:18	3.2	12.11	16.42	343	0.40	6.06	-55.4	6.77
10:23	4.4	12.11	15.42	342	0.36	6.07	-58.8	5.81
10:28	5.5	12.11	16.35	340	0.30	6.07	-60.9	7.23
10:33	6.7	12.11	16.34	339	0.29	6.07	-63.0	7.23
10:38	7.9	12.11	16.32	338	0.28	6.07	-64.5	7.68
10:43	9.1	12.11	16.25	337	0.27	6.07	-65.6	4.05
10:49	10.3	12.11	16.37	337	0.27	6.07	-66.7	2.65
10:53	11.5	12.11	16.35	336	0.26	6.07	-67.6	2.30
Parameters Stable				Roger E. Gerinski				

Comments: Slight sheen on purged water

Well purged/sampled with peristaltic / bladder pump. Intake Set to 16.67 feet below MP. (16.67)

Bladder pump controller settings: Refill/Discharge/PSI -> / / .

Equipment Specifications:

YSI 650 MDS 01H0711 AB - Sonde
Hach 2100Q 11090C012245 - Turbidity
YSI 600 XL 04C3884AA - Data Reader

Notes: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

[1] - When values are greater than 5 NTU (All readings <5 NTU are considered stablilized for sampling)

[2] - The final purge volume MUST be greater than the stablized drawdown volume (drawdown volume = volume between static water level and drawdown water level plus tubing volumes)

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
10:53	VOC	N	40mL VOA	12	HCl

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

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LOW FLOW GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name:	Davis Liquid Superfund	Date:	8/13/12
Well ID:	PC-20 (D)	Project #:	D164-007.01
Depth to Water:	12.06 (ft)	Measuring Point:	PVC
Depth to Bottom:	28.29 (ft)	ESS Personnel:	AHP
Screen Interval:	23.29-28.29 (ft - ft)	Weather:	Sunny 80s
Well Diameter:	1.25 (inches)	Additional Notes:	
Water Column:	16.23 (ft)		
Well Volume:	0.97 (gals)		

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged[2] (units:)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\- 0.1 pH	+\- 10 Orp (mV)	+\- 10%[1] Turb. (NTUs)
1001	PUMP	STARTED						
1006	CELL	12.07						
1011	0.70	12.08	16.67	357	0.65	6.17	-27.7	22.5
1016	1.25	12.08	16.50	356	0.55	6.17	-24.1	25.6
1021	1.95	12.07	16.49	351	0.51	6.17	-16.9	12.5
1026	2.65	12.07	16.19	349	0.48	6.17	-13.7	13.8
1031	3.35	12.07	16.17	348	0.44	6.17	-10.0	8.47
1036	4.05	12.07	16.25	347	0.41	6.18	-8.5	8.13
1041	4.75	12.07	16.17	348	0.40	6.19	-7.6	8.51
PARAMETERS STABLE 8/13/12 10:45								
GW-FS-PC-20(D)-081312								

Comments:

Well purged/sampled with peristaltic / bladder pump. Intake Set to 25.79 feet below MP. (25.79)

Bladder pump controller settings: Refill/Discharge/PSI -> / / .

Equipment Specifications:

Sonde: YSI 600 XLM 01L0702AA

Data Reader: YSI 650 MDS 02G1124 AK

Turbidity: Hach 2100 Q 11090C012234

Notes: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

[1] - When values are greater than 5 NTU (All readings <5 NTU are considered stablilized for sampling)

[2] - The final purge volume MUST be greater than the stablized drawdown volume (drawdown volume = volume between static water level and drawdown water level plus tubing volumes)

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
1045	VOCs	N	VOA 40ml	4	HCl

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

D164-002.03

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LOW FLOW GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name:	Davis Liquid Superfund	Date:	8/14/12
Well ID:	PC-23(D)	Project #:	D164-007.01
Depth to Water:	15.83 (ft)	Measuring Point:	PVC
Depth to Bottom:	33.74 (ft)	ESS Personnel:	AHP
Screen Interval:	28.74 - 33.74 (ft - ft)	Weather:	Partly cloudy, 80s
Well Diameter:	1.25 (inches)	Additional Notes:	
Water Column:	17.91 (ft)		
Well Volume:	1.07 (gals)		

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged[2] (units:)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\- 0.1 pH	+\- 10 Orp (mV)	+\- 10%[1] Turb. (NTUs)
0932	PUMP	STARTED						
0937	CELL	14.85						
0942	0.75	14.86	16.78	119	0.49	6.46	-100.7	35.8
0947	1.45	14.86	16.32	119	0.54	6.48	-102.8	14.3
0952	2.15	14.86	16.07	118	0.59	6.51	-98.7	9.76
0957	2.83	14.86	16.31	117	0.69	6.51	-105.6	9.41
1002	3.48	14.86	16.36	118	0.59	6.51	-108.3	6.34
1007	4.13	14.86	16.07	118	0.54	6.52	-108.9	21.9
1012	4.78	14.86	15.84	119	0.40	6.53	-105.1	7.71
1017	5.43	14.86	15.71	118	0.38	6.53	-106.3	3.61
1022	6.13	14.86	15.55	118	0.35	6.53	-107.5	3.04
PARAMETERS STABLE 8/14/12 10:24								
GW-MSD-PC-23(D)-081412								
GW-MS-PC-23(D)-081412								
GW-FS-PC-23(D)-081412								

Comments:

Well purged/sampled with (peristaltic) / bladder pump. Intake Set to 31.24 feet below MP. (31.24)

Bladder pump controller settings: Refill/Discharge/PSI -> / / .

Equipment Specifications:

Sonde: YSI 600 XLM 01L0702AA

Data Reader: YSI 650 MDS 02G1124 AK

Turbidity: Hach 2100 Q 11090C012245

Notes: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

[1] - When values are greater than 5 NTU (All readings <5 NTU are considered stablilized for sampling)

[2] - The final purge volume MUST be greater than the stablized drawdown volume (drawdown volume = volume between static water level and drawdown water level plus tubing volumes)

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
1024	VOCs	N	VOA 40mL	12	HCl

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

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LOW FLOW GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name:	Davis Liquid Superfund	Date:	08/14/12
Well ID:	PC-25(D)	Project #:	D164-007.01
Depth to Water:	12.31 (ft)	Measuring Point:	PVC
Depth to Bottom:	40.75 (ft)	ESS Personnel:	Gosciminski
Screen Interval:	35.75 - 40.75 (ft - ft)	Weather:	Sunny 80's
Well Diameter:	1.25 (inches)	Additional Notes:	
Water Column:	28.44 (ft)		
Well Volume:	1.70 (gals)		

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged[2] (units:)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\- 0.1 pH	+\- 10 Orp (mV)	+\- 10%[1] Turb. (NTUs)
1159		12.31	Pump	Started				
1202	Cell	12.33	16.11	265	1.28	6.48	-76.4	94.8
1207	1.0	12.33	14.54	253	0.45	6.40	-74.1	80.7
1212	1.9	12.33	14.28	250	0.37	6.44	-75.3	60.4
1217	2.9	12.33	14.44	250	0.29	6.47	-77.4	44.2
1222	3.9	12.33	14.19	249	0.25	6.47	-78.9	32.5
1227	4.9	12.33	14.09	248	0.23	6.49	-80.3	21.2
1232	5.7	12.33	14.07	248	0.23	6.51	-82.7	25.0
1237	6.7	12.33	14.18	246	0.21	6.51	-84.4	13.9
1242	7.5	12.33	14.28	246	0.21	6.51	-85.6	10.5
1247	8.5	12.33	14.38	246	0.21	6.51	-87.2	6.49
1252	9.5	12.33	14.27	246	0.21	6.51	-88.5	6.65
1257	10.5	12.33	14.27	246	0.21	6.52	-89.8	5.54
1302	11.5	12.33	14.20	245	0.21	6.52	-90.8	5.32
1307	12.5	12.33	14.18	245	0.20	6.52	-92.2	5.47
Parameters Stable Roger E. Gosciminski 08/14/12								

Comments:

Well purged/sampled with peristaltic / bladder pump. Intake Set to ~~38.25~~ feet below MP. (38.25)

Bladder pump controller settings: Refill/Discharge/PSI -> / / .

Equipment Specifications:

Sonde: 600XL

Data Reader: YSI 650 MDS 01H0711 AB

Turbidity: Hach 2100Q 11090C012234

Notes: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

[1] - When values are greater than 5 NTU (All readings <5 NTU are considered stablilized for sampling)

[2] - The final purge volume MUST be greater than the stablized drawdown volume (drawdown volume = volume between static water level and drawdown water level plus tubing volumes)

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
1310	VOC	N	40 mL VOA	4	HCl

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

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LOW FLOW GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name:	Davis Liquid Superfund	Date:	8/14/12
Well ID:	PC-28(D)	Project #:	D164-007.01
Depth to Water:	7.66 (ft)	Measuring Point:	PVC
Depth to Bottom:	36.84 (ft)	ESS Personnel:	AHP
Screen Interval:	31.84-36.84 (ft - ft)	Weather:	Overcast, 80s
Well Diameter:	1.25 (inches)	Additional Notes:	
Water Column:	29.18 (ft)		
Well Volume:	1.75 (gals)		

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged[2] (units:)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\- 0.1 pH	+\- 10 Orp (mV)	+\- 10%[1] Turb. (NTUs)
1217	PUMP	STARTED						
1219	CELL	7.67						
1224	0.72	7.67	17.33	265	2.43	6.36	-37.9	22.8
1229	1.50	7.67	16.71	263	1.75	6.35	-35.0	10.8
1234	2.20	7.66	16.55	262	1.38	6.35	-28.2	7.04
1239	2.90	7.67	16.73	260	0.97	6.35	-26.7	7.70
1244	3.60	7.66	16.74	258	0.76	6.32	-26.4	4.70
1249	4.10	7.67	16.75	256	0.62	6.31	-17.4	3.64
1254	4.82	7.67	16.51	255	0.58	6.30	-14.0	4.01
1259	5.56	7.67	16.11	254	0.53	6.28	-12.4	3.15
~~1304~~ 1303	PARAMETERS STABLE 8/14/12 1303							
GW-FS-PC-28(D)-081412								

Comments:

Well purged/sampled with (peristaltic) / bladder pump. Intake Set to 34.34 feet below MP. (34.34)

Bladder pump controller settings: Refill/Discharge/PSI -> / / .

Equipment Specifications:

Sonde: YSI 600

Data Reader: YSI 650 MDS 02G1124 AK

Turbidity: Hach 2100 Q 11090C012245

Notes: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

[1] - When values are greater than 5 NTU (All readings <5 NTU are considered stablilized for sampling)

[2] - The final purge volume MUST be greater than the stablized drawdown volume (drawdown volume = volume between static water level and drawdown water level plus tubing volumes)

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
1303	VOCs	N	VOA 40mL	4	HCl

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

Turbidity Instrument Calibration Log

ESS Project: Davis

ESS Project No.:

Date: 08/09/12 Instrument and Model Number: Hach 2100Q

Personnel: REG Instrument Serial Number: 11090C012245

TURBIDITY

CALIBRATION

Time	0 NTU Reading	10 NTU Reading	Calibrated to 20 NTU? (y/n)	Calibrated to 100 NTU? (y/n)	Comments
0845	1.45	6.46	Y	Y	

QUALITY CHECK

Time	0 NTU Reading	10 NTU Reading	0 NTU Reading	10 NTU Reading	Comments

Date: 08/09/12 Instrument and Model Number: Hach 2100Q

Personnel: REG Instrument Serial Number: 11090C012234

TURBIDITY

CALIBRATION

Time	0 NTU Reading	10 NTU Reading	Calibrated to 20 NTU? (y/n)	Calibrated to 100 NTU? (y/n)	Comments
0850	1.03	8.45	Y	Y	

QUALITY CHECK

Time	0 NTU Reading	10 NTU Reading	0 NTU Reading	10 NTU Reading	Comments

Date: 08/10/12 Instrument and Model Number: Hach 2100Q

Personnel: Instrument Serial Number: 11090C012234

TURBIDITY

CALIBRATION

Time	0 NTU Reading	10 NTU Reading	Calibrated to 20 NTU? (y/n)	Calibrated to 100 NTU? (y/n)	Comments
0857	0.45	10.2	N	N	

QUALITY CHECK

Time	0 NTU Reading	10 NTU Reading	0 NTU Reading	10 NTU Reading	Comments

Turbidity Instrument Calibration Log

ESS Project: Davis

ESS Project No.:

Date: 08/10/12 Instrument and Model Number: Hach 2100 Q

Personnel: REG Instrument Serial Number: 11090C012245

TURBIDITY

CALIBRATION

Time	0 NTU Reading	10 NTU Reading	Calibrated to 20 NTU? (y/n)	Calibrated to 100 NTU? (y/n)	Comments
0900	0.48	9.04	Y	Y	

QUALITY CHECK

Time	0 NTU Reading	10 NTU Reading	0 NTU Reading	10 NTU Reading	Comments

Date: 08/13/12 Instrument and Model Number: Hach 2100 Q

Personnel: REG Instrument Serial Number: 11090C012234

TURBIDITY

CALIBRATION

Time	0 NTU Reading	10 NTU Reading	Calibrated to 20 NTU? (y/n)	Calibrated to 100 NTU? (y/n)	Comments
0841	0.17	10.0	N	N	

QUALITY CHECK

Time	0 NTU Reading	10 NTU Reading	0 NTU Reading	10 NTU Reading	Comments

Date: 08/13/12 Instrument and Model Number: Hach 2100 Q

Personnel: REG Instrument Serial Number: 11090C012245

TURBIDITY

CALIBRATION

Time	0 NTU Reading	10 NTU Reading	Calibrated to 20 NTU? (y/n)	Calibrated to 100 NTU? (y/n)	Comments
0846	0.48	10.2	N	N	

QUALITY CHECK

Time	0 NTU Reading	10 NTU Reading	0 NTU Reading	10 NTU Reading	Comments

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Turbidity Instrument Calibration Log

ESS Project: Davis

ESS Project No.:

Date: 08/14/12 Instrument and Model Number: Hach 2100Q

Personnel: REG Instrument Serial Number: 11090C012245

TURBIDITY

CALIBRATION

Time	0 NTU Reading	10 NTU Reading	Calibrated to 0 NTU? (y/n)	Calibrated to 10 NTU? (y/n)	Comments
8:38	2.34	19.5	Y	Y	

QUALITY CHECK

Time	0 NTU Reading	10 NTU Reading	0 NTU Reading	10 NTU Reading	Comments

Date: 08/14/12 Instrument and Model Number: Hach 2100Q

Personnel: Instrument Serial Number: 11090C012234

TURBIDITY

CALIBRATION

Time	0 NTU Reading	10 NTU Reading	Calibrated to 0 NTU? (y/n)	Calibrated to 10 NTU? (y/n)	Comments
8:47	3.39	+++	Y	Y	

QUALITY CHECK

Time	0 NTU Reading	10 NTU Reading	0 NTU Reading	10 NTU Reading	Comments

Date: Instrument and Model Number:

Personnel: Instrument Serial Number:

TURBIDITY

CALIBRATION

Time	0 NTU Reading	10 NTU Reading	Calibrated to 0 NTU? (y/n)	Calibrated to 10 NTU? (y/n)	Comments

QUALITY CHECK

Time	0 NTU Reading	10 NTU Reading	0 NTU Reading	10 NTU Reading	Comments

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MULTIPARAMETER INSTRUMENT CALIBRATION LOG

ESS Project Name and No.: D164-007.02

Date: 8/10/12 Instrument Type and Model Number: YSI 600 XL

Personnel: AHP Instrument Serial Numbers: Sonde: 04C3884AA Datalogger: 01H0711AB

DISSOLVED OXYGEN

CALIBRATE to % DO in 100% Saturated Air After Stabilization of %DO & Temperature such that no significant changes for minimum 30 seconds

Time	Barometric Pressure (mm Hg)	Temperature	Reading Before Calibration (%DO)	Stabilization Time (minutes)	Calibrated? (y/n)	Comments
0849	757.5	27.94	100.8	4	Y	

pH

CALIBRATE to pH 7 Standard and either 4 or 10 pH Standard depending on range of water to be measured (2-Point Calibration)

Time	Standard (pH)	Temperature	Reading Before Calibration (pH)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0906	7	24.91	7.01	2	Y	2AE799 5/14

QUALITY CHECK

Time	Standard (pH)	Temperature	Reading (pH)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1214	7	31.15	7.03	2	2AE 799 5/14
1334	7	30.09	7.03	2	2AE 799 5/14

CONDUCTIVITY

CALIBRATION

Time	Standard (us/cm)	Temperature	Reading Before Calibration (us/cm)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0912	1000	26.16	1016	2	Y	2AE615 5/13

QUALITY CHECK

Time	Standard (us/cm)	Temperature	Reading (us/cm)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1212	1000	30.43	994	2	2AE 615 5/13
1338	1000	29.87	990	2	2AE 615 5/13

OXIDATION REDUCTION POTENTIAL

CALIBRATION

Time	Standard (mV)	Temperature	Reading Before Calibration (mV)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0909	231@25°C	25.57	228.4	2	Y	12E100590 6/14

QUALITY CHECK - midday, end of day

Time	Standard (mV)	Temperature	Reading (mV)	Stabilization Time (minutes)	Standard Solution (Name / Lot# / Expiration Date)
1216	231@25°C	31.22	221.8	2	12E 100590 6/14
1336	231@25°C	30.77	224.3	2	12E100 590 6/14

ADDITIONAL COMMENTS:

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MULTIPARAMETER INSTRUMENT CALIBRATION LOG

ESS Project Name and No.: N164-007.02

Date: 8/10/12 Instrument Type and Model Number: YSI 600 XLM

Personnel: AHP Instrument Serial Numbers: Sonde: 10L0702AA Datalogger: 0261124AK

DISSOLVED OXYGEN

CALIBRATE to % DO in 100% Saturated Air After Stabilization of %DO & Temperature such that no significant changes for minimum 30 seconds

Time	Barometric Pressure (mm Hg)	Temperature	Reading Before Calibration (%DO)	Stabilization Time (minutes)	Calibrated? (y/n)	Comments
0849	757.4	27.98	105.0	4	Y	

pH

CALIBRATE to pH 7 Standard and either 4 or 10 pH Standard depending on range of water to be measured (2-Point Calibration)

Time	Standard (pH)	Temperature	Reading Before Calibration (pH)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0910	7	26.49	7.06	2	Y	2AE799 5/14

QUALITY CHECK

Time	Standard (pH)	Temperature	Reading (pH)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1210	7	31.87	7.03	2	2AE799 5/14
1336	7	30.33	7.04	2	2AE799 5/14

CONDUCTIVITY

CALIBRATION

Time	Standard (us/cm)	Temperature	Reading Before Calibration (us/cm)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0906	1000	24.91	1020	2	Y	2AE615 5/13

QUALITY CHECK

Time	Standard (us/cm)	Temperature	Reading (us/cm)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1215	1000	31.07	993	2	2AE615 5/13
1334	1000	30.26	985	2	2AE615 5/13

OXIDATION REDUCTION POTENTIAL

CALIBRATION

Time	Standard (mV)	Temperature	Reading Before Calibration (mV)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0913	231@25°C	26.94	226.6	2	Y	12E100590 6/14

QUALITY CHECK - midday, end of day

Time	Standard (mV)	Temperature	Reading (mV)	Stabilization Time (minutes)	Standard Solution (Name / Lot# / Expiration Date)
1213	231@25°C	31.72	221.6	2	12E100590 6/14
1339	231@25°C	30.31	223.8	2	12E100590 6/14

ADDITIONAL COMMENTS:

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MULTIPARAMETER INSTRUMENT CALIBRATION LOG

ESS Project Name and No.: D164-007.02

Date: 8/13/12 Instrument Type and Model Number: YSI 600XL

Personnel: AHP Instrument Serial Numbers: Sonde: 04C3884AA Datalogger: 01H0711AB

DISSOLVED OXYGEN

CALIBRATE to % DO in 100% Saturated Air After Stabilization of %DO & Temperature such that no significant changes for minimum 30 seconds

Time	Barometric Pressure (mm Hg)	Temperature	Reading Before Calibration (%DO)	Stabilization Time (minutes)	Calibrated? (y/n)	Comments
0908	758.5	29.22	100.5	4	Y	
0925	758.9	25.71	<0.5mg/L	2	N	ZERO DO CHECK
1400	758.6	32.47	0.10mg/L	3	N	

pH

CALIBRATE to pH 7 Standard and either 4 or 10 pH Standard depending on range of water to be measured (2-Point Calibration)

Time	Standard (pH)	Temperature	Reading Before Calibration (pH)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0916	7	23.62	7.00	2	Y	2AE799 5/14

QUALITY CHECK

Time	Standard (pH)	Temperature	Reading (pH)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1347	7	31.51	7.03	2	

CONDUCTIVITY

CALIBRATION

Time	Standard (us/cm)	Temperature	Reading Before Calibration (us/cm)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0921	1000	23.63	1059	2	Y	2AE615 5/13

QUALITY CHECK

Time	Standard (us/cm)	Temperature	Reading (us/cm)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1355	1000	31.56	980	2	

OXIDATION REDUCTION POTENTIAL

CALIBRATION

Time	Standard (mV)	Temperature	Reading Before Calibration (mV)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0918	231@25°C	23.50	232.2	2	Y	12E100590 6/14

QUALITY CHECK - midday, end of day

Time	Standard (mV)	Temperature	Reading (mV)	Stabilization Time (minutes)	Standard Solution (Name / Lot# / Expiration Date)
1352	231@25°C	31.66	220.6	2	

ADDITIONAL COMMENTS:

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MULTIPARAMETER INSTRUMENT CALIBRATION LOG

ESS Project Name and No.: Di64-007.02

Date: 8/13/12 Instrument Type and Model Number: YSI 600 XLM

Personnel: AHP Instrument Serial Numbers: Sonde: 10 2 0 702AA Datalogger: 02G1124AK

DISSOLVED OXYGEN

CALIBRATE to % DO in 100% Saturated Air After Stabilization of %DO & Temperature such that no significant changes for minimum 30 seconds

Time	Barometric Pressure (mm Hg)	Temperature	Reading Before Calibration (%DO)	Stabilization Time (minutes)	Calibrated? (y/n)	Comments
0908	758.9	28.87	55.4	4	Y	
0927	759.3	26.36	<0.5 mg/L	2	N	ZERO DO CHECK
1354	762.0	32.83	-1.07 mg/L	2	N	

pH

CALIBRATE to pH 7 Standard and either 4 or 10 pH Standard depending on range of water to be measured (2-Point Calibration)

Time	Standard (pH)	Temperature	Reading Before Calibration (pH)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0926	7	23.62	7.02	2	Y	2AE 799 5/14

QUALITY CHECK

Time	Standard (pH)	Temperature	Reading (pH)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1343	7	31.72	7.03	2	

CONDUCTIVITY

CALIBRATION

Time	Standard (us/cm)	Temperature	Reading Before Calibration (us/cm)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0916	1000	23.37	1013	2	Y	2AE615 5/13

QUALITY CHECK

Time	Standard (us/cm)	Temperature	Reading (us/cm)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1351	1000	32.11	987	2	

OXIDATION REDUCTION POTENTIAL

CALIBRATION

Time	Standard (mV)	Temperature	Reading Before Calibration (mV)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0923	231@25°C	24.27	231.3	2	Y	12E100590 6/14

QUALITY CHECK - midday, end of day

Time	Standard (mV)	Temperature	Reading (mV)	Stabilization Time (minutes)	Standard Solution (Name / Lot# / Expiration Date)
1346	231@25°C	32.26	220.5	2	

ADDITIONAL COMMENTS:

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MULTIPARAMETER INSTRUMENT CALIBRATION LOG

ESS Project Name and No.: Davis D164-007.02

Date: 8/14/12 Instrument Type and Model Number: YSI 600 XL

Personnel: AAP Instrument Serial Numbers: Sonde: 04C3884AA Datalogger: 01H0711AB

DISSOLVED OXYGEN

CALIBRATE to % DO in 100% Saturated Air After Stabilization of %DO & Temperature such that no significant changes for minimum 30 seconds

Time	Barometric Pressure (mm Hg)	Temperature	Reading Before Calibration (%DO)	Stabilization Time (minutes)	Calibrated? (y/n)	Comments
0836	758.1	26.54	94.5	3	Y	
0852	758.2	21.40	<0.5mg/L	2	N	ZERO DO CHECK
1345	763.4	31.17	<0.5mg/L	1	N	ZERO DO CHECK

pH

CALIBRATE to pH 7 Standard and either 4 or 10 pH Standard depending on range of water to be measured (2-Point Calibration)

Time	Standard (pH)	Temperature	Reading Before Calibration (pH)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0842	7	20.10	6.99	2	Y	2AE799 5/14

QUALITY CHECK

Time	Standard (pH)	Temperature	Reading (pH)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1336	7	30.45	7.05	2	2AE799 5/14

CONDUCTIVITY

CALIBRATION

Time	Standard (us/cm)	Temperature	Reading Before Calibration (us/cm)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0849	1000	20.70	987	2	Y	2AE615 5/13

QUALITY CHECK

Time	Standard (us/cm)	Temperature	Reading (us/cm)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1342	1000	30.36	1001	2	2AE615 5/13

OXIDATION REDUCTION POTENTIAL

CALIBRATION

Time	Standard (mV)	Temperature	Reading Before Calibration (mV)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0846	231 @25°C	20.67	237.9	2	Y	12E100590 6/14

QUALITY CHECK - midday, end of day

Time	Standard (mV)	Temperature	Reading (mV)	Stabilization Time (minutes)	Standard Solution (Name / Lot# / Expiration Date)
1339	231 @25°C	30.27	221.6	2	12E100590 6/14

ADDITIONAL COMMENTS:

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MULTIPARAMETER INSTRUMENT CALIBRATION LOG

ESS Project Name and No.: Davis D164-007.02

Date: 8/14/12 Instrument Type and Model Number: YSI 600 XLM

Personnel: AHP Instrument Serial Numbers: Sonde: 10L0702AA Datalogger: 0261124AK

DISSOLVED OXYGEN

CALIBRATE to % DO in 100% Saturated Air After Stabilization of %DO & Temperature such that no significant changes for minimum 30 seconds

Time	Barometric Pressure (mm Hg)	Temperature	Reading Before Calibration (%DO)	Stabilization Time (minutes)	Calibrated? (y/n)	Comments
0836	757.2	26.18	52.6	3	Y	
0855	758.1	22.22	<0.5mg/L	2	N	ZERO DO CHECK
1347	763.6	31.28	<0.5mg/L	2	N	ZERO DO CHECK

pH

CALIBRATE to pH 7 Standard and either 4 or 10 pH Standard depending on range of water to be measured (2-Point Calibration)

Time	Standard (pH)	Temperature	Reading Before Calibration (pH)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0847	7	21.17	7.00	2	Y	2AE799 / 5-14

QUALITY CHECK

Time	Standard (pH)	Temperature	Reading (pH)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1340	7	30.92	7.02	2	2AE799 5/14

CONDUCTIVITY

CALIBRATION

Time	Standard (us/cm)	Temperature	Reading Before Calibration (us/cm)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0842	1000	20.06	1068	2	Y	2AE615 5/13

QUALITY CHECK

Time	Standard (us/cm)	Temperature	Reading (us/cm)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1337	1000	29.94	944	2	2AE615 5/13

OXIDATION REDUCTION POTENTIAL

CALIBRATION

Time	Standard (mV)	Temperature	Reading Before Calibration (mV)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0851	231@25°C	21.74	237.0	2	Y	12E100590 6/14

QUALITY CHECK - midday, end of day

Time	Standard (mV)	Temperature	Reading (mV)	Stabilization Time (minutes)	Standard Solution (Name / Lot# / Expiration Date)
1343	231@25°C	31.12	220.2	2	12E100590 6/14

ADDITIONAL COMMENTS:

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LOW FLOW GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name: DAVIS LIQUID SUPERFUND
Date: 11/15/12
Well ID: OW-93-0
Project #: D164-007.03
Depth to Water: 14.32 (ft)
Measuring Point: PVC
Depth to Bottom 30.89 (ft)
ESS Personnel: Alvarez
Screen Interval: 20.4-30.4 (ft - ft)
Weather: 47°F, Clear
Well Diameter: 2 (inches)
Additional Notes:
Water Column: (ft)
Well Volume: (gals)

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged (units: L)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\- 0.1 pH	+\- 10 Orp (mV)	+\- 10% Turb. (NTUs)
1408	0	14.32	PUMP	STARTED				
1410	CELL	14.32	13.03	95	5.69	6.34	-158.7	30.9
1415	1.2	14.32	12.98	84	0.58	6.05	-174.4	11.14
1420	2.4	14.32	12.76	84	0.36	6.03	-179.0	5.30
1425	3.7	14.33	12.76	83	0.29	6.03	-182.3	3.18
1430	5.0	14.33	12.82	83	0.24	6.05	-182.7	2.42
1435	6.4	14.33	12.84	83	0.22	6.05	-183.8	2.46
1440	7.7	14.33	12.84	83	0.23	6.06	-184.7	2.35

Parameters Stable @ 1440

Comments:
Well purged/sampled with peristaltic / bladder pump. Intake Set to 25.4 feet below MP.
Lamotte 2020WE - 879-1511 600XLM-01J0851AF
650MDS-02B0985MD

Bladder pump controller settings: Refill/Discharge/PSI -> / / .

Note: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
1440	VOCs	N	40mL VOA	4	HCL
	PEST/SVOCs		1 L Amber	4	—
	Total Metals		500mL Poly	1	HNO_3
	Diss Gases		40mL VOA	2	Trisod. Phosph.

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

ESS Group Inc.

LOW FLOW GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name: DAVIS LIQUID SUPERFUND
Date: 11/15/12
Well ID: OW-94-0
Project #: D164-007.03
Depth to Water: 16.38 (ft)
Measuring Point: PVC
Depth to Bottom 23.39 (ft)
ESS Personnel: REG
Screen Interval: 12.82 - 22.82 (ft - ft)
Weather: Cloudy 30's
Well Diameter: 2 (inches)
Additional Notes:
Water Column: (ft)
Well Volume: (gals)

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged (units:)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\- 0.1 pH	+\- 10 Orp (mV)	+\- 10% Turb. (NTUs)
10:22	[redacted]	16.38						
10:24	Cell	16.39	11.06	213	3.66	6.80	15.9	6.28
10:29	0.9	16.39	11.86	171	1.55	6.34	56.8	4.51
10:34	1.95	16.39	12.33	169	1.27	6.23	66.7	6.80
10:39	3.1	16.39	12.48	171	0.94	6.19	57.1	2.43
10:44	4.1	16.39	12.56	172	0.79	6.19	42.3	1.83
10:49	5.2	16.39	12.60	173	0.74	6.20	40.3	1.51
10:54	6.4	16.39	12.59	174	0.72	6.21	38.6	1.86
10:59	7.5	16.39	12.61	174	0.68	6.22	37.2	1.53
11:04	8.6	16.39	12.59	175	0.69	6.23	35.4	1.19
11:09	9.7	16.39	12.58	174	0.68	6.23	36.8	1.12
Parameters		Stable	11/15/12	11:09				
			Roger R. Gossmann					

Comments:
Well purged/sampled with peristaltic / bladder pump. Intake Set to 17.82 feet below MP.
Turbidity - LaMotte 2020we 239-4110
Data Reader - YSI 650 MDS 03D0903AP Sonde - YSI 600XL 08B101374

Bladder pump controller settings: Refill/Discharge/PSI -> / / .

Note: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
11:09	VOCs	N	40mL VOA	4	HCl
	SVOCs	↓	1L Amber	2	None
	Pesticides		1L Amber	2	None
	Metals		500mL Poly	1	HNO_3
	Dissolved Gases		40mL VOA	2	$NaPO_3$

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

ESS Group Inc.

LOW FLOW GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name:	Davis Liquid Superfund	Date:	11/14/12
Well ID:	OW-300	Project #:	D164-007.03
Depth to Water:	14.54 (ft)	Measuring Point:	PVC
Depth to Bottom	NM (ft)	ESS Personnel:	AHP
Screen Interval:	17.85-27.85 (ft - ft)	Weather:	Sunny, 40s
Well Diameter:	2.0 (inches)	Additional Notes:	
Water Column:	(ft)		
Well Volume:	(gals)		

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged (units:)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\- 0.1 pH	+\- 10 Orp (mV)	+\- 10% Turb. (NTUs)
1404	–	14.54	PUMP	STARTED				
1407	CELL	14.54	11.61	96	9.56	5.95	0.9	1.81
1412	0.95	14.54	12.38	101	1.48	5.88	-23.6	1.94
1417	1.85	14.54	12.49	101	0.84	5.87	-35.3	1.60
1422	2.75	14.54	12.56	101	0.71	5.87	-39.9	1.79
1427	3.65	14.54	12.66	101	0.57	5.87	-45.1	1.79
1432	4.55	14.54	12.63	101	0.47	5.87	-44.1	1.93
1437	5.45	14.54	12.64	100	0.48	5.87	-48.3	1.57
1442	6.35	14.54	12.65	101	0.43	5.87	-53.9	1.75
PARAMETERS	STABLE	11/14/12	1444	[illegible]				

~~OW-F~~ GW-FS-OW-300-111412

Comments: Strong chemical odor to water - no coloration.

Well purged/sampled with peristaltic / bladder pump. Intake Set to 22.8 feet below MP.

YSI 600 XL 08B101374 YSI 650 MDS 03D0903AF

La Motte 2020 we 239-4110

Bladder pump controller settings: Refill/Discharge/PSI -> / / .

Note: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
1444	VOCs	N	VOA 40mL	4	HCl
	SVOCs		Amber 1L	2	—
	Pesticides		Amber 1L	2	—
	Metals		Poly 500mL	1	HNO_3
	Dissolved gas		VOA 40mL	2	Trisod. phosp.

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

ESS Group Inc.

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LOW FLOW GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name:	Davis Liquid Superfund	Date:	11/16/12
Well ID:	OW-301	Project #:	D164-007.01
Depth to Water:	13.32 (ft)	Measuring Point:	PVC
Depth to Bottom:	~~[illegible]~~ 22.2 (ft)	ESS Personnel:	AHP
Screen Interval:	12.2 - 22.2 (ft - ft)	Weather:	Sunny 40s
Well Diameter:	2.0 (inches)	Additional Notes:	
Water Column:	(ft)		
Well Volume:	(gals)		

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged[2] (units:)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\- 0.1 pH	+\- 10 Orp (mV)	+\- 10%[1] Turb. (NTUs)
1157	—	13.32	PUMP STARTED					
1159	CELL	13.32	13.92	207	3.89	6.45	-112.9	9.63
1204	0.70	13.30	13.52	183	0.78	6.05	-141.9	7.63
1209	1.55	13.31	13.56	180	0.47	5.94	-148.6	17.6
1214	2.45	13.31	13.67	175	0.43	5.90	-149.0	18.0
1219	3.35	13.31	13.62	168	0.37	5.90	-150.0	10.11
1224	2.25	13.31	13.61	169	0.38	5.89	-144.5	3.96
PARAMETERS		STABLE	11/16/12	1226	[illegible]			
GW-FS-OW-301-111612								

Comments:

Well purged/sampled with peristaltic / bladder pump. Intake Set to 17.6 feet below MP.

Bladder pump controller settings: Refill/Discharge/PSI -> / / .

Equipment Specifications:

YSI 600 XLM 01J0851AF YSI 650 MDS 02B0985AD

La Motte 2020 we 879-1511

Notes: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

[1] - When values are greater than 5 NTU (All readings <5 NTU are considered stablilized for sampling)

[2] - The final purge volume MUST be greater than the stablized drawdown volume (drawdown volume = volume between static water level and drawdown water level plus tubing volumes)

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
1226	VOCs	N	VOA 40mL	4	HCl
	SVOCs		Amber 1L	2	—
	Pesticides		Amber 1L	2	—
	Metals		Poly 500mL	1	HNO_3
	Dissolved gas		VOA 40mL	2	Tissod. please.

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

LOW FLOW GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name: Davis Liquid Superfund
Well ID: OW-302
Depth to Water: 11.38 (ft)
Depth to Bottom 23.0 (ft)
Screen Interval: 12.5 - 22.5 (ft - ft)
Well Diameter: 2.0 (inches)
Water Column: (ft)
Well Volume: (gals)

Date: 11/16/12
Project #: D164-007.03
Measuring Point: PVC
ESS Personnel: AHP
Weather: Sunny 40s
Additional Notes:

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged (units:)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\- 0.1 pH	+\- 10 Orp (mV)	+\- 10% Turb. (NTUs)
0940	—	11.38	PUMP STARTED					
0942	CELL	11.44	10.35	674	4.05	6.45	-125.6	3.86
0947	0.85	11.44	11.91	687	1.04	6.37	-128.0	3.73
0952	1.75	11.45	12.12	685	0.54	6.34	-144.2	3.55
0957	2.75	11.45	12.13	678	0.47	6.33	-139.0	3.61
1002	3.75	11.45	12.18	670	0.38	6.33	-142.8	2.51
1007	4.75	11.44	12.15	656	0.35	6.32	-145.7	2.36
1012	5.75	11.43	12.08	649	0.32	6.31	-145.7	1.96
PARAMETERS		STABLE	11/16/12	1015				
GW-FS-OW-302-111612								
GW-MS-OW-302-111612								
GW-MSD-OW-302-111612								

Comments:

Well purged/sampled with peristaltic / bladder pump. Intake Set to 12.5 feet below MP.

YSI 600 XLM 01J0851AF YSI 650 MDS 02B0985 AD

La Motte 2020 we 550-8100

Bladder pump controller settings: Refill/Discharge/PSI -> / / .

Note: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
1015	VOCs	Y	VOA 40mL	12	HCl
	SVOCs	Y	Amber 1L	6	—
	Pesticides	Y	Amber 1L	6	—
	Metals	Y	Poly 500mL	3	HNO_3
	Dissolved gas	N	VOA 40mL	2	Trisod. phosp.

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

ESS Group Inc.

LOW FLOW GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name: Davis Liquid Superfund
Well ID: OW-30~~#~~3
Depth to Water: ~~11.38~~ 6.86 (ft)
Depth to Bottom ~~22.2~~ 15.0 (ft)
Screen Interval: ~~22.2 - 22.2~~ (ft - ft) 7.9-17.9
Well Diameter: 2.0 (inches)
Water Column: (ft)
Well Volume: (gals)

Date: 11/16/12
Project #: D164-007.03
Measuring Point: PVC
ESS Personnel: REG
Weather: Sunny 30's
Additional Notes:

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged (units: L)	D.T.W. (feet)	Temp. (°F / °C) +\- 3%	Sp. Cond (us/cm) +\- 3%	D.O. (mg/l) +\- 10%	pH +\- 0.1	Orp (mV) +\- 10	Turb. (NTUs) +\- 10%
9:57	Ø	6.86	PUMP	START	ED			
9:59	CECC	7.28	8.97	167	6.44	7.12	-24.1	11.97
10:04	0.8	7.32	11.02	161	2.72	6.40	-10.1	6.69
10:09	1.5	7.33	11.27	159	1.98	6.22	-9.2	7.45
10:14	2.3	7.33	11.66	159	1.52	6.12	-7.6	7.18
10:19	3.0	7.35	11.79	158	1.36	6.09	-6.0	6.99
10:24	3.8	7.35	11.79	160	1.08	6.06	-9.4	5.57
10:29	4.6	7.35	11.70	160	1.04	6.05	-5.0	4.91
10:34	5.4	7.35	11.87	161	0.88	6.04	-5.9	4.51
10:39	6.1	7.35	11.86	162	0.88	6.03	-3.2	4.21
10:44	6.9	7.35	11.87	162	0.87	6.03	-5.4	4.51
Parameters		Stable	11/16/12	10:44				
			Roger E. Harmon					
GW-FS-OW-301-111612								

Comments:
Well purged/sampled with peristaltic / bladder pump. Intake Set to ~~[illegible]~~ 12.9 feet below MP.
Turbidity - LaMotte 2020we 239-4110
Data Reader - YSI 650 MDS 03D0903AF Sonde - YSI 600XL 08B101374

Bladder pump controller settings: Refill/Discharge/PSI -> / /

Note: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
10:44	VOCs	N	40 mL VOA	4	HCL
↓	PEST/SVOCs	↓	1 L Amber	2/2	—
	Total Metals		0.5 L ~~Amber~~ Poly	1	HNO_3
↓	Diss Gases	↓	~~[illegible]~~	2	Tri sod. Phosp L.

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

ESS Group Inc.

LOW FLOW GROUNDWATER MONITORING WELL SAMPLING FORM

Site Name: Davis Liquid Superfund
Well ID: OW-30R
Depth to Water: 8.53 (ft)
Depth to Bottom: 17.8 (ft)
Screen Interval: 10.3 - 20.3 (ft - ft)
Well Diameter: 2.0 (inches)
Water Column: (ft)
Well Volume: (gals)

Date: 11/14/12
Project #: D164-007.03
Measuring Point: PVC
ESS Personnel: REG
Weather: Sunny - 40's
Additional Notes:

Well Volume Factors (gallons/foot of water in well): 0.75-inch (0.023), 1-inch (0.041), 1.5-inch (0.092), 2-inch (0.163), 4-inch (0.653)

Parameter Monitoring Results

Time	Vol. Purged (units:)	D.T.W. (feet)	+\- 3% Temp. (°F / °C)	+\- 3% Sp. Cond (us/cm)	+\- 10% D.O. (mg/l)	+\- 0.1 pH	+\- 10 Orp (mV)	+\- 10% Turb. (NTUs)
12:17		8.53	Pump	Started				
12:20	Cell	8.55	11.19	111	4.98	5.99	39.0	2.08
12:25	0.8	8.54	11.68	111	2.05	5.87	35.5	3.99
12:30	1.7	8.54	11.88	104	1.22	5.83	30.5	1.54
12:35	2.5	8.54	12.00	104	0.84	5.81	32.8	19.4
12:40	3.2	8.55	12.14	99	0.73	5.81	30.7	19.6
12:45	4.0	8.55	12.33	96	0.61	5.81	27.5	18.5
12:50	4.9	8.55	12.28	94	0.57	5.80	29.5	16.7
12:55	5.8	8.55	12.27	94	0.53	5.79	34.9	13.7
13:00	6.8	8.55	12.37	94	0.45	5.79	35.4	12.9
13:05	7.6	8.55	12.38	94	0.43	5.79	38.0	12.10
13:10	8.4	8.55	12.33	94	0.44	5.79	38.8	12.50
Parameters	Stable		11/14/12		13:10			
			Roger Gammino					

Comments:

Well purged/sampled with (peristaltic) / bladder pump. Intake Set to 15.3 feet below MP.

Turbidity - LaMotte 2020we 879-1511

Data Logger - YSI 650 MDS 03D0903 AF Sonde - YSI 600XL 08B101324

Bladder pump controller settings: Refill/Discharge/PSI -> / /

Note: Sampling Method, Sample Interval, Recharge Conditions, Color, Odor, Sheen, Sediment Content, etc.

Sample Parameters:

Time:	Parameters	Dup. (y/n)	Container Type	Quantity	Preservative
13:10	VOCs	N	40 mL VOA	4	HCl
	SVOCs	N	1 L Amber	2	None
	Pesticides	N	1 L Amber	2	None
	Metals	N	500mL Poly	1	HNO_3
	Dissolved Gases	N	40 mL VOA	2	$NaPO_3$

Note sample time, parameters, duplicates, field blanks, etc. Indicate which samples field filtered.

ESS Group Inc.

Turbidity Instrument Calibration Log

ESS Project: Davis Liquid Superfund

ESS Project No.: D164-007.03

Date: 11-13-2012 Instrument and Model Number: Lamotte 2020 WE

Personnel: Alvarez Instrument Serial Number: 239-4110

TURBIDITY

CALIBRATION

Time	0 NTU Reading	10 NTU Reading	Calibrated to 0 NTU? (y/n)	Calibrated to 10 NTU? (y/n)	Comments
0915	0.05	10.14	Y	Y	

QUALITY CHECK

Time	0 NTU Reading	10 NTU Reading	0 NTU Reading	10 NTU Reading	Comments

Date: 11-13-12 Instrument and Model Number: Lamotte 2020 WE

Personnel: Alvarez Instrument Serial Number: 279-1511

TURBIDITY

CALIBRATION

Time	0 NTU Reading	10 NTU Reading	Calibrated to 0 NTU? (y/n)	Calibrated to 10 NTU? (y/n)	Comments
0915	0.03	10.59	Y	Y	

QUALITY CHECK

Time	0 NTU Reading	10 NTU Reading	0 NTU Reading	10 NTU Reading	Comments

Date: 11/14/12 Instrument and Model Number: LaMotte 2020we

Personnel: REG Instrument Serial Number: ~~876~~ 879-1511

TURBIDITY

CALIBRATION

Time	0 NTU Reading	10 NTU Reading	Calibrated to 0 NTU? (y/n)	Calibrated to 10 NTU? (y/n)	Comments
0927	-0.02	8.96	Y	Y	

QUALITY CHECK

Time	0 NTU Reading	10 NTU Reading	0 NTU Reading	10 NTU Reading	Comments
15:30	0.02	9.67			

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MULTIPARAMETER INSTRUMENT CALIBRATION LOG

ESS Project Name and No.: DAVIS D164-007.03

Date: 11/14/12 Instrument Type and Model Number: YSI 600 XL "A"

Personnel: AHP Instrument Serial Numbers: Sonde: 08B101374 Datalogger: 03D0903AF

DISSOLVED OXYGEN

CALIBRATE to % DO in 100% Saturated Air After Stabilization of %DO & Temperature such that no significant changes for minimum 30 seconds

Time	Barometric Pressure (mm Hg)	Temperature	Reading Before Calibration (%DO)	Stabilization Time (minutes)	Calibrated? (y/n)	Comments
0914	773.7	6.08	92.8	4	Y	
0917	773.6	11.61	<0.5	5	N	ZERO DO 3/13
1139	772.8	11.29	<0.5	4	N	ZERO DO 3/13
1504	771.8	10.77	<0.5	5	N	Zero DO 3/13

pH

CALIBRATE to pH 7 Standard and either 4 or 10 pH Standard depending on range of water to be measured (2-Point Calibration)

Time	Standard (pH)	Temperature	Reading Before Calibration (pH)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0925	7	10.41	7.24	2	Y	2AE799 5/14

QUALITY CHECK

Time	Standard (pH)	Temperature	Reading (pH)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1145	7	12.74	7.02	2	2AE799 5/14
1148	(AB) ~~4~~ 10	9.96	9.83	2	2AE820 5/14
1152	(AB) ~~7~~ 4	9.75	3.91	2	2AH029 8/14
1459	7	10.90	6.76	3	2AE799 5/14

CONDUCTIVITY

CALIBRATION

Time	Standard (us/cm)	Temperature	Reading Before Calibration (us/cm)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0933	1000	5.02	773	2	Y	2AH181 8/13

QUALITY CHECK

Time	Standard (us/cm)	Temperature	Reading (us/cm)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1156	1000	10.79	1010	2	(AB) ~~2AE681~~ 2AH181 8/13
1501	1000	10.82	978	3	2AH181 8/13

OXIDATION REDUCTION POTENTIAL

CALIBRATION

Time	Standard (mV)	Temperature	Reading Before Calibration (mV)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0929	231@25°C	10.91	249.2	2	Y	12E100590 6/14

QUALITY CHECK - midday, end of day

Time	Standard (mV)	Temperature	Reading (mV)	Stabilization Time (minutes)	Standard Solution (Name / Lot# / Expiration Date)
1154	231@25°C	12.01	247.6	2	12E100590 6/14
1454	231@25°C	10.95	247.2	2	12E100590 6/14

ADDITIONAL COMMENTS:

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MULTIPARAMETER INSTRUMENT CALIBRATION LOG

ESS Project Name and No.: D164-007.03

Date: 11/14/12 Instrument Type and Model Number: YSI 600 XLM "B"

Personnel: AHP Instrument Serial Numbers: Sonde: 01J085IAF Datalogger: 03D0903AF

DISSOLVED OXYGEN

CALIBRATE to % DO in 100% Saturated Air After Stabilization of %DO & Temperature such that no significant changes for minimum 30 seconds

Time	Barometric Pressure (mm Hg)	Temperature	Reading Before Calibration (%DO)	Stabilization Time (minutes)	Calibrated? (y/n)	Comments
0914	773.2	6.11	108.4	4	Y	
0927	773.0	9.71	<0.5	3	N	ZERO DO 3/13
1146	772.2	11.81	<0.5	3	N	ZERO DO 3/13
1514	771.3	10.42	<0.5	4	N	ZERO DO 3/13

pH

CALIBRATE to pH 7 Standard and either 4 or 10 pH Standard depending on range of water to be measured (2-Point Calibration)

Time	Standard (pH)	Temperature	Reading Before Calibration (pH)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0921	7	11.05	7.16	1	Y	2AE 799 5/14

QUALITY CHECK

Time	Standard (pH)	Temperature	Reading (pH)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1150	7	12.74	6.79	3 (Y)	2AE 799 5/14
1156	10	10.41	10.15	2	2AE 820 5/14
1158	4	10.03	4.01	2	2AH029 8/14
1505	7	10.60	7.15		

CONDUCTIVITY 3

CALIBRATION

Time	Standard (us/cm)	Temperature	Reading Before Calibration (us/cm)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0919	1000	4.34	824	2	Y	2AH181 8/13

QUALITY CHECK

Time	Standard (us/cm)	Temperature	Reading (us/cm)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1140	1000	10.27	999	2	2AH181 8/13
1507	1000	10.29	982	3	2AH181 8/13

OXIDATION REDUCTION POTENTIAL

CALIBRATION

Time	Standard (mV)	Temperature	Reading Before Calibration (mV)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0924	231@25°C	11.36	250.2	2	Y	12E100590 6/14

QUALITY CHECK - midday, end of day

Time	Standard (mV)	Temperature	Reading (mV)	Stabilization Time (minutes)	Standard Solution (Name / Lot# / Expiration Date)
1200	231@25°C	11.63	249.9	2	12E100590 6/14
1510	231@25°C	10.56	244.5	3	12E100590 6/14

ADDITIONAL COMMENTS:

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Turbidity Instrument Calibration Log

ESS Project: D164-007.03

ESS Project No.: Davis Liquid Superfund

Date: 11/14/12 Instrument and Model Number: LaMotte 2020we

Personnel: REG Instrument Serial Number: 239-4110

TURBIDITY

CALIBRATION

Time	0 NTU Reading	10 NTU Reading	Calibrated to 0 NTU? (y/n)	Calibrated to 10 NTU? (y/n)	Comments
0920	0.03	9.99	Y	Y	

QUALITY CHECK

Time	0 NTU Reading	10 NTU Reading	0 NTU Reading	10 NTU Reading	Comments
1520	-0.15	11.22			

Date: 11/15/12 Instrument and Model Number: LaMotte 2020we

Personnel: REG Instrument Serial Number: 879-1511

TURBIDITY

CALIBRATION

Time	0 NTU Reading	10 NTU Reading	Calibrated to 0 NTU? (y/n)	Calibrated to 10 NTU? (y/n)	Comments
9:23	-0.03	9.22	Y	Y	

QUALITY CHECK

Time	0 NTU Reading	10 NTU Reading	0 NTU Reading	10 NTU Reading	Comments
12:37	-0.08	9.58			

Date: 11/15/12 Instrument and Model Number: LaMotte 2020 we

Personnel: REG Instrument Serial Number: 239-4110

TURBIDITY

CALIBRATION

Time	0 NTU Reading	10 NTU Reading	Calibrated to 0 NTU? (y/n)	Calibrated to 10 NTU? (y/n)	Comments
9:20	-0.11	11.35	Y	Y	

QUALITY CHECK

Time	0 NTU Reading	10 NTU Reading	0 NTU Reading	10 NTU Reading	Comments
12:32	-0.01	10.77			

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MULTIPARAMETER INSTRUMENT CALIBRATION LOG

ESS Project Name and No.: D164-00703

Date: 11/15/12 Instrument Type and Model Number: YSI 600 XLM "B"

Personnel: AHP Instrument Serial Numbers: Sonde: 01J0851AF Datalogger: 03D0903AF

DISSOLVED OXYGEN

CALIBRATE to % DO in 100% Saturated Air After Stabilization of %DO & Temperature such that no significant changes for minimum 30 seconds

Time	Barometric Pressure (mm Hg)	Temperature	Reading Before Calibration (%DO)	Stabilization Time (minutes)	Calibrated? (y/n)	Comments
0910	771.5	-0.07	127.9	5	Y	
0927	771.4	8.93	<0.5	5	N	ZERO DO 3/13
1244	769.3	6.81	<0.5	5	N	ZERO DO 3/13

pH

CALIBRATE to pH 7 Standard and either 4 or 10 pH Standard depending on range of water to be measured (2-Point Calibration)

Time	Standard (pH)	Temperature	Reading Before Calibration (pH)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0920	7	12.53	6.94	2	Y	2AE799 5/14
0924	10	11.96	9.87	2	Y	2AE820 5/14

QUALITY CHECK

Time	Standard (pH)	Temperature	Reading (pH)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1253	7	7.30	6.74	2	2AE799 5/14
1258	10	7.10	9.90	2	2AE820 5/14

CONDUCTIVITY

CALIBRATION

Time	Standard (us/cm)	Temperature	Reading Before Calibration (us/cm)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0912	1000	11.93	1007	2	Y	2AH181 8/13

QUALITY CHECK

Time	Standard (us/cm)	Temperature	Reading (us/cm)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1248	1000	6.99	~~996~~ 992	2	2AH181 8/13

OXIDATION REDUCTION POTENTIAL

CALIBRATION

Time	Standard (mV)	Temperature	Reading Before Calibration (mV)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0916	231@25°C	11.97	247.7	2		12E100590 6/14

QUALITY CHECK - midday, end of day

Time	Standard (mV)	Temperature	Reading (mV)	Stabilization Time (minutes)	Standard Solution (Name / Lot# / Expiration Date)
1300	231@25°C	7.36	255.5	1	12E100590 6/14

ADDITIONAL COMMENTS:

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MULTIPARAMETER INSTRUMENT CALIBRATION LOG

ESS Project Name and No.: DAVIS D164-007.03

Date: 11/15/12 Instrument Type and Model Number: YSI 600 XL "A"

Personnel: AHF Instrument Serial Numbers: Sonde: 05B101374 Datalogger: 03D0903AF

DISSOLVED OXYGEN

CALIBRATE to % DO in 100% Saturated Air After Stabilization of %DO & Temperature such that no significant changes for minimum 30 seconds

Time	Barometric Pressure (mm Hg)	Temperature	Reading Before Calibration (%DO)	Stabilization Time (minutes)	Calibrated? (y/n)	Comments
0940	771.2	-0.08	133.9	5	Y	
0912	771.4	11.90	<0.5	5	N	ZERO DO 3/13
1222	769.6	6.80	<0.5	5	N	ZERO DO 3/13

pH

CALIBRATE to pH 7 Standard and either 4 or 10 pH Standard depending on range of water to be measured (2-Point Calibration)

Time	Standard (pH)	Temperature	Reading Before Calibration (pH)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0930	7	10.47	7.17	2	Y	2AE799 5/14
0933	10	10.95	10.18	2	Y	2AE820 5/14

QUALITY CHECK

Time	Standard (pH)	Temperature	Reading (pH)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1241	7	6.82	7.12	2	2AE799 5/14
1246	10	7.21	9.96	2	2AE820 5/14

CONDUCTIVITY

CALIBRATION

Time	Standard (us/cm)	Temperature	Reading Before Calibration (us/cm)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0921	1000	11.85	1055	2	Y	2AH181 8/13

QUALITY CHECK

Time	Standard (us/cm)	Temperature	Reading (us/cm)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1231	1000	7.40	1043	3	2AH181 8/13

OXIDATION REDUCTION POTENTIAL

CALIBRATION

Time	Standard (mV)	Temperature	Reading Before Calibration (mV)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0925	231@25°C	10.77	247.2	2	Y	12E100590 6/14

QUALITY CHECK - midday, end of day

Time	Standard (mV)	Temperature	Reading (mV)	Stabilization Time (minutes)	Standard Solution (Name / Lot# / Expiration Date)
1237	231@25°C	7.12	257.7	2	12E100590 6/14

ADDITIONAL COMMENTS:

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MULTIPARAMETER INSTRUMENT CALIBRATION LOG

ESS Project Name and No.: DAVIS D164-007.03

Date: 11/16/12 Instrument Type and Model Number: YSI 600 XLM "B"

Personnel: AHP Instrument Serial Numbers: Sonde: 01J0851AF Datalogger: 03D0903AF

DISSOLVED OXYGEN

CALIBRATE to % DO in 100% Saturated Air After Stabilization of %DO & Temperature such that no significant changes for minimum 30 seconds

Time	Barometric Pressure (mm Hg)	Temperature	Reading Before Calibration (%DO)	Stabilization Time (minutes)	Calibrated? (y/n)	Comments
0858	768.5	3.18	82.9	5	Y	
0914	768.3	9.19	<0.5	4	N	ZERO DO 3/13
1235	767.1	9.86	<0.5	4	N	Zero DO 3/13

pH

CALIBRATE to pH 7 Standard and either 4 or 10 pH Standard depending on range of water to be measured (2-Point Calibration)

Time	Standard (pH)	Temperature	Reading Before Calibration (pH)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0907	7	12.93	6.85	2	Y	2AE799 5/14
0910	10	12.54	9.85	2	Y	2AE820 5/14

QUALITY CHECK

Time	Standard (pH)	Temperature	Reading (pH)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1240	7.0	9.91	7.02	2	2AE799 5/14
1242	10.0	10.16	9.97	2	2AE799 5/14 EOD

CONDUCTIVITY

CALIBRATION

Time	Standard (us/cm)	Temperature	Reading Before Calibration (us/cm)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0904	1000	13.90	988	2	Y	2AH181 8/13

QUALITY CHECK

Time	Standard (us/cm)	Temperature	Reading (us/cm)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1247	1000	9.92	1011	2	2AH181 8-13

OXIDATION REDUCTION POTENTIAL

CALIBRATION

Time	Standard (mV)	Temperature	Reading Before Calibration (mV)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0901	231 @ 25°C	12.53	246.6	1	Y	12E100590 6/14

QUALITY CHECK - midday, end of day

Time	Standard (mV)	Temperature	Reading (mV)	Stabilization Time (minutes)	Standard Solution (Name / Lot# / Expiration Date)
1244	231 @ 25°C	11.8	241.1	1	12E100590 6/14

ADDITIONAL COMMENTS:

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MULTIPARAMETER INSTRUMENT CALIBRATION LOG

ESS Project Name and No.: DAVIS D164-007.03

Date: 11/16/12 Instrument Type and Model Number: YSI 600 XL "A"

Personnel: AHF Instrument Serial Numbers: Sonde: 08B101374 Datalogger: 03D0903AF

DISSOLVED OXYGEN

CALIBRATE to % DO in 100% Saturated Air After Stabilization of %DO & Temperature such that no significant changes for minimum 30 seconds

Time	Barometric Pressure (mm Hg)	Temperature	Reading Before Calibration (%DO)	Stabilization Time (minutes)	Calibrated? (y/n)	Comments
0858	769.1	3.60	75.5	5	Y	
0900	769.1	12.16	<0.5	5	N	ZERO DO 3/13
1250	762.5	16.82	<0.5	4	N	Zero DO 3/13

pH

CALIBRATE to pH 7 Standard and either 4 or 10 pH Standard depending on range of water to be measured (2-Point Calibration)

Time	Standard (pH)	Temperature	Reading Before Calibration (pH)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0916	7	11.18	7.14	2	Y	2AE799 5/14
0919	10	11.46	9.77	2	Y	2AE820 5/14

QUALITY CHECK

Time	Standard (pH)	Temperature	Reading (pH)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1245	7	11.38	7.09	2	EOD - 2AE799 5/14
1247	10	11.37	9.71	1	2AE799 5-14

CONDUCTIVITY

CALIBRATION

Time	Standard (us/cm)	Temperature	Reading Before Calibration (us/cm)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0912	1000	12.63	1021	2	Y	2AH181 8/13

QUALITY CHECK

Time	Standard (us/cm)	Temperature	Reading (us/cm)	Stabilization Time (minutes)	Standard Solution / Comments (Name / Lot# / Expiration Date)
1252	1000	10.56	1019	2	2AH181 8/13

OXIDATION REDUCTION POTENTIAL

CALIBRATION

Time	Standard (mV)	Temperature	Reading Before Calibration (mV)	Stabilization Time (minutes)	Calibrated? (y/n)	Standard Solution / Comments (Name / Lot# / Expiration Date)
0909	231@25°C	11.58	248.9	2	Y	12E100 590 6/14

QUALITY CHECK - midday, end of day

Time	Standard (mV)	Temperature	Reading (mV)	Stabilization Time (minutes)	Standard Solution (Name / Lot# / Expiration Date)
1254	231@25C	10.47	228.1	2	12E100 590 6/14

ADDITIONAL COMMENTS:

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Turbidity Instrument Calibration Log

ESS Project: Davis Liquid Superfund

ESS Project No.: D164-007.03

Date: 11/16/12 Instrument and Model Number: LaMotte 2020we

Personnel: REG Instrument Serial Number: 879-1511

TURBIDITY

CALIBRATION

Time	0 NTU Reading	10 NTU Reading	Calibrated to 0 NTU? (y/n)	Calibrated to 10 NTU? (y/n)	Comments
9:34	-0.03	9.34	Y	Y	

QUALITY CHECK

Time	0 NTU Reading	10 NTU Reading	0 NTU Reading	10 NTU Reading	Comments
1300	-0.01	9.94			END OF DAY

Date: 11/16/12 Instrument and Model Number: LaMotte 2020we

Personnel: REG Instrument Serial Number: 239-4110

TURBIDITY

CALIBRATION

Time	0 NTU Reading	10 NTU Reading	Calibrated to 0 NTU? (y/n)	Calibrated to 10 NTU? (y/n)	Comments
9:31	-0.05	11.46	Y	Y	

QUALITY CHECK

Time	0 NTU Reading	10 NTU Reading	0 NTU Reading	10 NTU Reading	Comments
1304	-0.03	10.01			END OF DAY

Date: _____ Instrument and Model Number: _____

Personnel: _____ Instrument Serial Number: _____

TURBIDITY

CALIBRATION

Time	0 NTU Reading	10 NTU Reading	Calibrated to 0 NTU? (y/n)	Calibrated to 10 NTU? (y/n)	Comments

QUALITY CHECK

Time	0 NTU Reading	10 NTU Reading	0 NTU Reading	10 NTU Reading	Comments

ESS Group Inc.

Appendix H

Performance Monitoring Analysis Results – Groundwater (Fall 2012) (Provided on CD)

Microseeps, Inc
220 William Pitt Way
Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

November 27, 2012

Kevin Purdy
ESS Group, Inc.
401 Wampanag Trail
East Providence, RI 02915

RE: **DAVIS SUPERFUND / D164-002.01**
Microseeps Workorder: 7274

Dear Kevin Purdy:

Enclosed are the analytical results for sample(s) received by the laboratory on Thursday, November 15, 2012. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

JR 11-28-12

Ryan Rylands 11/27/2012
rrylands@microseeps.com

Customer Service Representative

Enclosures

As a valued client we would appreciate your comments on our service.
Please email info@microseeps.com.

Total Number of Pages 29

Report ID: 7274 - 311044

CERTIFICATE OF ANALYSIS

This report shall not be reproduced, except in full, without the written consent of Microseeps, Inc.

3004.1.0.0

Microseeps, Inc
220 William Pitt Way
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Phone: (412) 826-5245
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LABORATORY ACCREDITATIONS & CERTIFICATIONS

Accreditor:	Pennsylvania Department of Environmental Protection, Bureau of Laboratories
Accreditation ID:	02-00538
Scope:	NELAP Non-Potable Water and Solid & Hazardous Waste
Accreditor:	NELAP: State of Florida, Department of Health, Bureau of Laboratories
Accreditation ID:	E87832
Scope:	Clean Water Act (CWA) Resource Conservation and Recovery Act (RCRA)
Accreditor:	South Carolina Department of Health and Environmental Control, Office of Environmental Laboratory Certification
Accreditation ID:	89009003
Scope:	Clean Water Act (CWA); Resource Conservation and Recovery Act (RCRA)
Accreditor:	NELAP: State of Louisiana, Department of Environmental Quality
Accreditation ID:	04104
Scope:	Solid and Chemical Materials; Non-Potable Water
Accreditor:	NELAP: New Jersey, Department of Environmental Protection
Accreditation ID:	PA026
Scope:	Non-Potable Water; Solid and Chemical Materials
Accreditor:	NELAP: New York, Department of Health Wadsworth Center
Accreditation ID:	11815
Scope:	Non-Potable Water; Solid and Hazardous Waste
Accreditor:	State of Connecticut, Department of Public Health, Division of Environmental Health
Accreditation ID:	PH-0263
Scope:	Clean Water Act (CWA) Resource Conservation and Recovery Act (RCRA)
Accreditor:	NELAP: Texas, Commission on Environmental Quality
Accreditation ID:	T104704453-09-TX
Scope:	Non-Potable Water
Accreditor:	State of New Hampshire
Accreditation ID:	299409
Scope:	Non-potable water
Accreditor:	State of Georgia
Accreditation ID:	Chapter 391-3-26
Scope:	As per the Georgia EPD Rules and Regulations for Commercial Laboratories, Microseeps is accredited by the Pennsylvania Department of Environmental Protection Bureau of Laboratories under the National Environmental Laboratory Approval Program (NELAC).

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SAMPLE SUMMARY

Workorder: 7274 DAVIS SUPERFUND / D164-002.01

Lab ID	Sample ID	Matrix	Date Collected	Date Received
72740001	GW-FS-OW-407-R-111312	Water	11/13/2012 10:28	11/15/2012 08:00
72740002	GW-FS-OW-101-R-111312	Water	11/13/2012 13:16	11/15/2012 08:00
72740003	GW-FS-OW-406-R-111312	Water	11/13/2012 13:15	11/15/2012 08:00
72740004	GW-FS-OW-112-R-111312	Water	11/13/2012 10:31	11/15/2012 08:00
72740005	GW-FS-OW-051-R-111312	Water	11/13/2012 14:49	11/15/2012 08:00
72740006	GW-FS-OW-046-R-111412	Water	11/14/2012 10:39	11/15/2012 08:00
72740007	GW-FS-OW-045-111412	Water	11/14/2012 10:43	11/15/2012 08:00
72740008	GW-FS-OW-034-110712	Water	11/7/2012 12:28	11/15/2012 08:00
72740009	GW-FS-OW-103-0-110712	Water	11/7/2012 10:00	11/15/2012 08:00
72740010	GW-FS-OW-038-111212	Water	11/12/2012 11:58	11/15/2012 08:00
72740011	GW-FS-OW-037-111212	Water	11/12/2012 11:46	11/15/2012 08:00
72740012	GW-FS-OW-405-R-111412	Water	11/14/2012 12:58	11/15/2012 08:00
72740013	GW-FS-OW-304-111412	Water	11/14/2012 13:10	11/15/2012 08:00
72740014	GW-FS-OW-408-D-111212	Water	11/12/2012 10:28	11/15/2012 08:00
72740015	GW-FS-OW-408-S-111212	Water	11/12/2012 10:21	11/15/2012 08:00
72740016	GW-FS-OW-052-110912	Water	11/9/2012 13:40	11/15/2012 08:00
72740017	GW-FS-OW-409-S-111212	Water	11/12/2012 14:57	11/15/2012 08:00
72740018	GW-FS-OW-409-D-111212	Water	11/12/2012 13:31	11/15/2012 08:00

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ANALYTICAL RESULTS

Workorder: 7274 DAVIS SUPERFUND / D164-002.01

Lab ID: **72740001** Date Received: 11/15/2012 08:00 Matrix: Water

Sample ID: **GW-FS-OW-407-R-111312** Date Collected: 11/13/2012 10:28

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**4200**	ug/l	0.10	0.018	1			11/21/2012 14:19	BW	
Ethane	**180**	ug/l	0.025	0.0070	1			11/21/2012 14:19	BW	
Ethene	**3.6**	ug/l	0.025	0.0050	1			11/21/2012 14:19	BW	
Acetylene	**0.50 U**	ug/l	0.50	0.017	1			11/21/2012 14:19	BW	

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ANALYTICAL RESULTS

Workorder: 7274 DAVIS SUPERFUND / D164-002.01

Lab ID: **72740002** Date Received: 11/15/2012 08:00 Matrix: Water

Sample ID: **GW-FS-OW-101-R-111312** Date Collected: 11/13/2012 13:16

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**14000**	ug/l	0.10	0.018	1			11/21/2012 14:31	BW	
Ethane	**120**	ug/l	0.025	0.0070	1			11/21/2012 14:31	BW	
Ethene	**110**	ug/l	0.025	0.0050	1			11/21/2012 14:31	BW	
Acetylene	**0.50 U**	ug/l	0.50	0.017	1			11/21/2012 14:31	BW	

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ANALYTICAL RESULTS

Workorder: 7274 DAVIS SUPERFUND / D164-002.01

Lab ID: **72740003** Date Received: 11/15/2012 08:00 Matrix: Water

Sample ID: **GW-FS-OW-406-R-111312** Date Collected: 11/13/2012 13:15

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**18000**	ug/l	0.10	0.018	1			11/21/2012 14:45	BW	
Ethane	**310**	ug/l	0.025	0.0070	1			11/21/2012 14:45	BW	
Ethene	**240**	ug/l	0.025	0.0050	1			11/21/2012 14:45	BW	
Acetylene	**0.50 U**	ug/l	0.50	0.017	1			11/21/2012 14:45	BW	

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ANALYTICAL RESULTS

Workorder: 7274 DAVIS SUPERFUND / D164-002.01

Lab ID: **72740004** Date Received: 11/15/2012 08:00 Matrix: Water

Sample ID: **GW-FS-OW-112-R-111312** Date Collected: 11/13/2012 10:31

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**3800**	ug/l	0.10	0.018	1			11/21/2012 14:58	BW	
Ethane	**120**	ug/l	0.025	0.0070	1			11/21/2012 14:58	BW	
Ethene	**7.2**	ug/l	0.025	0.0050	1			11/21/2012 14:58	BW	
Acetylene	**0.50 U**	ug/l	0.50	0.017	1			11/21/2012 14:58	BW	

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ANALYTICAL RESULTS

Workorder: 7274 DAVIS SUPERFUND / D164-002.01

Lab ID: **72740005** Date Received: 11/15/2012 08:00 Matrix: Water

Sample ID: **GW-FS-OW-051-R-111312** Date Collected: 11/13/2012 14:49

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**600**	ug/l	0.10	0.018	1			11/21/2012 15:55	BW	
Ethane	**13**	ug/l	0.025	0.0070	1			11/21/2012 15:55	BW	
Ethene	**42**	ug/l	0.025	0.0050	1			11/21/2012 15:55	BW	
Acetylene	**0.50 U**	ug/l	0.50	0.017	1			11/21/2012 15:55	BW	

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ANALYTICAL RESULTS

Workorder: 7274 DAVIS SUPERFUND / D164-002.01

Lab ID: **72740006** Date Received: 11/15/2012 08:00 Matrix: Water

Sample ID: **GW-FS-OW-046-R-111412** Date Collected: 11/14/2012 10:39

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**13**	ug/l	0.10	0.018	1			11/21/2012 16:09	BW	
Ethane	**0.16**	ug/l	0.025	0.0070	1			11/21/2012 16:09	BW	
Ethene	**0.57**	ug/l	0.025	0.0050	1			11/21/2012 16:09	BW	
Acetylene	**0.50 U**	ug/l	0.50	0.017	1			11/21/2012 16:09	BW	

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Workorder: 7274 DAVIS SUPERFUND / D164-002.01

Lab ID: **72740007** Date Received: 11/15/2012 08:00 Matrix: Water

Sample ID: **GW-FS-OW-045-111412** Date Collected: 11/14/2012 10:43

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**11**	ug/l	0.10	0.018	1			11/21/2012 16:21	BW	
Ethane	**0.13**	ug/l	0.025	0.0070	1			11/21/2012 16:21	BW	
Ethene	**0.77**	ug/l	0.025	0.0050	1			11/21/2012 16:21	BW	
Acetylene	**0.50 U**	ug/l	0.50	0.017	1			11/21/2012 16:21	BW	

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ANALYTICAL RESULTS

Workorder: 7274 DAVIS SUPERFUND / D164-002.01

Lab ID: **72740008** Date Received: 11/15/2012 08:00 Matrix: Water

Sample ID: **GW-FS-OW-034-110712** Date Collected: 11/7/2012 12:28

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**0.23**	ug/l	0.10	0.018	1			11/20/2012 09:09	GT	
Ethane	**0.018J**	ug/l	0.025	0.0070	1			11/20/2012 09:09	GT	
Ethene	**0.016J**	ug/l	0.025	0.0050	1			11/20/2012 09:09	GT	
Acetylene	**0.50 U**	ug/l	0.50	0.017	1			11/20/2012 09:09	GT	

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Workorder: 7274 DAVIS SUPERFUND / D164-002.01

Lab ID: **72740009** Date Received: 11/15/2012 08:00 Matrix: Water

Sample ID: **GW-FS-OW-103-0-110712** Date Collected: 11/7/2012 10:00

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**0.13**	ug/l	0.10	0.018	1			11/20/2012 09:21	GT	
Ethane	**0.025 U**	ug/l	0.025	0.0070	1			11/20/2012 09:21	GT	
Ethene	**0.018J**	ug/l	0.025	0.0050	1			11/20/2012 09:21	GT	
Acetylene	**0.50 U**	ug/l	0.50	0.017	1			11/20/2012 09:21	GT	

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ANALYTICAL RESULTS

Workorder: 7274 DAVIS SUPERFUND / D164-002.01

Lab ID: **72740010** Date Received: 11/15/2012 08:00 Matrix: Water

Sample ID: **GW-FS-OW-038-111212** Date Collected: 11/12/2012 11:58

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**80**	ug/l	0.10	0.018	1			11/21/2012 16:34	BW	
Ethane	**1.0**	ug/l	0.025	0.0070	1			11/21/2012 16:34	BW	
Ethene	**3.6**	ug/l	0.025	0.0050	1			11/21/2012 16:34	BW	
Acetylene	**0.50 U**	ug/l	0.50	0.017	1			11/21/2012 16:34	BW	

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ANALYTICAL RESULTS

Workorder: 7274 DAVIS SUPERFUND / D164-002.01

Lab ID: **72740011** Date Received: 11/15/2012 08:00 Matrix: Water

Sample ID: **GW-FS-OW-037-111212** Date Collected: 11/12/2012 11:46

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**8.7**	ug/l	0.10	0.018	1			11/21/2012 16:48	BW	
Ethane	**0.15**	ug/l	0.025	0.0070	1			11/21/2012 16:48	BW	
Ethene	**0.41**	ug/l	0.025	0.0050	1			11/21/2012 16:48	BW	
Acetylene	**0.50 U**	ug/l	0.50	0.017	1			11/21/2012 16:48	BW	

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ANALYTICAL RESULTS

Workorder: 7274 DAVIS SUPERFUND / D164-002.01

Lab ID: **72740012** Date Received: 11/15/2012 08:00 Matrix: Water

Sample ID: **GW-FS-OW-405-R-111412** Date Collected: 11/14/2012 12:58

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**300**	ug/l	0.10	0.018	1			11/21/2012 17:01	BW	
Ethane	**2.0**	ug/l	0.025	0.0070	1			11/21/2012 17:01	BW	
Ethene	**21**	ug/l	0.025	0.0050	1			11/21/2012 17:01	BW	
Acetylene	**0.50 U**	ug/l	0.50	0.017	1			11/21/2012 17:01	BW	

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ANALYTICAL RESULTS

Workorder: 7274 DAVIS SUPERFUND / D164-002.01

Lab ID: **72740013** Date Received: 11/15/2012 08:00 Matrix: Water

Sample ID: **GW-FS-OW-304-111412** Date Collected: 11/14/2012 13:10

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**140**	ug/l	0.10	0.018	1			11/21/2012 17:13	BW	
Ethane	**0.17**	ug/l	0.025	0.0070	1			11/21/2012 17:13	BW	
Ethene	**0.30**	ug/l	0.025	0.0050	1			11/21/2012 17:13	BW	
Acetylene	**0.50 U**	ug/l	0.50	0.017	1			11/21/2012 17:13	BW	

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ANALYTICAL RESULTS

Workorder: 7274 DAVIS SUPERFUND / D164-002.01

Lab ID: **72740014** Date Received: 11/15/2012 08:00 Matrix: Water

Sample ID: **GW-FS-OW-408-D-111212** Date Collected: 11/12/2012 10:28

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**39**	ug/l	0.10	0.018	1			11/21/2012 17:26	BW	
Ethane	**0.88**	ug/l	0.025	0.0070	1			11/21/2012 17:26	BW	
Ethene	**2.9**	ug/l	0.025	0.0050	1			11/21/2012 17:26	BW	
Acetylene	**0.50 U**	ug/l	0.50	0.017	1			11/21/2012 17:26	BW	

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ANALYTICAL RESULTS

Workorder: 7274 DAVIS SUPERFUND / D164-002.01

Lab ID: **72740015** Date Received: 11/15/2012 08:00 Matrix: Water

Sample ID: **GW-FS-OW-408-S-111212** Date Collected: 11/12/2012 10:21

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**18**	ug/l	0.10	0.018	1			11/21/2012 17:38	BW	
Ethane	**0.45**	ug/l	0.025	0.0070	1			11/21/2012 17:38	BW	
Ethene	**1.1**	ug/l	0.025	0.0050	1			11/21/2012 17:38	BW	
Acetylene	**0.50 U**	ug/l	0.50	0.017	1			11/21/2012 17:38	BW	

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ANALYTICAL RESULTS

Workorder: 7274 DAVIS SUPERFUND / D164-002.01

Lab ID: **72740016** Date Received: 11/15/2012 08:00 Matrix: Water

Sample ID: **GW-FS-OW-052-110912** Date Collected: 11/9/2012 13:40

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**460**	ug/l	0.10	0.018	1			11/21/2012 12:33	BW	
Ethane	**8.8**	ug/l	0.025	0.0070	1			11/21/2012 12:33	BW	
Ethene	**51**	ug/l	0.025	0.0050	1			11/21/2012 12:33	BW	
Acetylene	**0.50 U**	ug/l	0.50	0.017	1			11/21/2012 12:33	BW	

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ANALYTICAL RESULTS

Workorder: 7274 DAVIS SUPERFUND / D164-002.01

Lab ID: **72740017** Date Received: 11/15/2012 08:00 Matrix: Water

Sample ID: **GW-FS-OW-409-S-111212** Date Collected: 11/12/2012 14:57

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**140**	ug/l	0.10	0.018	1			11/21/2012 12:46	BW	
Ethane	**2.0**	ug/l	0.025	0.0070	1			11/21/2012 12:46	BW	
Ethene	**5.6**	ug/l	0.025	0.0050	1			11/21/2012 12:46	BW	
Acetylene	**0.50 U**	ug/l	0.50	0.017	1			11/21/2012 12:46	BW	

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ANALYTICAL RESULTS

Workorder: 7274 DAVIS SUPERFUND / D164-002.01

Lab ID: **72740018** Date Received: 11/15/2012 08:00 Matrix: Water

Sample ID: **GW-FS-OW-409-D-111212** Date Collected: 11/12/2012 13:31

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**310**	ug/l	0.10	0.018	1			11/21/2012 12:58	BW	
Ethane	**5.5**	ug/l	0.025	0.0070	1			11/21/2012 12:58	BW	
Ethene	**17**	ug/l	0.025	0.0050	1			11/21/2012 12:58	BW	
Acetylene	**0.50 U**	ug/l	0.50	0.017	1			11/21/2012 12:58	BW	

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ANALYTICAL RESULTS QUALIFIERS

Workorder: 7274 DAVIS SUPERFUND / D164-002.01

PARAMETER QUALIFIERS

MDL	Method Detection Limit. Can be used synonymously with LOD; Limit Of Detection.
PQL	Practical Quanitation Limit. Can be used synonymously with LOQ; Limit Of Quantitation.
ND	Not detected at or above reporting limit.
DF	Dilution Factor.
S	Surrogate.
RPD	Relative Percent Difference.
% Rec	Percent Recovery.
U	Indicates the compound was analyzed for, but not detected at or above the noted concentration.
J	Estimated concentration greater than the set method detection limit (MDL) and less than the set reporting limit (PQL).

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QUALITY CONTROL DATA

Workorder: 7274 DAVIS SUPERFUND / D164-002.01

QC Batch: DISG/2601 Analysis Method: AM20GAX

QC Batch Method: AM20GAX

Associated Lab Samples: 72740008, 72740009

METHOD BLANK: 15998

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK				
Methane	ug/l	0.10 U	0.10	
Ethane	ug/l	0.025 U	0.025	
Ethene	ug/l	0.025 U	0.025	
Acetylene	ug/l	0.50 U	0.50	

LABORATORY CONTROL SAMPLE & LCSD: 16000 16002

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK										
Methane	ug/l	820	850	870	104	105	80-120	0.96	20	
Ethane	ug/l	42	42	42	101	100	80-120	1	20	
Ethene	ug/l	39	39	39	100	100	80-120	0	20	
Acetylene	ug/l	36	32	32	88	89	80-120	1.1	20	

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QUALITY CONTROL DATA

Workorder: 7274 DAVIS SUPERFUND / D164-002.01

QC Batch: DISG/2605 Analysis Method: AM20GAX

QC Batch Method: AM20GAX

Associated Lab Samples: 72740016, 72740017, 72740018

METHOD BLANK: 16040

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK				
Methane	ug/l	0.10 U	0.10	
Ethane	ug/l	0.025 U	0.025	
Ethene	ug/l	0.025 U	0.025	
Acetylene	ug/l	0.50 U	0.50	

LABORATORY CONTROL SAMPLE & LCSD: 16041 16042

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK										
Methane	ug/l	820	780	810	95	98	80-120	3.1	20	
Ethane	ug/l	42	45	46	109	111	80-120	1.8	20	
Ethene	ug/l	39	42	43	108	111	80-120	2.7	20	
Acetylene	ug/l	36	40	40	111	111	80-120	0	20	

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QUALITY CONTROL DATA

Workorder: 7274 DAVIS SUPERFUND / D164-002.01

QC Batch: DISG/2606 Analysis Method: AM20GAX

QC Batch Method: AM20GAX

Associated Lab Samples: 72740001, 72740002, 72740003, 72740004, 72740005, 72740006, 72740007, 72740010, 72740011, 72740012, 72740013, 72740014, 72740015

METHOD BLANK: 16049

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK				
Methane	ug/l	0.10 U	0.10	
Ethane	ug/l	0.025 U	0.025	
Ethene	ug/l	0.025 U	0.025	
Acetylene	ug/l	0.50 U	0.50	

LABORATORY CONTROL SAMPLE & LCSD: 16050 16051

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK										
Methane	ug/l	820	790	800	96	97	80-120	1	20	
Ethane	ug/l	42	44	46	106	109	80-120	2.8	20	
Ethene	ug/l	39	41	42	107	109	80-120	1.9	20	
Acetylene	ug/l	36	41	41	114	113	80-120	0.88	20	

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 7274 DAVIS SUPERFUND / D164-002.01

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
72740008	GW-FS-OW-034-110712			AM20GAX	DISG/2601
72740009	GW-FS-OW-103-0-110712			AM20GAX	DISG/2601
72740016	GW-FS-OW-052-110912			AM20GAX	DISG/2605
72740017	GW-FS-OW-409-S-111212			AM20GAX	DISG/2605
72740018	GW-FS-OW-409-D-111212			AM20GAX	DISG/2605
72740001	GW-FS-OW-407-R-111312			AM20GAX	DISG/2606
72740002	GW-FS-OW-101-R-111312			AM20GAX	DISG/2606
72740003	GW-FS-OW-406-R-111312			AM20GAX	DISG/2606
72740004	GW-FS-OW-112-R-111312			AM20GAX	DISG/2606
72740005	GW-FS-OW-051-R-111312			AM20GAX	DISG/2606
72740006	GW-FS-OW-046-R-111412			AM20GAX	DISG/2606
72740007	GW-FS-OW-045-111412			AM20GAX	DISG/2606
72740010	GW-FS-OW-038-111212			AM20GAX	DISG/2606
72740011	GW-FS-OW-037-111212			AM20GAX	DISG/2606
72740012	GW-FS-OW-405-R-111412			AM20GAX	DISG/2606
72740013	GW-FS-OW-304-111412			AM20GAX	DISG/2606
72740014	GW-FS-OW-408-D-111212			AM20GAX	DISG/2606
72740015	GW-FS-OW-408-S-111212			AM20GAX	DISG/2606

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Microseeps Lab. Proj. # 7274

CHAIN - OF - CUSTODY RECORD

Microseeps COC cont. #

Phone: (412) 826-5245 | Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238 | Fax No.: (412) 826-3433

Company : ESS Group, Inc.

Co. Address : 401 Wampanoag Trail, East Prov, RI

Phone # : 401.330.1218 Fax # :

Proj. Manager : Kevin Purdy

Proj. Name/Number : Davis Liquid Superfund/D164-002.01

Sampler's signature :

Cooler Temp. 3.8°C

Results to : Kevin Purdy

Invoice to : ESS Group
Accounts Payable
401 Wampanoag Trl
East Providence, RI

Parameters Requested

	Sample ID	Sample Description	Sample Type	Date	Time	Dissolved Gases (**) AM20 Gx	(**) - Methane, Ethene, Ethane, Acetylene)	Remarks :
1	GW-FS-OW-407-R-111312	GW		11-13-12	1028	X		
2	GW-FS-OW-101-R-111312	GW		11-13-12	1316	X		
3	GW-FS-OW-406-R-111312	GW		11-13-12	1315	X		
4	GW-FS-OW-112-R-111312	GW		11-13-12	1031	X		
5	GW-FS-OW-051-111312	GW		11-13-12	1449	X		
6	GW-FS-OW-046-111412	GW		11-14-12	1039	X		
7	GW-FS-OW-045-111412	GW		11-14-12	1043	X		
8	GW-FS-OW-034-110712	GW		[redacted]	1228	X		[redacted]
9	GW-FS-OW-103-0-110712	GW		[redacted]	1000	X		
10	GW-FS-OW-038-111212	GW		11-12-12	1158	X		
11	GW-FS-OW-037-111212	GW		11-12-12	1146	X		
12	GW-FS-OW-405-R-111412	GW		11-14-12	1258	X		

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
[signature]	ESS Group	11-14-12	1800	[signature]	MS	11.15.12	800
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

Microseeps Lab. Proj. # 7274

CHAIN - OF - CUSTODY RECORD

Microseeps COC cont. #

Phone: (412) 826-5245 | Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238 | Fax No.: (412) 826-3433

Company : ESS Group, Inc.

Co. Address : 401 Wampanoag Trail, East Prov, RI

Phone # : 401.330.1218 Fax # :

Proj. Manager : Kevin Purdy

Proj. Name/Number : Davis Liquid Superfund/D164-002.01

Sampler's signature :

Cooler Temp. 3.8°C

Results to : Kevin Purdy

Invoice to : ESS Group Accounts Payable 401 Wampanoag Trl East Providence, RI

Parameters Requested

	Sample ID	Sample Description	Sample Type	Date	Time	Dissolved Gases (**) AM20 Gx	(**) - Methane, Ethene, Ethane, Acetylene)	Remarks :
13	GW-FS-OW-304-111412	GW		11-14-12	1310	X		
14	GW-FS-OW-408D-111212	GW		11-12-12	1028	X		GW-FS-OW-408-D-111212
15	GW-FS-OW-408-S-111212	GW		11-12-12	1021	X		
16	GW-FS-OW-052-110912	GW		[redacted]	[redacted]	[redacted]		
17	GW-FS-OW-409-S-111212	GW		11-12-12	1457	X		
18	GW-FS-OW-409-D-111212	GW		11-12-12	1331	X		

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
[signature]	ESS Group	11-14-12	1400	[signature]	MS	11.15.12	08:00
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

Cooler Receipt Form

Client Name: ESS Group Project: David Liquid Superfund / D164-002.01 Lab Work Order: 7274

A. Shipping/Container Information (circle appropriate response)

Courier: (FedEx) UPS USPS Client Other:_____ Air bill Present: (Yes) No

Tracking Number: 8758 0860 7118

Custody Seal on Cooler/Box Present: Yes (No) Seals Intact: Yes No

Cooler/Box Packing Material: (Bubble Wrap) Absorbent Foam Other:_____

Type of Ice: (Wet) Blue None Ice Intact: (Yes) Melted

Cooler Temperature: 3.8°C Radiation Screened: Yes (No) Chain of Custody Present: (Yes) No

Comments:_____

B. Laboratory Assignment/Log-in (check appropriate response)

	YES	NO	N/A	Comment Reference non-Conformance
Chain of Custody properly filled out	✓			
Chain of Custody relinquished	✓			
Sampler Name & Signature on COC		✓		
Containers intact	✓			
Were samples in separate bags	✓			
Sample container labels match COC Sample name/date and time collected	✓			
Sufficient volume provided	✓			
Microseeps containers used	✓			
Are containers properly preserved for the requested testing? (as labeled)	✓			
If an unknown preservation state, were containers checked? Exception: VOA's coliform			✓	
Was volume for dissolved testing field filtered, as noted on the COC? Was volume received in a preserved container?			✓	

Comments:_____

Cooler contents examined/received by: HCG Date: 11-15-12

Project Manager Review: RGR Date: 11-16-12

Microseeps, Inc
220 William Pitt Way
Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

November 30, 2012

Kevin Purdy
ESS Group, Inc
401 Wampanag Trail
East Providence, RI 02915

RE: **DAVIS SUPERFUND / D164-002.01**
Microseeps Workorder: 7317

Dear Kevin Purdy:

Enclosed are the analytical results for sample(s) received by the laboratory on Saturday, November 17, 2012. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Ryan Rylands 11/30/2012
rrylands@microseeps.com

Customer Service Representative

Enclosures

As a valued client we would appreciate your comments on our service.
Please email info@microseeps.com

Total Number of Pages 21

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LABORATORY ACCREDITATIONS & CERTIFICATIONS

Accreditor:	Pennsylvania Department of Environmental Protection, Bureau of Laboratories
Accreditation ID:	02-00538
Scope:	NELAP Non-Potable Water and Solid & Hazardous Waste
Accreditor:	NELAP: State of Florida, Department of Health, Bureau of Laboratories
Accreditation ID:	E87832
Scope:	Clean Water Act (CWA) Resource Conservation and Recovery Act (RCRA)
Accreditor:	South Carolina Department of Health and Environmental Control, Office of Environmental Laboratory Certification
Accreditation ID:	89009003
Scope:	Clean Water Act (CWA); Resource Conservation and Recovery Act (RCRA)
Accreditor:	NELAP: State of Louisiana, Department of Environmental Quality
Accreditation ID:	04104
Scope:	Solid and Chemical Materials; Non-Potable Water
Accreditor:	NELAP: New Jersey, Department of Environmental Protection
Accreditation ID:	PA026
Scope:	Non-Potable Water; Solid and Chemical Materials
Accreditor:	NELAP: New York, Department of Health Wadsworth Center
Accreditation ID:	11815
Scope:	Non-Potable Water; Solid and Hazardous Waste
Accreditor:	State of Connecticut, Department of Public Health, Division of Environmental Health
Accreditation ID:	PH-0263
Scope:	Clean Water Act (CWA) Resource Conservation and Recovery Act (RCRA)
Accreditor:	NELAP: Texas, Commission on Environmental Quality
Accreditation ID:	T104704453-09-TX
Scope:	Non-Potable Water
Accreditor:	State of New Hampshire
Accreditation ID:	299409
Scope:	Non-potable water
Accreditor:	State of Georgia
Accreditation ID:	Chapter 391-3-26
Scope:	As per the Georgia EPD Rules and Regulations for Commercial Laboratories, Microseeps is accredited by the Pennsylvania Department of Environmental Protection Bureau of Laboratories under the National Environmental Laboratory Approval Program (NELAC).

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SAMPLE SUMMARY

Workorder: 7317 DAVIS SUPERFUND / D164-002 01

Lab ID	Sample ID	Matrix	Date Collected	Date Received
73170001	GW-FS-OW-093-0-111412	Water	11/14/2012 14:40	11/17/2012 11:00
73170002	GW-FS-OW-300-111412	Water	11/14/2012 14:44	11/17/2012 11:00
73170003	GW-FS-OW-404-R-111512	Water	11/15/2012 12:10	11/17/2012 11:00
73170004	GW-FS-OW-94R-111512	Water	11/15/2012 10:16	11/17/2012 11:00
73170005	GW-FS-OW-403-R-111512	Water	11/15/2012 11:00	11/17/2012 11:00
73170006	GW-FS-OW-094-0-111512	Water	11/15/2012 11:09	11/17/2012 11:00
73170007	GW-FS-OW-301-111612	Water	11/16/2012 12:26	11/17/2012 11:00
73170008	GW-FS-OW-302-111612	Water	11/16/2012 10:15	11/17/2012 11:00
73170009	GW-FS-OW-303-111612	Water	11/16/2012 10:44	11/17/2012 11:00

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PROJECT SUMMARY

Workorder: 7317 DAVIS SUPERFUND / D164-002 01

Batch Comments

Batch: DISG/2615 - AM20GAX Water QC

The matrix spike and/or matrix spike duplicate, recovery or relative percent difference; accuracy influenced by the concentration of the reference sample, 73460012. Analyte Methane Batch acceptance based on laboratory control sample recovery

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ANALYTICAL RESULTS

Workorder: 7317 DAVIS SUPERFUND / D164-002 01

Lab ID: **73170001** Date Received: 11/17/2012 11:00 Matrix: Water

Sample ID: **GW-FS-OW-093-0-111412** Date Collected: 11/14/2012 14:40

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**380**	ug/l	0.10	0.018	1			11/28/2012 09:33	GT	
Ethane	**3.8**	ug/l	0.025	0.0070	1			11/28/2012 09:33	GT	
Ethene	**11**	ug/l	0.025	0.0050	1			11/28/2012 09:33	GT	
Acetylene	**0.50 U**	ug/l	0.50	0.017	1			11/28/2012 09:33	GT	

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ANALYTICAL RESULTS

Workorder: 7317 DAVIS SUPERFUND / D164-002 01

Lab ID: **73170002** Date Received: 11/17/2012 11:00 Matrix: Water

Sample ID: **GW-FS-OW-300-111412** Date Collected: 11/14/2012 14:44

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**460**	ug/l	0 10	0.018	1			11/28/2012 09:47	GT	
Ethane	**0.017J**	ug/l	0.025	0 0070	1			11/28/2012 09:47	GT	
Ethene	**0.22**	ug/l	0 025	0 0050	1			11/28/2012 09:47	GT	
Acetylene	**0.50 U**	ug/l	0 50	0 017	1			11/28/2012 09:47	GT	

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ANALYTICAL RESULTS

Workorder: 7317 DAVIS SUPERFUND / D164-002 01

Lab ID: **73170003** Date Received: 11/17/2012 11:00 Matrix: Water

Sample ID: **GW-FS-OW-404-R-111512** Date Collected: 11/15/2012 12:10

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**2.2**	ug/l	0.10	0.018	1			11/29/2012 08:49	BW	
Ethane	**7.5**	ug/l	0.025	0.0070	1			11/29/2012 08:49	BW	
Ethene	**4.6**	ug/l	0.025	0.0050	1			11/29/2012 08:49	BW	
Acetylene	**0.22J**	ug/l	0.50	0.017	1			11/29/2012 08:49	BW	

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ANALYTICAL RESULTS

Workorder: 7317 DAVIS SUPERFUND / D164-002 01

Lab ID: **73170004** Date Received: 11/17/2012 11:00 Matrix: Water

Sample ID: **GW-FS-OW-94R-111512** Date Collected: 11/15/2012 10:16

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**2300**	ug/l	0.10	0.018	1			11/29/2012 09:02	BW	
Ethane	**15**	ug/l	0.025	0.0070	1			11/29/2012 09:02	BW	
Ethene	**370**	ug/l	0.025	0.0050	1			11/29/2012 09:02	BW	
Acetylene	**0.50 U**	ug/l	0.50	0.017	1			11/29/2012 09:02	BW	

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ANALYTICAL RESULTS

Workorder: 7317 DAVIS SUPERFUND / D164-002 01

Lab ID: **73170005** Date Received: 11/17/2012 11:00 Matrix: Water

Sample ID: **GW-FS-OW-403-R-111512** Date Collected: 11/15/2012 11:00

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**210**	ug/l	0 10	0 018	1			11/29/2012 09:15	BW	
Ethane	**1.6**	ug/l	0 025	0.0070	1			11/29/2012 09:15	BW	
Ethene	**130**	ug/l	0 025	0.0050	1			11/29/2012 09:15	BW	
Acetylene	**0.50 U**	ug/l	0 50	0 017	1			11/29/2012 09:15	BW	

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ANALYTICAL RESULTS

Workorder: 7317 DAVIS SUPERFUND / D164-002 01

Lab ID: **73170006** Date Received: 11/17/2012 11:00 Matrix: Water

Sample ID: **GW-FS-OW-094-0-111512** Date Collected: 11/15/2012 11:09

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**72**	ug/l	0.10	0.018	1			11/29/2012 09:30	BW	
Ethane	**0.55**	ug/l	0.025	0.0070	1			11/29/2012 09:30	BW	
Ethene	**17**	ug/l	0.025	0.0050	1			11/29/2012 09:30	BW	
Acetylene	**0.50 U**	ug/l	0.50	0.017	1			11/29/2012 09:30	BW	

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Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

ANALYTICAL RESULTS

Workorder: 7317 DAVIS SUPERFUND / D164-002 01

Lab ID: **73170007** Date Received: 11/17/2012 11:00 Matrix: Water

Sample ID: **GW-FS-OW-301-111612** Date Collected: 11/16/2012 12:26

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**1500**	ug/l	0 10	0 018	1			11/29/2012 09:44	BW	
Ethane	**100**	ug/l	0 025	0 0070	1			11/29/2012 09:44	BW	
Ethene	**260**	ug/l	0 025	0 0050	1			11/29/2012 09:44	BW	
Acetylene	**0.50 U**	ug/l	0 50	0 017	1			11/29/2012 09:44	BW	

CERTIFICATE OF ANALYSIS

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Pittsburgh. PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

ANALYTICAL RESULTS

Workorder: 7317 DAVIS SUPERFUND / D164-002 01

Lab ID: **73170008** Date Received: 11/17/2012 11:00 Matrix: Water

Sample ID: **GW-FS-OW-302-111612** Date Collected: 11/16/2012 10:15

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**11000**	ug/l	0 10	0 018	1			11/29/2012 09:57	BW	
Ethane	**140**	ug/l	0 025	0 0070	1			11/29/2012 09:57	BW	
Ethene	**2.4**	ug/l	0 025	0 0050	1			11/29/2012 09:57	BW	
Acetylene	**0.50 U**	ug/l	0 50	0 017	1			11/29/2012 09:57	BW	

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Fax: (412) 826-3433

ANALYTICAL RESULTS

Workorder: 7317 DAVIS SUPERFUND / D164-002.01

Lab ID: **73170009** Date Received: 11/17/2012 11:00 Matrix: Water

Sample ID: **GW-FS-OW-303-111612** Date Collected: 11/16/2012 10:44

Parameters	Results	Units	PQL	MDL	DF	Prepared	By	Analyzed	By	Qual
RISK - MICR										
Analysis Desc: AM20GAX			Analytical Method: AM20GAX							
Methane	**4800**	ug/l	0.10	0.018	1			11/29/2012 10:11	BW	
Ethane	**3.2**	ug/l	0.025	0.0070	1			11/29/2012 10:11	BW	
Ethene	**1.2**	ug/l	0.025	0.0050	1			11/29/2012 10:11	BW	
Acetylene	**0.50 U**	ug/l	0.50	0.017	1			11/29/2012 10:11	BW	

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220 William Pitt Way
Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

ANALYTICAL RESULTS QUALIFIERS

Workorder: 7317 DAVIS SUPERFUND / D164-002.01

PARAMETER QUALIFIERS

MDL	Method Detection Limit Can be used synonymously with LOD; Limit Of Detection
PQL	Practical Quanitation Limit Can be used synonymously with LOQ; Limit Of Quantitation
ND	Not detected at or above reporting limit
DF	Dilution Factor
S	Surrogate
RPD	Relative Percent Difference
% Rec	Percent Recovery
U	Indicates the compound was analyzed for, but not detected at or above the noted concentration
J	Estimated concentration greater than the set method detection limit (MDL) and less than the set reporting limit (PQL).

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220 William Pitt Way
Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

QUALITY CONTROL DATA

Workorder: 7317 DAVIS SUPERFUND / D164-002 01

QC Batch: DISG/2615 Analysis Method: AM20GAX

QC Batch Method: AM20GAX

Associated Lab Samples: 73170001, 73170002

METHOD BLANK: 16181

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK				
Methane	ug/l	0.10 U	0.10	
Ethane	ug/l	0.025 U	0.025	
Ethene	ug/l	0.025 U	0.025	
Acetylene	ug/l	0.50 U	0.50	

LABORATORY CONTROL SAMPLE & LCSD: 16183 16185

Parameter	Units	Spike Conc	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK										
Methane	ug/l	820	770	830	94	101	80-120	7.2	20	
Ethane	ug/l	42	44	47	106	113	80-120	6.4	20	
Ethene	ug/l	39	40	43	104	110	80-120	5.6	20	
Acetylene	ug/l	36	36	37	100	102	80-120	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 16214 16215 Original: 73460012

Parameter	Units	Original Result	Spike Conc	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK											
Methane	ug/l	5800	820	8000	8000	260	263	70-130	1.1	20	
Ethane	ug/l	1.3	42	56	51	130	120	70-130	8	20	
Ethene	ug/l	27	39	78	77	133	129	70-130	3.1	20	
Acetylene	ug/l	0	36	38	35	105	98	70-130	6.9	20	

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Fax: (412) 826-3433

QUALITY CONTROL DATA

Workorder: 7317 DAVIS SUPERFUND / D164-002.01

QC Batch: DISG/2617 Analysis Method: AM20GAX

QC Batch Method: AM20GAX

Associated Lab Samples: 73170003, 73170004, 73170005, 73170006, 73170007, 73170008, 73170009

METHOD BLANK: 16220

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK				
Methane	ug/l	0.10 U	0.10	
Ethane	ug/l	0.025 U	0.025	
Ethene	ug/l	0.025 U	0.025	
Acetylene	ug/l	0.50 U	0.50	

LABORATORY CONTROL SAMPLE & LCSD: 16221 16222

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK										
Methane	ug/l	820	800	790	98	96	80-120	2.1	20	
Ethane	ug/l	42	43	43	102	104	80-120	1.9	20	
Ethene	ug/l	39	39	40	101	102	80-120	0.99	20	
Acetylene	ug/l	36	35	37	98	101	80-120	3	20	

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Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 7317 DAVIS SUPERFUND / D164-002 01

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
73170001	GW-FS-OW-093-0-111412			AM20GAX	DISG/2615
73170002	GW-FS-OW-300-111412			AM20GAX	DISG/2615
73170003	GW-FS-OW-404-R-111512			AM20GAX	DISG/2617
73170004	GW-FS-OW-94R-111512			AM20GAX	DISG/2617
73170005	GW-FS-OW-403-R-111512			AM20GAX	DISG/2617
73170006	GW-FS-OW-094-0-111512			AM20GAX	DISG/2617
73170007	GW-FS-OW-301-111612			AM20GAX	DISG/2617
73170008	GW-FS-OW-302-111612			AM20GAX	DISG/2617
73170009	GW-FS-OW-303-111612			AM20GAX	DISG/2617

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7317 HCY 11-19-12

Microseeps Lab. Proj. # 3717

CHAIN - OF - CUSTODY RECORD

Microseeps COC cont. #

Phone: (412) 826-5245 Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238 Fax No. : (412) 826-3433

Company : ESS Group, Inc.

Co. Address : 401 Wampanoag Trail, East Prov, RI

Phone # : 401.330.1218 Fax # :

Proj. Manager : Kevin Purdy

Proj. Name/Number : Davis Liquid Superfund/D164-002.01

Sampler's signature :

Cooler Temp. 2.6°C

Results to : Kevin Purdy

Invoice to : ESS Group Accounts Payable 401 Wampanoag Trl East Providence, RI

Parameters Requested

	Sample ID	Sample Description	Sample Type	Date	Time	Dissolved Gases (**) AM20 Gx	(**) - Methane, Ethene, Ethane, Acetylene)	Remarks :
1	GW-FS-OW-093-O-111412	GW		11-14-12	1440	X		
2	GW-FS-OW-300-111412	GW		11-14-12	1444	X		
3	GW-FS-OW-404-R-111512	GW		11-15-12	1210	X		
4	GW-FS-OW-94R-111512	GW		11-15-12	1016	X		
5	GW-FS-OW-403-R-111512	GW		11-15-12	1100	X		
6	GW-FS-OW-094-O-111512	GW		11-15-12	1109	X		
7	GW-FS-OW-301-111612	GW		11-16-12	1226	X		
8	GW-FS-OW-302-111612	GW		11-16-12	1015	X		
9	GW-FS-OW-303-111612	GW		11-16-12	1044	X		

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
				H Hawley	MS	11.17.12	1102
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

NON-CONFORMANCE FORM

HCY 11/19/12

Microseeps Project Number: ~~3717~~ 7317

Date: 11.17.12 Time of Receipt: 11 00 Receiver: Hoan Tozeng

Client: ESS Group

REASON FOR NON-CONFORMANCE:

COC was not relinquished by Client.

ACTION TAKEN:

Client name: Kevin Purdy Date: 11-20-12 Time: Email

Emailed client

As per attached email client relinquished samples.

Customer Service Initials: JR Date: 11-20-12

7317

Julianne Rugh

From: Kevin Purdy <kpurdy@essgroup.com>
Sent: Tuesday, November 20, 2012 11:38 AM
To: Julianne Rugh
Subject: RE: Davis Liquid Superfund / D164-002.01

Juli,

I relinquish the samples to Microseeps for the requested analyses. Please don't hesitate to contact me with any questions.

Regards,
Kevin

Kevin Purdy | Group Manager - Environmental Geosciences & Engineering
ESS Group, Inc.
401 Wampanoag Trail, Suite 400, East Providence, RI 02915
p 401 330 1218 | c 401 465 3871 | kpurdy@essgroup.com | www.essgroup.com

This email message and any attachments are confidential. If you are not the intended recipient, please immediately reply to the sender and delete the message from your email system. Thank you

---

From: Julianne Rugh [mailto:jrugh@microseeps.com]
Sent: Tuesday, November 20, 2012 11:31 AM
To: Kevin Purdy
Subject: Davis Liquid Superfund / D164-002.01

Hi Kevin,

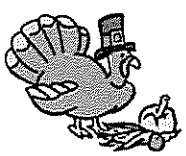
We received your samples for the above project but the COC was not signed relinquishing the samples for analysis. Could you please respond to this email relinquishing the samples?

Thank you!

Juli (Sproull) Rugh

Please note my name change from Sproull to Rugh. Emails to jsproull or jrugh will both be delivered.

Microseeps Inc. will be closed on Thursday November 22nd in honor of Thanksgiving. We will be open on Friday the 23rd with limited staff and we will not be accepting short holds.



Microseeps, Inc.
220 William Pitt Way
Pittsburgh PA 15238
412-826-4481 (Direct Dial)
412-826-5245 (Phone)
412-826-3433 (Fax)

Cooler Receipt Form

Client Name: ESS Group Project: David Superfund /D164-002.01 Lab Work Order: ~~3717~~ 7317 HCY 11/19/12

A. Shipping/Container Information (circle appropriate response)

Courier: (FedEx) UPS USPS Client Other:_____ Air bill Present: (Yes) No

Tracking Number: 8758 0860 7004

Custody Seal on Cooler/Box Present: Yes (No) Seals Intact: Yes No

Cooler/Box Packing Material: (Bubble Wrap) Absorbent Foam Other:_____

Type of Ice: (Wet) Blue None Ice Intact: (Yes) Melted

Cooler Temperature: 2-6°C Radiation Screened: Yes (No) Chain of Custody Present: (Yes) No

Comments:_____

B. Laboratory Assignment/Log-in (check appropriate response)

	YES	NO	N/A	Comment Reference non-Conformance
Chain of Custody properly filled out HCY	✓	✓		
Chain of Custody relinquished 11-17-12	✓	✓		
Sampler Name & Signature on COC		✓		
Containers intact	✓			
Were samples in separate bags	✓			
Sample container labels match COC Sample name/date and time collected	✓			
Sufficient volume provided	✓			
Microseeps containers used	✓			
Are containers properly preserved for the requested testing? (as labeled)	✓			
If an unknown preservation state, were containers checked? Exception: VOA's coliform			✓	
Was volume for dissolved testing field filtered, as noted on the COC? Was volume received in a preserved container?			✓	

Comments:_____

Cooler contents examined/received by: HCY Date: 11-17-12

Project Manager Review: JR Date: 11-20-12

Appendix I

IDW Management Documentation

TRADEBE™
UNITED INDUSTRIAL SERVICES
47 GRACEY AVENUE MERIDEN, CT 06451
TOLL FREE (888) 276-0887

INFO@UNITEDINDUSTRIALSERVICES.COM

Re: Manifest received at United Oil Recovery, Inc.
Meriden, CT

To Whom This May Concern:

Enclosed is a completed copy of a Uniform Hazardous Waste Manifest or a Non-Hazardous Waste Manifest regarding waste received at our facility on 12-06-12.

This copy, together with the copy of the manifest you retained when the waste was initially shipped, must be retained in your files as proof that the waste was transported and received by an authorized, designated facility.

Our storage and treatment methods are as follows:

- H141 Storage
- H135 Water Treatment
- H061 Fuel Blending*

*All products of our fuel blending process are burned for energy recovery.

Thank you for choosing a United facility for your treatment and recycling needs. For additional information, please visit our website at www.unitedindustrialservices.com. To schedule a tour of our facility, please call (888) 276-0887 or email us at csa@unitedindustrialservices.com.

Very truly yours,

William C. Morris

William C. Morris
Environmental Director

WCM/clm

207641 ST 409

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: RID980523070
2. Page 1 of 1
3. Emergency Response Phone: (800) 899-1038
4. Manifest Tracking Number: 006414360 JJK

5. Generator's Name and Mailing Address
Att: Mr. Kevin Purdy
Davis Liquid Waste Site
Davis Site Trust c/o ESS Group, 401 Wampanoag Trail, Suite 400
E. Providence RI 02915
Generator's Phone: 401 434-5560

Generator's Site Address (if different than mailing address)
Davis Liquid Waste Site
Tarkiln Rd.
Smithfield RI 02917

6. Transporter 1 Company Name: Cyn Oil Corporation
U.S. EPA ID Number: MAD082303777

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
United Oil Recovery, Inc.
136 Gracey Ave.
Meriden CT 06451
Facility's Phone: 203 238-6751
U.S. EPA ID Number: CTD021816889

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
X	1. RQ NA3082, Hazardous waste, liquid, n.o.s. (Tetrachloroethylene, Trichloroethylene) 9, PGIII	001	TT	4284	G	F001	F002	
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
1. F001/F002 purge water.
Profile # P1130120100
PO # 626148

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Timothy Alvarez on Behalf of the Davis Site Trust
Signature: on behalf of the Davis Site Trust
Month 12 Day 05 Year 12

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Kevin M. Sullivan
Signature
Month 12 Day 05 Year 12
Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H135
2.
3.
4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Melanie Gatermash
Signature
Month 12 Day 06 Year 12

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR

207641 ST 409

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: R I D 9 8 0 5 2 3 0 7 0
2. Page 1 of: 1
3. Emergency Response Phone: (800) 899-1036
4. Manifest Tracking Number: 006414360 JJK

5. Generator's Name and Mailing Address
Davis Liquid Waste Site
Davis Site Trust c/o ESS Group, 401 Wampanoag Trail, Suite 400
E. Providence RI 02915
Att: Mr. Kevin Purdy
Generator's Phone: 401 434-5560

Generator's Site Address (if different than mailing address)
Davis Liquid Waste Site
Tarklin Rd
Smithfield RI 02917

6. Transporter 1 Company Name: Cyn Oil Corporation
U.S. EPA ID Number: MAD082303777

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
United Oil Recovery, Inc.
136 Gracey Ave.
Meriden CT 06451
Facility's Phone: 203 238-6751
U.S. EPA ID Number: CTD021816889

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
X	1. RQ NA3082, Hazardous waste, liquid, n.o.s. (Tetrachloroethylene, Trichloroethylene) 9, PGIII	001	TT	4284	G	F001	F002	
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
1. F001 F002 purge water.
Profile # R1130120 1050
PO # 626148

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Jonathan Alvarez on Behalf of the Davis Site Trust
Signature: [signature] on behalf of the Davis Site Trust
Month 12 Day 06 Year 12

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Kevin M. Sullivan
Signature: [signature]
Month 12 Day 06 Year 12
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

GENERATOR'S INITIAL COPY

Appendix J

Residual Mass Calculation Detail Sheets

Appendix J1

Plume Core Borings

APPENDIX J-1
MASS ESTIMATE - CALCULATION KEY

Section	Area	Thickness of Impacted Deposits	Total VOC Concentration (dry weight)	Average Moisture Content Results of Samples	[3]Total VOC Concentration (wet weight)	[4]Average Bulk Density/1e9	Mass of Total VOC
	(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	(lb/ft^3)x(kg/1x10^9 ug)	(lbs)
Organic Peat							
OP	53,547	1.3	0	44%	0	2.50E-08	0.00
						Estimated Total VOC Mass for Area:	**0.00**
Grey Silty Sand/Silt							
GSSS	83,468	4.1	0	20%	0	1.07E-07	0.00
						Estimated Total VOC Mass for Area:	**0.00**
Sand / Sand and Gravel							
SSG	245,000	14.5	0	13%	0	1.18E-07	0.00
						Estimated Total VOC Mass for Area:	**0.00**
						Estimated Total VOC Mass for Site:	**0.00**

Notes:

1. Area calculated is estimated assuming extent of FSA, as outlined in RD Work Plan, and estimated extents of Organic Peat and Grey Silty Sand/Silt deposits.
2. Moisture Content results from laboratory analysis of Plume Core soil samples were averaged for each soil type
3. Total volatile organic compound (TVOC) wet weight = (TVOC dry weight) - [(TVOC dry weight) x (soil moisture content)].
4. Bulk Density is an average value based on the results of laboratory analysis of Plume Core soil samples. The resultant values have been multiplied by a units conversion factor of 1 kg/1x10^9 ug so that the resulting estimate of VOC mass is reported in pounds (lbs).
5. Non-detect concentrations were assigned a value of zero.
6. Thicknesses are based on the results of Plume Core soil borings (Summer 2012) and delineated by stratigraphic unit.

Boring	Strata	Sample Depth	Strat Top	Strat Bottom	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Average Moisture of all SSG Samples	Moisture Content Results of Samples	Total VOC Concentration (wet weight) with averaged % moisture	Total VOC Concentration (wet weight)	[4]Bulk Density/ 1e9	Mass with averaged % Moisture	Mass of Total VOC
					(ft^2)	(ft)	(ug/kg)		(%)		(ug/kg)	[2]x(kg/1x10[9] ug)		(lbs)
Sand / Sand and Gravel														
PC-1	SSG	8.75	7.6	11.75	8,100	4.2	0	13%	10%	0	0	1.18E-07	0.00	0.00
PC-1	SSG	14.75	11.75	15.75	8,100	4.0	0	13%	9%	0	0	1.18E-07	0.00	0.00
PC-1	SSG	16.75	16	17	8,100	1.0	0	13%	12%	0	0	1.18E-07	0.00	0.00
PC-2	SSG	9.25	8.75	13.25	8,100	4.5	3	13%	9%	3	3	1.18E-07	0.01	0.01
PC-2	SSG	17.25	13.25	19	8,100	5.8	4	13%	11%	3	3	1.18E-07	0.02	0.02
PC-3	SSG	13.75	10	19	8,100	9.0	9	13%	20%	8	7	1.18E-07	0.07	0.06
PC-3	SSG	22.75	20	23.5	8,100	3.5	30	13%	10%	26	27	1.18E-07	0.09	0.09
PC-4	SSG	11.25	11	17	8,100	6.0	12	13%	39%	10	7	1.18E-07	0.06	0.04
PC-4	SSG	22.75	17	24.25	8,100	7.3	25	13%	5%	22	24	1.18E-07	0.15	0.16
PC-4	SSG	25.75	24.25	26.5	8,100	2.3	63	13%	3%	55	61	1.18E-07	0.12	0.13
PC-5	SSG	11.25	10.1	15.75	8,100	5.7	17	13%	13%	15	15	1.18E-07	0.08	0.08
PC-5	SSG	20.25	15.75	22	8,100	6.3	73	13%	13%	64	64	1.18E-07	0.38	0.38
PC-5	SSG	23.75	22	27	8,100	5.0	35	13%	13%	30	30	1.18E-07	0.15	0.15
PC-6	SSG	13.25	9	17.75	8,100	8.8	116	13%	7%	101	108	1.18E-07	0.84	0.90
PC-6	SSG	22.25	17.75	22.5	8,100	4.8	5	13%	7%	5	5	1.18E-07	0.02	0.02
PC-7	SSG	13.25	5	15.75	6,488	10.8	540	13%	7%	470	504	1.18E-07	3.87	4.15
PC-7	SSG	18.25	15.75	18.5	6,488	2.8	5	13%	7%	4	4	1.18E-07	0.01	0.01
PC-8	SSG	19.25	15	21	8,100	6.0	0	13%	12%	0	0	1.18E-07	0.00	0.00
PC-9	SSG	15.75	12.8	16.5	8,100	3.7	18	13%	9%	16	16	1.18E-07	0.06	0.06
PC-10	SSG	14.75	12.25	16.25	8,100	4.0	92	13%	10%	80	83	1.18E-07	0.31	0.32
PC-10	SSG	17.75	16.25	20.75	8,100	4.5	60	13%	11%	52	53	1.18E-07	0.22	0.23
PC-10	SSG	23.75	20.75	23.5	8,100	2.8	304	13%	12%	265	268	1.18E-07	0.70	0.70
PC-11	SSG	20.25	11.5	21.5	8,100	10.0	168	13%	23%	146	129	1.18E-07	1.39	1.23
PC-12	SSG	14.25	9.75	18	8,100	8.3	550	13%	8%	479	507	1.18E-07	3.77	3.99
PC-12	SSG	21.75	18	22	8,100	4.0	98	13%	19%	85	79	1.18E-07	0.33	0.30
PC-13	SSG	10.25	8.5	12.75	8,100	4.3	43	13%	7%	37	40	1.18E-07	0.15	0.16
PC-13	SSG	15.25	12.75	18.75	8,100	6.0	54	13%	14%	47	47	1.18E-07	0.27	0.27
PC-13	SSG	22.25	18.75	25	8,100	6.3	52	13%	10%	45	47	1.18E-07	0.27	0.28
PC-14	SSG	11.25	8	13.25	5,447	5.3	17	13%	7%	15	15	1.18E-07	0.05	0.05
PC-14	SSG	15.25	13.25	17.5	5,447	4.3	41	13%	5%	35	39	1.18E-07	0.10	0.11
PC-14	SSG	19.75	17.5	20	5,447	2.5	37	13%	9%	32	33	1.18E-07	0.05	0.05
PC-15	SSG	14.75	13.25	15.75	8,100	2.5	0	13%	10%	0	0	1.18E-07	0.00	0.00
PC-15	SSG	16.75	15.75	20	8,100	4.3	0	13%	11%	0	0	1.18E-07	0.00	0.00
PC-16	SSG	16.25	14.25	19.25	8,100	5.0	33	13%	20%	28	26	1.18E-07	0.14	0.12
PC-16	SSG	25.25	24.25	26.5	8,100	2.3	14	13%	21%	12	11	1.18E-07	0.03	0.02
PC-17	SSG	16.25	13.5	17.75	8,100	4.3	76	13%	19%	66	62	1.18E-07	0.27	0.25
PC-17	SSG	19.25	17.75	20.25	8,100	2.5	44	13%	4%	38	42	1.18E-07	0.09	0.10
PC-17	SSG	21.25	20.25	22.5	8,100	2.3	20	13%	15%	17	13	1.18E-07	0.04	0.03
PC-17	SSG	23.75	22.5	24	8,100	1.5	4	13%	10%	4	10	1.18E-07	0.01	0.01
PC-18	SSG	16.25	12	18.25	8,100	6.3	17	13%	8%	15	16	1.18E-07	0.09	0.10
PC-18	SSG	20.25	18.25	21.75	8,100	3.5	227	13%	31%	197	156	1.18E-07	0.66	0.52
PC-18	SSG	23.25	21.75	23.5	8,100	1.8	20	13%	13%	17	17	1.18E-07	0.03	0.03
PC-19	SSG	18.75	17	20	8,100	3.0	217	13%	8%	189	201	1.18E-07	0.54	0.58
PC-19	SSG	21.25	20	23	8,100	3.0	215	13%	14%	187	185	1.18E-07	0.54	0.53
PC-19	SSG	24.75	23	25	8,100	2.0	356	13%	8%	309	326	1.18E-07	0.59	0.62
PC-20	SSG	15.75	11	16.5	8,100	5.5	191	13%	10%	166	173	1.18E-07	0.87	0.91
PC-20	SSG	25.25	21	26	8,100	5.0	174	13%	10%	151	157	1.18E-07	0.72	0.75
PC-21	SSG	6.75	6.5	9	6,926	2.5	41	13%	17%	36	34	1.18E-07	0.07	0.07
PC-21	SSG	11.25	9	12	6,926	3.0	26	13%	17%	22	21	1.18E-07	0.06	0.05
PC-21	SSG	12.75	12	17	6,926	5.0	23	13%	17%	20	19	1.18E-07	0.08	0.08
PC-22	SSG	16.25	15	22.5	5,621	7.5	4	13%	4%	4	4	1.18E-07	0.02	0.02
PC-22	SSG	28.75	22.5	29	5,621	6.5	2	13%	13%	2	2	1.18E-07	0.01	0.01
PC-23	SSG	14.25	13.5	17.5	7,918	4.0	4	13%	11%	3	3	1.18E-07	0.01	0.01
PC-23	SSG	24.25	17.5	26.75	7,918	9.3	0	13%	7%	0	0	1.18E-07	0.00	0.00
PC-23	SSG	29.25	26.75	34.5	7,918	7.8	0	13%	22%	0	0	1.18E-07	0.00	0.00
PC-24	SSG	18.25	18	21.25	8,100	3.3	4	13%	15%	4	3	1.18E-07	0.01	0.01
PC-24	SSG	24.25	21.25	29.25	8,100	8.0	19	13%	21%	16	15	1.18E-07	0.13	0.11
PC-24	SSG	34.25	29.25	38.5	8,100	9.3	7	13%	8%	6	7	1.18E-07	0.05	0.06
PC-25	SSG	27.25	13.5	31.25	7,109	17.8	6	13%	9%	6	6	1.18E-07	0.08	0.09
PC-25	SSG	35.25	31.25	40	7,109	8.8	23	13%	26%	20	17	1.18E-07	0.15	0.13
PC-26	SSG	10.25	6.75	12.25	5,378	5.5	22	13%	16%	19	19	1.18E-07	0.07	0.06
PC-26	SSG	14.25	12.25	17	5,378	4.8	14	13%	19%	12	11	1.18E-07	0.04	0.03
PC-26	SSG	19.75	17	23.5	5,378	6.5	21	13%	9%	18	19	1.18E-07	0.08	0.08
PC-26	SSG	27.25	23.5	30	5,378	6.5	0	13%	7%	0	0	1.18E-07	0.00	0.00
PC-26	SSG	32.75	30	36	5,378	6.0	21	13%	14%	18	18	1.18E-07	0.07	0.07
PC-27	SSG	10.75	7	15.25	6,458	8.3	34	13%	23%	29	26	1.18E-07	0.18	0.16
PC-27	SSG	19.75	15.25	27.75	6,458	12.5	29	13%	14%	25	25	1.18E-07	0.24	0.23
PC-27	SSG	35.75	27.75	36.5	6,458	8.8	9	13%	12%	8	8	1.18E-07	0.05	0.05
PC-28	SSG	12.75	10	16	7,752	6.0	162	13%	19%	141	132	1.18E-07	0.77	0.72
PC-28	SSG	19.25	16	25	7,752	9.0	216	13%	18%	188	177	1.18E-07	1.55	1.46
PC-28	SSG	30.75	25	34	7,752	9.0	103	13%	19%	90	83	1.18E-07	0.74	0.69
	Samples	70										**SUM of TVOC Mass - SSG**		**22.74**
												Using Average Moisture Content		**22.57**

Boring	Strata	Sample Depth	Strat Top	Strat Bottom	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Average Moisture of all SSG Samples	Moisture Content Results of Samples	Total VOC Concentration (wet weight) with averaged % moisture	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass with averaged % Moisture	Mass of Total VOC
											(ug/kg)	[2]x(kg/1x10[9] ug)		(lbs)
Grey Silty Sand / Silt														
PC-3	GSSS	19.25	19	20	8,100	1.0	29	20%	13%	23.28	25	1.07E-07	0.02	0.02
PC-8	GSSS	14.25	12	15	8,100	3.0	210	20%	16%	168	177	1.07E-07	0.44	0.46
PC-16	GSSS	20.25	19.25	24.25	8,100	5.0	4	20%	12%	3	3	1.18E-07	0.01	0.01
PC-19	GSSS	15.75	13	17	8,100	4.0	115	20%	15%	91.68	97	1.07E-07	0.32	0.34
PC-20	GSSS	18.25	16.5	21	8,100	4.5	41	20%	11%	32.8	36	1.07E-07	0.13	0.14
PC-22	GSSS	13.75	10.25	15	5,621	4.8	0	20%	17%	0	0	1.07E-07	0.00	0.00
PC-23	GSSS	18.25	17.5	21	7,918	3.5	59	20%	24%	47.52	45	1.07E-07	0.14	0.13
PC-24	GSSS	14.75	13.5	18	8,100	4.5	1,100	20%	17%	880	913	1.07E-07	3.43	3.56
PC-25	GSSS	12.75	12	13.5	7,109	1.5	347	20%	56%	277.6	153	1.07E-07	0.32	0.17
PC-28	GSSS	6.75	5.5	8	7,752	2.5	3,388	20%	16%	2710.4	2,846	1.07E-07	5.62	5.90
PC-28	GSSS	9.25	8	10	7,752	2.0	2	20%	11%	1.36	2	1.07E-07	0.00	0.00
Samples	11											**SUM of TVOC Mass - GSSS**		**10.75**
												Using Average Moisture Content		**10.43**

Boring	Strata	Sample Depth	Strat Top	Strat Bottom	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Average Moisture of all SSG Samples	Moisture Content Results of Samples	Total VOC Concentration (wet weight) with averaged % moisture	[3]Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass with averaged % Moisture	Mass of Total VOC
					(ft^2)	(ft)	(ug/kg)		(%)		(ug/kg)	[2]x(kg/1x10[9] ug)		(lbs)
Organic Peat														
PC-19	OP	11.75	11.5	13	8,100	1.5	18,520	44%	35%	10,371	12,038	2.50E-08	3.15	3.66
PC-20	OP	9.25	8.2	11	8,100	2.8	3,790	44%	31%	2,122	2,615	2.50E-08	1.20	1.48
PC-23	OP	13.25	13	13.5	7,918	0.5	153	44%	30%	86	107	2.50E-08	0.01	0.01
PC-24	OP	12.75	12	13.5	8,100	1.5	74,400	44%	30%	41,664	52,080	2.50E-08	12.66	15.82
PC-25	OP	11.75	11	12	7,109	1.0	21,010	44%	71%	11,766	6,093	2.50E-08	2.09	1.08
PC-27	OP	6.25	5.5	7	6,458	1.5	184	44%	68%	103	59	2.50E-08	0.02	0.01
PC-28	OP	4.75	4.5	5.5	7,752	1.0	89,470	44%	46%	50,103	48,314	2.50E-08	9.71	9.36
												SUM of TVOC Mass - OP		**31.43**
Samples	7											**Using Average Moisture Content**		**28.84**

SUM of TVOC Mass - Cumulative **64.92**

Using Average Moisture Content **61.85**

NOTES:
SSG - Sand and Sand and Gravel
GSSS - Grey Silt and Silty Sand
OP - Organic Peat
ug/kg - micrograms per kilogram
lbs - pounds

	PC-1		PC-1		PC-1	
	SB-FS-PC-1-8.5-8.75		SB-FS-PC-1-14.5-14.75		SB-FS-PC-1-16.5-16.75	
	5/18/2012		5/18/2012		5/18/2012	
	Sand		Sand & Gravel		Sand & Gravel	
	0		15		0	
	0.1		0.1		0.1	
	9.6		8.8		12	
CONSTITUENTS						
1,1,1-Trichloroethane	3.3	U	2.2	U	1.9	U
1,1,2,2-Tetrachloroethane	3.3	U	2.2	U	1.9	U
1,1,2-Trichloroethane	3.3	U	2.2	U	1.9	U
1,1-Dichloroethane	3.3	U	2.2	U	1.9	U
1,1-Dichloroethylene	3.3	U	2.2	U	1.9	U
1,2,3-Trichlorobenzene	3.3	U	2.2	U	1.9	U
1,2,4-Trichlorobenzene	3.3	U	2.2	U	1.9	U
1,2-Dichlorobenzene	3.3	U	2.2	U	1.9	U
1,2-Dichloroethane	3.3	U	2.2	U	1.9	U
1,2-Dichloropropane	3.3	U	2.2	U	1.9	U
1,3-Dichlorobenzene	3.3	U	2.2	U	1.9	U
1,4-Dichlorobenzene	3.3	U	2.2	U	1.9	U
2-Hexanone	33	U	22	U	19	U
Acetone	330	UJ	220	UJ	190	UJ
Benzene	3.3	U	2.2	U	1.9	U
Bromochloromethane	3.3	U	2.2	U	1.9	U
Bromodichloromethane	3.3	U	2.2	U	1.9	U
Bromoform	3.3	U	2.2	U	1.9	U
Carbon Disulfide	3.3	U	2.2	U	1.9	U
Carbon Tetrachloride	3.3	U	2.2	U	1.9	U
Chlorobenzene	3.3	U	2.2	U	1.9	U
1,1-Dichloroethane	6.5	U	4.3	U	3.8	U
Chloroform	3.3	U	2.2	U	1.9	U
cis-1,2-Dichloroethylene	3.3	U	2.2	U	1.9	U
cis-1,3-Dichloropropene	3.3	U	2.2	U	1.9	U
Cyclohexane	33	U	22	U	19	U
DBCP	33	U	22	U	19	U
Dibromochloromethane	3.3	U	2.2	U	1.9	U
Dichlorodifluoromethane	6.5	U	4.3	U	3.8	U
Diethyl ether	3.3	U	2.2	U	1.9	U
Ethylene dibromide (EDB)	3.3	U	2.2	U	1.9	U
Ethylbenzene	3.3	U	2.2	U	1.9	U
Freon 113	16	U	11	U	9.5	U
Isopropylbenzene	3.3	U	2.2	U	1.9	U
Methyl Acetate	65	UJ	43	UJ	38	UJ
Methyl bromide	6.5	U	4.3	U	3.8	U
Methyl chloride	6.5	U	4.3	U	3.8	U
Methyl ethyl ketone (MEK)	33	UJ	22	UJ	19	UJ
Methyl isobutyl ketone	33	U	22	U	19	U
Methyl tert Butyl Ether (MTBE)	3.3	U	2.2	U	1.9	U
Methylcyclohexane	3.3	U	2.2	U	1.9	U
Methylene chloride	13	U	9.4	U	7.6	U
m-Xylene & p-Xylene	6.5	U	4.3	U	3.8	U
o-Xylene	3.3	U	2.2	U	1.9	U
Styrene	3.3	U	2.2	U	1.9	U
Tetrachloroethylene	3.3	U	2.2	U	1.9	U
Tetrahydrofuran	65	U	43	U	38	U
Toluene	3.3	U	2.2	U	1.9	U
Trans-1,2-Dichloroethene	3.3	U	2.2	U	1.9	U
trans-1,3-Dichloropropene	3.3	U	2.2	U	1.9	U
Trichloroethylene	3.3	U	2.2	U	1.9	U
Trichlorofluoromethane	6.5	U	4.3	U	3.8	U
Vinyl chloride	3.3	U	2.2	U	1.9	U
Xylene (total)	3.3	U	2.2	U	1.9	U
Sum of Constituents	**0**		**0**		**0**	

Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/1e9	Mass of Total VOC
						(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	ft^3)x(kg/1x10^9	(lbs)
Sand / Sand and Gravel												
PC-1	SSG	8.75	7.6	11.75	SSG	8,100	4.2	0	13%	0	1.18E-07	0.00
PC-1	SSG	14.75	11.75	15.75	SSG	8,100	4.0	0	13%	0	1.18E-07	0.00
PC-1	SSG	16.75	16	17	SSG	8,100	1.0	0	13%	0	1.18E-07	0.00
					Estimated Total VOC Mass for Strata:							**0.00**
					Estimated Total VOC Mass for PC-1 Area:							**0.00**

NO COC MASS

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-2

	PC-2		PC-2	
	SB-FS-PC-2-9.0-9.25		SB-FS-PC-2-17.0-17.25	
	5/21/2012		5/21/2012	
	Sand		Gravel	
	10		5	
	0.1		0.1	
	9.1		11	
CONSTITUENTS				
1,1,1-Trichloroethane	2.4	U	2.7	U
1,1,2,2-Tetrachloroethane	2.4	U	2.7	U
1,1,2-Trichloroethane	2.4	U	2.7	U
1,1-Dichloroethane	2.4	U	2.7	U
1,1-Dichloroethylene	2.4	U	2.7	U
1,2,3-Trichlorobenzene	2.4	U	2.7	U
1,2,4-Trichlorobenzene	2.4	U	2.7	U
1,2-Dichlorobenzene	2.4	U	2.7	U
1,2-Dichloroethane	2.4	U	2.7	U
1,2-Dichloropropane	2.4	U	2.7	U
1,3-Dichlorobenzene	2.4	U	2.7	U
1,4-Dichlorobenzene	2.4	U	2.7	U
2-Hexanone	24	UJ	27	UJ
Acetone	240	UJ	270	UJ
Benzene	2.4	U	2.7	U
Bromochloromethane	2.4	U	2.7	U
Bromodichloromethane	2.4	U	2.7	U
Bromoform	2.4	U	2.7	U
Carbon Disulfide	2.4	U	2.7	U
Carbon Tetrachloride	2.4	U	2.7	U
Chlorobenzene	2.4	U	2.7	U
Chloroethane	4.8	U	5.3	U
Chloroform	2.4	U	2.7	U
cis-1,2-Dichloroethylene	2.4	U	2.7	U
cis-1,3-Dichloropropene	2.4	U	2.7	U
Cyclohexane	24	U	27	U
DBCP	24	U	27	U
Dibromochloromethane	2.4	U	2.7	U
Dichlorodifluoromethane	4.8	U	5.3	U
Diethyl ether	2.4	U	2.7	U
Ethylene dibromide (EDB)	2.4	U	2.7	U
Ethylbenzene	2.4	U	2.7	U
Freon 113	12	U	13	U
Isopropylbenzene	2.4	U	2.7	U
Methyl Acetate	48	UJ	53	UJ
Methyl bromide	4.8	U	5.3	U
Methyl chloride	4.8	U	5.3	U
Methyl ethyl ketone (MEK)	24	UJ	27	UJ
Methyl isobutyl ketone	24	UJ	27	UJ
Methyl tert Butyl Ether (MTBE)	2.4	U	2.7	U
Methylcyclohexane	2.4	U	2.7	U
Methylene chloride	16	U	17	U
m-Xylene & p-Xylene	4.8	U	5.3	U
o-Xylene	2.4	U	2.7	U
Styrene	2.4	U	2.7	U
Tetrachloroethylene	2.9		3.9	
Tetrahydrofuran	48	U	53	U
Toluene	2.4	U	2.7	U
Trans-1,2-Dichloroethene	2.4	U	2.7	U
trans-1,3-Dichloropropene	2.4	U	2.7	U
Trichloroethylene	2.4	U	2.7	U
Trichlorofluoromethane	4.8	U	5.3	U
Vinyl chloride	2.4	U	2.7	U
Xylene (total)	2.4	U	2.7	U
Sum of Constituents	**2.9**		**3.9**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{5})x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-2	SSG	9.25	8.75	13.25	SSG	8,100	4.5	3	13%	3	1.18E-07	0.01
	PC-2	SSG	17.25	13.25	19	SSG	8,100	5.8	4	13%	3	1.18E-07	0.02
												Estimated Total VOC Mass for Strata:	**0.03**
												Estimated Total VOC Mass for PC-2 Area:	**0.03**
COC Specific Calculations by Strata													
Tetrachloroethylene	PC-2	SSG	9.25	8.75	13.25	SSG	8,100	4.5	3	13%	3	1.18E-07	0.01
Tetrachloroethylene	PC-2	SSG	17.25	13.25	19	SSG	8,100	5.8	4	13%	3	1.18E-07	0.02
												Estimated Total Target COC Mass for PC-2 Area:	**0.03**

	Target Mass per COC (lbs)	SSG
Tetrachloroethylene	0.03	0.03

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-3

	PC-3		PC-3		PC-3	
	SB-FS-PC-3-19.0-19.25		SB-FS-PC-3-13.5-13.75		SB-FS-PC-3-22.5-22.75	
	5/21/2012		5/21/2012		5/21/2012	
	Silt & Sand		Sand		Sand	
	35		0		0	
	0.1		0.1		0.1	
	13		20		9.6	
CONSTITUENTS						
1,1,1-Trichloroethane	3.2		2.5	U	4.9	
1,1,2,2-Tetrachloroethane	2.3	U	2.5	U	2.5	U
1,1,2-Trichloroethane	2.3	U	2.5	U	2.5	U
1,1-Dichloroethane	2.3	U	2.5	U	2.5	U
1,1-Dichloroethylene	2.3	U	2.5	U	2.5	U
1,2,3-Trichlorobenzene	2.3	U	2.5	U	2.5	U
1,2,4-Trichlorobenzene	2.3	U	2.5	U	2.5	U
1,2-Dichlorobenzene	2.3	U	2.5	U	1.4	J
1,2-Dichloroethane	2.3	U	2.5	U	2.5	U
1,2-Dichloropropane	2.3	U	2.5	U	2.5	U
1,3-Dichlorobenzene	2.3	U	2.5	U	2.5	U
1,4-Dichlorobenzene	2.3	U	2.5	U	2.5	U
2-Hexanone	23	UJ	25	UJ	25	UJ
Acetone	230	UJ	250	UJ	250	UJ
Benzene	2.3	U	2.5	U	2.5	U
Bromochloromethane	2.3	U	2.5	U	2.5	U
Bromodichloromethane	2.3	U	2.5	U	2.5	U
Bromoform	2.3	U	2.5	U	2.5	U
Carbon Disulfide	2.3	U	2.5	U	2.5	U
Carbon Tetrachloride	2.3	U	2.5	U	2.5	U
Chlorobenzene	2.3	U	2.5	U	2.5	U
Chloroethane	4.6	U	5	U	5	U
Chloroform	2.3	U	2.5	U	2.5	U
cis-1,2-Dichloroethylene	1.5	J	9.1		3.4	
cis-1,3-Dichloropropene	2.3	U	2.5	U	2.5	U
Cyclohexane	23	U	25	U	25	U
DBCP	23	U	25	U	25	U
Dibromochloromethane	2.3	U	2.5	U	2.5	U
Dichlorodifluoromethane	4.6	U	5	U	5	U
Diethyl ether	2.3	U	2.5	U	2.5	U
Ethylene dibromide (EDB)	2.3	U	2.5	U	2.5	U
Ethylbenzene	2.3	U	2.5	U	2.5	U
Freon 113	11	U	13	U	13	U
Isopropylbenzene	2.3	U	2.5	U	2.5	U
Methyl Acetate	46	UJ	50	UJ	50	UJ
Methyl bromide	4.6	U	5	U	5	U
Methyl chloride	4.6	U	5	U	5	U
Methyl ethyl ketone (MEK)	23	UJ	25	UJ	25	UJ
Methyl isobutyl ketone	23	UJ	25	UJ	25	UJ
Methyl tert Butyl Ether (MTBE	2.3	U	2.5	U	2.5	U
Methylcyclohexane	2.3	U	2.5	U	2.5	U
Methylene chloride	34	U	44	U	40	U
m-Xylene & p-Xylene	4.6	U	5	U	5	U
o-Xylene	2.3	U	2.5	U	2.5	U
Styrene	2.3	U	2.5	U	2.5	U
Tetrachloroethylene	19		2.5	U	16	
Tetrahydrofuran	46	U	50	U	50	U
Toluene	2.3	U	2.5	U	2.5	U
Trans-1,2-Dichloroethene	2.3	U	2.5	U	2.5	U
trans-1,3-Dichloropropene	2.3	U	2.5	U	2.5	U
Trichloroethylene	5.4		2.5	U	6	
Trichlorofluoromethane	4.6	U	5	U	5	U
Vinyl chloride	2.3	U	2.5	U	2.5	U
Xylene (total)	2.3	U	2.5	U	2.5	U
Sum of Constituents	**29.1**		**9.1**		**30.3**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area (ft^2)	Thickness of Mass Unit (ft)	Total VOC Concentration (dry weight) (ug/kg)	Moisture Content Results of Samples (%)	Total VOC Concentration (wet weight) (ug/kg)	Bulk Density/ 1e9 (^{3})x(kg/1x10	Mass of Total VOC (lbs)
	Grey Silty Sand/Silt												
	PC-3	GSSS	19.25	19	20	GSSS	8,100	1.0	29	20%	23	1.07E-07	0.02
												Estimated Total VOC Mass for Strata:	**0.02**
	Sand / Sand and Gravel												
	PC-3	SSG	13.75	10	19	SSG	8,100	9.0	9	13%	8	1.18E-07	0.07
	PC-3	SSG	22.75	20	23.5	SSG	8,100	3.5	30	13%	26	1.18E-07	0.09
												Estimated Total VOC Mass for Strata:	**0.16**
												Estimated Total VOC Mass for PC-3 Area:	**0.18**
	COC Specific Calculations by Strata												
1,1,1-Trichloroethane	PC-3	GSSS	19.25	19	20	GSSS	8,100	1.0	3.2	20%	3	1.07E-07	0.002
cis-1,2-Dichloroethylene	PC-3	GSSS	19.25	19	20	GSSS	8,100	1.0	1.5	20%	1	1.07E-07	0.00
Tetrachloroethylene	PC-3	GSSS	19.25	19	20	GSSS	8,100	1.0	19	20%	15	1.07E-07	0.01
Trichloroethylene	PC-3	GSSS	19.25	19	20	GSSS	8,100	1.0	5.4	20%	4	1.07E-07	0.00
cis-1,2-Dichloroethylene	PC-3	SSG	13.75	10	19	SSG	8,100	9.0	9.1	13%	8	1.18E-07	0.07
Tetrachloroethylene	PC-3	SSG	13.75	10	19	SSG	8,100	9.0	2.5	13%	2	1.18E-07	0.02
1,1,1-Trichloroethane	PC-3	SSG	22.75	20	23.5	SSG	8,100	3.5	4.9	13%	4	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-3	SSG	22.75	20	23.5	SSG	8,100	3.5	3.4	13%	3	1.18E-07	0.01
Tetrachloroethylene	PC-3	SSG	22.75	20	23.5	SSG	8,100	3.5	16	13%	14	1.18E-07	0.05
Trichloroethylene	PC-3	SSG	22.75	20	23.5	SSG	8,100	3.5	6	13%	5	1.18E-07	0.02
												Estimated Total Target COC Mass for PC-3 Area:	**0.20**

	Target Mass per COC (lbs)	GSSS	SSG	
1,1,1-Trichloroethane	0.02	0.002	0.01	0.016
cis-1,2-Dichloroethylene	0.08	0.00	0.08	0.079
Tetrachloroethylene	0.08	0.01	0.07	0.078
Trichloroethylene	0.02	0.00	0.02	0.021

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-4

	PC-4		PC-4		PC-4	
	SB-FS-PC-4-11.0-11.25		SB-FS-PC-4-22.5-22.75		SB-FS-PC-4-25.5-25.75	
	5/18/2012		5/18/2012		5/18/2012	
	Sand		Sand & Gravel		Sand	
	0		0		40	
	0.1		0.1		0.1	
	39		5		3.3	
CONSTITUENTS						
1,1,1-Trichloroethane	3.9	U	3		10	
1,1,2,2-Tetrachloroethane	3.9	U	2.2	U	2	U
1,1,2-Trichloroethane	3.9	U	2.2	U	2	U
1,1-Dichloroethane	3.9	U	2.2	U	2	U
1,1-Dichloroethylene	3.9	U	2.2	U	2	U
1,2,3-Trichlorobenzene	3.8	J	2.2	U	2	U
1,2,4-Trichlorobenzene	2.5	J	2.2	U	2	U
1,2-Dichlorobenzene	3.9	U	0.89	J	2.6	
1,2-Dichloroethane	3.9	U	2.2	U	2	U
1,2-Dichloropropane	3.9	U	2.2	U	2	U
1,3-Dichlorobenzene	3.9	U	2.2	U	2	U
1,4-Dichlorobenzene	3.9	U	2.2	U	2	U
2-Hexanone	39	U	22	U	20	U
Acetone	390	UJ	220	UJ	200	UJ
Benzene	3.9	U	2.2	U	2	U
Bromochloromethane	3.9	U	2.2	U	2	U
Bromodichloromethane	3.9	U	2.2	U	2	U
Bromoform	3.9	U	2.2	U	2	U
Carbon Disulfide	3.9	U	2.2	U	2	U
Carbon Tetrachloride	3.9	U	2.2	U	2	U
Chlorobenzene	3.9	U	2.2	U	2	U
Chloroethane	7.7	U	4.4	U	4	U
Chloroform	3.9	U	2.2	U	2	U
cis-1,2-Dichloroethylene	3.9	U	6.9		7.1	
cis-1,3-Dichloropropene	3.9	U	2.2	U	2	U
Cyclohexane	39	U	22	U	20	U
DBCP	39	U	22	U	20	U
Dibromochloromethane	3.9	U	2.2	U	2	U
Dichlorodifluoromethane	7.7	U	4.4	U	4	U
Diethyl ether	3.9	U	2.2	U	2	U
Ethylene dibromide (EDB)	3.9	U	2.2	U	2	U
Ethylbenzene	3.9	U	2.2	U	2	U
Freon 113	19	U	11	U	9.9	U
Isopropylbenzene	3.9	U	2.2	U	2	U
Methyl Acetate	77	UJ	44	UJ	40	UJ
Methyl bromide	7.7	U	4.4	U	4	U
Methyl chloride	7.7	U	4.4	U	4	U
Methyl ethyl ketone (MEK)	39	UJ	22	UJ	20	UJ
Methyl isobutyl ketone	39	U	22	U	20	U
Methyl tert Butyl Ether (MTBE)	3.9	U	2.2	U	2	U
Methylcyclohexane	3.9	U	2.2	U	2	U
Methylene chloride	15	U	8.7	U	7.9	U
m-Xylene & p-Xylene	7.7	U	4.4	U	4	U
o-Xylene	3.9	U	2.2	U	2	U
Styrene	3.9	U	2.2	U	2	U
Tetrachloroethylene	5.3		11		32	
Tetrahydrofuran	77	U	44	U	40	U
Toluene	3.9	U	2.2	U	2	U
Trans-1,2-Dichloroethene	3.9	U	2.2	U	2	U
trans-1,3-Dichloropropene	3.9	U	2.2	U	2	U
Trichloroethylene	3.9	U	3		11	
Trichlorofluoromethane	7.7	U	4.4	U	4	U
Vinyl chloride	3.9	U	2.2	U	2	U
Xylene (total)	3.9	U	2.2	U	2	U
Sum of Constituents	**11.6**		**24.79**		**62.7**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thicknes s of Mass Unit	Total VOC Concentr ation (dry weight)	Moisture Content Results of Samples	Total VOC Concentr ation (wet weight)	Bulk Density / 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{6})x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-4	SSG	11.25	11	17	SSG	8,100	6.0	12	13%	10	1.18E-07	0.06
	PC-4	SSG	22.75	17	24.25	SSG	8,100	7.3	25	13%	22	1.18E-07	0.15
	PC-4	SSG	25.75	24.25	26.5	SSG	8,100	2.3	63	13%	55	1.18E-07	0.12
											Estimated Total VOC Mass for Strata:		**0.32**
											Estimated Total VOC Mass for PC-4 Area:		**0.32**
COC Specific Calculations by Strata													
Tetrachloroethylene	PC-4	SSG	11.25	11	17	SSG	8,100	6.0	5	13%	5	1.18E-07	0.03
1,1,1-Trichloroethane	PC-4	SSG	22.75	17	24.25	SSG	8,100	7.3	3	13%	3	1.18E-07	0.02
cis-1,2-Dichloroethylene	PC-4	SSG	22.75	17	24.25	SSG	8,100	7.3	7	13%	6	1.18E-07	0.04
Tetrachloroethylene	PC-4	SSG	22.75	17	24.25	SSG	8,100	7.3	11	13%	10	1.18E-07	0.07
Trichloroethylene	PC-4	SSG	22.75	17	24.25	SSG	8,100	7.3	3	13%	3	1.18E-07	0.02
1,1,1-Trichloroethane	PC-4	SSG	25.75	24.25	26.5	SSG	8,100	2.3	10	13%	9	1.18E-07	0.02
cis-1,2-Dichloroethylene	PC-4	SSG	25.75	24.25	26.5	SSG	8,100	2.3	7	13%	6	1.18E-07	0.01
Tetrachloroethylene	PC-4	SSG	25.75	24.25	26.5	SSG	8,100	2.3	32	13%	28	1.18E-07	0.06
Trichloroethylene	PC-4	SSG	25.75	24.25	26.5	SSG	8,100	2.3	11	13%	10	1.18E-07	0.02
											Estimated Total Target COC Mass for PC-4 Area:		**0.28**

	Target Mass per COC (lbs)	SSG
1,1,1-Trichloroethane	0.04	0.04
cis-1,2-Dichloroethylene	0.05	0.05
Tetrachloroethylene	0.15	0.15
Trichloroethylene	0.04	0.04
		0.28

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-5

	PC-5		PC-5		PC-5	
	SB-FS-PC-5-11.0-11.25		SB-FS-PC-5-20.0-20.25		SB-FS-PC-5-23.5-23.75	
	5/18/2012		5/18/2012		5/18/2012	
	Sand & Gravel		Gravel		Sand	
	0		0		5	
	0.1		0.1		0.1	
	12		19		18	
CONSTITUENTS						
1,1,1-Trichloroethane	2.5	U	12		9.8	
1,1,2,2-Tetrachloroethane	2.5	U	3	U	2.8	U
1,1,2-Trichloroethane	2.5	U	3	U	2.8	U
1,1-Dichloroethane	2.5	U	3	U	2.8	U
1,1-Dichloroethylene	2.5	U	3	U	2.8	U
1,2,3-Trichlorobenzene	2.5	U	3	U	2.8	U
1,2,4-Trichlorobenzene	2.5	U	3	U	2.8	U
1,2-Dichlorobenzene	2.5	U	5.3		1.9	J
1,2-Dichloroethane	2.5	U	3	U	2.8	U
1,2-Dichloropropane	2.5	U	3	U	2.8	U
1,3-Dichlorobenzene	2.5	U	3	U	2.8	U
1,4-Dichlorobenzene	2.5	U	3	U	2.8	U
2-Hexanone	25	U	30	U	28	U
Acetone	250	UJ	300	UJ	280	UJ
Benzene	2.5	U	3	U	2.8	U
Bromochloromethane	2.5	U	3	U	2.8	U
Bromodichloromethane	2.5	U	3	U	2.8	U
Bromoform	2.5	U	3	U	2.8	U
Carbon Disulfide	2.5	U	2.7	J	2.8	U
Carbon Tetrachloride	2.5	U	3	U	2.8	U
Chlorobenzene	2.5	U	3	U	2.8	U
Chloroethane	4.9	U	6	U	5.6	U
Chloroform	2.5	U	3	U	2.8	U
cis-1,2-Dichloroethylene	6.2		33		9.3	
cis-1,3-Dichloropropene	2.5	U	3	U	2.8	U
Cyclohexane	25	U	30	U	28	U
DBCP	25	U	30	U	28	U
Dibromochloromethane	2.5	U	3	U	2.8	U
Dichlorodifluoromethane	4.9	U	6	U	5.6	U
Diethyl ether	2.5	U	3	U	2.8	U
Ethylene dibromide (EDB)	2.5	U	3	U	2.8	U
Ethylbenzene	2.5	U	4.4		2.8	U
Freon 113	12	U	15	U	14	U
Isopropylbenzene	2.5	U	3	U	2.8	U
Methyl Acetate	49	UJ	60	UJ	56	UJ
Methyl bromide	4.9	U	6	U	5.6	U
Methyl chloride	4.9	U	6	U	5.6	U
Methyl ethyl ketone (MEK)	25	UJ	30	UJ	28	UJ
Methyl isobutyl ketone	25	U	30	U	28	U
Methyl tert Butyl Ether (MTBE)	2.5	U	3	U	2.8	U
Methylcyclohexane	2.5	U	3	U	2.8	U
Methylene chloride	9.9	U	12	U	11	U
m-Xylene & p-Xylene	4.9	U	6	U	5.6	U
o-Xylene	2.5	U	3	U	2.8	U
Styrene	2.5	U	3	U	2.8	U
Tetrachloroethylene	8.3		3.6		2.8	U
Tetrahydrofuran	49	U	60	U	56	U
Toluene	2.5	U	3	U	2.8	U
Trans-1,2-Dichloroethene	2.5	U	3	U	2.8	U
trans-1,3-Dichloropropene	2.5	U	3	U	2.8	U
Trichloroethylene	2.8		5.6		2.8	U
Trichlorofluoromethane	4.9	U	6	U	5.6	U
Vinyl chloride	2.5	U	6.6		14	
Xylene (total)	2.5	U	3	U	2.8	U
Sum of Constituents	**17.3**		**73.2**		**35**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-5	SSG	11.25	10.1	15.75	SSG	8,100	5.7	17	13%	15	1.18E-07	0.08
	PC-5	SSG	20.25	15.75	22	SSG	8,100	6.3	73	13%	64	1.18E-07	0.38
	PC-5	SSG	23.75	22	27	SSG	8,100	5.0	35	13%	30	1.18E-07	0.15
												Estimated Total VOC Mass for Strata:	**0.61**
												Estimated Total VOC Mass for PC-5 Area:	**0.61**

COC Specific Calculations by Strata

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
cis-1,2-Dichloroethylene	PC-5	SSG	11.25	10.1	15.75	SSG	8,100	5.7	6.2	13%	5	1.18E-07	0.03
Tetrachloroethylene	PC-5	SSG	11.25	10.1	15.75	SSG	8,100	5.7	8.3	13%	7	1.18E-07	0.04
Trichloroethylene	PC-5	SSG	11.25	10.1	15.75	SSG	8,100	5.7	2.8	13%	2	1.18E-07	0.01
1,1,1-Trichloroethane	PC-5	SSG	20.25	15.75	22	SSG	8,100	6.3	12	13%	10	1.18E-07	0.06
cis-1,2-Dichloroethylene	PC-5	SSG	20.25	15.75	22	SSG	8,100	6.3	33	13%	29	1.18E-07	0.17
Tetrachloroethylene	PC-5	SSG	20.25	15.75	22	SSG	8,100	6.3	3.6	13%	3	1.18E-07	0.02
Trichloroethylene	PC-5	SSG	20.25	15.75	22	SSG	8,100	6.3	5.6	13%	5	1.18E-07	0.03
Vinyl chloride	PC-5	SSG	20.25	15.75	22	SSG	8,100	6.3	6.6	13%	6	1.18E-07	0.03
1,1,1-Trichloroethane	PC-5	SSG	23.75	22	27	SSG	8,100	5.0	9.8	13%	9	1.18E-07	0.04
cis-1,2-Dichloroethylene	PC-5	SSG	23.75	22	27	SSG	8,100	5.0	9.3	13%	8	1.18E-07	0.04
Vinyl chloride	PC-5	SSG	23.75	22	27	SSG	8,100	5.0	14	13%	12	1.18E-07	0.06
												Estimated Total Target COC Mass for PC-5 Area:	**0.53**

	Target Mass per COC (lbs)	SSG
1,1,1-Trichloroethane	0.10	0.10
cis-1,2-Dichloroethylene	0.24	0.24
Tetrachloroethylene	0.06	0.06
Trichloroethylene	0.04	0.04
Vinyl chloride	0.09	0.09

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-6

	PC-6		PC-6	
	SB-FS-PC-6-13.0-13.25		SB-FS-PC-6-22.0-22.25	
	6/1/2012		6/1/2012	
	Sand		Sand	
	15		0	
	0.1		0.1	
	6.7		6.7	
CONSTITUENTS				
1,1,1-Trichloroethane	2.4	U	2.6	U
1,1,2,2-Tetrachloroethane	2.4	U	2.6	U
1,1,2-Trichloroethane	2.4	U	2.6	U
1,1-Dichloroethane	2.4	U	2.6	U
1,1-Dichloroethylene	2.4	U	2.6	U
1,2,3-Trichlorobenzene	2.4	U	2.6	U
1,2,4-Trichlorobenzene	2.4	U	2.6	U
1,2-Dichlorobenzene	1.1	J	2.6	U
1,2-Dichloroethane	2.4	U	2.6	U
1,2-Dichloropropane	2.4	U	2.6	U
1,3-Dichlorobenzene	7.4		2.6	U
1,4-Dichlorobenzene	70		2.6	U
2-Hexanone	24	UJ	26	UJ
Acetone	240	UJ	260	UJ
Benzene	2.4	U	2.6	U
Bromochloromethane	2.4	U	2.6	U
Bromodichloromethane	2.4	U	2.6	U
Bromoform	2.4	U	2.6	U
Carbon Disulfide	2.4	U	2.6	U
Carbon Tetrachloride	2.4	U	2.6	U
Chlorobenzene	13		2.6	U
Chloroethane	4.8	U	5.1	U
Chloroform	2.4	U	2.6	U
cis-1,2-Dichloroethylene	1.5	J	5.2	
cis-1,3-Dichloropropene	2.4	U	2.6	U
Cyclohexane	1.6	J	26	U
DBCP	24	U	26	U
Dibromochloromethane	2.4	U	2.6	U
Dichlorodifluoromethane	4.8	U	5.1	U
Diethyl ether	2.4	U	2.6	U
Ethylene dibromide (EDB)	2.4	U	2.6	U
Ethylbenzene	4.3		2.6	U
Freon 113	12	U	13	U
Isopropylbenzene	2	J	2.6	U
Methyl Acetate	48	U	51	U
Methyl bromide	4.8	U	5.1	U
Methyl chloride	4.8	U	5.1	U
Methyl ethyl ketone (MEK)	24	UJ	26	UJ
Methyl isobutyl ketone	24	U	26	U
Methyl tert Butyl Ether (MTBE)	2.4	U	2.6	U
Methylcyclohexane	8.6		2.6	U
Methylene chloride	9.5	U	10	U
m-Xylene & p-Xylene	4.8	U	5.1	U
o-Xylene	6.3		2.6	U
Styrene	2.4	U	2.6	U
Tetrachloroethylene	2.4	U	2.6	U
Tetrahydrofuran	48	UJ	51	UJ
Toluene	2.4	U	2.6	U
Trans-1,2-Dichloroethene	2.4	U	2.6	U
trans-1,3-Dichloropropene	2.4	U	2.6	U
Trichloroethylene	2.4	U	2.6	U
Trichlorofluoromethane	4.8	U	5.1	U
Vinyl chloride	2.4	U	2.6	U
Xylene (total)	6.3		2.6	U
Sum of Constituents	**115.8**		**5.2**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density / 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-6	SSG	13.25	9	17.75	SSG	8,100	8.8	116	13%	101	1.18E-07	0.84
	PC-6	SSG	22.25	17.75	22.5	SSG	8,100	4.8	5	13%	5	1.18E-07	0.02
												Estimated Total VOC Mass for Strata:	**0.86**
												Estimated Total VOC Mass for PC-6 Area:	**0.86**

COC Specific Calculations by Strata

cis-1,2-Dichloroethylene	PC-6	SSG	13.25	9	17.75	SSG	8,100	8.8	2	13%	1	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-6	SSG	22.25	17.75	22.5	SSG	8,100	4.8	5	13%	5	1.18E-07	0.02
												Estimated Total Target COC Mass for PC- 5Area:	**0.03**

	Target Mass per COC (lbs)	SSG
cis-1,2-Dichloroethylene	0.03	0.03

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-7

	PC-7		PC-7	
	SB-FS-PC-7-13.0-13.25		SB-FS-PC-7-18.0-18.25	
	6/1/2012		6/1/2012	
	Sand & Gravel		Sand & Gravel	
	15		20	
	0.1		0.1	
	6.6		7.3	
CONSTITUENTS				
1,1,1-Trichloroethane	140	U	2.4	U
1,1,2,2-Tetrachloroethane	140	U	2.4	U
1,1,2-Trichloroethane	140	U	2.4	U
1,1-Dichloroethane	140	U	2.4	U
1,1-Dichloroethylene	140	U	2.4	U
1,2,3-Trichlorobenzene	140	U	2.4	U
1,2,4-Trichlorobenzene	140	U	2.4	U
1,2-Dichlorobenzene	140	U	2.4	U
1,2-Dichloroethane	140	U	2.4	U
1,2-Dichloropropane	140	U	2.4	U
1,3-Dichlorobenzene	140	U	2.4	U
1,4-Dichlorobenzene	140	U	2.4	U
2-Hexanone	1400	UJ	24	U
Acetone	14000	UJ	240	UJ
Benzene	140	U	2.4	U
Bromochloromethane	140	U	2.4	U
Bromodichloromethane	140	U	2.4	U
Bromoform	140	U	2.4	U
Carbon Disulfide	140	U	2.4	U
Carbon Tetrachloride	140	U	2.4	U
Chlorobenzene	140	U	2.4	U
Chloroethane	280	U	4.8	U
Chloroform	140	U	2.4	U
cis-1,2-Dichloroethylene	140	U	4.6	
cis-1,3-Dichloropropene	140	U	2.4	U
Cyclohexane	1400	U	24	U
DBCP	1400	U	24	U
Dibromochloromethane	140	U	2.4	U
Dichlorodifluoromethane	280	U	4.8	U
Diethyl ether	140	U	2.4	U
Ethylene dibromide (EDB)	140	U	2.4	U
Ethylbenzene	140	U	2.4	U
Freon 113	700	U	12	U
Isopropylbenzene	140	U	2.4	U
Methyl Acetate	2800	U	48	U
Methyl bromide	280	U	4.8	U
Methyl chloride	280	U	4.8	U
Methyl ethyl ketone (MEK)	1400	UJ	24	UJ
Methyl isobutyl ketone	1400	U	24	U
Methyl tert Butyl Ether (MTBE)	140	U	2.4	U
Methylcyclohexane	540		2.4	U
Methylene chloride	770	U	6.5	U
m-Xylene & p-Xylene	280	U	4.8	U
o-Xylene	140	U	2.4	U
Styrene	140	U	2.4	U
Tetrachloroethylene	140	U	2.4	U
Tetrahydrofuran	2800	UJ	48	UJ
Toluene	140	U	2.4	U
Trans-1,2-Dichloroethene	140	U	2.4	U
trans-1,3-Dichloropropene	140	U	2.4	U
Trichloroethylene	140	U	2.4	U
Trichlorofluoromethane	280	U	4.8	U
Vinyl chloride	140	U	2.4	U
Xylene (total)	140	U	2.4	U
Sum of Constituents	**540**		**4.6**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area (ft^2)	Thickness of Mass Unit (ft)	Total VOC Concentration (dry weight) (ug/kg)	Moisture Content Results of Samples (%)	Total VOC Concentration (wet weight) (ug/kg)	Bulk Density / 1e9 ^{3})x(kg/1x10	Mass of Total VOC (lbs)
	Sand / Sand and Gravel												
	PC-7	SSG	13.25	5	15.75	SSG	6,488	10.8	540	13%	470	1.18E-07	3.87
	PC-7	SSG	18.25	15.75	18.5	SSG	6,488	2.8	5	13%	4	1.18E-07	0.01
												Estimated Total VOC Mass for Strata:	**3.87**
												Estimated Total VOC Mass for PC-7 Area:	**3.87**

COC Specific Calculations by Strata													
cis-1,2-Dichloroethylene	PC-7	SSG	18.25	15.75	18.5	SSG	6,488	6.8	5	13%	4	1.18E-07	0.02
												Estimated Total Target COC Mass for PC-7 Area:	**0.02**

	Target Mass per COC (lbs)	SSG
cis-1,2-Dichloroethylene	0.02	0.02

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-8

	PC-8		PC-8	
	SB-FS-PC-8-19.0-19.25		SB-FS-PC-8-14.0-14.25	
	5/22/2012		5/22/2012	
	Sand		Sand & Silt	
	5		30	
	0.1		0.1	
	12.2		15.9	
CONSTITUENTS				
1,1,1-Trichloroethane	2.3	U	150	U
1,1,2,2-Tetrachloroethane	2.3	U	150	U
1,1,2-Trichloroethane	2.3	U	150	U
1,1-Dichloroethane	2.3	U	150	U
1,1-Dichloroethylene	2.3	U	150	U
1,2,3-Trichlorobenzene	2.3	U	150	U
1,2,4-Trichlorobenzene	2.3	U	150	U
1,2-Dichlorobenzene	2.3	U	150	U
1,2-Dichloroethane	2.3	U	150	U
1,2-Dichloropropane	2.3	U	150	U
1,3-Dichlorobenzene	2.3	U	150	U
1,4-Dichlorobenzene	2.3	U	150	U
2-Hexanone	23	U	1500	U
Acetone	230	UJ	15000	UJ
Benzene	2.3	U	150	U
Bromochloromethane	2.3	U	150	U
Bromodichloromethane	2.3	U	150	U
Bromoform	2.3	U	150	U
Carbon Disulfide	2.3	U	150	U
Carbon Tetrachloride	2.3	U	150	U
Chlorobenzene	2.3	U	150	U
Chloroethane	4.6	U	300	UJ
Chloroform	2.3	U	150	U
cis-1,2-Dichloroethylene	2.3	U	150	U
cis-1,3-Dichloropropene	2.3	U	150	U
Cyclohexane	23	U	1500	U
DBCP	23	U	1500	U
Dibromochloromethane	2.3	U	150	U
Dichlorodifluoromethane	4.6	U	300	U
Diethyl ether	2.3	U	150	U
Ethylene dibromide (EDB)	2.3	U	150	U
Ethylbenzene	2.3	U	150	U
Freon 113	12	U	750	U
Isopropylbenzene	2.3	U	150	U
Methyl Acetate	46	U	3000	U
Methyl bromide	4.6	U	300	U
Methyl chloride	4.6	U	300	U
Methyl ethyl ketone (MEK)	23	UJ	1500	UJ
Methyl isobutyl ketone	23	U	1500	U
Methyl tert Butyl Ether (MTBE)	2.3	U	150	U
Methylcyclohexane	2.3	U	210	
Methylene chloride	19	U	600	U
m-Xylene & p-Xylene	4.6	U	300	U
o-Xylene	2.3	U	150	U
Styrene	2.3	U	150	U
Tetrachloroethylene	2.3	U	150	U
Tetrahydrofuran	46	U	3000	U
Toluene	2.3	U	150	U
Trans-1,2-Dichloroethene	2.3	U	150	U
trans-1,3-Dichloropropene	2.3	U	150	U
Trichloroethylene	2.3	U	150	U
Trichlorofluoromethane	4.6	U	300	U
Vinyl chloride	2.3	U	150	U
Xylene (total)	2.3	U	150	U
Sum of Constituents	**0**		**210**	

Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thicknes s of Mass Unit	Total VOC Concentr ation (dry weight)	Moisture Content Results of Samples	Total VOC Concentr ation (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
						(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
					Grey Silty Sand/Silt							
PC-8	GSSS	14.25	12	15	GSSS	8,100	3.0	210	13%	183	1.07E-07	0.48
										Estimated Total VOC Mass for Strata:		**0.48**
					Sand / Sand and Gravel							
PC-8	SSG	19.25	15	21	SSG	8,100	6.0	0	13%	0	1.18E-07	0.00
										Estimated Total VOC Mass for Strata:		**0.00**
										Estimated Total VOC Mass for PC-8 Area:		**0.48**

NO COC MASS

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-9

	PC-9	
	SB-FS-PC-9-15.5-15.75	
	6/5/2012	
	Sand	
	0	
	0.1	
	8.7	
CONSTITUENTS		
1,1,1-Trichloroethane	2.8	U
1,1,2,2-Tetrachloroethane	2.8	U
1,1,2-Trichloroethane	2.8	U
1,1-Dichloroethane	2.8	U
1,1-Dichloroethylene	2.8	U
1,2,3-Trichlorobenzene	2.8	U
1,2,4-Trichlorobenzene	2.8	U
1,2-Dichlorobenzene	2.8	U
1,2-Dichloroethane	2.8	U
1,2-Dichloropropane	2.8	U
1,3-Dichlorobenzene	2.8	U
1,4-Dichlorobenzene	2.8	U
2-Hexanone	28	UJ
Acetone	280	UJ
Benzene	2.8	U
Bromochloromethane	2.8	U
Bromodichloromethane	2.8	U
Bromoform	2.8	U
Carbon Disulfide	2.8	U
Carbon Tetrachloride	2.8	U
Chlorobenzene	2.8	U
Chloroethane	5.6	U
Chloroform	2.8	U
cis-1,2-Dichloroethylene	8.6	
cis-1,3-Dichloropropene	2.8	U
Cyclohexane	28	U
DBCP	28	U
Dibromochloromethane	2.8	U
Dichlorodifluoromethane	5.6	U
Diethyl ether	2.8	U
Ethylene dibromide (EDB)	2.8	U
Ethylbenzene	2.8	U
Freon 113	14	U
Isopropylbenzene	2.8	U
Methyl Acetate	56	U
Methyl bromide	5.6	U
Methyl chloride	5.6	U
Methyl ethyl ketone (MEK)	28	UJ
Methyl isobutyl ketone	28	U
Methyl tert Butyl Ether (MTBE)	2.8	U
Methylcyclohexane	2.8	U
Methylene chloride	11	U
m-Xylene & p-Xylene	5.6	U
o-Xylene	2.8	U
Styrene	2.8	U
Tetrachloroethylene	9.3	
Tetrahydrofuran	56	UJ
Toluene	2.8	U
Trans-1,2-Dichloroethene	2.8	U
trans-1,3-Dichloropropene	2.8	U
Trichloroethylene	2.8	U
Trichlorofluoromethane	5.6	U
Vinyl chloride	2.8	U
Xylene (total)	2.8	U
Sum of Constituents	**17.9**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density / 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
						Sand / Sand and Gravel							
	PC-9	SSG	15.75	12.8	16.5	SSG	8,100	3.7	18	13%	16	1.18E-07	0.06
												Estimated Total VOC Mass for Strata:	**0.06**
												Estimated Total VOC Mass for PC-9 Area:	**0.06**

COC Specific Calculations by Strata

cis-1,2-Dichloroethylene	PC-9	SSG	15.75	12.8	16.5	SSG	8,100	3.7	9	13%	7	1.18E-07	0.03
Tetrachloroethylene	PC-9	SSG	15.75	12.8	16.5	SSG	8,100	3.7	9	13%	8	1.18E-07	0.03
												Estimated Total Target COC Mass for PC-9 Area:	**0.06**

	Target Mass per COC (lbs)	SSG
cis-1,2-Dichloroethylene	0.03	0.03
Tetrachloroethylene	0.03	0.03

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-10

	PC-10		PC-10		PC-10	
	SB-FS-PC-10-14.5-14.75		SB-FS-PC-10-17.5-17.75		SB-FS-PC-10-23.5-23.75	
	5/23/2012		6/8/2012		5/23/2012	
	Sand & Gravel		Sand		Sand & Gravel	
	15		15		0	
	0.1		0.1		0.1	
	10				12	
CONSTITUENTS						
1,1,1-Trichloroethane	2.4	U	9.4		61	
1,1,2,2-Tetrachloroethane	2.4	U	2.2	U	2.2	U
1,1,2-Trichloroethane	2.4	U	2.2	U	2.2	U
1,1-Dichloroethane	2.4	U	2.2	U	4	
1,1-Dichloroethylene	2.4	U	2.2	U	1.4	J
1,2,3-Trichlorobenzene	5.3		2.2	U	2.2	U
1,2,4-Trichlorobenzene	12		2.2	U	2.2	U
1,2-Dichlorobenzene	37		2.2	U	2.2	U
1,2-Dichloroethane	2.4	U	2.2	U	2.2	U
1,2-Dichloropropane	2.4	U	2.2	U	2.2	U
1,3-Dichlorobenzene	2.4	U	2.2	U	2.2	U
1,4-Dichlorobenzene	2.4	U	2.2	U	2.2	U
2-Hexanone	24	U	22	U	22	U
Acetone	240	UJ	220	U	220	UJ
Benzene	2.4	U	2.2	U	2.2	U
Bromochloromethane	2.4	U	2.2	U	2.2	U
Bromodichloromethane	2.4	U	2.2	U	2.2	U
Bromoform	2.4	U	2.2	U	2.2	U
Carbon Disulfide	2.4	U	2.2	U	2.2	U
Carbon Tetrachloride	2.4	U	2.2	U	2.2	U
Chlorobenzene	2.4	U	2.2	U	2.2	U
Chloroethane	4.9	U	4.3	U	4.5	U
Chloroform	2.4	U	2.2	U	2.2	U
cis-1,2-Dichloroethylene	10		46		220	
cis-1,3-Dichloropropene	2.4	U	2.2	U	2.2	U
Cyclohexane	24	U	22	U	22	U
DBCP	24	U	22	U	22	U
Dibromochloromethane	2.4	U	2.2	U	2.2	U
Dichlorodifluoromethane	4.9	U	4.3	U	4.5	U
Diethyl ether	2.4	U	2.2	U	2.2	U
Ethylene dibromide (EDB)	2.4	U	2.2	U	2.2	U
Ethylbenzene	2.4	U	2.2	U	2.2	U
Freon 113	12	U	11	U	11	U
Isopropylbenzene	4.5		2.2	U	2.2	U
Methyl Acetate	49	U	43	U	45	U
Methyl bromide	4.9	U	4.3	U	4.5	U
Methyl chloride	4.9	U	4.3	U	4.5	U
Methyl ethyl ketone (MEK)	24	UJ	22	U	22	UJ
Methyl isobutyl ketone	24	U	22	U	22	U
Methyl tert Butyl Ether (MTBE)	2.4	U	2.2	U	2.2	U
Methylcyclohexane	2.4	U	2.2	U	2.2	U
Methylene chloride	9.8	U	8.7	U	9	U
m-Xylene & p-Xylene	4.9	U	4.3	U	4.5	U
o-Xylene	2.6		2.2	U	2.2	U
Styrene	2.4	U	2.2	U	2.2	U
Tetrachloroethylene	18		2.2	U	2.2	U
Tetrahydrofuran	49	U	43	UJ	45	U
Toluene	2.4	U	2.2	U	2.2	U
Trans-1,2-Dichloroethene	2.4	U	2.2	U	3.1	
trans-1,3-Dichloropropene	2.4	U	2.2	U	2.2	U
Trichloroethylene	2.6		2.2	U	1.9	J
Trichlorofluoromethane	4.9	U	4.3	U	4.5	U
Vinyl chloride	2.4	U	4.2		13	
Xylene (total)	2.6		2.2	U	2.2	U
Sum of Constituents	**92**		**59.6**		**304.4**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-10	SSG	14.75	12.25	16.25	SSG	8,100	4.0	92	13%	80	1.18E-07	0.31
	PC-10	SSG	17.75	16.25	20.75	SSG	8,100	4.5	60	13%	52	1.18E-07	0.22
	PC-10	SSG	23.75	20.75	23.5	SSG	8,100	2.8	304	13%	265	1.18E-07	0.70
											Estimated Total VOC Mass for Strata:		**1.23**
											Estimated Total VOC Mass for PC-10 Area:		**1.23**
COC Specific Calculations by Strata													
cis-1,2-Dichloroethylene	PC-10	SSG	14.75	12.25	16.25	SSG	8,100	4.0	10	13%	9	1.18E-07	0.03
Tetrachloroethylene	PC-10	SSG	14.75	12.25	16.25	SSG	8,100	4.0	18	13%	16	1.18E-07	0.06
Trichloroethylene	PC-10	SSG	14.75	12.25	16.25	SSG	8,100	4.0	2.6	13%	2	1.18E-07	0.01
1,1,1-Trichloroethane	PC-10	SSG	17.75	16.25	20.75	SSG	8,100	4.5	9.4	13%	8	1.18E-07	0.04
cis-1,2-Dichloroethylene	PC-10	SSG	17.75	16.25	20.75	SSG	8,100	4.5	46	13%	40	1.18E-07	0.17
Vinyl chloride	PC-10	SSG	17.75	16.25	20.75	SSG	8,100	4.5	4.2	13%	4	1.18E-07	0.02
1,1,1-Trichloroethane	PC-10	SSG	23.75	20.75	23.5	SSG	8,100	2.8	61	13%	53	1.18E-07	0.14
1,1-Dichloroethane	PC-10	SSG	23.75	20.75	23.5	SSG	8,100	2.8	4	13%	3	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-10	SSG	23.75	20.75	23.5	SSG	8,100	2.8	220	13%	191	1.18E-07	0.50
Trans-1,2-Dichloroethene	PC-10	SSG	23.75	20.75	23.5	SSG	8,100	2.8	3.1	13%	3	1.18E-07	0.01
Vinyl chloride	PC-10	SSG	23.75	20.75	23.5	SSG	8,100	2.8	13	13%	11	1.18E-07	0.03
											Estimated Total Target COC Mass for PC-10 Area:		**1.01**

	Target Mass per COC (lbs)	SSG
1,1,1-Trichloroethane	0.17	0.17
1,1-Dichloroethane	0.01	0.01
cis-1,2-Dichloroethylene	0.71	0.71
Tetrachloroethylene	0.06	0.06
Trans-1,2-Dichloroethene	0.01	0.01
Trichloroethylene	0.01	0.01
Vinyl chloride	0.05	0.05

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

	PC-11	
	SB-FS-PC-11-20.0-20.25	
	5/25/2012	
	Sand	
	10	
	0.1	
	23	
CONSTITUENTS		
1,1,1-Trichloroethane	20	
1,1,2,2-Tetrachloroethane	2.8	UJ
1,1,2-Trichloroethane	2.8	U
1,1-Dichloroethane	5.9	
1,1-Dichloroethylene	2.8	U
1,2,3-Trichlorobenzene	2.8	U
1,2,4-Trichlorobenzene	2.8	U
1,2-Dichlorobenzene	1.8	J
1,2-Dichloroethane	2.8	U
1,2-Dichloropropane	2.8	U
1,3-Dichlorobenzene	2.8	U
1,4-Dichlorobenzene	2.8	U
2-Hexanone	28	U
Acetone	280	UJJ
Benzene	2.8	U
Bromochloromethane	2.8	U
Bromodichloromethane	2.8	U
Bromoform	2.8	U
Carbon Disulfide	2.8	U
Carbon Tetrachloride	2.8	U
Chlorobenzene	2.8	U
Chloroethane	5.6	UJ
Chloroform	2.8	U
cis-1,2-Dichloroethylene	96	
cis-1,3-Dichloropropene	2.8	U
Cyclohexane	28	U
DBCP	28	UJJ
Dibromochloromethane	2.8	U
Dichlorodifluoromethane	5.6	U
Diethyl ether	2.8	U
Ethylene dibromide (EDB)	2.8	U
Ethylbenzene	2.8	U
Freon 113	14	U
Isopropylbenzene	8.8	
Methyl Acetate	56	UJJ
Methyl bromide	5.6	U
Methyl chloride	5.6	U
Methyl ethyl ketone (MEK)	28	UJJ
Methyl isobutyl ketone	28	U
Methyl tert Butyl Ether (MTBE)	2.8	U
Methylcyclohexane	2.8	U
Methylene chloride	11	U
m-Xylene & p-Xylene	5.6	U
o-Xylene	2.8	U
Styrene	2.8	U
Tetrachloroethylene	2.8	U
Tetrahydrofuran	56	U
Toluene	2.8	U
Trans-1,2-Dichloroethene	2.1	J
trans-1,3-Dichloropropene	2.8	U
Trichloroethylene	2.8	U
Trichlorofluoromethane	5.6	U
Vinyl chloride	33	J
Xylene (total)	2.8	U
Sum of Constituents	**167.6**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-11	SSG	20.25	11.5	21.5	SSG	8,100	10.0	168	13%	146	1.18E-07	1.39
												Estimated Total VOC Mass for Strata:	**1.39**
												Estimated Total VOC Mass for PC-11 Area:	**1.39**
COC Specific Calculations by Strata													
1,1,1-Trichloroethane	PC-11	SSG	20.25	11.5	21.5	SSG	8,100	10.0	20	13%	17	1.18E-07	0.17
1,1-Dichloroethane	PC-11	SSG	20.25	11.5	21.5	SSG	8,100	10.0	5.9	13%	5	1.18E-07	0.05
cis-1,2-Dichloroethylene	PC-11	SSG	20.25	11.5	21.5	SSG	8,100	10.0	96	13%	84	1.18E-07	0.80
Trans-1,2-Dichloroethene	PC-11	SSG	20.25	11.5	21.5	SSG	8,100	10.0	2.1	13%	2	1.18E-07	0.02
Vinyl chloride	PC-11	SSG	20.25	11.5	21.5	SSG	8,100	10.0	33	13%	29	1.18E-07	0.27
												Estimated Total Target COC Mass for PC-11 Area:	**1.31**

	Target Mass per COC (lbs)	SSG
1,1,1-Trichloroethane	0.17	0.17
1,1-Dichloroethane	0.05	0.05
cis-1,2-Dichloroethylene	0.80	0.80
Trans-1,2-Dichloroethene	0.02	0.02
Vinyl chloride	0.27	0.27

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-12

	PC-12		PC-12	
	SB-FS-PC-12-14.0-		SB-FS-PC-12-21.5-	
	14.25		21.75	
	5/25/2012		5/25/2012	
	Sand		Sand	
	5		0	
	0.1		0.1	
	7.9		19	
CONSTITUENTS				
1,1,1-Trichloroethane	130	J	16	
1,1,2,2-Tetrachloroethane	130	U	2.1	UJ
1,1,2-Trichloroethane	130	U	2.1	U
1,1-Dichloroethane	130	U	2.6	
1,1-Dichloroethylene	130	U	2.1	U
1,2,3-Trichlorobenzene	130	U	2.1	U
1,2,4-Trichlorobenzene	130	U	2.1	U
1,2-Dichlorobenzene	130	U	1.1	J
1,2-Dichloroethane	130	U	2.1	U
1,2-Dichloropropane	130	U	2.1	U
1,3-Dichlorobenzene	130	U	2.1	U
1,4-Dichlorobenzene	130	U	2.1	U
2-Hexanone	1300	U	21	U
Acetone	13000	UJ	210	UJ
Benzene	130	U	2.1	U
Bromochloromethane	130	U	2.1	U
Bromodichloromethane	130	U	2.1	U
Bromoform	130	U	2.1	U
Carbon Disulfide	130	U	2.1	U
Carbon Tetrachloride	130	U	2.1	U
Chlorobenzene	130	U	2.1	U
Chloroethane	270	UJ	4.3	UJ
Chloroform	130	U	2.1	U
cis-1,2-Dichloroethylene	110	J	66	
cis-1,3-Dichloropropene	130	U	2.1	U
Cyclohexane	1300	U	21	U
DBCP	1300	U	21	UJ
Dibromochloromethane	130	U	2.1	U
Dichlorodifluoromethane	270	U	4.3	U
Diethyl ether	130	U	2.1	U
Ethylene dibromide (EDB)	130	U	2.1	U
Ethylbenzene	310		1.5	J
Freon 113	660	U	11	U
Isopropylbenzene	130	U	2.1	U
Methyl Acetate	2700	U	43	UJ
Methyl bromide	270	U	4.3	U
Methyl chloride	270	U	4.3	U
Methyl ethyl ketone (MEK)	1300	UJ	21	UJ
Methyl isobutyl ketone	1300	U	21	U
Methyl tert Butyl Ether (MTBE)	130	U	2.1	U
Methylcyclohexane	130	U	2.1	U
Methylene chloride	1200	U	8.6	U
m-Xylene & p-Xylene	270	U	4.3	U
o-Xylene	130	U	2.1	U
Styrene	130	U	2.1	U
Tetrachloroethylene	130	U	2.1	U
Tetrahydrofuran	2700	U	43	U
Toluene	130	U	2.1	U
Trans-1,2-Dichloroethene	130	U	1.3	J
trans-1,3-Dichloropropene	130	U	2.1	U
Trichloroethylene	130	U	2.1	U
Trichlorofluoromethane	270	U	4.3	U
Vinyl chloride	130	U	9.4	J
Xylene (total)	130	U	2.1	U
Sum of Constituents	**550**		**97.9**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-12	SSG	14.25	9.75	18	SSG	8,100	8.3	550	13%	479	1.18E-07	3.77
	PC-12	SSG	21.75	18	22	SSG	8,100	4.0	98	13%	85	1.18E-07	0.33
											Estimated Total VOC Mass for Strata:		**4.10**
											Estimated Total VOC Mass for PC-12 Area:		**4.10**
COC Specific Calculations by Strata													
1,1,1-Trichloroethane	PC-12	SSG	14.25	9.75	18	SSG	8,100	8.3	130	13%	113	1.18E-07	0.89
cis-1,2-Dichloroethylene	PC-12	SSG	14.25	9.75	18	SSG	8,100	8.3	110	13%	96	1.18E-07	0.75
1,1,1-Trichloroethane	PC-12	SSG	21.75	18	22	SSG	8,100	4.0	16	13%	14	1.18E-07	0.05
1,1-Dichloroethane	PC-12	SSG	21.75	18	22	SSG	8,100	4.0	2.6	13%	2	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-12	SSG	21.75	18	22	SSG	8,100	4.0	66	13%	57	1.18E-07	0.22
Trans-1,2-Dichloroethene	PC-12	SSG	21.75	18	22	SSG	8,100	4.0	1.3	13%	1	1.18E-07	0.00
Vinyl chloride	PC-12	SSG	21.75	18	22	SSG	8,100	4.0	9.4	13%	8	1.18E-07	0.03
											Estimated Total Target COC Mass for PC-12 Area:		**1.96**

	Target Mass per COC (lbs)	SSG
1,1,1-Trichloroethane	0.95	0.95
1,1-Dichloroethane	0.01	0.01
cis-1,2-Dichloroethylene	0.97	0.97
Trans-1,2-Dichloroethene	0.004	0.004
Vinyl chloride	0.03	0.03

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-13

	PC-13		PC-13		PC-13	
	SB-FS-PC-13-10.0-10.25		SB-FS-PC-13-15.0-15.25		SB-FS-PC-13-22.0-22.25	
	6/4/2012		5/31/2012		5/31/2012	
	Sand & Gravel		Sand		Sand	
	5		15		15	
	0.1		0.1		0.1	
	7.3		14		10	
CONSTITUENTS						
1,1,1-Trichloroethane	2.5	U	3.7		2.3	J
1,1,2,2-Tetrachloroethane	2.5	U	2	U	2.6	U
1,1,2-Trichloroethane	2.5	U	2	U	2.6	U
1,1-Dichloroethane	2.5	U	1.5	J	2.4	J
1,1-Dichloroethylene	2.5	U	2	U	2.6	U
1,2,3-Trichlorobenzene	6.1		2	U	2.6	U
1,2,4-Trichlorobenzene	4.7		2	U	2.6	U
1,2-Dichlorobenzene	6.3		0.97	J	1.5	J
1,2-Dichloroethane	2.5	U	2	U	2.6	U
1,2-Dichloropropane	2.5	U	2	U	2.6	U
1,3-Dichlorobenzene	1.7	J	2	U	2.6	U
1,4-Dichlorobenzene	5.6		2	U	2.6	U
2-Hexanone	25	UJ	20	U	26	U
Acetone	250	UJ	200	UJ	260	UJ
Benzene	2.5	U	2	U	2.6	U
Bromochloromethane	2.5	U	2	U	2.6	U
Bromodichloromethane	2.5	U	2	U	2.6	U
Bromoform	2.5	U	2	U	2.6	U
Carbon Disulfide	2.5	U	3.4	J	2.6	J
Carbon Tetrachloride	2.5	U	2	U	2.6	U
Chlorobenzene	2.5	U	2	U	2.6	U
Chloroethane	5	U	4	U	5.2	U
Chloroform	2.5	U	2	U	2.6	U
cis-1,2-Dichloroethylene	3.2		7.6		14	
cis-1,3-Dichloropropene	2.5	U	2	U	2.6	U
Cyclohexane	25	U	20	U	26	U
DBCP	25	U	20	U	26	U
Dibromochloromethane	2.5	U	2	U	2.6	U
Dichlorodifluoromethane	5	U	4	U	5.2	U
Diethyl ether	2.5	U	2	U	2.6	U
Ethylene dibromide (EDB)	2.5	U	2	U	2.6	U
Ethylbenzene	9.5		19		12	
Freon 113	13	U	10	U	13	U
Isopropylbenzene	3.6		1.8	J	1.8	J
Methyl Acetate	50	U	40	U	52	U
Methyl bromide	5	U	4	U	5.2	U
Methyl chloride	5	U	4	U	5.2	U
Methyl ethyl ketone (MEK)	25	UJ	20	UJ	26	UJ
Methyl isobutyl ketone	25	U	20	U	26	U
Methyl tert Butyl Ether (MTBE)	2.5	U	2	U	2.6	U
Methylcyclohexane	2.5	U	2	U	2.6	U
Methylene chloride	10	U	6.3	J	6.7	J
m-Xylene & p-Xylene	5	U	4	U	5.2	U
o-Xylene	2.2	J	2	U	2.6	U
Styrene	2.5	U	2	U	2.6	U
Tetrachloroethylene	2.5	U	2	U	2.6	U
Tetrahydrofuran	50	UJ	40	UJ	52	UJ
Toluene	2.5	U	2	U	2.6	U
Trans-1,2-Dichloroethene	2.5	U	2	U	2.6	U
trans-1,3-Dichloropropene	2.5	U	2	U	2.6	U
Trichloroethylene	2.5	U	2	U	2.6	U
Trichlorofluoromethane	5	U	4	U	5.2	U
Vinyl chloride	2.5	U	9.8		8.8	
Xylene (total)	2.2	J	2	U	2.6	U
Sum of Constituents	**42.9**		**54.07**		**52.1**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-13	SSG	10.25	8.5	12.75	SSG	8,100	4.3	43	13%	37	1.18E-07	0.15
	PC-13	SSG	15.25	12.75	18.75	SSG	8,100	6.0	54	13%	47	1.18E-07	0.27
	PC-13	SSG	22.25	18.75	25	SSG	8,100	6.3	52	13%	45	1.18E-07	0.27
											Estimated Total VOC Mass for Strata:		**0.69**
											Estimated Total VOC Mass for PC-13 Area:		**0.69**
COC Specific Calculations by Strata													
cis-1,2-Dichloroethylene	PC-13	SSG	10.25	8.5	12.75	SSG	8,100	4.3	3	13%	3	1.18E-07	0.01
1,1,1-Trichloroethane	PC-13	SSG	15.25	12.75	18.75	SSG	8,100	6.0	4	13%	3	1.18E-07	0.02
1,1-Dichloroethane	PC-13	SSG	15.25	12.75	18.75	SSG	8,100	6.0	2	13%	1	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-13	SSG	15.25	12.75	18.75	SSG	8,100	6.0	8	13%	7	1.18E-07	0.04
Vinyl chloride	PC-13	SSG	15.25	12.75	18.75	SSG	8,100	6.0	10	13%	9	1.18E-07	0.05
1,1,1-Trichloroethane	PC-13	SSG	22.25	18.75	25	SSG	8,100	6.3	2	13%	2	1.18E-07	0.01
1,1-Dichloroethane	PC-13	SSG	22.25	18.75	25	SSG	8,100	6.3	2	13%	2	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-13	SSG	22.25	18.75	25	SSG	8,100	6.3	14	13%	12	1.18E-07	0.07
Vinyl chloride	PC-13	SSG	22.25	18.75	25	SSG	8,100	6.3	9	13%	8	1.18E-07	0.05
											Estimated Total Target COC Mass for PC-13 Area:		**0.27**

	Target Mass per COC (lbs)	SSG
1,1,1-Trichloroethane	0.03	0.03
1,1-Dichloroethane	0.02	0.02
cis-1,2-Dichloroethylene	0.12	0.12
Vinyl chloride	0.09	0.09

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-14

	PC-14		PC-14		PC-14		PC-14	
	SB-FS-PC-14-11.0-		SB-PCB-5		SB-FS-PC-14-15.0-		SB-FS-PC-14-19.5-	
	11.25		11.25		15.25		19.75	
	5/31/2012		5/31/2012		5/31/2012		5/31/2012	
	Sand		Sand		Sand		Sand	
	5		5		5		0	
	0.1		0.1		0.1		0.1	
	7.4		7.4		5		9.3	
CONSTITUENTS			Duplicate					
1,1,1-Trichloroethane	2.7	U	1.7	U	3.4		3.2	
1,1,2,2-Tetrachloroethane	2.7	U	1.7	U	2.3	U	2.3	U
1,1,2-Trichloroethane	2.7	U	1.7	U	2.3	U	2.3	U
1,1-Dichloroethane	2.7	U	1.7	U	2.3	U	2.4	
1,1-Dichloroethylene	2.7	U	1.7	U	2.3	U	2.3	U
1,2,3-Trichlorobenzene	2.7	U	1.7	U	2.3	U	2.3	U
1,2,4-Trichlorobenzene	2.7	U	1.7	U	2.3	U	2.3	U
1,2-Dichlorobenzene	2.9		2.4		2	J	1.5	J
1,2-Dichloroethane	2.7	U	1.7	U	2.3	U	2.3	U
1,2-Dichloropropane	2.7	U	1.7	U	2.3	U	2.3	U
1,3-Dichlorobenzene	2.7	U	1.7	U	2.3	U	2.3	U
1,4-Dichlorobenzene	2.1	J	1.6	J	2.3	U	2.3	U
2-Hexanone	27	U	17	U	23	U	23	U
Acetone	270	UJ	170	UJ	230	UJ	230	UJ
Benzene	2.7	U	1.7	U	2.3	U	2.3	U
Bromochloromethane	2.7	U	1.7	U	2.3	U	2.3	U
Bromodichloromethane	2.7	U	1.7	U	2.3	U	2.3	U
Bromoform	2.7	U	1.7	U	2.3	U	2.3	U
Carbon Disulfide	2.7	U	1.7	U	2.6	J	2.3	U
Carbon Tetrachloride	2.7	U	1.7	U	2.3	U	2.3	U
Chlorobenzene	2.7	U	1.7	U	2.3	U	2.3	U
Chloroethane	5.5	U	3.4	U	4.5	U	4.7	U
Chloroform	2.7	U	1.7	U	2.3	U	2.3	U
cis-1,2-Dichloroethylene	3.8		1.7	U	15		14	
cis-1,3-Dichloropropene	2.7	U	1.7	U	2.3	U	2.3	U
Cyclohexane	27	U	17	U	23	U	23	U
DBCP	27	U	17	U	23	U	23	U
Dibromochloromethane	2.7	U	1.7	U	2.3	U	2.3	U
Dichlorodifluoromethane	5.5	U	3.4	U	4.5	U	4.7	U
Diethyl ether	2.7	U	1.7	U	2.3	U	2.3	U
Ethylene dibromide (EDB)	2.7	U	1.7	U	2.3	U	2.3	U
Ethylbenzene	2.7	U	1.7	U	3.9		1.7	J
Freon 113	14	U	8.4	U	11	U	12	U
Isopropylbenzene	2.7	U	1.7	U	2.3	U	2.3	U
Methyl Acetate	55	U	34	U	45	U	47	U
Methyl bromide	5.5	U	3.4	U	4.5	U	4.7	U
Methyl chloride	5.5	U	3.4	U	4.5	U	4.7	U
Methyl ethyl ketone (MEK)	27	UJ	17	UJ	23	UJ	23	UJ
Methyl isobutyl ketone	27	U	17	U	23	U	23	U
Methyl tert Butyl Ether (MTBE)	2.7	U	1.7	U	2.3	U	2.3	U
Methylcyclohexane	2.7	U	1.7	U	2.3	U	2.3	U
Methylene chloride	7.9	J	6.1	J	5.2	J	6.5	J
m-Xylene & p-Xylene	5.5	U	3.4	U	4.5	U	4.7	U
o-Xylene	2.7	U	1.7	U	1.8	J	2.3	U
Styrene	2.7	U	1.7	U	2.3	U	2.3	U
Tetrachloroethylene	2.7	U	1.7	U	2.3	U	2.3	U
Tetrahydrofuran	55	UJ	34	UJ	45	UJ	47	UJ
Toluene	2.7	U	1.7	U	2.3	U	2.3	U
Trans-1,2-Dichloroethene	2.7	U	1.7	U	2.3	U	2.3	U
trans-1,3-Dichloropropene	2.7	U	1.7	U	2.3	U	2.3	U
Trichloroethylene	2.7	U	1.7	U	2.3	U	2.3	U
Trichlorofluoromethane	5.5	U	3.4	U	4.5	U	4.7	U
Vinyl chloride	2.7	U	1.7	U	6.9		7.3	
Xylene (total)	2.7	U	1.7	U	1.8	J	2.3	U
Sum of Constituents	**16.7**		**10.1**		**40.8**		**36.6**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area (ft^2)	Thickness of Mass Unit (ft)	Total VOC Concentration (dry weight) (ug/kg)	Moisture Content Results of Samples (%)	Total VOC Concentration (wet weight) (ug/kg)	Bulk Density / 1e9 ($^{-6}$)x(kg/1x10	Mass of Total VOC (lbs)
						Sand / Sand and Gravel							
	PC-14	SSG	11.25	8	13.25	SSG	5,447	5.3	17	13%	15	1.18E-07	0.05
	PC-14	SSG	15.25	13.25	17.5	SSG	5,447	4.3	41	13%	35	1.18E-07	0.10
	PC-14	SSG	19.75	17.5	20	SSG	5,447	2.5	37	13%	32	1.18E-07	0.05
											Estimated Total VOC Mass for Strata:		**0.20**
											Estimated Total VOC Mass for PC-14 Area:		**0.20**
COC Specific Calculations by Strata													
cis-1,2-Dichloroethylene	PC-14	SSG	11.25	8	13.25	SSG	5,447	5.3	4	13%	3	1.18E-07	0.01
1,1,1-Trichloroethane	PC-14	SSG	15.25	13.25	17.5	SSG	5,447	4.3	3	13%	3	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-14	SSG	15.25	13.25	17.5	SSG	5,447	4.3	15	13%	13	1.18E-07	0.04
Vinyl chloride	PC-14	SSG	15.25	13.25	17.5	SSG	5,447	4.3	7	13%	6	1.18E-07	0.02
1,1,1-Trichloroethane	PC-14	SSG	19.75	17.5	20	SSG	5,447	2.5	3	13%	3	1.18E-07	0.00
1,1-Dichloroethane	PC-14	SSG	19.75	17.5	20	SSG	5,447	2.5	2	13%	2	1.18E-07	0.0034
cis-1,2-Dichloroethylene	PC-14	SSG	19.75	17.5	20	SSG	5,447	2.5	14	13%	12	1.18E-07	0.02
Vinyl chloride	PC-14	SSG	19.75	17.5	20	SSG	5,447	2.5	7	13%	6	1.18E-07	0.01
											Estimated Total Target COC Mass for PC-14 Area:		**0.11**

	Target Mass per COC (lbs)	SSG
1,1,1-Trichloroethane	0.01	0.01
1,1-Dichloroethane	0.003	0.003
cis-1,2-Dichloroethylene	0.07	0.07
Vinyl chloride	0.03	0.03

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

	PC-15		PC-15	
	SB-FS-PC-15-14.5-		SB-FS-PC-15-16.5-	
	14.75		16.75	
	5/22/2012		5/22/2012	
	Gravel		Sand	
	5		25	
	0.1		0.1	
	10.4		10.8	
CONSTITUENTS				
1,1,1-Trichloroethane	120	U	2.5	U
1,1,2,2-Tetrachloroethane	120	U	2.5	U
1,1,2-Trichloroethane	120	U	2.5	U
1,1-Dichloroethane	120	U	2.5	U
1,1-Dichloroethylene	120	U	2.5	U
1,2,3-Trichlorobenzene	120	U	2.5	U
1,2,4-Trichlorobenzene	120	U	2.5	U
1,2-Dichlorobenzene	120	U	2.5	U
1,2-Dichloroethane	120	U	2.5	U
1,2-Dichloropropane	120	U	2.5	U
1,3-Dichlorobenzene	120	U	2.5	U
1,4-Dichlorobenzene	120	U	2.5	U
2-Hexanone	1200	U	25	U
Acetone	12000	UJ	250	UJ
Benzene	120	U	2.5	U
Bromochloromethane	120	U	2.5	U
Bromodichloromethane	120	U	2.5	U
Bromoform	120	U	2.5	U
Carbon Disulfide	120	U	2.5	U
Carbon Tetrachloride	120	U	2.5	U
Chlorobenzene	120	U	2.5	U
Chloroethane	250	UJ	4.9	U
Chloroform	120	U	2.5	U
cis-1,2-Dichloroethylene	120	U	2.5	U
cis-1,3-Dichloropropene	120	U	2.5	U
Cyclohexane	1200	U	25	U
DBCP	1200	U	25	U
Dibromochloromethane	120	U	2.5	U
Dichlorodifluoromethane	250	U	4.9	U
Diethyl ether	120	U	2.5	U
Ethylene dibromide (EDB)	120	U	2.5	U
Ethylbenzene	120	U	2.5	U
Freon 113	610	U	12	U
Isopropylbenzene	120	U	2.5	U
Methyl Acetate	2500	U	49	U
Methyl bromide	250	U	4.9	U
Methyl chloride	250	U	4.9	U
Methyl ethyl ketone (MEK)	1200	UJ	25	UJ
Methyl isobutyl ketone	1200	U	25	U
Methyl tert Butyl Ether (MTBE)	120	U	2.5	U
Methylcyclohexane	120	U	2.5	U
Methylene chloride	490	U	27	U
m-Xylene & p-Xylene	250	U	4.9	U
o-Xylene	120	U	2.5	U
Styrene	120	U	2.5	U
Tetrachloroethylene	120	U	2.5	U
Tetrahydrofuran	2500	U	49	U
Toluene	120	U	2.5	U
Trans-1,2-Dichloroethene	120	U	2.5	U
trans-1,3-Dichloropropene	120	U	2.5	U
Trichloroethylene	120	U	2.5	U
Trichlorofluoromethane	250	U	4.9	U
Vinyl chloride	120	U	2.5	U
Xylene (total)	120	U	2.5	U
Sum of Constituents	**0**		**0**	

Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thicknes s of Mass Unit	Total VOC Concentr ation (dry weight)	Moisture Content Results of Samples	Total VOC Concentr ation (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
						(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
Sand / Sand and Gravel												
PC-15	SSG	14.75	13.25	15.75	SSG	8,100	2.5	0	13%	0	1.18E-07	0.00
PC-15	SSG	16.75	15.75	20	SSG	8,100	4.3	0	13%	0	1.18E-07	0.00
											Estimated Total VOC Mass for Strata:	**0.00**
											Estimated Total VOC Mass for PC-15 Area:	**0.00**

NO COC MASS

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-16

	PC-16		PC-16		PC-16	
	SB-FS-PC-16-16.0-		SB-FS-PC-16-20.0-		SB-FS-PC-16-25.0-	
	16.25		20.25		25.25	
	5/23/2012		5/23/2012		5/23/2012	
	Sand		Sand & Silt		Sand & Silt	
	15		35		25	
	0.1		0.1		0.1	
	20		12		21	
CONSTITUENTS						
1,1,1-Trichloroethane	3	U	2.6	U	2.6	U
1,1,2,2-Tetrachloroethane	3	UJ	2.6	UJ	2.6	UJ
1,1,2-Trichloroethane	3	U	2.6	U	2.6	U
1,1-Dichloroethane	3	U	2.6	U	2.6	U
1,1-Dichloroethylene	3	U	2.6	U	2.6	U
1,2,3-Trichlorobenzene	3	U	2.6	U	2.6	U
1,2,4-Trichlorobenzene	3	U	2.6	U	2.6	U
1,2-Dichlorobenzene	3	U	2.6	U	2.6	U
1,2-Dichloroethane	3	U	2.6	U	2.6	U
1,2-Dichloropropane	3	U	2.6	U	2.6	U
1,3-Dichlorobenzene	3	U	2.6	U	2.6	U
1,4-Dichlorobenzene	3	U	2.6	U	2.6	U
2-Hexanone	30	U	26	U	26	U
Acetone	300	UJ	260	UJ	260	UJ
Benzene	3	U	2.6	U	2.6	U
Bromochloromethane	3	U	2.6	U	2.6	U
Bromodichloromethane	3	U	2.6	U	2.6	U
Bromoform	3	U	2.6	U	2.6	U
Carbon Disulfide	3	U	3.5		2.8	
Carbon Tetrachloride	3	U	2.6	U	2.6	U
Chlorobenzene	3	U	2.6	U	2.6	U
Chloroethane	6	U	5.1	U	5.3	U
Chloroform	3	U	2.6	U	2.6	U
cis-1,2-Dichloroethylene	3	U	2.6	U	2.6	U
cis-1,3-Dichloropropene	3	U	2.6	U	2.6	U
Cyclohexane	30	U	26	U	26	U
DBCP	30	UJ	26	UJ	26	UJ
Dibromochloromethane	3	U	2.6	U	2.6	U
Dichlorodifluoromethane	6	U	5.1	U	5.3	U
Diethyl ether	3	U	2.6	U	2.6	U
Ethylene dibromide (EDB)	3	U	2.6	U	2.6	U
Ethylbenzene	3	U	2.6	U	2.5	J
Freon 113	15	U	13	U	13	U
Isopropylbenzene	3	U	2.6	U	2.6	U
Methyl Acetate	60	U	51	U	53	U
Methyl bromide	6	U	5.1	U	5.3	U
Methyl chloride	6	U	5.1	U	5.3	U
Methyl ethyl ketone (MEK)	30	U	26	U	26	U
Methyl isobutyl ketone	30	U	26	U	26	U
Methyl tert Butyl Ether (MTBE)	3	U	2.6	U	2.6	U
Methylcyclohexane	3	U	2.6	U	2.6	U
Methylene chloride	12	U	10	U	11	U
m-Xylene & p-Xylene	6	U	5.1	U	5.3	U
o-Xylene	3	U	2.6	U	2.6	U
Styrene	3	U	2.6	U	2.6	U
Tetrachloroethylene	29		2.6	U	2.6	U
Tetrahydrofuran	60	U	51	U	53	U
Toluene	3	U	2.6	U	2.6	U
Trans-1,2-Dichloroethene	3	U	2.6	U	2.6	U
trans-1,3-Dichloropropene	3	U	2.6	U	2.6	U
Trichloroethylene	3.5		2.6	U	2.6	U
Trichlorofluoromethane	6	U	5.1	U	5.3	U
Vinyl chloride	3	U	2.6	U	8.8	
Xylene (total)	3	U	2.6	U	2.6	U
Sum of Constituents	**32.5**		**3.5**		**14.1**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density / 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
	Grey Silty Sand / Silt												
	PC-16	GSSS	20.25	19.25	24.25	GSSS	8,100	5.0	4	13%	3	1.18E-07	0.01
												Estimated Total VOC Mass for Strata:	**0.01**
	Sand / Sand and Gravel												
	PC-16	SSG	16.25	14.25	19.25	SSG	8,100	5.0	33	13%	28	1.18E-07	0.14
	PC-16	SSG	25.25	24.25	26.5	SSG	8,100	2.3	14	13%	12	1.18E-07	0.03
												Estimated Total VOC Mass for Strata:	**0.16**
												Estimated Total VOC Mass for PC-16 Area:	**0.18**
COC Specific Calculations by Strata													
Tetrachloroethylene	PC-16	SSG	16.25	14.25	19.25	SSG	8,100	5.0	29	13%	25	1.18E-07	0.12
Trichloroethylene	PC-16	SSG	16.25	14.25	19.25	SSG	8,100	5.0	3.5	13%	3	1.18E-07	0.01
Vinyl chloride	PC-16	SSG	25.25	24.25	26.5	SSG	8,100	2.3	9	13%	8	1.18E-07	0.02
												Estimated Total Target COC Mass for PC-16 Area:	**0.15**

	Target Mass per COC (lbs)	SSG
Tetrachloroethylene	0.12	0.12
Trichloroethylene	0.01	0.01
Vinyl chloride	0.02	0.02

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-17

	PC-17		PC-17		PC-17		PC-17		PC-17	
	SB-FS-PC-17-16.0-		SB-FS-PC-17-19.0-		SB-FS-PC-17-21.0-		SB-PCB-6		SB-FS-PC-17-23.5-	
	16.25		19.25		21.25		21.25		23.75	
	6/5/2012		6/5/2012		6/5/2012		6/5/2012		6/5/2012	
	S&G / Sand		Sand & Gravel		Sand		Sand		Sand & Silt	
	5		5		25		25		35	
	0.1		0.1		0.1		0.1		0.1	
	19		4.2		15		11		9.7	
CONSTITUENTS							Duplicate			
1,1,1-Trichloroethane	7		3.5		3.5		3.4		2.4	U
1,1,2,2-Tetrachloroethane	3.3	U	2	U	3.3	U	2.4	U	2.4	U
1,1,2-Trichloroethane	3.3	U	2	U	3.3	U	2.4	U	2.4	U
1,1-Dichloroethane	3.3	U	2	U	3.3	U	2.4	U	2.4	U
1,1-Dichloroethylene	3.3	U	2	U	3.3	U	2.4	U	2.4	U
1,2,3-Trichlorobenzene	3.3	U	2	U	3.3	U	2.4	U	2.4	U
1,2,4-Trichlorobenzene	3.3	U	2	U	3.3	U	2.4	U	2.4	U
1,2-Dichlorobenzene	3.3	U	2	U	3.3	U	2.4	U	2.4	U
1,2-Dichloroethane	3.3	U	2	U	3.3	U	2.4	U	2.4	U
1,2-Dichloropropane	3.3	U	2	U	3.3	U	2.4	U	2.4	U
1,3-Dichlorobenzene	3.3	U	2	U	3.3	U	2.4	U	2.4	U
1,4-Dichlorobenzene	3.3	U	2	U	3.3	U	2.4	U	2.4	U
2-Hexanone	33	UJ	20	UJ	33	UJ	24	UJ	24	UJ
Acetone	330	UJ	200	UJ	330	UJ	240	UJ	240	UJ
Benzene	3.3	U	2	U	3.3	U	2.4	U	2.4	U
Bromochloromethane	3.3	U	2	U	3.3	U	2.4	U	2.4	U
Bromodichloromethane	3.3	U	2	U	3.3	U	2.4	U	2.4	U
Bromoform	3.3	U	2	U	3.3	U	2.4	U	2.4	U
Carbon Disulfide	5.2		7.7		3.3	U	2.4	U	2.4	U
Carbon Tetrachloride	3.3	U	2	U	3.3	U	2.4	U	2.4	U
Chlorobenzene	3.3	U	2	U	3.3	U	2.4	U	2.4	U
Chloroethane	6.6	U	4	U	6.6	U	4.8	U	4.8	U
Chloroform	3.3	U	2	U	3.3	U	2.4	U	2.4	U
cis-1,2-Dichloroethylene	46		19		3.6		3.5		2.4	U
cis-1,3-Dichloropropene	3.3	U	2	U	3.3	U	2.4	U	2.4	U
Cyclohexane	33	U	20	U	33	U	24	U	24	U
DBCP	33	U	20	U	33	U	24	U	24	U
Dibromochloromethane	3.3	U	2	U	3.3	U	2.4	U	2.4	U
Dichlorodifluoromethane	6.6	U	4	U	6.6	U	4.8	U	4.8	U
Diethyl ether	3.3	U	2	U	3.3	U	2.4	U	2.4	U
Ethylene dibromide (EDB)	3.3	U	2	U	3.3	U	2.4	U	2.4	U
Ethylbenzene	7.9		5.7		4.9		4.9		2	J
Freon 113	16	U	10	U	16	U	12	U	12	U
Isopropylbenzene	3.3	U	2	U	3.3	U	2.4	U	2.4	U
Methyl Acetate	66	U	40	U	66	U	48	U	48	U
Methyl bromide	6.6	U	4	U	6.6	U	4.8	U	4.8	U
Methyl chloride	6.6	U	4	U	6.6	U	4.8	U	4.8	U
Methyl ethyl ketone (MEK)	33	UJ	20	UJ	33	UJ	24	UJ	24	UJ
Methyl isobutyl ketone	33	U	20	U	33	U	24	U	24	U
Methyl tert Butyl Ether (MTBE)	3.3	U	2	U	3.3	U	2.4	U	2.4	U
Methylcyclohexane	3.3	U	2	U	3.3	U	2.4	U	2.4	U
Methylene chloride	13	U	8	U	13	U	9.6	U	9.6	U
m-Xylene & p-Xylene	6.6	U	3.7	J	6.6	U	4.8	U	4.8	U
o-Xylene	3.3	U	1.8	J	3.3	U	2.4	U	2.4	U
Styrene	3.3	U	2	U	3.3	U	2.4	U	2.4	U
Tetrachloroethylene	2.6	J	2	U	3.3	U	2.4	U	2.4	U
Tetrahydrofuran	66	UJ	40	UJ	66	UJ	48	UJ	48	UJ
Toluene	3.3	U	2	U	3.3	U	2.4	U	2.4	U
Trans-1,2-Dichloroethene	3.3	U	2	U	3.3	U	2.4	U	2.4	U
trans-1,3-Dichloropropene	3.3	U	2	U	3.3	U	2.4	U	2.4	U
Trichloroethylene	3.3	U	2	U	3.3	U	2.4	U	2.4	U
Trichlorofluoromethane	6.6	U	4	U	6.6	U	4.8	U	4.8	U
Vinyl chloride	7.4		2.8		7.6		8.4		2.3	J
Xylene (total)	3.3	U	5.5		3.3	U	2.4	U	2.4	U
Sum of Constituents	**76.1**		**44.2**		**19.6**		**20.2**		**4.3**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-17	SSG	16.25	13.5	17.75	SSG	8,100	4.3	76	13%	66	1.18E-07	0.27
	PC-17	SSG	19.25	17.75	20.25	SSG	8,100	2.5	44	13%	38	1.18E-07	0.09
	PC-17	SSG	21.25	20.25	22.5	SSG	8,100	2.3	20	13%	17	1.18E-07	0.04
	PC-17	SSG	23.75	22.5	24	SSG	8,100	1.5	4	13%	4	1.18E-07	0.01
						Estimated Total VOC Mass for Strata:							**0.40**
						Estimated Total VOC Mass for PC-17 Area:							**0.40**
	COC Specific Calculations by Strata												
1,1,1-Trichloroethane	PC-17	SSG	16.25	13.5	17.75	SSG	8,100	4.3	7	13%	6	1.18E-07	0.02
cis-1,2-Dichloroethylene	PC-17	SSG	16.25	13.5	17.75	SSG	8,100	4.3	46	13%	40	1.18E-07	0.16
Tetrachloroethylene	PC-17	SSG	16.25	13.5	17.75	SSG	8,100	4.3	2.6	13%	2	1.18E-07	0.01
Vinyl chloride	PC-17	SSG	16.25	13.5	17.75	SSG	8,100	4.3	7.4	13%	6	1.18E-07	0.03
1,1,1-Trichloroethane	PC-17	SSG	19.25	17.75	20.25	SSG	8,100	2.5	3.5	13%	3	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-17	SSG	19.25	17.75	20.25	SSG	8,100	2.5	19	13%	17	1.18E-07	0.04
Vinyl chloride	PC-17	SSG	19.25	17.75	20.25	SSG	8,100	2.5	2.8	13%	2	1.18E-07	0.01
1,1,1-Trichloroethane	PC-17	SSG	21.25	20.25	22.5	SSG	8,100	2.3	4	13%	3	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-17	SSG	21.25	20.25	22.5	SSG	8,100	2.3	4	13%	3	1.18E-07	0.01
Vinyl chloride	PC-17	SSG	21.25	20.25	22.5	SSG	8,100	2.3	8	13%	7	1.18E-07	0.02
Vinyl chloride	PC-17	SSG	23.75	22.5	24	SSG	8,100	1.5	2	13%	2	1.18E-07	0.00
								Estimated Total Target COC Mass for PC-17 Area:					**0.31**

	Target Mass per COC (lbs)	SSG
1,1,1-Trichloroethane	0.04	0.04
cis-1,2-Dichloroethylene	0.21	0.21
Tetrachloroethylene	0.01	0.01
Vinyl chloride	0.05	0.05

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-18

	PC-18		PC-18		PC-18	
	SB-FS-PC-18-16.0-16.25		SB-FS-PC-18-20.0-20.25		SB-FS-PC-18-23.0-23.25	
	5/29/2012		5/29/2012		5/29/2012	
	Sand & Gravel		Sand		Sand & Silt	
	20		0		25	
	0.1		0.1		0.1	
	8.4		31		13	
CONSTITUENTS						
1,1,1-Trichloroethane	2	J	46		4.2	
1,1,2,2-Tetrachloroethane	2.5	U	3.4	UJ	2	UJ
1,1,2-Trichloroethane	2.5	U	3.4	U	2	U
1,1-Dichloroethane	2.5	U	5.2		2	U
1,1-Dichloroethylene	2.5	U	3.4	U	2	U
1,2,3-Trichlorobenzene	2.5	U	3.4	U	2	U
1,2,4-Trichlorobenzene	2.5	U	3.4	U	2	U
1,2-Dichlorobenzene	2.5	U	3.4	UJ	2	UJ
1,2-Dichloroethane	2.5	U	3.4	U	2	U
1,2-Dichloropropane	2.5	U	3.4	U	2	U
1,3-Dichlorobenzene	2.5	U	3.4	U	2	U
1,4-Dichlorobenzene	2.5	U	3.4	U	2	U
2-Hexanone	25	U*	34	U	20	U
Acetone	250	UJ	340	UJ	200	UJ
Benzene	2.5	U	3.4	U	2	U
Bromochloromethane	2.5	U	3.4	U	2	U
Bromodichloromethane	2.5	U	3.4	U	2	U
Bromoform	2.5	U	3.4	U	2	U
Carbon Disulfide	2.5	U*	4.8		1.6	J
Carbon Tetrachloride	2.5	U	3.4	U*	2	U*
Chlorobenzene	2.5	U	3.4	U	2	U
Chloroethane	5.1	U	6.7	UJ	4	UJ
Chloroform	2.5	U	3.4	U	2	U
cis-1,2-Dichloroethylene	3.5		71		7.3	
cis-1,3-Dichloropropene	2.5	U	3.4	U	2	U
Cyclohexane	25	U	34	U	20	U
DBCP	25	U	34	UJ	20	UJ
Dibromochloromethane	2.5	U	3.4	U	2	U
Dichlorodifluoromethane	5.1	U	6.7	U	4	U
Diethyl ether	2.5	U	3.4	U	2	U
Ethylene dibromide (EDB)	2.5	U	3.4	U	2	U
Ethylbenzene	2.4	J	33		1.5	J
Freon 113	13	U	17	U	9.9	U
Isopropylbenzene	2.5	U	3.4	U	2	U
Methyl Acetate	51	U	67	UJ	40	UJ
Methyl bromide	5.1	U	6.7	U	4	U
Methyl chloride	5.1	U	6.7	U	4	U
Methyl ethyl ketone (MEK)	25	UJ	34	UJ	20	UJ
Methyl isobutyl ketone	25	U	34	U	20	U
Methyl tert Butyl Ether (MTBE)	2.5	U	3.4	U	2	U
Methylcyclohexane	2.5	U	3.4	U	2	U
Methylene chloride	4.8	J	13	U	7.9	U
m-Xylene & p-Xylene	5.1	U	8.1		4	U
o-Xylene	2.5	U	2.6	J	2	U
Styrene	2.5	U	3.4	U	2	U
Tetrachloroethylene	2.5	U	3.4	U	2	U
Tetrahydrofuran	51	UJ	67	U	40	U
Toluene	2.5	U	3.4	U	2	U
Trans-1,2-Dichloroethene	2.5	U	2.8	J	2	U
trans-1,3-Dichloropropene	2.5	U	3.4	U	2	U
Trichloroethylene	2.5	U	3.4	U	2	U
Trichlorofluoromethane	5.1	U	6.7	U	4	U
Vinyl chloride	4.7		53	J	5.5	J
Xylene (total)	2.5	U	11		2	U
Sum of Constituents	**17.4**		**226.5**		**20.1**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{6})x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-18	SSG	16.25	12	18.25	SSG	8,100	6.3	17	13%	15	1.18E-07	0.09
	PC-18	SSG	20.25	18.25	21.75	SSG	8,100	3.5	227	13%	197	1.18E-07	0.66
	PC-18	SSG	23.25	21.75	23.5	SSG	8,100	1.8	20	13%	17	1.18E-07	0.03
												Estimated Total VOC Mass for Strata:	**0.78**
												Estimated Total VOC Mass for PC-18 Area:	**0.78**
COC Specific Calculations by Strata													
1,1,1-Trichloroethane	PC-18	SSG	16.25	12	18.25	SSG	8,100	6.3	2	13%	2	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-18	SSG	16.25	12	18.25	SSG	8,100	6.3	3.5	13%	3	1.18E-07	0.02
Vinyl chloride	PC-18	SSG	16.25	12	18.25	SSG	8,100	6.3	4.7	13%	4	1.18E-07	0.02
1,1,1-Trichloroethane	PC-18	SSG	20.25	18.25	21.75	SSG	8,100	3.5	46	13%	40	1.18E-07	0.13
1,1-Dichloroethane	PC-18	SSG	20.25	18.25	21.75	SSG	8,100	3.5	5.2	13%	5	1.18E-07	0.02
cis-1,2-Dichloroethylene	PC-18	SSG	20.25	18.25	21.75	SSG	8,100	3.5	71	13%	62	1.18E-07	0.21
Trans-1,2-Dichloroethene	PC-18	SSG	20.25	18.25	21.75	SSG	8,100	3.5	2.8	13%	2	1.18E-07	0.01
Vinyl chloride	PC-18	SSG	20.25	18.25	21.75	SSG	8,100	3.5	53	13%	46	1.18E-07	0.15
1,1,1-Trichloroethane	PC-18	SSG	23.25	21.75	23.5	SSG	8,100	1.8	4.2	13%	4	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-18	SSG	23.25	21.75	23.5	SSG	8,100	1.8	7.3	13%	6	1.18E-07	0.01
Vinyl chloride	PC-18	SSG	23.25	21.75	23.5	SSG	8,100	1.8	5.5	13%	5	1.18E-07	0.01
												Estimated Total Target COC Mass for PC-18 Area:	**0.60**

	Target Mass per COC (lbs)	SSG
1,1,1-Trichloroethane	0.15	0.15
1,1-Dichloroethane	0.02	0.02
cis-1,2-Dichloroethylene	0.24	0.24
Trans-1,2-Dichloroethene	0.01	0.01
Vinyl chloride	0.19	0.19

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

	PC-19	PC-19	PC-19	PC-19	PC-19	PC-19
	SB-FS-PC-19-11.5-12.0	SB-PCB-3	SB-FS-PC-19-15.5-	SB-FS-PC-19-18.5-	SB-FS-PC-19-21.0-	SB-FS-PC-19-24.5-
	11.75	11.75	15.75	18.75	21.25	24.75
	5/29/2012	5/29/2012	6/5/2012	5/29/2012	6/5/2012	6/5/2012
	Sand/Silt/Peat	Sand/Silt/Peat	Sand & Silt	Sand	Sand	Sand
	70	70	50	0	0	0
	10	10	5	0.1	0.1	0.1
	35	33	15	7.5	14	8.4
CONSTITUENTS		**Duplicate**				
1,1,1-Trichloroethane	260 U	240 U	2 U	20	20	37
1,1,2,2-Tetrachloroethane	260 U	240 U	2 U	2 UJ	2.8 U	2.3 U
1,1,2-Trichloroethane	260 U	240 U	2 U	2 U	2.8 U	2.3 U
1,1-Dichloroethane	260 U	240 U	2.9	7.1	8.5	15
1,1-Dichloroethylene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
1,2,3-Trichlorobenzene	260 U	240 U	2 U	1.2 J	2.8 U	2.3 U
1,2,4-Trichlorobenzene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
1,2-Dichlorobenzene	260 U	240 U	2 U	2 UJ	2.8 U	2.3 U
1,2-Dichloroethane	260 U	240 U	2 U	2 U	2.8 U	2.3 U
1,2-Dichloropropane	260 U	240 U	2 U	2 U	2.8 U	2.3 U
1,3-Dichlorobenzene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
1,4-Dichlorobenzene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
2-Hexanone	2600 U	2400 U	20 UJ	20 UJ	28 UJ	23 UJ
Acetone	26000 UJ	24000 UJ	200 UJ	200 UJ	280 UJ	230 UJ
Benzene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Bromochloromethane	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Bromodichloromethane	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Bromoform	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Carbon Disulfide	260 U	240 U	2 U	2 U	2.8 U	2.4
Carbon Tetrachloride	260 U	240 U	2 U	2 U*	2.8 U	2.3 U
Chlorobenzene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Chloroethane	520 UJ	470 UJ	27	3.4 J	3.7 J	6.5
Chloroform	260 U	240 U	2 U	2 U	2.8 U	2.3 U
cis-1,2-Dichloroethylene	5600 J	4200 J	1.2 J	170 J	170	270
cis-1,3-Dichloropropene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Cyclohexane	2600 U	2400 U	20 U	20 U	28 U	23 U
DBCP	2600 U	2400 U	20 U	20 UJ	28 U	23 U
Dibromochloromethane	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Dichlorodifluoromethane	520 U	470 U	4 U	4 U	5.7 U	4.7 U
Diethyl ether	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Ethylene dibromide (EDB)	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Ethylbenzene	310 J	940 J	2.6	4.2	2.8 U	2.3 U
Freon 113	1300 U	1200 U	10 U	10 UJ	14 U	12 U
Isopropylbenzene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Methyl Acetate	5200 U	4700 U	40 U	40 UJ	57 U	47 U
Methyl bromide	520 U	470 U	4 U	4 U	5.7 U	4.7 U
Methyl chloride	520 U	470 U	4 U	4 U	5.7 U	4.7 U
Methyl ethyl ketone (MEK)	2600 UJ	2400 UJ	20 UJ	20 UJ	28 UJ	23 UJ
Methyl isobutyl ketone	2600 U	2400 U	20 U	20 U	28 U	23 U
Methyl tert Butyl Ether (MTBE)	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Methylcyclohexane	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Methylene chloride	1000 U	950 U	8 U	8 U	11 U	9.3 U
m-Xylene & p-Xylene	670 J	2200 J	5.7	4 U	5.7 U	4.7 U
o-Xylene	250 J	800 J	2.8	2 U	2.8 U	2.3 U
Styrene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Tetrachloroethylene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Tetrahydrofuran	5200 U	4700 U	40 UJ	40 U	57 UJ	47 UJ
Toluene	5900	9700	68	1.7 J	2.8 U	2.3 U
Trans-1,2-Dichloroethene	460	430	4.4	1.7 J	1.8 J	2.7
trans-1,3-Dichloropropene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Trichloroethylene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Trichlorofluoromethane	520 U*	470 U*	4 U	4 U	5.7 U	4.7 U
Vinyl chloride	260 U	250	2 U	7.8 J	11	22
Xylene (total)	920 J	3000 J	8.5	2 U	2.8 U	2.3 U
Sum of Constituents	**13190**	**18520**	**114.6**	**217.1**	**215**	**355.6**

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	lb/ft^3)x(kg/1x10^9 ug	(lbs)
							Organic Peat						
	PC-19	Peat	11.75	11.5	13	OP	8,100	1.5	18,520	44%	10,371	2.50E-08	3.15
												Estimated Total VOC Mass for Strata:	**3.15**
							Grey Silty Sand/Silt						
	PC-19	Silt	15.75	13	17	GSSS	8,100	4.0	115	20%	92	1.07E-07	0.32
												Estimated Total VOC Mass for Strata:	**0.32**
							Sand / Sand and Gravel						
	PC-19	SSG	18.75	17	20	SSG	8,100	3.0	217	13%	189	1.18E-07	0.54
	PC-19	SSG	21.25	20	23	SSG	8,100	3.0	215	13%	187	1.18E-07	0.54
	PC-19	SSG	24.75	23	25	SSG	8,100	2.0	356	13%	309	1.18E-07	0.59
												Estimated Total VOC Mass for Strata:	**1.67**
												Estimated Total VOC Mass for PC-19 Area:	**5.14**
COC Specific Calculations by Strata													
cis-1,2-Dichloroethylene	PC-19	Peat	11.75	11.5	13	OP	8,100	1.5	5,600	44%	3,136	2.50E-08	0.95
Trans-1,2-Dichloroethene	PC-19	Peat	11.75	11.5	13	OP	8,100	1.5	460	44%	258	2.50E-08	0.08
Vinyl chloride	PC-19	Peat	11.75	11.5	13	OP	8,100	1.5	250	44%	140	2.50E-08	0.04
1,1-Dichloroethane	PC-19	Silt	15.75	13	17	GSSS	8,100	4.0	2.9	20%	2	1.07E-07	0.01
Chloroethane	PC-19	Silt	15.75	13	17	GSSS	8,100	4.0	27	20%	22	1.07E-07	0.07
cis-1,2-Dichloroethylene	PC-19	Silt	15.75	13	17	GSSS	8,100	4.0	1.2	20%	1	1.07E-07	0.00
Trans-1,2-Dichloroethene	PC-19	Silt	15.75	13	17	GSSS	8,100	4.0	4.4	20%	4	1.07E-07	0.01
1,1,1-Trichloroethane	PC-19	SSG	18.75	17	20	SSG	8,100	3.0	20	13%	17	1.18E-07	0.05
1,1-Dichloroethane	PC-19	SSG	18.75	17	20	SSG	8,100	3.0	7.1	13%	6	1.18E-07	0.02
Chloroethane	PC-19	SSG	18.75	17	20	SSG	8,100	3.0	3.4	13%	3	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-19	SSG	18.75	17	20	SSG	8,100	3.0	170	13%	148	1.18E-07	0.42
Trans-1,2-Dichloroethene	PC-19	SSG	18.75	17	20	SSG	8,100	3.0	1.7	13%	1	1.18E-07	0.00
Vinyl chloride	PC-19	SSG	18.75	17	20	SSG	8,100	3.0	7.8	13%	7	1.18E-07	0.02
1,1,1-Trichloroethane	PC-19	SSG	21.25	20	23	SSG	8,100	3.0	20	13%	17	1.18E-07	0.05
1,1-Dichloroethane	PC-19	SSG	21.25	20	23	SSG	8,100	3.0	8.5	13%	7	1.18E-07	0.02
Chloroethane	PC-19	SSG	21.25	20	23	SSG	8,100	3.0	3.7	13%	3	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-19	SSG	21.25	20	23	SSG	8,100	3.0	170	13%	148	1.18E-07	0.42
Trans-1,2-Dichloroethene	PC-19	SSG	21.25	20	23	SSG	8,100	3.0	1.8	13%	2	1.18E-07	0.00
Vinyl chloride	PC-19	SSG	21.25	20	23	SSG	8,100	3.0	11	13%	10	1.18E-07	0.03
1,1,1-Trichloroethane	PC-19	SSG	24.75	23	25	SSG	8,100	2.0	37	13%	32	1.18E-07	0.06
1,1-Dichloroethane	PC-19	SSG	24.75	23	25	SSG	8,100	2.0	15	13%	13	1.18E-07	0.02
Chloroethane	PC-19	SSG	24.75	23	25	SSG	8,100	2.0	6.5	13%	6	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-19	SSG	24.75	23	25	SSG	8,100	2.0	270	13%	235	1.18E-07	0.45
Trans-1,2-Dichloroethene	PC-19	SSG	24.75	23	25	SSG	8,100	2.0	2.7	13%	2	1.18E-07	0.00
Vinyl chloride	PC-19	SSG	24.75	23	25	SSG	8,100	2.0	22	13%	19	1.18E-07	0.04
												Estimated Total Target COC Mass for PC-19 Area:	**2.82**

	Target Mass per COC (lbs)	OP	GSSS	SSG
1,1,1-Trichloroethane	0.16	-	-	0.16
1,1-Dichloroethane	0.07	-	0.01	0.06
Chloroethane	0.10	-	0.07	0.03
cis-1,2-Dichloroethylene	2.25	0.95	0.00	1.30
Trans-1,2-Dichloroethene	0.10	0.08	0.01	0.01
Vinyl chloride	0.13	0.04	-	0.08
	2.82			

Mass Calculation Worksheets
Boring PC-20

	PC-20		PC-20		PC-20		PC-20	
	SB-FS-TB-PC-20-		SB-FS-PC-20-15.5-		SB-FS-PC-20-18.0-		SB-FS-PC-20-25.0-	
	9.25		15.75		18.25		25.25	
	5/29/2012		6/4/2012		6/4/2012		6/4/2012	
	Peat		Sand		Sand & Silt		Sand	
	60		20		35		5	
	15		0.1		0.1		0.1	
	31		9.5		11		9.9	
CONSTITUENTS								
1,1,1-Trichloroethane	240	U	4.9		2.6	U	20	
1,1,2,2-Tetrachloroethane	240	U	2.4	U	2.6	U	2.6	U
1,1,2-Trichloroethane	240	U	2.4	U	2.6	U	2.6	U
1,1-Dichloroethane	240	U	7.7		2	J	5.5	
1,1-Dichloroethylene	240	U	2.4	U	2.6	U	2.6	U
1,2,3-Trichlorobenzene	240	U	2.4	U	2.6	U	2.6	U
1,2,4-Trichlorobenzene	240	U	2.4	U	2.6	U	2.6	U
1,2-Dichlorobenzene	240	U	2.4	U	2.6	U	5.4	
1,2-Dichloroethane	240	U	2.4	U	2.6	U	2.6	U
1,2-Dichloropropane	240	U	2.4	U	2.6	U	2.6	U
1,3-Dichlorobenzene	240	U	2.4	U	2.6	U	2.6	U
1,4-Dichlorobenzene	240	U	2.4	U	2.6	U	2.6	U
2-Hexanone	2400	U	24	UJ	26	UJ	26	UJ
Acetone	24000	UJ	240	UJ	260	UJ	260	UJ
Benzene	240	U	2.4	U	2.6	U	2.6	U
Bromochloromethane	240	U	2.4	U	2.6	U	2.6	U
Bromodichloromethane	240	U	2.4	U	2.6	U	2.6	U
Bromoform	240	U	2.4	U	2.6	U	2.6	U
Carbon Disulfide	240	U	2.4	U	2.6	U	2.6	U
Carbon Tetrachloride	240	U	2.4	U	2.6	U	2.6	U
Chlorobenzene	240	U	2.4	U	2.6	U	2.6	U
Chloroethane	470	UJ	2.5	J	5.3	U	5.1	U
Chloroform	240	U	2.4	U	2.6	U	2.6	U
cis-1,2-Dichloroethylene	240	U	160		37		130	
cis-1,3-Dichloropropene	240	U	2.4	U	2.6	U	2.6	U
Cyclohexane	2400	U	24	U	26	U	26	U
DBCP	2400	U	24	U	26	U	26	U
Dibromochloromethane	240	U	2.4	U	2.6	U	2.6	U
Dichlorodifluoromethane	470	U	4.8	U	5.3	U	5.1	U
Diethyl ether	240	U	2.4	U	2.6	U	2.6	U
Ethylene dibromide (EDB)	240	U	2.4	U	2.6	U	2.6	U
Ethylbenzene	190	J	2.3	J	2.6	U	2.6	U
Freon 113	1200	U	12	U	13	U	13	U
Isopropylbenzene	240	U	2.4	U	2.6	U	2.6	U
Methyl Acetate	4700	U	48	U	53	U	51	U
Methyl bromide	470	U	4.8	U	5.3	U	5.1	U
Methyl chloride	470	U	4.8	U	5.3	U	5.1	U
Methyl ethyl ketone (MEK)	2400	U*	24	UJ	26	UJ	26	UJ
Methyl isobutyl ketone	2400	U	24	U	26	U	26	U
Methyl tert Butyl Ether (MTBE)	240	U	2.4	U	2.6	U	2.6	U
Methylcyclohexane	240	U	2.4	U	2.6	U	2.6	U
Methylene chloride	940	U	9.6	U	11	U	10	U
m-Xylene & p-Xylene	2400		4.8	U	5.3	U	5.1	U
o-Xylene	1200		2.4	U	2.6	U	2.6	U
Styrene	240	U	2.4	U	2.6	U	2.6	U
Tetrachloroethylene	240	U	2.4	U	2.6	U	2.6	U
Tetrahydrofuran	4700	U	48	UJ	53	UJ	51	UJ
Toluene	240	U	2.4	U	2.6	U	2.6	U
Trans-1,2-Dichloroethene	240	U	2.4		2.6	U	2	J
trans-1,3-Dichloropropene	240	U	2.4	U	2.6	U	2.6	U
Trichloroethylene	240	U	2.4	U	2.6	U	2.6	U
Trichlorofluoromethane	470	U*	4.8	U	5.3	U	5.1	U
Vinyl chloride	240	U	11		1.8	J	11	
Xylene (total)	3600		2.4	U	2.6	U	2.6	U
Sum of Constituents	**3790**		**190.8**		**40.8**		**173.9**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
						Organic Peat							
	PC-20	OP	9.25	8.2	11	OP	8,100	2.8	3,790	44%	2,122	2.50E-08	1.20
												Estimated Total VOC Mass for Strata:	**1.20**
						Grey Silty Sand/Silt							
	PC-20	GSSS	18.25	16.5	21	GSSS	8,100	4.5	41	20%	33	1.07E-07	0.13
												Estimated Total VOC Mass for Strata:	**0.13**
						Sand / Sand and Gravel							
	PC-20	SSG	15.75	11	16.5	SSG	8,100	5.5	191	13%	166	1.18E-07	0.87
	PC-20	SSG	25.25	21	26	SSG	8,100	5.0	174	13%	151	1.18E-07	0.72
												Estimated Total VOC Mass for Strata:	**1.60**
												Estimated Total VOC Mass for PC-20 Area:	**2.93**
COC Specific Calculations by Strata													
1,1,1-Trichloroethane	PC-20	SSG	15.75	11	16.5	SSG	8,100	5.5	4.9	13%	4	1.18E-07	0.02
1,1-Dichloroethane	PC-20	SSG	15.75	11	16.5	SSG	8,100	5.5	7.7	13%	7	1.18E-07	0.04
Chloroethane	PC-20	SSG	15.75	11	16.5	SSG	8,100	5.5	2.5	13%	2	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-20	SSG	15.75	11	16.5	SSG	8,100	5.5	160	13%	139	1.18E-07	0.73
Trans-1,2-Dichloroethene	PC-20	SSG	15.75	11	16.5	SSG	8,100	5.5	2.4	13%	2	1.18E-07	0.01
Vinyl chloride	PC-20	SSG	15.75	11	16.5	SSG	8,100	5.5	11	13%	10	1.18E-07	0.05
1,1-Dichloroethane	PC-20	GSSS	18.25	16.5	21	GSSS	8,100	4.5	2	20%	2	1.07E-07	0.01
cis-1,2-Dichloroethylene	PC-20	GSSS	18.25	16.5	21	GSSS	8,100	4.5	37	20%	30	1.07E-07	0.12
Vinyl chloride	PC-20	GSSS	18.25	16.5	21	GSSS	8,100	4.5	1.8	20%	1	1.07E-07	0.01
1,1,1-Trichloroethane	PC-20	SSG	25.25	21	26	SSG	8,100	5.0	20	13%	17	1.18E-07	0.08
1,1-Dichloroethane	PC-20	SSG	25.25	21	26	SSG	8,100	5.0	5.5	13%	5	1.18E-07	0.02
cis-1,2-Dichloroethylene	PC-20	SSG	25.25	21	26	SSG	8,100	5.0	130	13%	113	1.18E-07	0.54
Trans-1,2-Dichloroethene	PC-20	SSG	25.25	21	26	SSG	8,100	5.0	2	13%	2	1.18E-07	0.01
Vinyl chloride	PC-20	SSG	25.25	21	26	SSG	8,100	5.0	11	13%	10	1.18E-07	0.05
												Estimated Total Target COC Mass for PC-20 Area:	**1.69**

	Target Mass per COC (lbs)	GSSS	SSG
1,1,1-Trichloroethane	0.11	-	0.11
1,1-Dichloroethane	0.06	0.01	0.06
Chloroethane	0.01	-	0.01
cis-1,2-Dichloroethylene	1.39	0.12	1.27
Trans-1,2-Dichloroethene	0.02	-	0.02
Vinyl chloride	0.10	0.01	0.10

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-21

	PC-21		PC-21		PC-21	
	SB-FS-PC-21-6.5-6.75		SB-FS-PC-21-11.0-11.25		SB-FS-PC-21-12.5-12.75	
	5/31/2012		6/7/2012		6/7/2012	
	Gravel		Sand		Gravel	
	15		25		0	
	0.1		0.1		0.1	
	17					
CONSTITUENTS						
1,1,1-Trichloroethane	3.8		2.4	J	2.6	J
1,1,2,2-Tetrachloroethane	2.5	U	2.6	U	2.7	U
1,1,2-Trichloroethane	2.5	U	2.6	U	2.7	U
1,1-Dichloroethane	1.8	J	2.6	U	2.8	
1,1-Dichloroethylene	2.5	U	2.6	U	2.7	U
1,2,3-Trichlorobenzene	2.5	U	2.6	U	2.7	U
1,2,4-Trichlorobenzene	2.5	U	2.6	U	2.7	U
1,2-Dichlorobenzene	1.3	J	2.3	J	1.4	J
1,2-Dichloroethane	2.5	U	2.6	U	2.7	U
1,2-Dichloropropane	2.5	U	2.6	U	2.7	U
1,3-Dichlorobenzene	2.5	U	2.6	U	2.7	U
1,4-Dichlorobenzene	2.5	U	2.6	U	2.7	U
2-Hexanone	25	U	26	U	27	U
Acetone	250	UJ	260	U	270	UJ
Benzene	2.5	U	2.6	U	2.7	U
Bromochloromethane	2.5	U	2.6	U	2.7	U
Bromodichloromethane	2.5	U	2.6	U	2.7	U
Bromoform	2.5	U	2.6	U	2.7	U
Carbon Disulfide	2.5	U	2.6	U	2.7	U
Carbon Tetrachloride	2.5	U	2.6	U	2.7	U
Chlorobenzene	2.5	U	2.6	U	2.7	U
Chloroethane	5.1	U	5.2	U	5.5	U
Chloroform	2.5	U	2.6	U	2.7	U
cis-1,2-Dichloroethylene	19		13		10	
cis-1,3-Dichloropropene	2.5	U	2.6	U	2.7	U
Cyclohexane	25	U	26	U	27	U
DBCP	25	U	26	U	27	U
Dibromochloromethane	2.5	U	2.6	U	2.7	U
Dichlorodifluoromethane	5.1	U	5.2	U	5.5	U
Diethyl ether	2.5	U	2.6	U	2.7	U
Ethylene dibromide (EDB)	2.5	U	2.6	U	2.7	U
Ethylbenzene	2.5	U	3.8		2.7	U
Freon 113	13	U	13	U	14	U
Isopropylbenzene	2.5	U	2.6	U	2.7	U
Methyl Acetate	51	U	52	U	55	U
Methyl bromide	5.1	U	5.2	U	5.5	U
Methyl chloride	5.1	U	5.2	U	5.5	U
Methyl ethyl ketone (MEK)	25	UJ	26	U	27	U
Methyl isobutyl ketone	25	U	26	U	27	U
Methyl tert Butyl Ether (MTBE)	2.5	U	2.6	U	2.7	U
Methylcyclohexane	2.5	U	2.6	U	2.7	U
Methylene chloride	8.4	J	10	U	11	U
m-Xylene & p-Xylene	5.1	U	5.2	U	5.5	U
o-Xylene	2.5	U	2.6	U	2.7	U
Styrene	2.5	U	2.6	U	2.7	U
Tetrachloroethylene	2.5	U	2.6	U	2.7	U
Tetrahydrofuran	51	UJ	52	UJ	55	U
Toluene	2.5	U	2.6	U	2.7	U
Trans-1,2-Dichloroethene	2.5	U	2.6	U	2.7	U
trans-1,3-Dichloropropene	2.5	U	2.6	U	2.7	U
Trichloroethylene	2.5	U	2.6	U	2.7	U
Trichlorofluoromethane	5.1	U	5.2	U	5.5	U
Vinyl chloride	6.6		4.3		6.6	
Xylene (total)	2.5	U	2.6	U	2.7	U
Sum of Constituents	**40.9**		**25.8**		**23.4**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density / 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-21	SSG	6.75	6.5	9	SSG	6,926	2.5	41	13%	36	1.18E-07	0.07
	PC-21	SSG	11.25	9	12	SSG	6,926	3.0	26	13%	22	1.18E-07	0.06
	PC-21	SSG	12.75	12	17	SSG	6,926	5.0	23	13%	20	1.18E-07	0.08
											Estimated Total VOC Mass for Strata:		**0.21**
											Estimated Total VOC Mass for PC-21 Area:		**0.21**
COC Specific Calculations by Strata													
1,1,1-Trichloroethane	PC-21	SSG	6.75	6.5	9	SSG	6,926	2.5	3.8	13%	3	1.18E-07	0.01
1,1-Dichloroethane	PC-21	SSG	6.75	6.5	9	SSG	6,926	2.5	1.8	13%	2	1.18E-07	0.00
cis-1,2-Dichloroethylene	PC-21	SSG	6.75	6.5	9	SSG	6,926	2.5	19	13%	17	1.18E-07	0.03
Vinyl chloride	PC-21	SSG	6.75	6.5	9	SSG	6,926	2.5	6.6	13%	6	1.18E-07	0.01
1,1,1-Trichloroethane	PC-21	SSG	11.25	9	12	SSG	6,926	3.0	2.4	13%	2	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-21	SSG	11.25	9	12	SSG	6,926	3.0	13	13%	11	1.18E-07	0.03
Vinyl chloride	PC-21	SSG	11.25	9	12	SSG	6,926	3.0	4.3	13%	4	1.18E-07	0.01
1,1,1-Trichloroethane	PC-21	SSG	12.75	12	17	SSG	6,926	5.0	2.6	13%	2	1.18E-07	0.01
1,1-Dichloroethane	PC-21	SSG	12.75	12	17	SSG	6,926	5.0	2.8	13%	2	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-21	SSG	12.75	12	17	SSG	6,926	5.0	10	13%	9	1.18E-07	0.04
Vinyl chloride	PC-21	SSG	12.75	12	17	SSG	6,926	5.0	6.6	13%	6	1.18E-07	0.02
											Estimated Total Target COC Mass for PC-21 Area:		**0.18**

	Target Mass per COC (lbs)	SSG
1,1,1-Trichloroethane	0.02	0.02
1,1-Dichloroethane	0.01	0.01
cis-1,2-Dichloroethylene	0.10	0.10
Vinyl chloride	0.04	0.04

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-22

	PC-22		PC-22		PC-22	
	SB-FS-PC-22-13.5-13.75		SB-FS-PC-22-16.0-16.25		SB-FS-PC-22-28.5-28.75	
	5/23/2012		5/23/2012		5/23/2012	
	Sand & Silt		Sand		Sand	
	25		10		5	
	0.5		0.1		0.1	
	17		4.2		13	
CONSTITUENTS						
1,1,1-Trichloroethane	3	U	2.8	U	2.2	U
1,1,2,2-Tetrachloroethane	3	U	2.8	U	2.2	U
1,1,2-Trichloroethane	3	U	2.8	U	2.2	U
1,1-Dichloroethane	3	U	2.8	U	2.2	U
1,1-Dichloroethylene	3	U	2.8	U	2.2	U
1,2,3-Trichlorobenzene	3	U	2.8	U	2.2	U
1,2,4-Trichlorobenzene	3	U	2.8	U	2.2	U
1,2-Dichlorobenzene	3	U	2.8	U	2.2	U
1,2-Dichloroethane	3	U	2.8	U	2.2	U
1,2-Dichloropropane	3	U	2.8	U	2.2	U
1,3-Dichlorobenzene	3	U	2.8	U	2.2	U
1,4-Dichlorobenzene	3	U	2.8	U	2.2	U
2-Hexanone	30	U	28	U	22	U
Acetone	300	UJ	280	UJ	220	UJ
Benzene	3	U	2.8	U	2.2	U
Bromochloromethane	3	U	2.8	U	2.2	U
Bromodichloromethane	3	U	2.8	U	2.2	U
Bromoform	3	U	2.8	U	2.2	U
Carbon Disulfide	3	U	2.8	U	1.9	J
Carbon Tetrachloride	3	U	2.8	U	2.2	U
Chlorobenzene	3	U	2.8	U	2.2	U
Chloroethane	6	U	5.5	U	4.4	U
Chloroform	3	U	2.8	U	2.2	U
cis-1,2-Dichloroethylene	3	U	2.8	U	2.2	U
cis-1,3-Dichloropropene	3	U	2.8	U	2.2	U
Cyclohexane	30	U	28	U	22	U
DBCP	30	U	28	U	22	U
Dibromochloromethane	3	U	2.8	U	2.2	U
Dichlorodifluoromethane	6	U	5.5	U	4.4	U
Diethyl ether	3	U	2.8	U	2.2	U
Ethylene dibromide (EDB)	3	U	2.8	U	2.2	U
Ethylbenzene	3	U	2.8	U	2.2	U
Freon 113	15	U	14	U	11	U
Isopropylbenzene	3	U	2.8	U	2.2	U
Methyl Acetate	60	U	55	U	44	U
Methyl bromide	6	U	5.5	U	4.4	U
Methyl chloride	6	U	5.5	U	4.4	U
Methyl ethyl ketone (MEK)	30	UJ	28	UJ	22	UJ
Methyl isobutyl ketone	30	U	28	U	22	U
Methyl tert Butyl Ether (MTBE)	3	U	2.8	U	2.2	U
Methylcyclohexane	3	U	2.8	U	2.2	U
Methylene chloride	12	U	11	U	8.7	U
m-Xylene & p-Xylene	6	U	5.5	U	4.4	U
o-Xylene	3	U	2.8	U	2.2	U
Styrene	3	U	2.8	U	2.2	U
Tetrachloroethylene	3	U	4.2		2.2	U
Tetrahydrofuran	60	U	55	U	44	U
Toluene	3	U	2.8	U	2.2	U
Trans-1,2-Dichloroethene	3	U	2.8	U	2.2	U
trans-1,3-Dichloropropene	3	U	2.8	U	2.2	U
Trichloroethylene	3	U	2.8	U	2.2	U
Trichlorofluoromethane	6	U	5.5	U	4.4	U
Vinyl chloride	3	U	2.8	U	2.2	U
Xylene (total)	3	U	2.8	U	2.2	U
Sum of Constituents	**0**		**4.2**		**1.9**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density / 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
	Grey Silty Sand / Silt												
	PC-22	GSSS	13.75	10.25	15	GSSS	5,621	4.8	0	20%	0	1.07E-07	0.00
												Estimated Total VOC Mass for Strata:	**0.00**
	Sand / Sand and Gravel												
	PC-22	SSG	16.25	15	22.5	SSG	5,621	7.5	4	13%	4	1.18E-07	0.02
	PC-22	SSG	28.75	22.5	29	SSG	5,621	6.5	2	13%	2	1.18E-07	0.01
												Estimated Total VOC Mass for Strata:	**0.03**
												Estimated Total VOC Mass for PC-22 Area:	**0.03**
COC Specific Calculations by Strata													
Tetrachloroethylene	PC-22	SSG	16.25	15	22.5	SSG	5,621	7.5	4	13%	4	1.18E-07	0.02
												Estimated Total Target COC Mass for PC-22 Area:	**0.02**

	Target Mass per COC (lbs)	SSG
Tetrachloroethylene	0.02	0.02

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-23

	PC-23		PC-23		PC-23		PC-23		PC-23		PC-23	
	SB-FS-PC-23-13.0-		SB-FS-PC-23-14.0-		SB-PCB-2		SB-FS-PC-23-18.0-		SB-FS-PC-23-24.0-		SB-FS-PC-23-29.0-	
	13.25		14.25		14.25		18.25		24.25		29.25	
	5/24/2012		5/24/2012		5/24/2012		5/24/2012		5/24/2012		5/24/2012	
	Peat		Sand		Sand		Sand & Silt		Sand		Sand	
	40		15		15		25		0		0	
	15		1		1		5		0.1		0.1	
	30		10		12		24		7.2		22	
CONSTITUENTS					Duplicate							
1,1,1-Trichloroethane	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
1,1,2,2-Tetrachloroethane	3.1	UJ	2.7	UJ	2.6	UJ	3.1	UJ	2.2	UJ	2.7	UJ
1,1,2-Trichloroethane	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
1,1-Dichloroethane	81		3.8		3.1		2.3	J	2.2	U	2.7	U
1,1-Dichloroethylene	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
1,2,3-Trichlorobenzene	3.1	UJ	2.7	U	2.6	U	3.1	UJ	2.2	U	2.7	U
1,2,4-Trichlorobenzene	3.1	UJ	2.7	U	2.6	U	3.1	UJ	2.2	U	2.7	U
1,2-Dichlorobenzene	3.1	UJ	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
1,2-Dichloroethane	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
1,2-Dichloropropane	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
1,3-Dichlorobenzene	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
1,4-Dichlorobenzene	3.1	UJ	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
2-Hexanone	31	U	27	U	26	U	31	U	22	U	27	U
Acetone	310	UJ	270	UJ	260	UJ	310	UJ	220	UJ	270	UJ
Benzene	4.6		2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
Bromochloromethane	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
Bromodichloromethane	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
Bromoform	3.1	UJ	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
Carbon Disulfide	3	J	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
Carbon Tetrachloride	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
Chlorobenzene	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
Chloroethane	16		5.4	U	5.3	U	6.2	U	4.3	U	5.4	U
Chloroform	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
cis-1,2-Dichloroethylene	8.1		2.7	U	2.6	U	18		2.2	U	2.7	U
cis-1,3-Dichloropropene	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
Cyclohexane	31	U	27	U	26	U	31	U	22	U	27	U
DBCP	31	UJ	27	UJ	26	UJ	31	UJ	22	UJ	27	UJ
Dibromochloromethane	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
Dichlorodifluoromethane	6.2	U	5.4	U	5.3	U	6.2	U	4.3	U	5.4	U
Diethyl ether	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
Ethylene dibromide (EDB)	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
Ethylbenzene	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
Freon 113	16	U	14	U	13	U	15	U	11	U	14	U
Isopropylbenzene	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
Methyl Acetate	62	U	54	U	53	U	62	U	43	U	54	U
Methyl bromide	6.2	U	5.4	U	5.3	U	6.2	U	4.3	U	5.4	U
Methyl chloride	6.2	U	5.4	U	5.3	U	6.2	U	4.3	U	5.4	U
Methyl ethyl ketone (MEK)	31	U	27	U	26	U	31	UJ	22	U	27	U
Methyl isobutyl ketone	31	U	27	U	26	U	31	U	22	U	27	U
Methyl tert Butyl Ether (MTBE)	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
Methylcyclohexane	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
Methylene chloride	12	U	11	U	11	U	12	U	8.7	U	11	U
m-Xylene & p-Xylene	6.2	U	5.4	U	5.3	U	6.2	U	4.3	U	5.4	U
o-Xylene	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
Styrene	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
Tetrachloroethylene	17		2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
Tetrahydrofuran	62	U	54	U	53	U	62	U	43	U	54	U
Toluene	10		2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
Trans-1,2-Dichloroethene	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
trans-1,3-Dichloropropene	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
Trichloroethylene	13		2.7	U	2.6	U	37		2.2	U	2.7	U
Trichlorofluoromethane	6.2	U	5.4	U	5.3	U	6.2	U	4.3	U	5.4	U
Vinyl chloride	3.1	U	2.7	U	2.6	U	2.1	J	2.2	U	2.7	U
Xylene (total)	3.1	U	2.7	U	2.6	U	3.1	U	2.2	U	2.7	U
Sum of Constituents	**152.7**		**3.8**		**3.1**		**59.4**		**0**		**0**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thicknes s of Mass Unit	Total VOC Concentr ation (dry weight)	Moisture Content Results of Samples	Total VOC Concentr ation (wet weight)	Bulk Density / 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{5})x(kg/1x10	(lbs)
	Organic Peat												
	PC-23	OP	13.25	13	13.5	OP	7,918	0.5	153	44%	86	2.50E-08	0.01
	Estimated Total VOC Mass for Strata:												**0.01**
	Grey Silty Sand / Silt												
	PC-23	GSSS	18.25	17.5	21	GSSS	7,918	3.5	59	20%	48	1.07E-07	0.14
	Estimated Total VOC Mass for Strata:												**0.14**
	Sand / Sand and Gravel												
	PC-23	SSG	14.25	13.5	17.5	GSSS	7,918	4.0	4	13%	3	1.18E-07	0.01
	PC-23	SSG	24.25	17.5	26.75	SSG	7,918	9.3	0	13%	0	1.18E-07	0.00
	PC-23	SSG	29.25	26.75	34.5	SSG	7,918	7.8	0	13%	0	1.18E-07	0.00
	Estimated Total VOC Mass for Strata:												**0.01**
	Estimated Total VOC Mass for PC-23 Area:												**0.16**
COC Specific Calculations by Strata													
1,1-Dichloroethane	PC-23	OP	13.25	13	13.5	OP	7,918	0.5	81	44%	45	2.50E-08	0.00
Chloroethane	PC-23	OP	13.25	13	13.5	OP	7,918	0.5	16	44%	9	2.50E-08	0.001
cis-1,2-Dichloroethylene	PC-23	OP	13.25	13	13.5	OP	7,918	0.5	8.1	44%	5	2.50E-08	0.00
Tetrachloroethylene	PC-23	OP	13.25	13	13.5	OP	7,918	0.5	17	44%	10	2.50E-08	0.001
Trichloroethylene	PC-23	OP	13.25	13	13.5	OP	7,918	0.5	13	44%	7	2.50E-08	0.00
1,1-Dichloroethane	PC-23	SSG	14.25	13.5	17.5	GSSS	7,918	4.0	3.8	13%	3	1.18E-07	0.01
1,1-Dichloroethane	PC-23	GSSS	18.25	17.5	21	GSSS	7,918	3.5	2.3	20%	2	1.07E-07	0.01
cis-1,2-Dichloroethylene	PC-23	GSSS	18.25	17.5	21	GSSS	7,918	3.5	18	20%	14	1.07E-07	0.04
Trichloroethylene	PC-23	GSSS	18.25	17.5	21	GSSS	7,918	3.5	37	20%	30	1.07E-07	0.09
Vinyl chloride	PC-23	GSSS	18.25	17.5	21	GSSS	7,918	3.5	2.1	20%	2	1.07E-07	0.00
	Estimated Total Target COC Mass for PC-23 Area:												**0.16**

	Target Mass per COC (lbs)	OP	GSSS	SSG
1,1-Dichloroethane	0.02	0.00	0.01	0.01
Chloroethane	0.001	0.001	-	-
cis-1,2-Dichloroethylene	0.04	0.00	0.04	-
Tetrachloroethylene	0.001	0.00	-	-
Trichloroethylene	0.09	0.00	0.09	-
Vinyl chloride	0.005	-	0.00	-

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-24

	PC-24		PC-24		PC-24		PC-24		PC-24	
	SB-FS-PC-24-12.5-		SB-FS-PC-24-14.5-		SB-FS-PC-24-18.0-		SB-FS-PC-24-24.0-		SB-FS-PC-24-34.0-	
	12.75		14.75		18.25		24.25		34.25	
	5/30/2012		5/30/2012		6/8/2012		5/30/2012		5/30/2012	
	Peat		Sand & Silt		Sand		Sand		Sand & Gravel	
	30		45		0		0		0	
	15		5		0.1		0.1		0.1	
			17				21		8	
CONSTITUENTS										
1,1,1-Trichloroethane	880	UJ	170	U	2.5	U	2.7	U	2.3	U
1,1,2,2-Tetrachloroethane	880	UJ	170	U	2.5	U	2.7	U	2.3	U
1,1,2-Trichloroethane	880	UJ	170	U	2.5	U	2.7	U	2.3	U
1,1-Dichloroethane	880	UJ	170	U	2.5	U	2.7	U	2.3	U
1,1-Dichloroethylene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
1,2,3-Trichlorobenzene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
1,2,4-Trichlorobenzene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
1,2-Dichlorobenzene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
1,2-Dichloroethane	880	UJ	170	U	2.5	U	2.7	U	2.3	U
1,2-Dichloropropane	880	UJ	170	U	2.5	U	2.7	U	2.3	U
1,3-Dichlorobenzene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
1,4-Dichlorobenzene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
2-Hexanone	8800	UJ	1700	UJ	25	U	27	U*	23	U*
Acetone	88000	UJ	17000	UJ	250	U	270	U*	230	U*
Benzene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Bromochloromethane	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Bromodichloromethane	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Bromoform	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Carbon Disulfide	880	UJ	170	U	2.5	U	2.7	U*	2.3	U*
Carbon Tetrachloride	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Chlorobenzene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Chloroethane	1800	UJ	340	U	4.9	U	5.5	U	4.6	U
Chloroform	880	UJ	170	U	2.5	U	2.7	U	2.3	U
cis-1,2-Dichloroethylene	68000	J	1100		2.5		2.5	J	2.3	U
cis-1,3-Dichloropropene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Cyclohexane	8800	UJ	1700	U	25	U	27	U	23	U
DBCP	8800	UJ	1700	U	25	U	27	U	23	U
Dibromochloromethane	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Dichlorodifluoromethane	1800	UJ	340	U	4.9	U	5.5	U	4.6	U
Diethyl ether	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Ethylene dibromide (EDB)	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Ethylbenzene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Freon 113	4400	UJ	850	U	12	U	14	U	12	U
Isopropylbenzene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Methyl Acetate	18000	UJ	3400	U	49	U	55	U	46	U
Methyl bromide	1800	UJ	340	U	4.9	U	5.5	U	4.6	U
Methyl chloride	1800	UJ	340	U	4.9	U	5.5	U	4.6	U
Methyl ethyl ketone (MEK)	8800	UJ	1700	UJ	25	U	27	U*	23	U*
Methyl isobutyl ketone	8800	UJ	1700	U	25	U	27	U	23	U
Methyl tert Butyl Ether (MTBE)	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Methylcyclohexane	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Methylene chloride	4200	UJ	830	U	9.8	U	8	J	7.1	J
m-Xylene & p-Xylene	1800	UJ	340	U	4.9	U	5.5	U	4.6	U
o-Xylene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Styrene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Tetrachloroethylene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Tetrahydrofuran	18000	UJ	3400	UJ	49	UJ	55	U	46	U
Toluene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Trans-1,2-Dichloroethene	4000	J	170	U	2.5	U	2.7	U	2.3	U
trans-1,3-Dichloropropene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Trichloroethylene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Trichlorofluoromethane	1800	UJ	340	U	4.9	U	5.5	U	4.6	U
Vinyl chloride	2400	J	170	U	1.6	J	8.3		2.3	U
Xylene (total)	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Sum of Constituents	**74400**		**1100**		**4.1**		**18.8**		**7.1**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
	Organic Peat												
	PC-24	OP	12.75	12	13.5	OP	8,100	1.5	74,400	44%	41,664	2.50E-08	12.66
	Estimated Total VOC Mass for Strata:												**12.66**
	Grey Silty Sand/Silt												
	PC-24	GSSS	14.75	13.5	18	GSSS	8,100	4.5	1,100	17%	913	1.07E-07	3.56
	Estimated Total VOC Mass for Strata:												**3.56**
	Sand / Sand and Gravel												
	PC-24	SSG	18.25	18	21.25	SSG	8,100	3.3	4	15%	3	1.18E-07	0.01
	PC-24	SSG	24.25	21.25	29.25	SSG	8,100	8.0	19	21%	15	1.18E-07	0.11
	PC-24	SSG	34.25	29.25	38.5	SSG	8,100	9.3	7	8%	7	1.18E-07	0.06
	Estimated Total VOC Mass for Strata:												**0.18**
	Estimated Total VOC Mass for PC-24 Area:												**16.40**
COC Specific Calculations by Strata													
cis-1,2-Dichloroethylene	PC-24	OP	12.75	12	13.5	OP	8,100	1.5	68000	44%	38,080	2.50E-08	11.57
Trans-1,2-Dichloroethene	PC-24	OP	12.75	12	13.5	OP	8,100	1.5	4000	44%	2,240	2.50E-08	0.68
Vinyl chloride	PC-24	OP	12.75	12	13.5	OP	8,100	1.5	2400	44%	1,344	2.50E-08	0.41
cis-1,2-Dichloroethylene	PC-24	GSSS	14.75	13.5	18	GSSS	8,100	4.5	1100	20%	880	1.07E-07	3.43
cis-1,2-Dichloroethylene	PC-24	SSG	18.25	18	21.25	SSG	8,100	3.3	2.5	13%	2	1.18E-07	0.01
Vinyl chloride	PC-24	SSG	18.25	18	21.25	SSG	8,100	3.3	1.6	13%	1	1.18E-07	0.00
cis-1,2-Dichloroethylene	PC-24	SSG	24.25	21.25	29.25	SSG	8,100	8.0	2.5	13%	2	1.18E-07	0.02
Vinyl chloride	PC-24	SSG	24.25	21.25	29.25	SSG	8,100	8.0	8.3	13%	7	1.18E-07	0.06
	Estimated Total Target COC Mass for PC-24 Area:												**16.17**

	Target Mass per COC (lbs)	OP	GSSS	SSG
cis-1,2-Dichloroethylene	15.02	11.57	3.43	0.02
Trans-1,2-Dichloroethene	0.68	0.68	-	-
Vinyl chloride	0.47	0.41	-	0.06

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-25

	PC-25		PC-25		PC-25		PC-25	
	SB-FS-PC-25-11.5-		SB-FS-PC-25-12.5-		SB-FS-PC-25-27.0-		SB-FS-PC-25-35.0-	
	11.75		12.75		27.25		35.25	
	5/24/2012		5/24/2012		5/24/2012		5/24/2012	
	Peat		Silt & Clay		Sand		Sand	
	30		90		0		0	
	15		5		0.1		0.1	
	71		56		8.7		26	
CONSTITUENTS								
1,1,1-Trichloroethane	740	UJ	5.8	U	2.3	U	2.6	U
1,1,2,2-Tetrachloroethane	740	UJ	5.8	UJ	2.3	UJ	2.6	UJ
1,1,2-Trichloroethane	740	UJ	5.8	U	2.3	U	2.6	U
1,1-Dichloroethane	1700	J	39		2.3	U	2.6	U
1,1-Dichloroethylene	740	UJ	5.8	U	2.3	U	2.6	U
1,2,3-Trichlorobenzene	740	UJ	5.8	U	2.3	U	2.6	U
1,2,4-Trichlorobenzene	740	UJ	5.8	U	2.3	U	2.6	U
1,2-Dichlorobenzene	740	UJ	5.8	U	2.3	U	2.6	U
1,2-Dichloroethane	740	UJ	5.8	U	2.3	U	2.6	U
1,2-Dichloropropane	740	UJ	5.8	U	2.3	U	2.6	U
1,3-Dichlorobenzene	740	UJ	5.8	U	2.3	U	2.6	U
1,4-Dichlorobenzene	740	UJ	5.8	U	2.3	U	2.6	U
2-Hexanone	7400	UJ	58	U	23	U	26	U
Acetone	74000	UJ	580	UJ	230	UJ	260	UJ
Benzene	740	UJ	5.8	U	2.3	U	2.6	U
Bromochloromethane	740	UJ	5.8	U	2.3	U	2.6	U
Bromodichloromethane	740	UJ	5.8	U	2.3	U	2.6	U
Bromoform	740	UJ	5.8	U	2.3	U	2.6	U
Carbon Disulfide	740	UJ	5.8	U	2.3	U	12	
Carbon Tetrachloride	740	UJ	5.8	U	2.3	U	2.6	U
Chlorobenzene	740	UJ	5.8	U	2.3	U	2.6	U
Chloroethane	1500	UJ	16		4.5	U	5.2	U
Chloroform	740	UJ	5.8	U	2.3	U	2.6	U
cis-1,2-Dichloroethylene	15000	J	130		2.3	U	1.5	J
cis-1,3-Dichloropropene	740	UJ	5.8	U	2.3	U	2.6	U
Cyclohexane	7400	UJ	58	U	23	U	26	U
DBCP	7400	UJ	58	UJ	23	UJ	26	UJ
Dibromochloromethane	740	UJ	5.8	U	2.3	U	2.6	U
Dichlorodifluoromethane	1500	UJ	12	U	4.5	U	5.2	U
Diethyl ether	740	UJ	5.8	U	2.3	U	2.6	U
Ethylene dibromide (EDB)	740	UJ	5.8	U	2.3	U	2.6	U
Ethylbenzene	740	UJ	5.8	U	2.3	U	2.9	
Freon 113	3700	UJ	29	U	11	U	13	U
Isopropylbenzene	740	UJ	5.8	U	2.3	U	2.6	U
Methyl Acetate	15000	UJ	120	U	45	U	52	U
Methyl bromide	1500	UJ	12	U	4.5	U	5.2	U
Methyl chloride	1500	UJ	12	U	4.5	U	5.2	U
Methyl ethyl ketone (MEK)	7400	UJ	51	J	23	U	26	U
Methyl isobutyl ketone	7400	UJ	58	U	23	U	26	U
Methyl tert Butyl Ether (MTBE)	740	UJ	5.8	U	2.3	U	2.6	U
Methylcyclohexane	740	UJ	5.8	U	2.3	U	2.6	U
Methylene chloride	2900	UJ	23	U	9.1	U	10	U
m-Xylene & p-Xylene	1500	UJ	12	U	4.5	U	5.2	U
o-Xylene	740	UJ	5.8	U	2.3	U	2.6	U
Styrene	740	UJ	5.8	U	2.3	U	2.6	U
Tetrachloroethylene	590	J	5.8	U	2.3	U	2.6	U
Tetrahydrofuran	15000	UJ	120	U	45	U	52	U
Toluene	740	UJ	5.8	U	2.3	U	2.6	U
Trans-1,2-Dichloroethene	570	J	11		2.3	U	2.6	U
trans-1,3-Dichloropropene	740	UJ	5.8	U	2.3	U	2.6	U
Trichloroethylene	2200	J	5.8	U	2.3	U	2.6	U
Trichlorofluoromethane	1500	UJ	12	U	4.5	U	5.2	U
Vinyl chloride	950	J	100		6.4		6.7	
Xylene (total)	740	UJ	5.8	U	2.3	U	2.6	U
Sum of Constituents	**21010**		**347**		**6.4**		**23.1**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density / 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
	Organic Peat												
	PC-25	OP	11.75	11	12	OP	7,109	1.0	21,010	44%	11,766	2.50E-08	2.09
	Estimated Total VOC Mass for Strata:												**2.09**
	Grey Silty Sand / Silt												
	PC-25	GSSS	12.75	12	13.5	GSSS	7,109	1.5	347	20%	278	1.07E-07	0.32
	Estimated Total VOC Mass for Strata:												**0.32**
	Sand / Sand and Gravel												
	PC-25	SSG	27.25	13.5	31.25	SSG	7,109	17.8	6	13%	6	1.18E-07	0.08
	PC-25	SSG	35.25	31.25	40	SSG	7,109	8.8	23	13%	20	1.18E-07	0.15
	Estimated Total VOC Mass for Strata:												**0.23**
	Estimated Total VOC Mass for PC-25 Area:												**2.64**
	COC Specific Calculations by Strata												
1,1-Dichloroethane	PC-25	OP	11.75	11	12	OP	7,109	1.0	1700	44%	952	2.50E-08	0.17
cis-1,2-Dichloroethylene	PC-25	OP	11.75	11	12	OP	7,109	1.0	15000	44%	8,400	2.50E-08	1.49
Tetrachloroethylene	PC-25	OP	11.75	11	12	OP	7,109	1.0	590	44%	330	2.50E-08	0.06
Trans-1,2-Dichloroethene	PC-25	OP	11.75	11	12	OP	7,109	1.0	570	44%	319	2.50E-08	0.06
Trichloroethylene	PC-25	OP	11.75	11	12	OP	7,109	1.0	2200	44%	1,232	2.50E-08	0.22
Vinyl chloride	PC-25	OP	11.75	11	12	OP	7,109	1.0	950	44%	532	2.50E-08	0.09
1,1-Dichloroethane	PC-25	GSSS	12.75	12	13.5	GSSS	7,109	1.5	39	20%	31	1.07E-07	0.04
Chloroethane	PC-25	GSSS	12.75	12	13.5	GSSS	7,109	1.5	16	20%	13	1.07E-07	0.01
cis-1,2-Dichloroethylene	PC-25	GSSS	12.75	12	13.5	GSSS	7,109	1.5	130	20%	104	1.07E-07	0.12
Trans-1,2-Dichloroethene	PC-25	GSSS	12.75	12	13.5	GSSS	7,109	1.5	11	20%	9	1.07E-07	0.01
Vinyl chloride	PC-25	GSSS	12.75	12	13.5	GSSS	7,109	1.5	100	20%	80	1.07E-07	0.09
Vinyl chloride	PC-25	SSG	27.25	13.5	31.25	SSG	7,109	17.8	6.4	13%	6	1.18E-07	0.08
cis-1,2-Dichloroethylene	PC-25	SSG	35.25	31.25	40	SSG	7,109	8.8	1.5	13%	1	1.18E-07	0.01
Vinyl chloride	PC-25	SSG	35.25	31.25	40	SSG	7,109	8.8	6.7	13%	6	1.18E-07	0.04
	Estimated Total Target COC Mass for PC-25 Area:												**2.50**

	Target Mass per COC (lbs)	OP	GSSS	SSG
1,1-Dichloroethane	0.20	0.17	0.04	-
Chloroethane	0.01	-	0.01	-
cis-1,2-Dichloroethylene	1.62	1.49	0.12	0.01
Tetrachloroethylene	0.06	0.06	-	-
Trans-1,2-Dichloroethene	0.07	0.06	0.01	-
Trichloroethylene	0.22	0.22	-	-
Vinyl chloride	0.31	0.09	0.09	0.13

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-26

	PC-26		PC-26		PC-26		PC-26		PC-26	
	SB-FS-PC-26-10.0-		SB-FS-PC-26-14.0-		SB-FS-PC-26-19.5-		SB-FS-PC-26-27.0-		SB-FS-PC-26-32.5-	
	10.25		14.25		19.75		27.25		32.75	
	6/6/2012		6/6/2012		6/6/2012		6/6/2012		6/6/2012	
	Sand		Sand		Sand		Sand		Sand & Gravel	
	0		0		0		0		15	
	0.1		0.1		0.1		0.1		0.1	
	16		19		9.3		6.6		14	
CONSTITUENTS										
1,1,1-Trichloroethane	2.8	U	3	U	2.4	J	2.3	U	2.4	
1,1,2,2-Tetrachloroethane	2.8	U	3	U	2.5	U	2.3	U	2.1	U
1,1,2-Trichloroethane	2.8	U	3	U	2.5	U	2.3	U	2.1	U
1,1-Dichloroethane	2.8	U	3	U	2.5	U	2.3	U	2.1	U
1,1-Dichloroethylene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
1,2,3-Trichlorobenzene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
1,2,4-Trichlorobenzene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
1,2-Dichlorobenzene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
1,2-Dichloroethane	2.8	U	3	U	2.5	U	2.3	U	2.1	U
1,2-Dichloropropane	2.8	U	3	U	2.5	U	2.3	U	2.1	U
1,3-Dichlorobenzene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
1,4-Dichlorobenzene	6		3	U	2.5	U	2.3	U	2.1	U
2-Hexanone	28	U	30	UJ	25	U	23	UJ	21	UJ
Acetone	280	U	300	UJ	250	U	230	UJ	210	UJ
Benzene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Bromochloromethane	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Bromodichloromethane	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Bromoform	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Carbon Disulfide	2.8	U	3	U	2.5	U	2.3	U	7.8	
Carbon Tetrachloride	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Chlorobenzene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Chloroethane	5.6	U	6	U	5	U	4.5	U	4.1	U
Chloroform	2.8	U	3	U	2.5	U	2.3	U	2.1	U
cis-1,2-Dichloroethylene	2.8	U	5.7		5.6		2.3	U	3.7	
cis-1,3-Dichloropropene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Cyclohexane	28	U	30	U	25	U	23	U	21	U
DBCP	28	U	30	U	25	U	23	U	21	U
Dibromochloromethane	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Dichlorodifluoromethane	5.6	U	6	U	5	U	4.5	U	4.1	U
Diethyl ether	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Ethylene dibromide (EDB)	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Ethylbenzene	2.8	U	3	U	2.1	J	2.3	U	2.1	
Freon 113	14	U	15	U	13	U	11	U	10	U
Isopropylbenzene	8.6		3	U	2.5	U	2.3	U	2.1	U
Methyl Acetate	56	U	60	U	50	U	45	U	41	U
Methyl bromide	5.6	U	6	U	5	U	4.5	U	4.1	U
Methyl chloride	5.6	U	6	U	5	U	4.5	U	4.1	U
Methyl ethyl ketone (MEK)	28	U	30	UJ	25	U	23	UJ	21	UJ
Methyl isobutyl ketone	28	U	30	U	25	U	23	U	21	U
Methyl tert Butyl Ether (MTBE)	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Methylcyclohexane	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Methylene chloride	11	U	3.3	U	10	U	9.1	U	2.1	U
m-Xylene & p-Xylene	7.5		6	U	5	U	4.5	U	4.1	U
o-Xylene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Styrene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Tetrachloroethylene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Tetrahydrofuran	56	UJ	60	UJ	50	UJ	45	UJ	41	UJ
Toluene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Trans-1,2-Dichloroethene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
trans-1,3-Dichloropropene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Trichloroethylene	2.8	U	5		2.5	U	2.3	U	2.1	U
Trichlorofluoromethane	5.6	U	6	U	5	U	4.5	U	4.1	U
Vinyl chloride	2.8	U	3.4		11		2.3	U	5	
Xylene (total)	7.5		3	U	2.5	U	2.3	U	2.1	U
Sum of Constituents	**22.1**		**14.1**		**21.1**		**0**		**21**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-26	SSG	10.25	6.75	12.25	SSG	5,378	5.5	22	16%	19	1.18E-07	0.06
	PC-26	SSG	14.25	12.25	17	SSG	5,378	4.8	14	19%	11	1.18E-07	0.03
	PC-26	SSG	19.75	17	23.5	SSG	5,378	6.5	21	9%	19	1.18E-07	0.08
	PC-26	SSG	27.25	23.5	30	SSG	5,378	6.5	0	7%	0	1.18E-07	0.00
	PC-26	SSG	32.75	30	36	SSG	5,378	6.0	21	14%	18	1.18E-07	0.07
												Estimated Total VOC Mass for Strata:	**0.25**
												Estimated Total VOC Mass for PC-28 Area:	**0.25**
COC Specific Calculations by Strata													
cis-1,2-Dichloroethylene	PC-26	SSG	14.25	12.25	17	SSG	5,378	4.8	5.7	13%	5	1.18E-07	0.01
Trichloroethylene	PC-26	SSG	14.25	12.25	17	SSG	5,378	4.8	5	13%	4	1.18E-07	0.01
Vinyl chloride	PC-26	SSG	14.25	12.25	17	SSG	5,378	4.8	3.4	13%	3	1.18E-07	0.01
							5,378						
1,1,1-Trichloroethane	PC-26	SSG	19.75	17	23.5	SSG	5,378	6.5	2.4	13%	2	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-26	SSG	19.75	17	23.5	SSG	5,378	6.5	5.6	13%	5	1.18E-07	0.02
Vinyl chloride	PC-26	SSG	19.75	17	23.5	SSG	5,378	6.5	11	13%	10	1.18E-07	0.04
							5,378						
1,1,1-Trichloroethane	PC-26	SSG	32.75	30	36	SSG	5,378	6.0	2.4	13%	2	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-26	SSG	32.75	30	36	SSG	5,378	6.0	3.7	13%	3	1.18E-07	0.01
Vinyl chloride	PC-26	SSG	32.75	30	36	SSG	5,378	6.0	5	13%	4	1.18E-07	0.02
												Estimated Total Target COC Mass for PC-26 Area:	**0.14**

	Target COC Mass (lbs)	SSG
1,1,1-Trichloroethane	0.02	0.02
cis-1,2-Dichloroethylene	0.05	0.05
Trichloroethylene	0.01	0.01
Vinyl chloride	0.06	0.06

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-27

	PC-27		PC-27		PC-27		PC-27	
	SB-FS-PC-27-6.0-6.25		SB-FS-PC-27-10.5-10.75		SB-FS-PC-27-19.5-19.75		SB-FS-PC-27-35.5-35.75	
	5/30/2012		5/30/2012		5/30/2012		5/30/2012	
	Peat		Sand		Sand		Sand	
	35		25		15			
	15		5		0.1			
	68		23		14		12	
CONSTITUENTS								
1,1,1-Trichloroethane	7.6	U	2.8	U	3.1		2.9	U
1,1,2,2-Tetrachloroethane	7.6	U	2.8	U	2.3	U	2.9	U
1,1,2-Trichloroethane	7.6	U	2.8	U	2.3	U	2.9	U
1,1-Dichloroethane	7.6	U	2.8		1.9	J	2.9	U
1,1-Dichloroethylene	7.6	U	2.8	U	2.3	U	2.9	U
1,2,3-Trichlorobenzene	7.6	U	2.8	U	2.3	U	2.9	U
1,2,4-Trichlorobenzene	7.6	U	2.8	U	2.3	U	2.9	U
1,2-Dichlorobenzene	7.6	U	2.8	U	2.3	U	2.9	U
1,2-Dichloroethane	7.6	U	2.8	U	2.3	U	2.9	U
1,2-Dichloropropane	7.6	U	2.8	U	2.3	U	2.9	U
1,3-Dichlorobenzene	7.6	U	2.8	U	2.3	U	2.9	U
1,4-Dichlorobenzene	7.6	U	2.8	U	2.3	U	2.9	U
2-Hexanone	76	U	28	U	23	U	29	U
Acetone	760	UJ	280	UJ	230	UJ	290	UJ
Benzene	7.6	U	2.8	U	2.3	U	2.9	U
Bromochloromethane	7.6	U	2.8	U	2.3	U	2.9	U
Bromodichloromethane	7.6	U	2.8	U	2.3	U	2.9	U
Bromoform	7.6	U	2.8	U	2.3	U	2.9	U
Carbon Disulfide	7.6	U	2.8	U	2.3	U	2.9	U
Carbon Tetrachloride	7.6	U	2.8	U	2.3	U	2.9	U
Chlorobenzene	7.6	U	2.8	U	2.3	U	2.9	U
Chloroethane	15	U	5.6	U	4.6	U	5.7	U
Chloroform	7.6	U	2.8	U	2.3	U	2.9	U
cis-1,2-Dichloroethylene	7.6	U	20		6.5		1.5	J
cis-1,3-Dichloropropene	7.6	U	2.8	U	2.3	U	2.9	U
Cyclohexane	76	U	28	U	23	U	29	U
DBCP	76	U	28	U	23	U	29	U
Dibromochloromethane	7.6	U	2.8	U	2.3	U	2.9	U
Dichlorodifluoromethane	15	U	5.6	U	4.6	U	5.7	U
Diethyl ether	7.6	U	2.8	U	2.3	U	2.9	U
Ethylene dibromide (EDB)	7.6	U	2.8	U	2.3	U	2.9	U
Ethylbenzene	7.6	U	2.8	U	2.3	U	2.9	U
Freon 113	38	U	14	U	12	U	14	U
Isopropylbenzene	35		2.8	U	2.3	U	2.9	U
Methyl Acetate	150	U	56	U	46	U	57	U
Methyl bromide	15	U	5.6	U	4.6	U	5.7	U
Methyl chloride	15	U	5.6	U	4.6	U	5.7	U
Methyl ethyl ketone (MEK)	110	J	28	UJ	23	UJ	29	UJ
Methyl isobutyl ketone	76	U	28	U	23	U	29	U
Methyl tert Butyl Ether (MTBE)	7.6	U	2.8	U	2.3	U	2.9	U
Methylcyclohexane	7.6	U	2.8	U	2.3	U	2.9	U
Methylene chloride	23	J	6	J	7.7	J	7.7	J
m-Xylene & p-Xylene	10	J	5.6	U	4.6	U	5.7	U
o-Xylene	5.8	J	2.8	U	2.3	U	2.9	U
Styrene	7.6	U	2.8	U	2.3	U	2.9	U
Tetrachloroethylene	7.6	U	2.8	U	2.3	U	2.9	U
Tetrahydrofuran	150	UJ	56	UJ	46	UJ	57	UJ
Toluene	7.6	U	2.8	U	2.3	U	2.9	U
Trans-1,2-Dichloroethene	7.6	U	2.8	U	2.3	U	2.9	U
trans-1,3-Dichloropropene	7.6	U	2.8	U	2.3	U	2.9	U
Trichloroethylene	7.6	U	2.8	U	2.3	U	2.9	U
Trichlorofluoromethane	15	U	5.6	U	4.6	U	5.7	U
Vinyl chloride	7.6	U	4.7		9.3		2.9	U
Xylene (total)	16		2.8	U	2.3	U	2.9	U
Sum of Constituents	**184**		**33.5**		**28.5**		**9.2**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area (ft^2)	Thickness of Mass Unit (ft)	Total VOC Concentration (dry weight) (ug/kg)	Moisture Content Results of Samples (%)	Total VOC Concentration (wet weight) (ug/kg)	Bulk Density/ 1e9 (^{3})x(kg/1x10	Mass of Total VOC (lbs)
	Organic Peat												
	PC-27	OP	6.25	5.5	7	OP	6,458	1.5	184	68%	59	2.50E-08	0.01
	Estimated Total VOC Mass for Strata:												**0.01**
	Sand / Sand and Gravel												
	PC-27	SSG	10.75	7	15.25	SSG	6,458	8.3	34	23%	26	1.18E-07	0.16
	PC-27	SSG	19.75	15.25	27.75	SSG	6,458	12.5	29	14%	25	1.18E-07	0.23
	PC-27	SSG	35.75	27.75	36.5	SSG	6,458	8.8	9	12%	8	1.18E-07	0.05
	Estimated Total VOC Mass for Strata:												**0.45**
	Estimated Total VOC Mass for PC-27 Area:												**0.46**
COC Specific Calculations by Strata													
1,1-Dichloroethane	PC-27	SSG	10.75	7	15.25	SSG	6,458	8.3	2.8	13%	2	1.18E-07	0.02
cis-1,2-Dichloroethylene	PC-27	SSG	10.75	7	15.25	SSG	6,458	8.3	20	13%	17	1.18E-07	0.11
Vinyl chloride	PC-27	SSG	10.75	7	15.25	SSG	6,458	8.3	4.7	13%	4	1.18E-07	0.03
1,1,1-Trichloroethane	PC-27	SSG	19.75	15.25	27.75	SSG	6,458	12.5	3.1	13%	3	1.18E-07	0.03
1,1-Dichloroethane	PC-27	SSG	19.75	15.25	27.75	SSG	6,458	12.5	1.9	13%	2	1.18E-07	0.02
cis-1,2-Dichloroethylene	PC-27	SSG	19.75	15.25	27.75	SSG	6,458	12.5	6.5	13%	6	1.18E-07	0.05
Vinyl chloride	PC-27	SSG	19.75	15.25	27.75	SSG	6,458	12.5	9.3	13%	8	1.18E-07	0.08
	Estimated Total Target COC Mass for PC-27 Area:												**0.32**

	Target Mass per COC (lbs)	SSG
1,1,1-Trichloroethane	0.03	0.03
1,1-Dichloroethane	0.03	0.03
cis-1,2-Dichloroethylene	0.16	0.16
Vinyl chloride	0.10	0.10

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-28

	PC-28		PC-28		PC-28		PC-28		PC-28		PC-28	
	SB-FS-PC-28-4.5-		SB-FS-PC-28-6.5-		SB-FS-PC-28-9.0-		SB-FS-PC-28-12.5		SB-FS-PC-28-19.0		SB-FS-PC-28-30.5	
	4.75		6.75		9.25		12.75		19.25		30.75	
	5/30/2012		5/30/2012		5/30/2012		6/7/2012		5/30/2012		5/30/2012	
	Peat		Silt		Sand & Silt		Sand		Sand		Sand & Gravel	
	35		65		35		5		0		0	
	15		5		5		0.1		0.1		0.1	
	46		16		11				18		19	
CONSTITUENTS												
1,1,1-Trichloroethane	330	U	160	U	1.9	U	8.4		16		7	
1,1,2,2-Tetrachloroethane	330	U	160	U	1.9	UJ	2.8	U	2.8	UJ	3	UJ
1,1,2-Trichloroethane	330	U	160	U	1.9	U	2.8	U	2.8	U	3	U
1,1-Dichloroethane	330	U	160	U	1.9	U	11		11		6.3	
1,1-Dichloroethylene	330	U	160	U	1.9	U	2.8	U	2.8	U	3	U
1,2,3-Trichlorobenzene	330	U	160	U	1.9	U	2.8	U	2.8	U	3	U
1,2,4-Trichlorobenzene	170	J	160	U	1.9	U	2.8	U	2.8	U	3	U
1,2-Dichlorobenzene	3200		88	J	1.9	U	1.2	J	1.6	J	3	U
1,2-Dichloroethane	330	U	160	U	1.9	UJ	2.8	U	2.8	UJ	3	UJ
1,2-Dichloropropane	330	U	160	U	1.9	U	2.8	U	2.8	U	3	U
1,3-Dichlorobenzene	130	J	160	U	1.9	U	2.8	U	2.8	U	3	U
1,4-Dichlorobenzene	1000		160	U	1.9	U	2.8	U	2.8	U	3	U
2-Hexanone	3300	U	1600	U	19	U	28	U	28	U	30	U
Acetone	33000	UJ	16000	UJ	190	UJ	280	U	280	UJ	300	UJ
Benzene	330	U	160	U	1.9	U	2.8	U	2.8	U	3	U
Bromochloromethane	330	U	160	U	1.9	U	2.8	U	2.8	U	3	U
Bromodichloromethane	330	U	160	U	1.9	U	2.8	U	2.8	U	3	U
Bromoform	330	U	160	U	1.9	U	2.8	U	2.8	U	3	U
Carbon Disulfide	330	U	160	U	1.9	U	2.8	U	2.8	U	3	U
Carbon Tetrachloride	330	U	160	U	1.9	U	2.8	U	2.8	U	3	U
Chlorobenzene	330	U	160	U	1.9	U	2.8	U	2.8	U	3	U
Chloroethane	660	UJ	310	UJ	3.8	UJ	2.5	J	2.7	J	6	UJ
Chloroform	330	U	160	U	1.9	U	2.8	U	2.8	U	3	U
cis-1,2-Dichloroethylene	330	U	160	U	1.7	J	99		150		72	
cis-1,3-Dichloropropene	330	U	160	U	1.9	U	2.8	U	2.8	U	3	U
Cyclohexane	280	J	1600	U	19	U	28	U	28	U	30	U
DBCP	3300	U	1600	U	19	UJ	28	U	28	UJ	30	UJ
Dibromochloromethane	330	U	160	U	1.9	U	2.8	U	2.8	U	3	U
Dichlorodifluoromethane	660	U	310	U	3.8	U	5.7	U	5.5	U	6	U
Diethyl ether	330	U	160	U	1.9	U	2.8	U	2.8	U	3	U
Ethylene dibromide (EDB)	330	U	160	U	1.9	U	2.8	U	2.8	U	3	U
Ethylbenzene	14000		160	U	1.9	U	2.8	U	2.8	U	3	U
Freon 113	1600	U	780	U	9.5	U	14	U	14	U	15	U
Isopropylbenzene	390		160	U	1.9	U	2.8	U	2.8	U	3	U
Methyl Acetate	6600	U	3100	U	38	UJ	57	U	55	UJ	60	UJ
Methyl bromide	660	U	310	U	3.8	U	5.7	U	5.5	U	6	U
Methyl chloride	660	U	310	U	3.8	U	5.7	U	5.5	U	6	U
Methyl ethyl ketone (MEK)	3300	UJ	1600	UJ	19	UJ	28	U	28	UJ	30	UJ
Methyl isobutyl ketone	3300	U	1600	U	19	U	28	U	28	U	30	U
Methyl tert Butyl Ether (MTBE)	330	U	160	U	1.9	U	2.8	U	2.8	U	3	U
Methylcyclohexane	1800		160	U	1.9	U	2.8	U	2.8	U	3	U
Methylene chloride	1300	U	630	U	7.6	U	11	U	11	U	12	U
m-Xylene & p-Xylene	49000		2700		3.8	U	5.7	U	5.5	U	6	U
o-Xylene	18000		640		1.9	U	2.8	U	2.8	U	3	U
Styrene	330	U	160	U	1.9	U	2.8	U	2.8	U	3	U
Tetrachloroethylene	330	U	160	U	1.9	U	4.2		2.8	U	3	U
Tetrahydrofuran	6600	U	3100	U	38	U	57	UJ	55	U	60	U
Toluene	1500		160	U	1.9	U	2.8	U	2.8	U	3	U
Trans-1,2-Dichloroethene	330	U	160	U	1.9	U	2.8	U	3.5		1.7	J
trans-1,3-Dichloropropene	330	U	160	U	1.9	U	2.8	U	2.8	U	3	U
Trichloroethylene	330	U	160	U	1.9	U	2.5	J	2.8	U	3	U
Trichlorofluoromethane	660	U*	310	U	3.8	U	5.7	U	5.5	U	6	U
Vinyl chloride	330	U	160	U	1.9	UJ	33		31	J	16	J
Xylene (total)	67000		3300		1.9	U	2.8	U	2.8	U	3	U
Sum of Constituents	**89470**		**3428**		**1.7**		**161.8**		**215.8**		**103**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area (ft^2)	Thickness of Mass Unit (ft)	Total VOC Concentration (dry weight) (ug/kg)	Moisture Content Results of Samples (%)	Total VOC Concentration (wet weight) (ug/kg)	Bulk Density/1e9 (^{3})x(kg/1x10	Mass of Total VOC (lbs)
	Organic Peat												
	PC-28	OP	4.75	4.5	5.5	OP	7,752	1.0	89,470	44%	50,103	2.50E-08	9.71
												Estimated Total VOC Mass for Strata:	**9.71**
	Grey Silty Sand/Silt												
	PC-28	GSSS	6.75	5.5	8	GSSS	7,752	2.5	3,388	20%	2,710	1.07E-07	5.62
	PC-28	GSSS	9.25	8	10	GSSS	7,752	2.0	2	20%	1	1.07E-07	0.00
												Estimated Total VOC Mass for Strata:	**5.62**
	Sand / Sand and Gravel												
	PC-28	SSG	12.75	10	16	SSG	7,752	6.0	162	13%	141	1.18E-07	0.77
	PC-28	SSG	19.25	16	25	SSG	7,752	9.0	216	13%	188	1.18E-07	1.55
	PC-28	SSG	30.75	25	34	SSG	7,752	9.0	103	13%	90	1.18E-07	0.74
												Estimated Total VOC Mass for Strata:	**3.06**
												Estimated Total VOC Mass for PC-28 Area:	**18.39**
COC Specific Calculations by Strata													
cis-1,2-Dichloroethylene	PC-28	GSSS	6.75	5.5	8	GSSS	7,752	2.5	2	20%	1	1.07E-07	0.00
1,1,1-Trichloroethane	PC-28	SSG	12.75	10	16	SSG	7,752	6.0	8	13%	7	1.18E-07	0.04
1,1-Dichloroethane	PC-28	SSG	12.75	10	16	SSG	7,752	6.0	11	13%	10	1.18E-07	0.05
Chloroethane	PC-28	SSG	12.75	10	16	SSG	7,752	6.0	3	13%	2	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-28	SSG	12.75	10	16	SSG	7,752	6.0	99	13%	86	1.18E-07	0.47
Tetrachloroethylene	PC-28	SSG	12.75	10	16	SSG	7,752	6.0	4	13%	4	1.18E-07	0.02
Trichloroethylene	PC-28	SSG	12.75	10	16	SSG	7,752	6.0	3	13%	2	1.18E-07	0.01
Vinyl chloride	PC-28	SSG	12.75	10	16	SSG	7,752	6.0	33	13%	29	1.18E-07	0.16
1,1,1-Trichloroethane	PC-28	SSG	19.25	16	25	SSG	7,752	9.0	16	13%	14	1.18E-07	0.11
1,1-Dichloroethane	PC-28	SSG	19.25	16	25	SSG	7,752	9.0	11	13%	10	1.18E-07	0.08
Chloroethane	PC-28	SSG	19.25	16	25	SSG	7,752	9.0	2.7	13%	2	1.18E-07	0.02
cis-1,2-Dichloroethylene	PC-28	SSG	19.25	16	25	SSG	7,752	9.0	150	13%	131	1.18E-07	1.07
Trans-1,2-Dichloroethene	PC-28	SSG	19.25	16	25	SSG	7,752	9.0	3.5	13%	3	1.18E-07	0.03
Vinyl chloride	PC-28	SSG	19.25	16	25	SSG	7,752	9.0	31	13%	27	1.18E-07	0.22
1,1,1-Trichloroethane	PC-28	SSG	30.75	25	34	SSG	7,752	9.0	7	13%	6	1.18E-07	0.05
1,1-Dichloroethane	PC-28	SSG	30.75	25	34	SSG	7,752	9.0	6.3	13%	5	1.18E-07	0.05
cis-1,2-Dichloroethylene	PC-28	SSG	30.75	25	34	SSG	7,752	9.0	72	13%	63	1.18E-07	0.52
Trans-1,2-Dichloroethene	PC-28	SSG	30.75	25	34	SSG	7,752	9.0	1.7	13%	1	1.18E-07	0.01
Vinyl chloride	PC-28	SSG	30.75	25	34	SSG	7,752	9.0	16	13%	14	1.18E-07	0.11
												Estimated Total Target COC Mass for PC-28 Area:	**3.04**

	Target Mass per COC (lbs)	OP	GSSS	SSG
1,1,1-Trichloroethane	0.20	-	-	0.20
1,1-Dichloroethane	0.18	-	-	0.18
Chloroethane	0.03	-	-	0.03
cis-1,2-Dichloroethylene	2.07	-	0.00	2.06
Tetrachloroethylene	0.02	-	-	0.02
Trans-1,2-Dichloroethene	0.04	-	-	0.04
Trichloroethylene	0.01	-	-	0.01
Vinyl chloride	0.49	-	-	0.49

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Appendix J2

Combined 2008/2012

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APPENDIX J-2
MASS ESTIMATE - CALCULATION KEY

Section	Area	Thickness of Impacted Deposits	Total VOC Concentration (dry weight)	Average Moisture Content Results of Samples	[3]Total VOC Concentration (wet weight)	[4]Average Bulk Density/1e9	Mass of Total VOC
	(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	(lb/ft^3)x(kg/1x10^9 ug)	(lbs)
Organic Peat							
OP	53,547	1.3	0	44%	0	2.50E-08	0.00
						Estimated Total VOC Mass for Area:	**0.00**
Grey Silty Sand/Silt							
GSSS	83,468	4.1	0	20%	0	1.07E-07	0.00
						Estimated Total VOC Mass for Area:	**0.00**
Sand / Sand and Gravel							
SSG	245,000	14.5	0	13%	0	1.18E-07	0.00
						Estimated Total VOC Mass for Area:	**0.00**
						Estimated Total VOC Mass for Site:	**0.00**

Notes:

1. Area calculated is estimated assuming extent of FSA, as outlined in RD Work Plan, and estimated extents of Organic Peat and Grey Silty Sand/Silt deposits.
2. Moisture Content results from laboratory analysis of Plume Core soil samples were averaged for each soil type
3. Total volatile organic compound (TVOC) wet weight = (TVOC dry weight) - [(TVOC dry weight) x (soil moisture content)].
4. Bulk Density is an average value based on the results of laboratory analysis of Plume Core soil samples. The resultant values have been multiplied by a units conversion factor of 1 kg/1x10^9 ug so that the resulting estimate of VOC mass is reported in pounds (lbs).
5. Non-detect concentrations were assigned a value of zero.
6. Thicknesses are based on the results of Plume Core soil borings (Summer 2012) and delineated by stratigraphic unit.

COMBINED PHASE 4 (2008) AND PLUME CORE (2012)

Boring	Strata	Sample Depth	Strat Top	Strat Bottom	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Average Moisture of all SSG Samples	Moisture Content Results of Samples	Total VOC Concentration (wet weight) with averaged % moisture	Total VOC Concentration (wet weight)	[4]Bulk Density/ 1e9	Mass with averaged % Moisture	Mass of Total VOC
					(ft^2)	(ft)	(ug/kg)		(%)		(ug/kg)	[7]x(kg/1x10[9] ug)		(lbs)
Sand / Sand and Gravel														
PC-1	SSG	8.75	7.6	11.75	8,100	4.2	0	13%	10%	0	0	1.18E-07	0.00	0.00
PC-1	SSG	14.75	11.75	15.75	8,100	4.0	0	13%	9%	0	0	1.18E-07	0.00	0.00
PC-1	SSG	16.75	16	17	8,100	1.0	0	13%	12%	0	0	1.18E-07	0.00	0.00
PC-2	SSG	9.25	8.75	13.25	8,100	4.5	3	13%	9%	3	3	1.18E-07	0.01	0.01
PC-2	SSG	17.25	13.25	19	8,100	5.8	28	13%	11%	25	25	1.18E-07	0.14	0.14
PC-3	SSG	13.75	10	19	8,100	9.0	9	13%	20%	8	7	1.18E-07	0.07	0.06
PC-3	SSG	22.75	20	23.5	8,100	3.5	30	13%	10%	26	27	1.18E-07	0.09	0.09
PC-4	SSG	11.25	11	17	8,100	6.0	12	13%	39%	10	7	1.18E-07	0.06	0.04
PC-4	SSG	22.75	17	24.25	8,100	7.3	2,867	13%	5%	2495	2,724	1.18E-07	17.29	18.88
PC-4	SSG	25.75	24.25	26.5	8,100	2.3	126	13%	3%	110	122	1.18E-07	0.24	0.26
PC-5	SSG	11.25	10.1	15.75	8,100	5.7	17	13%	13%	15	15	1.18E-07	0.08	0.08
PC-5	SSG	20.25	15.75	22	8,100	6.3	73	13%	13%	64	64	1.18E-07	0.38	0.38
PC-5	SSG	23.75	22	27	8,100	5.0	35	13%	13%	30	30	1.18E-07	0.15	0.15
PC-6	SSG	13.25	9	17.75	8,100	8.8	116	13%	7%	101	108	1.18E-07	0.84	0.90
PC-6	SSG	22.25	17.75	22.5	8,100	4.8	5	13%	7%	5	5	1.18E-07	0.02	0.02
PC-7	SSG	13.25	5	15.75	6,488	10.8	540	13%	7%	470	504	1.18E-07	3.87	4.15
PC-7	SSG	18.25	15.75	18.5	6,488	2.8	233	13%	7%	203	216	1.18E-07	0.43	0.45
PC-8	SSG	14.25	12	15	4,050	3.0	3,691	13%	12%	3211	3,241	1.18E-07	4.60	4.65
PC-8	SSG	19.25	15	21	8,100	6.0	1,024	13%	12%	890	899	1.18E-07	5.11	5.15
PC-9	SSG	15.75	12.8	16.5	8,100	3.7	18	13%	9%	16	16	1.18E-07	0.06	0.06
PC-10	SSG	14.75	12.25	16.25	8,100	4.0	92	13%	10%	80	83	1.18E-07	0.31	0.32
PC-10	SSG	17.75	16.25	20.75	8,100	4.5	60	13%	11%	52	53	1.18E-07	0.22	0.23
PC-10	SSG	23.75	20.75	23.5	8,100	2.8	304	13%	12%	265	268	1.18E-07	0.70	0.70
PC-11	SSG	20.25	11.5	21.5	8,100	10.0	168	13%	23%	146	129	1.18E-07	1.39	1.23
PC-12	SSG	14.25	9.75	18	8,100	8.3	550	13%	8%	479	507	1.18E-07	3.77	3.99
PC-12	SSG	21.75	18	22	8,100	4.0	98	13%	19%	85	79	1.18E-07	0.33	0.30
PC-13	SSG	10.25	8.5	12.75	8,100	4.3	124	13%	7%	108	115	1.18E-07	0.44	0.47
PC-13	SSG	15.25	12.75	18.75	8,100	6.0	816	13%	14%	710	702	1.18E-07	4.07	4.02
PC-13	SSG	22.25	18.75	25	8,100	6.3	52	13%	10%	45	47	1.18E-07	0.27	0.28
PC-14	SSG	11.25	8	13.25	5,447	5.3	46	13%	7%	40	42	1.18E-07	0.13	0.14
PC-14	SSG	15.25	13.25	17.5	5,447	4.3	41	13%	5%	35	39	1.18E-07	0.10	0.11
PC-14	SSG	19.75	17.5	20	5,447	2.5	37	13%	9%	32	33	1.18E-07	0.05	0.05
PC-15	SSG	14.75	13.25	15.75	8,100	2.5	0	13%	10%	0	0	1.18E-07	0.00	0.00
PC-15	SSG	16.75	15.75	20	8,100	4.3	0	13%	11%	0	0	1.18E-07	0.00	0.00
PC-16	SSG	16.25	14.25	19.25	8,100	5.0	33	13%	20%	28	26	1.18E-07	0.14	0.12
PC-16	SSG	25.25	24.25	26.5	8,100	2.3	14	13%	21%	12	11	1.18E-07	0.03	0.02
PC-17	SSG	16.25	13.5	17.75	8,100	4.3	463	13%	19%	403	375	1.18E-07	1.64	1.52
PC-17	SSG	19.25	17.75	20.25	8,100	2.5	44	13%	4%	38	42	1.18E-07	0.09	0.10
PC-17	SSG	21.25	20.25	22.5	8,100	2.3	5,251	13%	15%	4568	13	1.18E-07	9.82	0.03
PC-17	SSG	23.75	22.5	24	8,100	1.5	77	13%	10%	67	10	1.18E-07	0.10	0.01
PC-18	SSG	16.25	12	18.25	8,100	6.3	17	13%	8%	15	16	1.18E-07	0.09	0.10
PC-18	SSG	20.25	18.25	21.75	8,100	3.5	227	13%	31%	197	156	1.18E-07	0.66	0.52
PC-18	SSG	23.25	21.75	23.5	8,100	1.8	20	13%	13%	17	17	1.18E-07	0.03	0.03
PC-19	SSG	18.75	17	20	8,100	3.0	217	13%	8%	189	201	1.18E-07	0.54	0.58
PC-19	SSG	21.25	20	23	8,100	3.0	215	13%	14%	187	185	1.18E-07	0.54	0.53
PC-19	SSG	24.75	23	25	8,100	2.0	201	13%	8%	175	184	1.18E-07	0.33	0.35
PC-20	SSG	15.75	11	16.5	8,100	5.5	191	13%	10%	166	173	1.18E-07	0.87	0.91
PC-20	SSG	25.25	21	26	8,100	5.0	174	13%	10%	151	157	1.18E-07	0.72	0.75
PC-21	SSG	6.75	6.5	9	6,926	2.5	41	13%	17%	36	34	1.18E-07	0.07	0.07
PC-21	SSG	11.25	9	12	6,926	3.0	26	13%	17%	22	21	1.18E-07	0.06	0.05
PC-21	SSG	12.75	12	17	6,926	5.0	23	13%	17%	20	19	1.18E-07	0.08	0.08
PC-22	SSG	16.25	15	22.5	5,621	7.5	4	13%	4%	4	4	1.18E-07	0.02	0.02
PC-22	SSG	28.75	22.5	29	5,621	6.5	2	13%	13%	2	2	1.18E-07	0.01	0.01
PC-23	SSG	14.25	13.5	17.5	7,918	4.0	73	13%	11%	63	65	1.18E-07	0.24	0.24
PC-23	SSG	24.25	17.5	26.75	7,918	9.3	0	13%	7%	0	0	1.18E-07	0.00	0.00
PC-23	SSG	29.25	26.75	34.5	7,918	7.8	0	13%	22%	0	0	1.18E-07	0.00	0.00
PC-24	SSG	18.25	18	21.25	8,100	3.3	4	13%	15%	4	3	1.18E-07	0.01	0.01
PC-24	SSG	24.25	21.25	29.25	8,100	8.0	19	13%	21%	16	15	1.18E-07	0.13	0.11
PC-24	SSG	34.25	29.25	38.5	8,100	9.3	7	13%	8%	6	7	1.18E-07	0.05	0.06
PC-25	SSG	27.25	13.5	31.25	7,109	17.8	6	13%	9%	6	6	1.18E-07	0.08	0.09
PC-25	SSG	35.25	31.25	40	7,109	8.8	23	13%	26%	20	17	1.18E-07	0.15	0.13
PC-26	SSG	10.25	6.75	12.25	5,378	5.5	22	13%	16%	19	19	1.18E-07	0.07	0.06
PC-26	SSG	14.25	12.25	17	5,378	4.8	14	13%	19%	12	11	1.18E-07	0.04	0.03
PC-26	SSG	19.75	17	23.5	5,378	6.5	21	13%	9%	18	19	1.18E-07	0.08	0.08
PC-26	SSG	27.25	23.5	30	5,378	6.5	0	13%	7%	0	0	1.18E-07	0.00	0.00
PC-26	SSG	32.75	30	36	5,378	6.0	21	13%	14%	18	18	1.18E-07	0.07	0.07
PC-27	SSG	10.75	7	15.25	6,458	8.3	180	13%	23%	157	139	1.18E-07	0.99	0.87
PC-27	SSG	19.75	15.25	27.75	6,458	12.5	1,035	13%	14%	901	890	1.18E-07	8.58	8.48
PC-27	SSG	35.75	27.75	36.5	6,458	8.8	9	13%	12%	8	8	1.18E-07	0.05	0.05
PC-28	SSG	12.75	10	16	7,752	6.0	162	13%	19%	141	132	1.18E-07	0.77	0.72
PC-28	SSG	19.25	16	25	7,752	9.0	190	13%	18%	166	156	1.18E-07	1.36	1.28
PC-28	SSG	30.75	25	34	7,752	9.0	103	13%	19%	90	83	1.18E-07	0.74	0.69
	Samples	70										**SUM of TVOC Mass - SSG**		**66.13**
												Using Average Moisture Conten		**74.43**

Boring	Strata	Sample Depth	Strat Top	Strat Bottom	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Average Moisture of all SSG Samples	Moisture Content Results of Samples	Total VOC Concentration (wet weight) with averaged % moisture	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass with averaged % Moisture	Mass of Total VOC
						(ft)	(ug/kg)		(%)		(ug/kg)	[7]x(kg/1x10[9] ug)		(lbs)
Grey Silty Sand/Silt														
PC-3	GSSS	19.25	19	20	8,100	1.0	29	20%	13%	23.28	25	1.07E-07	0.02	0.02
PC-8	GSSS	14.25	12	15	4,050	3.0	210	20%	16%	168	177	1.07E-07	0.22	0.23
PC-16	GSSS	20.25	19.25	24.25	8,100	5.0	4	20%	12%	3	3	1.18E-07	0.01	0.01
PC-19	GSSS	15.75	13	17	8,100	4.0	11,319	20%	15%	9055.44	9,621	1.07E-07	31.39	33.36
PC-20	GSSS	18.25	16.5	21	8,100	4.5	41	20%	11%	32.8	36	1.07E-07	0.13	0.14
PC-22	GSSS	13.75	10.25	15	5,621	4.8	0	20%	17%	0	0	1.07E-07	0.00	0.00
PC-23	GSSS	18.25	17.5	21	7,918	3.5	59	20%	24%	47.52	45	1.07E-07	0.14	0.13
PC-24	GSSS	14.75	13.5	18	8,100	4.5	1,100	20%	17%	880	913	1.07E-07	3.43	3.56
PC-25	GSSS	12.75	12	13.5	7,109	1.5	347	20%	56%	277.6	153	1.07E-07	0.32	0.17
PC-28	GSSS	6.75	5.5	8	7,752	2.5	3,388	20%	16%	2710.4	2,846	1.07E-07	5.62	5.90
PC-28	GSSS	9.25	8	10	7,752	2.0	2	20%	11%	1.36	2	1.07E-07	0.00	0.00
Samples	11											**SUM of TVOC Mass - GSSS**		**43.54**
												Using Average Moisture Conten		**41.29**

Boring	Strata	Sample Depth	Strat Top	Strat Bottom	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Average Moisture of all SSG Samples	Moisture Content Results of Samples	Total VOC Concentration (wet weight) with averaged % moisture	[3]Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass with averaged % Moisture	Mass of Total VOC
					(ft^2)	(ft)	(ug/kg)		(%)		(ug/kg)	[7]x(kg/1x10[9] ug)		(lbs)
Organic Peat														
PC-19	OP	11.75	11.5	13	8,100	1.5	13,860	44%	35%	7,762	9,009	2.50E-08	2.36	2.74
PC-20	OP	9.25	8.2	11	8,100	2.8	3,790	44%	31%	2,122	2,615	2.50E-08	1.20	1.48
PC-23	OP	13.25	13	13.5	7,918	0.5	351	44%	30%	197	246	2.50E-08	0.02	0.02
PC-24	OP	12.75	12	13.5	8,100	1.5	37,700	44%	30%	21,112	26,390	2.50E-08	6.41	8.02
PC-25	OP	11.75	11	12	7,109	1.0	11,525	44%	71%	6,454	3,342	2.50E-08	1.15	0.59
PC-27	OP	6.25	5.5	7	6,458	1.5	597	44%	68%	334	191	2.50E-08	0.08	0.05
PC-28	OP	4.75	4.5	5.5	7,752	1.0	31,193	44%	46%	17,468	16,844	2.50E-08	3.39	3.26
												SUM of TVOC Mass - OP		**16.16**
Samples	7											**Using Average Moisture Conten**		**14.61**

SUM of TVOC Mass - Cumulative **125.83**

Using Average Moisture Content **130.32**

NOTES:
SSG - Sand and Sand and Gravel
GSSS - Grey Silt and Silty Sand
OP - Organic Peat
ug/kg - micrograms per kilogram
lbs - pounds

Mass Calculation Worksheets
Boring PC-1

	PC-1		PC-1		PC-1	
	SB-FS-PC-1-8.5-8.75		SB-FS-PC-1-14.5-14.75		SB-FS-PC-1-16.5-16.75	
	5/18/2012		5/18/2012		5/18/2012	
	Sand		Sand & Gravel		Sand & Gravel	
	0		15		0	
	0.1		0.1		0.1	
	9.6		8.8		12	
CONSTITUENTS						
1,1,1-Trichloroethane	3.3	U	2.2	U	1.9	U
1,1,2,2-Tetrachloroethane	3.3	U	2.2	U	1.9	U
1,1,2-Trichloroethane	3.3	U	2.2	U	1.9	U
1,1-Dichloroethane	3.3	U	2.2	U	1.9	U
1,1-Dichloroethylene	3.3	U	2.2	U	1.9	U
1,2,3-Trichlorobenzene	3.3	U	2.2	U	1.9	U
1,2,4-Trichlorobenzene	3.3	U	2.2	U	1.9	U
1,2-Dichlorobenzene	3.3	U	2.2	U	1.9	U
1,2-Dichloroethane	3.3	U	2.2	U	1.9	U
1,2-Dichloropropane	3.3	U	2.2	U	1.9	U
1,3-Dichlorobenzene	3.3	U	2.2	U	1.9	U
1,4-Dichlorobenzene	3.3	U	2.2	U	1.9	U
2-Hexanone	33	U	22	U	19	U
Acetone	330	UJ	220	UJ	190	UJ
Benzene	3.3	U	2.2	U	1.9	U
Bromochloromethane	3.3	U	2.2	U	1.9	U
Bromodichloromethane	3.3	U	2.2	U	1.9	U
Bromoform	3.3	U	2.2	U	1.9	U
Carbon Disulfide	3.3	U	2.2	U	1.9	U
Carbon Tetrachloride	3.3	U	2.2	U	1.9	U
Chlorobenzene	3.3	U	2.2	U	1.9	U
Chloroethane	6.5	U	4.3	U	3.8	U
Chloroform	3.3	U	2.2	U	1.9	U
cis-1,2-Dichloroethylene	3.3	U	2.2	U	1.9	U
cis-1,3-Dichloropropene	3.3	U	2.2	U	1.9	U
Cyclohexane	33	U	22	U	19	U
DBCP	33	U	22	U	19	U
Dibromochloromethane	3.3	U	2.2	U	1.9	U
Dichlorodifluoromethane	6.5	U	4.3	U	3.8	U
Diethyl ether	3.3	U	2.2	U	1.9	U
Ethylene dibromide (EDB)	3.3	U	2.2	U	1.9	U
Ethylbenzene	3.3	U	2.2	U	1.9	U
Freon 113	16	U	11	U	9.5	U
Isopropylbenzene	3.3	U	2.2	U	1.9	U
Methyl Acetate	65	UJ	43	UJ	38	UJ
Methyl bromide	6.5	U	4.3	U	3.8	U
Methyl chloride	6.5	U	4.3	U	3.8	U
Methyl ethyl ketone (MEK)	33	UJ	22	UJ	19	UJ
Methyl isobutyl ketone	33	U	22	U	19	U
Methyl tert Butyl Ether (MTBE)	3.3	U	2.2	U	1.9	U
Methylcyclohexane	3.3	U	2.2	U	1.9	U
Methylene chloride	13	U	9.4	U	7.6	U
m-Xylene & p-Xylene	6.5	U	4.3	U	3.8	U
o-Xylene	3.3	U	2.2	U	1.9	U
Styrene	3.3	U	2.2	U	1.9	U
Tetrachloroethylene	3.3	U	2.2	U	1.9	U
Tetrahydrofuran	65	U	43	U	38	U
Toluene	3.3	U	2.2	U	1.9	U
Trans-1,2-Dichloroethene	3.3	U	2.2	U	1.9	U
trans-1,3-Dichloropropene	3.3	U	2.2	U	1.9	U
Trichloroethylene	3.3	U	2.2	U	1.9	U
Trichlorofluoromethane	6.5	U	4.3	U	3.8	U
Vinyl chloride	3.3	U	2.2	U	1.9	U
Xylene (total)	3.3	U	2.2	U	1.9	U
Sum of Constituents	**0**		**0**		**0**	

	SW1		SW3		SW3	
	16-17		18-18.5		21-21.5	
	9/23/2008		9/24/2008		9/24/2008	
CONSTITUENTS						
1,1,1-Trichloroethane	51	U	50	U	51	U
1,1,2,2-Tetrachloroethane	51	U	50	U	51	U
1,1,2-Trichloroethane	51	U	50	U	51	U
1,1-Dichloroethane	51	U	50	U	51	U
1,1-Dichloroethylene	51	U	50	U	51	U
1,2,4-Trichlorobenzene	51	U	50	U	51	U
1,2-Dichlorobenzene	51	U	50	U	51	U
1,2-Dichloroethane	51	U	50	U	51	U
1,2-Dichloropropane	51	U	50	U	51	U
1,3-Dichlorobenzene	51	U	50	U	51	U
1,4-Dichlorobenzene	51	U	50	U	51	U
2-Hexanone	150	U	150	U	150	U
Acetone	360	U	350	U	360	U
Benzene	26	U	25	U	26	U
Bromochloromethane	51	U	50	U	51	U
Bromodichloromethane	51	U	50	U	51	U
Bromoform	51	U	50	U	51	U
Carbon disulfide	51	U	50	U	51	U
Carbon tetrachloride	51	U	50	U	51	U
Chlorobenzene	51	U	50	U	51	U
Chloroethane	100	U	100	U	100	U
Chloroform	51	U	50	U	51	U
cis-1,2-Dichloroethylene	51	U	50	U	51	U
cis-1,3-Dichloropropene	51	U	50	U	51	U
DBCP	100	U	100	U	100	U
Dibromochloromethane	51	U	50	U	51	U
Dichlorodifluoromethane	100	U	100	U	100	U
Diethyl ether	51	U	50	U	51	U
EDB	51	U	50	U	51	U
Ethylbenzene	51	U	50	U	51	U
Isopropylbenzene	51	U	50	U	51	U
Methyl bromide	100	U	100	U	100	U
Methyl chloride	100	U	100	U	100	U
Methyl ethyl ketone (MEK)	210	U	200	U	200	U
Methyl isobutyl ketone	150	U	150	U	150	U
Methylene chloride	100	U	100	U	100	U
Styrene	51	U	50	U	51	U
Tetrachloroethylene	51	U	50	U	51	U
Tetrahydrofuran	210	U	200	U	200	U
Toluene	51	U	50	U	51	U
Trans-1,2-Dichloroethene	51	U	50	U	51	U
trans-1,3-Dichloropropene	51	U	50	U	51	U
Trichloroethylene	51	U	50	U	51	U
Trichlorofluoromethane	100	U	100	U	100	U
Vinyl chloride	51	U	50	U	51	U
Xylene (total)	51	U	50	U	51	U
Sum of Constituents	**0**		**0**		**0**	

Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thicknes s of Mass Unit	Total VOC Concentr ation (dry weight)	Moisture Content Results of Samples	Total VOC Concentr ation (wet weight)	Bulk Density / 1e9	Mass of Total VOC
						(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
Sand / Sand and Gravel												
PC-1	SSG	8.75	7.6	11.75	SSG	8,100	4.2	0	13%	0	1.18E-07	0.00
PC-1	SSG	14.75	11.75	15.75	SSG	8,100	4.0	0	13%	0	1.18E-07	0.00
PC-1	SSG	16.75	16	17	SSG	8,100	1.0	0	13%	0	1.18E-07	0.00
					Estimated Total VOC Mass for Strata:							**0.00**
					Estimated Total VOC Mass for PC-1 Area:							**0.00**

NO COC MASS

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-2

	PC-2		PC-2			SW4		SW4		SW9	
	SB-FS-PC-2-9.0-9.25		SB-FS-PC-2-17.0-17.25			12-12.5		21-21.5		17-17.5	
	5/21/2012		5/21/2012			9/24/2008		9/24/2008		9/24/2008	
	Sand		Gravel								
	10		5								
	0.1		0.1								
	9.1		11								
CONSTITUENTS					**CONSTITUENTS**						
1,1,1-Trichloroethane	2.4	U	2.7	U	1,1,1-Trichloroethane	56	U	53	U	59	U
1,1,2,2-Tetrachloroethane	2.4	U	2.7	U	1,1,2,2-Tetrachloroethane	56	U	53	U	59	U
1,1,2-Trichloroethane	2.4	U	2.7	U	1,1,2-Trichloroethane	56	U	53	U	59	U
1,1-Dichloroethane	2.4	U	2.7	U	1,1-Dichloroethane	56	U	53	U	59	U
1,1-Dichloroethylene	2.4	U	2.7	U	1,1-Dichloroethylene	56	U	53	U	59	U
1,2,3-Trichlorobenzene	2.4	U	2.7	U	1,2,4-Trichlorobenzene	56	U	53	U	59	U
1,2,4-Trichlorobenzene	2.4	U	2.7	U	1,2-Dichlorobenzene	56	U	53	U	59	U
1,2-Dichlorobenzene	2.4	U	2.7	U	1,2-Dichloroethane	56	U	53	U	59	U
1,2-Dichloroethane	2.4	U	2.7	U	1,2-Dichloropropane	56	U	53	U	59	U
1,2-Dichloropropane	2.4	U	2.7	U	1,3-Dichlorobenzene	56	U	53	U	59	U
1,3-Dichlorobenzene	2.4	U	2.7	U	1,4-Dichlorobenzene	56	U	53	U	59	U
1,4-Dichlorobenzene	2.4	U	2.7	U	2-Hexanone	170	U	160	U	180	U
2-Hexanone	24	UJ	27	UJ	Acetone	390	U	370	U	410	U
Acetone	240	UJ	270	UJ	Benzene	28	U	26	U	29	U
Benzene	2.4	U	2.7	U	Bromochloromethane	56	U	53	U	59	U
Bromochloromethane	2.4	U	2.7	U	Bromodichloromethane	56	U	53	U	59	U
Bromodichloromethane	2.4	U	2.7	U	Bromoform	56	U	53	U	59	U
Bromoform	2.4	U	2.7	U	Carbon disulfide	56	U	53	U	59	U
Carbon Disulfide	2.4	U	2.7	U	Carbon tetrachloride	56	U	53	U	59	U
Carbon Tetrachloride	2.4	U	2.7	U	Chlorobenzene	56	U	53	U	59	U
Chlorobenzene	2.4	U	2.7	U	Chloroethane	110	U	110	U	120	U
Chloroethane	4.8	U	5.3	U	Chloroform	56	U	53	U	59	U
Chloroform	2.4	U	2.7	U	cis-1,2-Dichloroethylene	56	U	53	U	59	U
cis-1,2-Dichloroethylene	2.4	U	2.7	U	cis-1,3-Dichloropropene	56	U	53	U	59	U
cis-1,3-Dichloropropene	2.4	U	2.7	U	DBCP	110	U	110	U	120	U
Cyclohexane	24	U	27	U	Dibromochloromethane	56	U	53	U	59	U
DBCP	24	U	27	U	Dichlorodifluoromethane	110	U	110	U	120	U
Dibromochloromethane	2.4	U	2.7	U	Diethyl ether	56	U	53	U	59	U
Dichlorodifluoromethane	4.8	U	5.3	U	EDB	56	U	53	U	59	U
Diethyl ether	2.4	U	2.7	U	Ethylbenzene	56	U	53	U	59	U
Ethylene dibromide (EDB)	2.4	U	2.7	U	Isopropylbenzene	56	U	53	U	59	U
Ethylbenzene	2.4	U	2.7	U	Methyl bromide	110	U	110	U	120	U
Freon 113	12	U	13	U	Methyl chloride	110	U	110	U	120	U
Isopropylbenzene	2.4	U	2.7	U	Methyl ethyl ketone (MEK)	220	U	210	U	240	U
Methyl Acetate	48	UJ	53	UJ	Methyl isobutyl ketone	170	U	160	U	180	U
Methyl bromide	4.8	U	5.3	U	Methylene chloride	110	U	110	U	120	U
Methyl chloride	4.8	U	5.3	U	Styrene	56	U	53	U	59	U
Methyl ethyl ketone (MEK)	24	UJ	27	UJ	Tetrachloroethylene	56	U	**53**	**J**	59	U
Methyl isobutyl ketone	24	UJ	27	UJ	Tetrahydrofuran	220	U	210	U	240	U
Methyl tert Butyl Ether (MTBE)	2.4	U	2.7	U	Toluene	56	U	53	U	59	U
Methylcyclohexane	2.4	U	2.7	U	Trans-1,2-Dichloroethene	56	U	53	U	59	U
Methylene chloride	16	U	17	U	trans-1,3-Dichloropropene	56	U	53	U	59	U
m-Xylene & p-Xylene	4.8	U	5.3	U	Trichloroethylene	56	U	53	U	59	U
o-Xylene	2.4	U	2.7	U	Trichlorofluoromethane	110	U	110	U	120	U
Styrene	2.4	U	2.7	U	Vinyl chloride	56	U	53	U	59	U
Tetrachloroethylene	**2.9**		**3.9**		Xylene (total)	56	U	53	U	59	U
Tetrahydrofuran	48	U	53	U	**Sum of Constituents**	**0**		**53**		**0**	
Toluene	2.4	U	2.7	U							
Trans-1,2-Dichloroethene	2.4	U	2.7	U							
trans-1,3-Dichloropropene	2.4	U	2.7	U							
Trichloroethylene	2.4	U	2.7	U							
Trichlorofluoromethane	4.8	U	5.3	U							
Vinyl chloride	2.4	U	2.7	U							
Xylene (total)	2.4	U	2.7	U							
Sum of Constituents	**2.9**		**3.9**								

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	$^{-9}$x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-2	SSG	9.25	8.75	13.25	SSG	8,100	4.5	3	13%	3	1.18E-07	0.01
	PC-2/SW-4	SSG	17.25	13.25	19	SSG	8,100	5.8	28	13%	25	1.18E-07	0.14
						Estimated Total VOC Mass for Strata:							**0.15**
						Estimated Total VOC Mass for PC-2 Area:							**0.15**
COC Specific Calculations by Strata													
Tetrachloroethylene	PC-2	SSG	9.25	8.75	13.25	SSG	8,100	4.5	3	13%	3	1.18E-07	0.01
Tetrachloroethylene	PC-2/SW-4	SSG	17.25	13.25	19	SSG	8,100	5.8	28	13%	25	1.18E-07	0.14
												Estimated Total Target COC Mass for PC-2 Area:	**0.15**

	Target Mass per COC (lbs)	SSG
Tetrachloroethylene	0.15	0.15

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-3

	PC-3		PC-3		PC-3	
	SB-FS-PC-3-19.0-19.25		SB-FS-PC-3-13.5-13.75		SB-FS-PC-3-22.5-22.75	
	5/21/2012		5/21/2012		5/21/2012	
	Silt & Sand		Sand		Sand	
	35		0		0	
	0.1		0.1		0.1	
	13		20		9.6	
CONSTITUENTS						
1,1,1-Trichloroethane	3.2		2.5	U	4.9	
1,1,2,2-Tetrachloroethane	2.3	U	2.5	U	2.5	U
1,1,2-Trichloroethane	2.3	U	2.5	U	2.5	U
1,1-Dichloroethane	2.3	U	2.5	U	2.5	U
1,1-Dichloroethylene	2.3	U	2.5	U	2.5	U
1,2,3-Trichlorobenzene	2.3	U	2.5	U	2.5	U
1,2,4-Trichlorobenzene	2.3	U	2.5	U	2.5	U
1,2-Dichlorobenzene	2.3	U	2.5	U	1.4	J
1,2-Dichloroethane	2.3	U	2.5	U	2.5	U
1,2-Dichloropropane	2.3	U	2.5	U	2.5	U
1,3-Dichlorobenzene	2.3	U	2.5	U	2.5	U
1,4-Dichlorobenzene	2.3	U	2.5	U	2.5	U
2-Hexanone	23	UJ	25	UJ	25	UJ
Acetone	230	UJ	250	UJ	250	UJ
Benzene	2.3	U	2.5	U	2.5	U
Bromochloromethane	2.3	U	2.5	U	2.5	U
Bromodichloromethane	2.3	U	2.5	U	2.5	U
Bromoform	2.3	U	2.5	U	2.5	U
Carbon Disulfide	2.3	U	2.5	U	2.5	U
Carbon Tetrachloride	2.3	U	2.5	U	2.5	U
Chlorobenzene	2.3	U	2.5	U	2.5	U
Chloroethane	4.6	U	5	U	5	U
Chloroform	2.3	U	2.5	U	2.5	U
cis-1,2-Dichloroethylene	1.5	J	9.1		3.4	
cis-1,3-Dichloropropene	2.3	U	2.5	U	2.5	U
Cyclohexane	23	U	25	U	25	U
DBCP	23	U	25	U	25	U
Dibromochloromethane	2.3	U	2.5	U	2.5	U
Dichlorodifluoromethane	4.6	U	5	U	5	U
Diethyl ether	2.3	U	2.5	U	2.5	U
Ethylene dibromide (EDB)	2.3	U	2.5	U	2.5	U
Ethylbenzene	2.3	U	2.5	U	2.5	U
Freon 113	11	U	13	U	13	U
Isopropylbenzene	2.3	U	2.5	U	2.5	U
Methyl Acetate	46	UJ	50	UJ	50	UJ
Methyl bromide	4.6	U	5	U	5	U
Methyl chloride	4.6	U	5	U	5	U
Methyl ethyl ketone (MEK)	23	UJ	25	UJ	25	UJ
Methyl isobutyl ketone	23	UJ	25	UJ	25	UJ
Methyl tert Butyl Ether (MTBE	2.3	U	2.5	U	2.5	U
Methylcyclohexane	2.3	U	2.5	U	2.5	U
Methylene chloride	34	U	44	U	40	U
m-Xylene & p-Xylene	4.6	U	5	U	5	U
o-Xylene	2.3	U	2.5	U	2.5	U
Styrene	2.3	U	2.5	U	2.5	U
Tetrachloroethylene	19		2.5	U	16	
Tetrahydrofuran	46	U	50	U	50	U
Toluene	2.3	U	2.5	U	2.5	U
Trans-1,2-Dichloroethene	2.3	U	2.5	U	2.5	U
trans-1,3-Dichloropropene	2.3	U	2.5	U	2.5	U
Trichloroethylene	5.4		2.5	U	6	
Trichlorofluoromethane	4.6	U	5	U	5	U
Vinyl chloride	2.3	U	2.5	U	2.5	U
Xylene (total)	2.3	U	2.5	U	2.5	U
Sum of Constituents	**29.1**		**9.1**		**30.3**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area (ft^2)	Thickness of Mass Unit (ft)	Total VOC Concentration (dry weight) (ug/kg)	Moisture Content Results of Samples (%)	Total VOC Concentration (wet weight) (ug/kg)	Bulk Density/ 1e9 (^{3})x(kg/1x10	Mass of Total VOC (lbs)
	Grey Silty Sand/Silt												
	PC-3	GSSS	19.25	19	20	GSSS	8,100	1.0	29	20%	23	1.07E-07	0.02
												Estimated Total VOC Mass for Strata:	**0.02**
	Sand / Sand and Gravel												
	PC-3	SSG	13.75	10	19	SSG	8,100	9.0	9	13%	8	1.18E-07	0.07
	PC-3	SSG	22.75	20	23.5	SSG	8,100	3.5	30	13%	26	1.18E-07	0.09
												Estimated Total VOC Mass for Strata:	**0.16**
												Estimated Total VOC Mass for PC-3 Area:	**0.18**
	COC Specific Calculations by Strata												
1,1,1-Trichloroethane	PC-3	GSSS	19.25	19	20	GSSS	8,100	1.0	3.2	20%	3	1.07E-07	0.002
cis-1,2-Dichloroethylene	PC-3	GSSS	19.25	19	20	GSSS	8,100	1.0	1.5	20%	1	1.07E-07	0.00
Tetrachloroethylene	PC-3	GSSS	19.25	19	20	GSSS	8,100	1.0	19	20%	15	1.07E-07	0.01
Trichloroethylene	PC-3	GSSS	19.25	19	20	GSSS	8,100	1.0	5.4	20%	4	1.07E-07	0.00
cis-1,2-Dichloroethylene	PC-3	SSG	13.75	10	19	SSG	8,100	9.0	9.1	13%	8	1.18E-07	0.07
Tetrachloroethylene	PC-3	SSG	13.75	10	19	SSG	8,100	9.0	2.5	13%	2	1.18E-07	0.02
1,1,1-Trichloroethane	PC-3	SSG	22.75	20	23.5	SSG	8,100	3.5	4.9	13%	4	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-3	SSG	22.75	20	23.5	SSG	8,100	3.5	3.4	13%	3	1.18E-07	0.01
Tetrachloroethylene	PC-3	SSG	22.75	20	23.5	SSG	8,100	3.5	16	13%	14	1.18E-07	0.05
Trichloroethylene	PC-3	SSG	22.75	20	23.5	SSG	8,100	3.5	6	13%	5	1.18E-07	0.02
												Estimated Total Target COC Mass for PC-3 Area:	**0.20**

	Target Mass per COC (lbs)	GSSS	SSG	
1,1,1-Trichloroethane	0.02	0.002	0.01	0.016
cis-1,2-Dichloroethylene	0.08	0.00	0.08	0.079
Tetrachloroethylene	0.08	0.01	0.07	0.078
Trichloroethylene	0.02	0.00	0.02	0.021

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-4

	PC-4		PC-4		PC-4	
	SB-FS-PC-4-11.0-11.25		SB-FS-PC-4-22.5-22.75		SB-FS-PC-4-25.5-25.75	
	5/18/2012		5/18/2012		5/18/2012	
	Sand		Sand & Gravel		Sand	
	0		0		40	
	0.1		0.1		0.1	
	39		5		3.3	
CONSTITUENTS						
1,1,1-Trichloroethane	3.9	U	**3**		**10**	
1,1,2,2-Tetrachloroethane	3.9	U	2.2	U	2	U
1,1,2-Trichloroethane	3.9	U	2.2	U	2	U
1,1-Dichloroethane	3.9	U	2.2	U	2	U
1,1-Dichloroethylene	3.9	U	2.2	U	2	U
1,2,3-Trichlorobenzene	3.8	J	2.2	U	2	U
1,2,4-Trichlorobenzene	2.5	J	2.2	U	2	U
1,2-Dichlorobenzene	3.9	U	0.89	J	2.6	
1,2-Dichloroethane	3.9	U	2.2	U	2	U
1,2-Dichloropropane	3.9	U	2.2	U	2	U
1,3-Dichlorobenzene	3.9	U	2.2	U	2	U
1,4-Dichlorobenzene	3.9	U	2.2	U	2	U
2-Hexanone	39	U	22	U	20	U
Acetone	390	UJ	220	UJ	200	UJ
Benzene	3.9	U	2.2	U	2	U
Bromochloromethane	3.9	U	2.2	U	2	U
Bromodichloromethane	3.9	U	2.2	U	2	U
Bromoform	3.9	U	2.2	U	2	U
Carbon Disulfide	3.9	U	2.2	U	2	U
Carbon Tetrachloride	3.9	U	2.2	U	2	U
Chlorobenzene	3.9	U	2.2	U	2	U
Chloroethane	7.7	U	4.4	U	4	U
Chloroform	3.9	U	2.2	U	2	U
cis-1,2-Dichloroethylene	3.9	U	**6.9**		**7.1**	
cis-1,3-Dichloropropene	3.9	U	2.2	U	2	U
Cyclohexane	39	U	22	U	20	U
DBCP	39	U	22	U	20	U
Dibromochloromethane	3.9	U	2.2	U	2	U
Dichlorodifluoromethane	7.7	U	4.4	U	4	U
Diethyl ether	3.9	U	2.2	U	2	U
Ethylene dibromide (EDB)	3.9	U	2.2	U	2	U
Ethylbenzene	3.9	U	2.2	U	2	U
Freon 113	19	U	11	U	9.9	U
Isopropylbenzene	3.9	U	2.2	U	2	U
Methyl Acetate	77	UJ	44	UJ	40	UJ
Methyl bromide	7.7	U	4.4	U	4	U
Methyl chloride	7.7	U	4.4	U	4	U
Methyl ethyl ketone (MEK)	39	UJ	22	UJ	20	UJ
Methyl isobutyl ketone	39	U	22	U	20	U
Methyl tert Butyl Ether (MTBE)	3.9	U	2.2	U	2	U
Methylcyclohexane	3.9	U	2.2	U	2	U
Methylene chloride	15	U	8.7	U	7.9	U
m-Xylene & p-Xylene	7.7	U	4.4	U	4	U
o-Xylene	3.9	U	2.2	U	2	U
Styrene	3.9	U	2.2	U	2	U
Tetrachloroethylene	**5.3**		**11**		**32**	
Tetrahydrofuran	77	U	44	U	40	U
Toluene	3.9	U	2.2	U	2	U
Trans-1,2-Dichloroethene	3.9	U	2.2	U	2	U
trans-1,3-Dichloropropene	3.9	U	2.2	U	2	U
Trichloroethylene	3.9	U	**3**		**11**	
Trichlorofluoromethane	7.7	U	4.4	U	4	U
Vinyl chloride	3.9	U	2.2	U	2	U
Xylene (total)	3.9	U	2.2	U	2	U
Sum of Constituents	**11.6**		**24.79**		**62.7**	

	SW2		SW2	
	17-17.5		28-28.5	
	9/25/2008		9/25/2008	
CONSTITUENTS				
1,1,1-Trichloroethane	57	U	55	U
1,1,2,2-Tetrachloroethane	57	U	55	U
1,1,2-Trichloroethane	57	U	55	U
1,1-Dichloroethane	57	U	55	U
1,1-Dichloroethylene	57	U	55	U
1,2,4-Trichlorobenzene	**86**	**J**	55	U
1,2-Dichlorobenzene	**5400**		55	U
1,2-Dichloroethane	57	U	55	U
1,2-Dichloropropane	57	U	55	U
1,3-Dichlorobenzene	57	U	55	U
1,4-Dichlorobenzene	**84**	**J**	55	U
2-Hexanone	170	U	160	U
Acetone	400	U	380	U
Benzene	28	U	27	U
Bromochloromethane	57	U	55	U
Bromodichloromethane	57	U	55	U
Bromoform	57	U	55	U
Carbon disulfide	57	U	55	U
Carbon tetrachloride	57	U	55	U
Chlorobenzene	**60**	**J**	55	U
Chloroethane	110	U	110	U
Chloroform	57	U	55	U
cis-1,2-Dichloroethylene	57	U	**190**	**J**
cis-1,3-Dichloropropene	57	U	55	U
DBCP	110	U	110	U
Dibromochloromethane	57	U	55	U
Dichlorodifluoromethane	110	U	110	U
Diethyl ether	57	U	55	U
EDB	57	U	55	U
Ethylbenzene	57	U	55	U
Isopropylbenzene	57	U	55	U
Methyl bromide	110	U	110	U
Methyl chloride	110	U	110	U
Methyl ethyl ketone (MEK)	230	U	220	U
Methyl isobutyl ketone	170	U	160	U
Methylene chloride	110	U	110	U
Styrene	57	U	55	U
Tetrachloroethylene	**80**	**J**	55	U
Tetrahydrofuran	230	U	220	U
Toluene	57	U	55	U
Trans-1,2-Dichloroethene	57	U	55	U
trans-1,3-Dichloropropene	57	U	55	U
Trichloroethylene	57	U	55	U
Trichlorofluoromethane	110	U	110	U
Vinyl chloride	57	U	55	U
Xylene (total)	57	U	55	U
	5710		**190**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thicknes s of Mass Unit	Total VOC Concentr ation (dry weight)	Moisture Content Results of Samples	Total VOC Concentr ation (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{8})x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-4	SSG	11.25	11	17	SSG	8,100	6.0	12	13%	10	1.18E-07	0.06
	PC-4/SW2	SSG	22.75	17	24.25	SSG	8,100	7.3	2,867	13%	2,495	1.18E-07	17.29
	PC-4/SW2	SSG	25.75	24.25	26.5	SSG	8,100	2.3	126	13%	110	1.18E-07	0.24
						Estimated Total VOC Mass for Strata:							**17.58**
						Estimated Total VOC Mass for PC-4 Area:							**17.58**
COC Specific Calculations by Strata													
Tetrachloroethylene	PC-4	SSG	11.25	11	17	SSG	8,100	6.0	5	13%	5	1.18E-07	0.03
1,1,1-Trichloroethane	PC-4	SSG	22.75	17	24.25	SSG	8,100	7.3	3	13%	3	1.18E-07	0.02
cis-1,2-Dichloroethylene	PC-4	SSG	22.75	17	24.25	SSG	8,100	7.3	7	13%	6	1.18E-07	0.04
Tetrachloroethylene	PC-4/SW-2	SSG	22.75	17	24.25	SSG	8,100	7.3	46	13%	40	1.18E-07	0.27
Trichloroethylene	PC-4	SSG	22.75	17	24.25	SSG	8,100	7.3	3	13%	3	1.18E-07	0.02
1,1,1-Trichloroethane	PC-4	SSG	25.75	24.25	26.5	SSG	8,100	2.3	10	13%	9	1.18E-07	0.02
cis-1,2-Dichloroethylene	PC-4/SW-2	SSG	25.75	24.25	26.5	SSG	8,100	2.3	99	13%	86	1.18E-07	0.18
Tetrachloroethylene	PC-4	SSG	25.75	24.25	26.5	SSG	8,100	2.3	32	13%	28	1.18E-07	0.06
Trichloroethylene	PC-4	SSG	25.75	24.25	26.5	SSG	8,100	2.3	11	13%	10	1.18E-07	0.02
									Estimated Total Target COC Mass for PC-4 Area:				**0.66**

	Target Mass per COC (lbs)	SSG
1,1,1-Trichloroethane	0.04	0.04
cis-1,2-Dichloroethylene	0.23	0.23
Tetrachloroethylene	0.36	0.36
Trichloroethylene	0.04	0.04
		0.66

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-5

	PC-5		PC-5		PC-5	
	SB-FS-PC-5-11.0-11.25		SB-FS-PC-5-20.0-20.25		SB-FS-PC-5-23.5-23.75	
	5/18/2012		5/18/2012		5/18/2012	
	Sand & Gravel		Gravel		Sand	
	0		0		5	
	0.1		0.1		0.1	
	12		19		18	
CONSTITUENTS						
1,1,1-Trichloroethane	2.5	U	12		9.8	
1,1,2,2-Tetrachloroethane	2.5	U	3	U	2.8	U
1,1,2-Trichloroethane	2.5	U	3	U	2.8	U
1,1-Dichloroethane	2.5	U	3	U	2.8	U
1,1-Dichloroethylene	2.5	U	3	U	2.8	U
1,2,3-Trichlorobenzene	2.5	U	3	U	2.8	U
1,2,4-Trichlorobenzene	2.5	U	3	U	2.8	U
1,2-Dichlorobenzene	2.5	U	5.3		1.9	J
1,2-Dichloroethane	2.5	U	3	U	2.8	U
1,2-Dichloropropane	2.5	U	3	U	2.8	U
1,3-Dichlorobenzene	2.5	U	3	U	2.8	U
1,4-Dichlorobenzene	2.5	U	3	U	2.8	U
2-Hexanone	25	U	30	U	28	U
Acetone	250	UJ	300	UJ	280	UJ
Benzene	2.5	U	3	U	2.8	U
Bromochloromethane	2.5	U	3	U	2.8	U
Bromodichloromethane	2.5	U	3	U	2.8	U
Bromoform	2.5	U	3	U	2.8	U
Carbon Disulfide	2.5	U	2.7	J	2.8	U
Carbon Tetrachloride	2.5	U	3	U	2.8	U
Chlorobenzene	2.5	U	3	U	2.8	U
Chloroethane	4.9	U	6	U	5.6	U
Chloroform	2.5	U	3	U	2.8	U
cis-1,2-Dichloroethylene	6.2		33		9.3	
cis-1,3-Dichloropropene	2.5	U	3	U	2.8	U
Cyclohexane	25	U	30	U	28	U
DBCP	25	U	30	U	28	U
Dibromochloromethane	2.5	U	3	U	2.8	U
Dichlorodifluoromethane	4.9	U	6	U	5.6	U
Diethyl ether	2.5	U	3	U	2.8	U
Ethylene dibromide (EDB)	2.5	U	3	U	2.8	U
Ethylbenzene	2.5	U	4.4		2.8	U
Freon 113	12	U	15	U	14	U
Isopropylbenzene	2.5	U	3	U	2.8	U
Methyl Acetate	49	UJ	60	UJ	56	UJ
Methyl bromide	4.9	U	6	U	5.6	U
Methyl chloride	4.9	U	6	U	5.6	U
Methyl ethyl ketone (MEK)	25	UJ	30	UJ	28	UJ
Methyl isobutyl ketone	25	U	30	U	28	U
Methyl tert Butyl Ether (MTBE)	2.5	U	3	U	2.8	U
Methylcyclohexane	2.5	U	3	U	2.8	U
Methylene chloride	9.9	U	12	U	11	U
m-Xylene & p-Xylene	4.9	U	6	U	5.6	U
o-Xylene	2.5	U	3	U	2.8	U
Styrene	2.5	U	3	U	2.8	U
Tetrachloroethylene	8.3		3.6		2.8	U
Tetrahydrofuran	49	U	60	U	56	U
Toluene	2.5	U	3	U	2.8	U
Trans-1,2-Dichloroethene	2.5	U	3	U	2.8	U
trans-1,3-Dichloropropene	2.5	U	3	U	2.8	U
Trichloroethylene	2.8		5.6		2.8	U
Trichlorofluoromethane	4.9	U	6	U	5.6	U
Vinyl chloride	2.5	U	6.6		14	
Xylene (total)	2.5	U	3	U	2.8	U
Sum of Constituents	**17.3**		**73.2**		**35**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-5	SSG	11.25	10.1	15.75	SSG	8,100	5.7	17	13%	15	1.18E-07	0.08
	PC-5	SSG	20.25	15.75	22	SSG	8,100	6.3	73	13%	64	1.18E-07	0.38
	PC-5	SSG	23.75	22	27	SSG	8,100	5.0	35	13%	30	1.18E-07	0.15
												Estimated Total VOC Mass for Strata:	**0.61**
												Estimated Total VOC Mass for PC-5 Area:	**0.61**

COC Specific Calculations by Strata

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
cis-1,2-Dichloroethylene	PC-5	SSG	11.25	10.1	15.75	SSG	8,100	5.7	6.2	13%	5	1.18E-07	0.03
Tetrachloroethylene	PC-5	SSG	11.25	10.1	15.75	SSG	8,100	5.7	8.3	13%	7	1.18E-07	0.04
Trichloroethylene	PC-5	SSG	11.25	10.1	15.75	SSG	8,100	5.7	2.8	13%	2	1.18E-07	0.01
1,1,1-Trichloroethane	PC-5	SSG	20.25	15.75	22	SSG	8,100	6.3	12	13%	10	1.18E-07	0.06
cis-1,2-Dichloroethylene	PC-5	SSG	20.25	15.75	22	SSG	8,100	6.3	33	13%	29	1.18E-07	0.17
Tetrachloroethylene	PC-5	SSG	20.25	15.75	22	SSG	8,100	6.3	3.6	13%	3	1.18E-07	0.02
Trichloroethylene	PC-5	SSG	20.25	15.75	22	SSG	8,100	6.3	5.6	13%	5	1.18E-07	0.03
Vinyl chloride	PC-5	SSG	20.25	15.75	22	SSG	8,100	6.3	6.6	13%	6	1.18E-07	0.03
1,1,1-Trichloroethane	PC-5	SSG	23.75	22	27	SSG	8,100	5.0	9.8	13%	9	1.18E-07	0.04
cis-1,2-Dichloroethylene	PC-5	SSG	23.75	22	27	SSG	8,100	5.0	9.3	13%	8	1.18E-07	0.04
Vinyl chloride	PC-5	SSG	23.75	22	27	SSG	8,100	5.0	14	13%	12	1.18E-07	0.06
												Estimated Total Target COC Mass for PC-5 Area:	**0.53**

	Target Mass per COC (lbs)	SSG
1,1,1-Trichloroethane	0.10	0.10
cis-1,2-Dichloroethylene	0.24	0.24
Tetrachloroethylene	0.06	0.06
Trichloroethylene	0.04	0.04
Vinyl chloride	0.09	0.09
		0.53

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-6

	PC-6		PC-6	
	SB-FS-PC-6-13.0-13.25		SB-FS-PC-6-22.0-22.25	
	6/1/2012		6/1/2012	
	Sand		Sand	
	15		0	
	0.1		0.1	
	6.7		6.7	
CONSTITUENTS				
1,1,1-Trichloroethane	2.4	U	2.6	U
1,1,2,2-Tetrachloroethane	2.4	U	2.6	U
1,1,2-Trichloroethane	2.4	U	2.6	U
1,1-Dichloroethane	2.4	U	2.6	U
1,1-Dichloroethylene	2.4	U	2.6	U
1,2,3-Trichlorobenzene	2.4	U	2.6	U
1,2,4-Trichlorobenzene	2.4	U	2.6	U
1,2-Dichlorobenzene	1.1	J	2.6	U
1,2-Dichloroethane	2.4	U	2.6	U
1,2-Dichloropropane	2.4	U	2.6	U
1,3-Dichlorobenzene	7.4		2.6	U
1,4-Dichlorobenzene	70		2.6	U
2-Hexanone	24	UJ	26	UJ
Acetone	240	UJ	260	UJ
Benzene	2.4	U	2.6	U
Bromochloromethane	2.4	U	2.6	U
Bromodichloromethane	2.4	U	2.6	U
Bromoform	2.4	U	2.6	U
Carbon Disulfide	2.4	U	2.6	U
Carbon Tetrachloride	2.4	U	2.6	U
Chlorobenzene	13		2.6	U
Chloroethane	4.8	U	5.1	U
Chloroform	2.4	U	2.6	U
cis-1,2-Dichloroethylene	1.5	J	5.2	
cis-1,3-Dichloropropene	2.4	U	2.6	U
Cyclohexane	1.6	J	26	U
DBCP	24	U	26	U
Dibromochloromethane	2.4	U	2.6	U
Dichlorodifluoromethane	4.8	U	5.1	U
Diethyl ether	2.4	U	2.6	U
Ethylene dibromide (EDB)	2.4	U	2.6	U
Ethylbenzene	4.3		2.6	U
Freon 113	12	U	13	U
Isopropylbenzene	2	J	2.6	U
Methyl Acetate	48	U	51	U
Methyl bromide	4.8	U	5.1	U
Methyl chloride	4.8	U	5.1	U
Methyl ethyl ketone (MEK)	24	UJ	26	UJ
Methyl isobutyl ketone	24	U	26	U
Methyl tert Butyl Ether (MTBE)	2.4	U	2.6	U
Methylcyclohexane	8.6		2.6	U
Methylene chloride	9.5	U	10	U
m-Xylene & p-Xylene	4.8	U	5.1	U
o-Xylene	6.3		2.6	U
Styrene	2.4	U	2.6	U
Tetrachloroethylene	2.4	U	2.6	U
Tetrahydrofuran	48	UJ	51	UJ
Toluene	2.4	U	2.6	U
Trans-1,2-Dichloroethene	2.4	U	2.6	U
trans-1,3-Dichloropropene	2.4	U	2.6	U
Trichloroethylene	2.4	U	2.6	U
Trichlorofluoromethane	4.8	U	5.1	U
Vinyl chloride	2.4	U	2.6	U
Xylene (total)	6.3		2.6	U
Sum of Constituents	**115.8**		**5.2**	

	NW6		NW6		NW7		NW7	
	14-15		18-18.5		15-16		20-20.5	
	######		######		10/8/2008		######	
CONSTITUENTS								
1,1,1-Trichloroethane	50	U	57	U	66	U	52	U
1,1,2,2-Tetrachloroethane	50	U	57	U	66	U	52	U
1,1,2-Trichloroethane	50	U	57	U	66	U	52	U
1,1-Dichloroethane	50	U	57	U	66	U	52	U
1,1-Dichloroethylene	50	U	57	U	66	U	52	U
1,2,4-Trichlorobenzene	50	U	57	U	66	U	52	U
1,2-Dichlorobenzene	50	U	57	U	66	U	52	U
1,2-Dichloroethane	50	U	57	U	66	U	52	U
1,2-Dichloropropane	50	U	57	U	66	U	52	U
1,3-Dichlorobenzene	50	U	57	U	66	U	52	U
1,4-Dichlorobenzene	50	U	57	U	66	U	52	U
2-Hexanone	150	U	170	U	200	U	150	U
Acetone	350	U	400	U	460	U	360	U
Benzene	25	U	28	U	33	U	26	U
Bromochloromethane	50	U	57	U	66	U	52	U
Bromodichloromethane	50	U	57	U	66	U	52	U
Bromoform	50	U	57	U	66	U	52	U
Carbon disulfide	50	U	57	U	66	U	52	U
Carbon tetrachloride	50	U	57	U	66	U	52	U
Chlorobenzene	50	U	57	U	66	U	52	U
Chloroethane	99	U	110	U	130	U	100	U
Chloroform	50	U	57	U	66	U	52	U
cis-1,2-Dichloroethylene	50	U	57	U	66	U	52	U
cis-1,3-Dichloropropene	50	U	57	U	66	U	52	U
DBCP	99	U	110	U	130	U	100	U
Dibromochloromethane	50	U	57	U	66	U	52	U
Dichlorodifluoromethane	99	U	110	U	130	U	100	U
Diethyl ether	50	U	57	U	66	U	52	U
EDB	50	U	57	U	66	U	52	U
Ethylbenzene	50	U	57	U	66	U	52	U
Isopropylbenzene	50	U	57	U	66	U	52	U
Methyl bromide	99	U	110	U	130	U	100	U
Methyl chloride	99	U	110	U	130	U	100	U
Methyl ethyl ketone (MEK)	200	U	230	U	260	U	210	U
Methyl isobutyl ketone	150	U	170	U	200	U	150	U
Methylene chloride	99	U	110	U	130	U	100	U
Styrene	50	U	57	U	66	U	52	U
Tetrachloroethylene	50	U	57	U	66	U	52	U
Tetrahydrofuran	200	U	230	U	260	U	210	U
Toluene	50	U	57	U	66	U	52	U
Trans-1,2-Dichloroethene	50	U	57	U	66	U	52	U
trans-1,3-Dichloropropene	50	U	57	U	66	U	52	U
Trichloroethylene	50	U	57	U	66	U	52	U
Trichlorofluoromethane	99	U	110	U	130	U	100	U
Vinyl chloride	50	U	57	U	66	U	52	U
Xylene (total)	50	U	57	U	66	U	52	U
Sum of Constituents	**0**		**0**		**0**		**0**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thicknes s of Mass Unit	Total VOC Concentr ation (dry weight)	Moisture Content Results of Samples	Total VOC Concentr ation (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft²)	(ft)	(ug/kg)	(%)	(ug/kg)	)x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-6	SSG	13.25	9	17.75	SSG	8,100	8.8	116	13%	101	1.18E-07	0.84
	PC-6	SSG	22.25	17.75	22.5	SSG	8,100	4.8	5	13%	5	1.18E-07	0.02
												Estimated Total VOC Mass for Strata:	**0.86**
												Estimated Total VOC Mass for PC-6 Area:	**0.86**
COC Specific Calculations by Strata													
cis-1,2-Dichloroethylene	PC-6	SSG	13.25	9	17.75	SSG	8,100	8.8	2	13%	1	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-6	SSG	22.25	17.75	22.5	SSG	8,100	4.8	5	13%	5	1.18E-07	0.02
												Estimated Total Target COC Mass for PC- 5Area:	**0.03**

	Target Mass per COC (lbs)	SSG
cis-1,2-Dichloroethylene	0.03	0.03

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-7

	PC-7		PC-7	
	SB-FS-PC-7-13.0-13.25		SB-FS-PC-7-18.0-18.25	
	6/1/2012		6/1/2012	
	Sand & Gravel		Sand & Gravel	
	15		20	
	0.1		0.1	
	6.6		7.3	
CONSTITUENTS				
1,1,1-Trichloroethane	140	U	2.4	U
1,1,2,2-Tetrachloroethane	140	U	2.4	U
1,1,2-Trichloroethane	140	U	2.4	U
1,1-Dichloroethane	140	U	2.4	U
1,1-Dichloroethylene	140	U	2.4	U
1,2,3-Trichlorobenzene	140	U	2.4	U
1,2,4-Trichlorobenzene	140	U	2.4	U
1,2-Dichlorobenzene	140	U	2.4	U
1,2-Dichloroethane	140	U	2.4	U
1,2-Dichloropropane	140	U	2.4	U
1,3-Dichlorobenzene	140	U	2.4	U
1,4-Dichlorobenzene	140	U	2.4	U
2-Hexanone	1400	UJ	24	U
Acetone	14000	UJ	240	UJ
Benzene	140	U	2.4	U
Bromochloromethane	140	U	2.4	U
Bromodichloromethane	140	U	2.4	U
Bromoform	140	U	2.4	U
Carbon Disulfide	140	U	2.4	U
Carbon Tetrachloride	140	U	2.4	U
Chlorobenzene	140	U	2.4	U
Chloroethane	280	U	4.8	U
Chloroform	140	U	2.4	U
cis-1,2-Dichloroethylene	140	U	4.6	
cis-1,3-Dichloropropene	140	U	2.4	U
Cyclohexane	1400	U	24	U
DBCP	1400	U	24	U
Dibromochloromethane	140	U	2.4	U
Dichlorodifluoromethane	280	U	4.8	U
Diethyl ether	140	U	2.4	U
Ethylene dibromide (EDB)	140	U	2.4	U
Ethylbenzene	140	U	2.4	U
Freon 113	700	U	12	U
Isopropylbenzene	140	U	2.4	U
Methyl Acetate	2800	U	48	U
Methyl bromide	280	U	4.8	U
Methyl chloride	280	U	4.8	U
Methyl ethyl ketone (MEK)	1400	UJ	24	UJ
Methyl isobutyl ketone	1400	U	24	U
Methyl tert Butyl Ether (MTBE)	140	U	2.4	U
Methylcyclohexane	540		2.4	U
Methylene chloride	770	U	6.5	U
m-Xylene & p-Xylene	280	U	4.8	U
o-Xylene	140	U	2.4	U
Styrene	140	U	2.4	U
Tetrachloroethylene	140	U	2.4	U
Tetrahydrofuran	2800	UJ	48	UJ
Toluene	140	U	2.4	U
Trans-1,2-Dichloroethene	140	U	2.4	U
trans-1,3-Dichloropropene	140	U	2.4	U
Trichloroethylene	140	U	2.4	U
Trichlorofluoromethane	280	U	4.8	U
Vinyl chloride	140	U	2.4	U
Xylene (total)	140	U	2.4	U
Sum of Constituents	**540**		**4.6**	

	NW1		NW1		NW5		NW5	
	14-15		16-17		13.13.5		19-19.5	
	10/7/2008		10/7/2008		10/8/2008		10/8/2008	
CONSTITUENTS								
1,1,1-Trichloroethane	39	U	60	U	49	U	57	U
1,1,2,2-Tetrachloroethane	39	U	60	U	49	U	57	U
1,1,2-Trichloroethane	39	U	60	U	49	U	57	U
1,1-Dichloroethane	39	U	60	U	49	U	57	U
1,1-Dichloroethylene	39	U	60	U	49	U	57	U
1,2,4-Trichlorobenzene	39	U	60	U	49	U	57	U
1,2-Dichlorobenzene	39	U	60	U	49	U	57	U
1,2-Dichloroethane	39	U	60	U	49	U	57	U
1,2-Dichloropropane	39	U	60	U	49	U	57	U
1,3-Dichlorobenzene	39	U	60	U	49	U	57	U
1,4-Dichlorobenzene	**77**	**J**	**70**	**J**	**500**		57	U
2-Hexanone	120	U	180	U	150	U	170	U
Acetone	270	U	420	U	340	U	400	U
Benzene	19	U	30	U	25	U	29	U
Bromochloromethane	39	U	60	U	49	U	57	U
Bromodichloromethane	39	U	60	U	49	U	57	U
Bromoform	39	U	60	U	49	U	57	U
Carbon disulfide	39	U	60	U	49	U	57	U
Carbon tetrachloride	39	U	60	U	49	U	57	U
Chlorobenzene	39	U	60	U	49	U	57	U
Chloroethane	78	U	120	U	98	U	110	U
Chloroform	39	U	60	U	49	U	57	U
cis-1,2-Dichloroethylene	39	U	60	U	49	U	57	U
cis-1,3-Dichloropropene	39	U	60	U	49	U	57	U
DBCP	78	U	120	U	98	U	110	U
Dibromochloromethane	39	U	60	U	49	U	57	U
Dichlorodifluoromethane	78	U	120	U	98	U	110	U
Diethyl ether	39	U	60	U	49	U	57	U
EDB	39	U	60	U	49	U	57	U
Ethylbenzene	39	U	60	U	49	U	57	U
Isopropylbenzene	39	U	60	U	49	U	57	U
Methyl bromide	78	U	120	U	98	U	110	U
Methyl chloride	78	U	120	U	98	U	110	U
Methyl ethyl ketone (MEK)	160	U	240	U	200	U	230	U
Methyl isobutyl ketone	120	U	180	U	150	U	170	U
Methylene chloride	78	U	120	U	98	U	110	U
Styrene	39	U	60	U	49	U	57	U
Tetrachloroethylene	39	U	60	U	49	U	57	U
Tetrahydrofuran	160	U	240	U	200	U	230	U
Toluene	39	U	60	U	49	U	57	U
Trans-1,2-Dichloroethene	39	U	60	U	49	U	57	U
trans-1,3-Dichloropropene	39	U	60	U	49	U	57	U
Trichloroethylene	39	U	60	U	49	U	57	U
Trichlorofluoromethane	78	U	120	U	98	U	110	U
Vinyl chloride	39	U	60	U	49	U	57	U
Xylene (total)	**140**	**J**	60	U	**140**	**J**	57	U
Sum of Constituents	**217**		**70**		**640**		**0**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thicknes s of Mass Unit	Total VOC Concentr ation (dry weight)	Moisture Content Results of Samples	Total VOC Concentr ation (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	$^{-3}$)x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-7	SSG	13.25	5	15.75	SSG	6,488	10.8	540	13%	470	1.18E-07	3.87
	PC-7/NW1/NW5	SSG	18.25	15.75	18.5	SSG	6,488	2.8	233	13%	203	1.18E-07	0.43
						Estimated Total VOC Mass for Strata:							**4.29**
						Estimated Total VOC Mass for PC-7 Area:							**4.29**
COC Specific Calculations by Strata													
cis-1,2-Dichloroethylene	PC-7	SSG	18.25	15.75	18.5	SSG	6,488	6.8	5	13%	4	1.18E-07	0.02
						Estimated Total Target COC Mass for PC-7 Area:							**0.02**

	Target Mass per COC (lbs)	SSG
cis-1,2-Dichloroethylene	0.02	0.02

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-8

CONSTITUENTS	PC-8 SB-FS-PC-8-14.0-14.25 5/22/2012 Sand & Silt 30 0.1 15.9		PC-8 SB-FS-PC-8-19.0-19.25 5/22/2012 Sand 5 0.1 12.2	
1,1,1-Trichloroethane	150	U	2.3	U
1,1,2,2-Tetrachloroethane	150	U	2.3	U
1,1,2-Trichloroethane	150	U	2.3	U
1,1-Dichloroethane	150	U	2.3	U
1,1-Dichloroethylene	150	U	2.3	U
1,2,3-Trichlorobenzene	150	U	2.3	U
1,2,4-Trichlorobenzene	150	U	2.3	U
1,2-Dichlorobenzene	150	U	2.3	U
1,2-Dichloroethane	150	U	2.3	U
1,2-Dichloropropane	150	U	2.3	U
1,3-Dichlorobenzene	150	U	2.3	U
1,4-Dichlorobenzene	150	U	2.3	U
2-Hexanone	1500	U	23	U
Acetone	15000	UJ	230	UJ
Benzene	150	U	2.3	U
Bromochloromethane	150	U	2.3	U
Bromodichloromethane	150	U	2.3	U
Bromoform	150	U	2.3	U
Carbon Disulfide	150	U	2.3	U
Carbon Tetrachloride	150	U	2.3	U
Chlorobenzene	150	U	2.3	U
Chloroethane	300	UJ	4.6	U
Chloroform	150	U	2.3	U
cis-1,2-Dichloroethylene	150	U	2.3	U
cis-1,3-Dichloropropene	150	U	2.3	U
Cyclohexane	1500	U	23	U
DBCP	1500	U	23	U
Dibromochloromethane	150	U	2.3	U
Dichlorodifluoromethane	300	U	4.6	U
Diethyl ether	150	U	2.3	U
Ethylene dibromide (EDB)	150	U	2.3	U
Ethylbenzene	150	U	2.3	U
Freon 113	750	U	12	U
Isopropylbenzene	150	U	2.3	U
Methyl Acetate	3000	U	46	U
Methyl bromide	300	U	4.6	U
Methyl chloride	300	U	4.6	U
Methyl ethyl ketone (MEK)	1500	UJ	23	UJ
Methyl isobutyl ketone	1500	U	23	U
Methyl tert Butyl Ether (MTBE)	150	U	2.3	U
Methylcyclohexane	**210**		2.3	U
Methylene chloride	600	U	19	U
m-Xylene & p-Xylene	300	U	4.6	U
o-Xylene	150	U	2.3	U
Styrene	150	U	2.3	U
Tetrachloroethylene	150	U	2.3	U
Tetrahydrofuran	3000	U	46	U
Toluene	150	U	2.3	U
Trans-1,2-Dichloroethene	150	U	2.3	U
trans-1,3-Dichloropropene	150	U	2.3	U
Trichloroethylene	150	U	2.3	U
Trichlorofluoromethane	300	U	4.6	U
Vinyl chloride	150	U	2.3	U
Xylene (total)	150	U	2.3	U
Sum of Constituents	**210**		**0**	

CONSTITUENTS	SW5 14.5-15 9/25/2008		SW5 16.5-17 9/25/2008		SW5 20.5-21 9/25/2008		SW6 19.5-20 9/30/2008		SW6 26.5-27 9/30/2008		SW8 11.5-12 9/25/2008		SW8 16-16.5 9/25/2008	
1,1,1-Trichloroethane	43	U	66	U	57	U	47	U	63	U	43	U	48	U
1,1,2,2-Tetrachloroethane	43	U	66	U	57	U	47	U	63	U	43	U	48	U
1,1,2-Trichloroethane	43	U	66	U	57	U	47	U	63	U	43	U	48	U
1,1-Dichloroethane	43	U	66	U	57	U	47	U	63	U	43	U	48	U
1,1-Dichloroethylene	43	U	66	U	57	U	47	U	63	U	43	U	48	U
1,2,3-Trichlorobenzene	**930**		**87**	**J**	**240**	**J**	**110**	**J**	63	U	43	U	48	U
1,2,4-Trichlorobenzene	43	U	66	U	57	U	47	U	63	U	43	U	48	U
1,2-Dichlorobenzene	43	U	66	U	57	U	47	U	63	U	43	U	48	U
1,2-Dichloroethane	43	U	66	U	57	U	47	U	63	U	43	U	48	U
1,2-Dichloropropane	43	U	66	U	57	U	47	U	63	U	43	U	48	U
1,3-Dichlorobenzene	43	U	66	U	57	U	47	U	63	U	43	U	48	U
1,4-Dichlorobenzene	**44**	**J**	66	U	57	U	47	U	63	U	43	U	48	U
2-Hexanone	130	U	200	U	170	U	140	U	190	U	130	U	140	U
Acetone	300	U	460	U	400	U	330	U	440	U	300	U	340	U
Benzene	22	U	33	U	28	U	24	U	31	U	22	U	24	U
Bromochloromethane	43	U	66	U	57	U	47	U	63	U	43	U	48	U
Bromodichloromethane	43	U	66	U	57	U	47	U	63	U	43	U	48	U
Bromoform	43	U	66	U	57	U	47	U	63	U	43	U	48	U
Carbon disulfide	**110**	**J**	**130**	**J**	**250**	**J**	47	U	63	U	43	U	48	U
Carbon tetrachloride	43	U	66	U	57	U	47	U	63	U	43	U	48	U
Chlorobenzene	43	U	66	U	57	U	47	U	63	U	43	U	48	U
Chloroethane	86	U	130	U	110	U	95	U	130	U	87	U	96	U
Chloroform	43	U	66	U	57	U	47	U	63	U	43	U	48	U
cis-1,2-Dichloroethylene	**56**	**J**	**110**	**J**	57	U	47	U	63	U	43	U	48	U
cis-1,3-Dichloropropene	43	U	66	U	57	U	47	U	63	U	43	U	48	U
DBCP	86	U	130	U	110	U	95	U	130	U	87	U	96	U
Dibromochloromethane	43	U	66	U	57	U	47	U	63	U	43	U	48	U
Dichlorodifluoromethane	86	U	130	U	110	U	95	U	130	U	87	U	96	U
Diethyl ether	43	U	66	U	57	U	47	U	63	U	43	U	48	U
EDB	43	U	66	U	57	U	47	U	63	U	43	U	48	U
Ethylbenzene	**2200**		**120**	**J**	**320**		**320**		63	U	43	U	48	U
Isopropylbenzene	**360**		66	U	57	U	**63**	**J**	63	U	43	U	48	U
Methyl bromide	86	U	130	U	110	U	95	U	130	U	87	U	96	U
Methyl chloride	86	U	130	U	110	U	95	U	130	U	87	U	96	U
Methyl ethyl ketone (MEK)	170	U	260	U	230	U	190	U	250	U	170	U	190	U
Methyl isobutyl ketone	130	U	200	U	170	U	140	U	190	U	130	U	140	U
Methylene chloride	86	U	130	U	110	U	95	U	130	U	87	U	96	U
Styrene	43	U	66	U	57	U	47	U	63	U	43	U	48	U
Tetrachloroethylene	**52**	**J**	**84**	**J**	57	U	47	U	63	U	**230**		**810**	
Tetrahydrofuran	170	U	260	U	230	U	190	U	250	U	170	U	190	U
Toluene	43	U	66	U	57	U	47	U	63	U	43	U	48	U
Trans-1,2-Dichloroethene	43	U	66	U	57	U	47	U	63	U	43	U	48	U
trans-1,3-Dichloropropene	43	U	66	U	57	U	47	U	63	U	43	U	48	U
Trichloroethylene	43	U	66	U	57	U	47	U	63	U	43	U	48	U
Trichlorofluoromethane	86	U	130	U	110	U	95	U	130	U	87	U	96	U
Vinyl chloride	43	U	66	U	57	U	47	U	63	U	43	U	48	U
Xylene (total)	**3400**		**260**	**J**	**570**		**620**		63	U	43	U	48	U
Sum of Constituents	**7152**		**791**		**1380**		**1113**		**0**		**230**		**810**	

Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thicknesses of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/1e9	Mass of Total VOC
						(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	(lb/ft^3)x(kg/1x10^9 ug)	(lbs)
Grey Silty Sand/Silt												
PC-8	GSSS	14.25	12	15	GSSS	4,050	3.0	210	13%	183	1.07E-07	0.24
Estimated Total VOC Mass for Strata:												**0.24**
Sand / Sand and Gravel												
PC-8/SW5/SW8	SSG	14.25	12	15	SSG	4,050	3	3,691	13%	3,211	1.18E-07	4.60
PC-8/SW5/SW6/SW8	SSG	19.25	15	21	SSG	8,100	6.0	1,024	13%	890	1.18E-07	5.11
Estimated Total VOC Mass for Strata:												**9.71**
Estimate Total Mass for PC-8 Area												**9.95**
COC Specific Calculations by Strata												
cis-1,2-Dichloroethylene	SW5	SSG	14.25	12	15	SSG	8,100	3	56	13%	49	1.18E-07	0.14
Tetrachloroethylene	SW5/SW8	SSG	14.25	12	15	SSG	8,100	3	141	13%	123	1.18E-07	0.35
cis-1,2-Dichloroethylene	SW5	SSG	19.25	15	21	SSG	8,100	6.0	110	13%	96	1.18E-07	0.55
Tetrachloroethylene	SW5/SW8	SSG	19.25	15	21	SSG	8,100	6.0	447	13%	389	1.18E-07	2.23
Estimated Total VOC Mass for PC-8 Area:												**3.27**

Compound	Target Mass per COC (lbs)	SSG
cis-1,2-Dichloroethylene	0.69	0.69
Tetrachloroethylene	2.58	2.58
		3.27

Notes:
Divided Cell Area between GSSS and SSG for 12-15 depth interval

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-9

	PC-9	
	SB-FS-PC-9-15.5-15.75	
	6/5/2012	
	Sand	
	0	
	0.1	
	8.7	
CONSTITUENTS		
1,1,1-Trichloroethane	2.8	U
1,1,2,2-Tetrachloroethane	2.8	U
1,1,2-Trichloroethane	2.8	U
1,1-Dichloroethane	2.8	U
1,1-Dichloroethylene	2.8	U
1,2,3-Trichlorobenzene	2.8	U
1,2,4-Trichlorobenzene	2.8	U
1,2-Dichlorobenzene	2.8	U
1,2-Dichloroethane	2.8	U
1,2-Dichloropropane	2.8	U
1,3-Dichlorobenzene	2.8	U
1,4-Dichlorobenzene	2.8	U
2-Hexanone	28	UJ
Acetone	280	UJ
Benzene	2.8	U
Bromochloromethane	2.8	U
Bromodichloromethane	2.8	U
Bromoform	2.8	U
Carbon Disulfide	2.8	U
Carbon Tetrachloride	2.8	U
Chlorobenzene	2.8	U
Chloroethane	5.6	U
Chloroform	2.8	U
cis-1,2-Dichloroethylene	8.6	
cis-1,3-Dichloropropene	2.8	U
Cyclohexane	28	U
DBCP	28	U
Dibromochloromethane	2.8	U
Dichlorodifluoromethane	5.6	U
Diethyl ether	2.8	U
Ethylene dibromide (EDB)	2.8	U
Ethylbenzene	2.8	U
Freon 113	14	U
Isopropylbenzene	2.8	U
Methyl Acetate	56	U
Methyl bromide	5.6	U
Methyl chloride	5.6	U
Methyl ethyl ketone (MEK)	28	UJ
Methyl isobutyl ketone	28	U
Methyl tert Butyl Ether (MTBE)	2.8	U
Methylcyclohexane	2.8	U
Methylene chloride	11	U
m-Xylene & p-Xylene	5.6	U
o-Xylene	2.8	U
Styrene	2.8	U
Tetrachloroethylene	9.3	
Tetrahydrofuran	56	UJ
Toluene	2.8	U
Trans-1,2-Dichloroethene	2.8	U
trans-1,3-Dichloropropene	2.8	U
Trichloroethylene	2.8	U
Trichlorofluoromethane	5.6	U
Vinyl chloride	2.8	U
Xylene (total)	2.8	U
Sum of Constituents	**17.9**	

	SW11	
	17-17.5	
	9/25/2008	
CONSTITUENTS		
1,1,1-Trichloroethane	82	U
1,1,2,2-Tetrachloroethane	82	U
1,1,2-Trichloroethane	82	U
1,1-Dichloroethane	82	U
1,1-Dichloroethylene	82	U
1,2,4-Trichlorobenzene	82	U
1,2-Dichlorobenzene	82	U
1,2-Dichloroethane	82	U
1,2-Dichloropropane	82	U
1,3-Dichlorobenzene	82	U
1,4-Dichlorobenzene	82	U
2-Hexanone	240	U
Acetone	570	U
Benzene	41	U
Bromochloromethane	82	U
Bromodichloromethane	82	U
Bromoform	82	U
Carbon disulfide	82	U
Carbon tetrachloride	82	U
Chlorobenzene	82	U
Chloroethane	160	U
Chloroform	82	U
cis-1,2-Dichloroethylene	82	U
cis-1,3-Dichloropropene	82	U
DBCP	160	U
Dibromochloromethane	82	U
Dichlorodifluoromethane	160	U
Diethyl ether	82	U
EDB	82	U
Ethylbenzene	82	U
Isopropylbenzene	82	U
Methyl bromide	160	U
Methyl chloride	160	U
Methyl ethyl ketone (MEK)	330	U
Methyl isobutyl ketone	240	U
Methylene chloride	160	U
Styrene	82	U
Tetrachloroethylene	82	U
Tetrahydrofuran	330	U
Toluene	82	U
Trans-1,2-Dichloroethene	82	U
trans-1,3-Dichloropropene	82	U
Trichloroethylene	82	U
Trichlorofluoromethane	160	U
Vinyl chloride	82	U
Xylene (total)	82	U
Sum of Constituents	**0**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density / 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-9	SSG	15.75	12.8	16.5	SSG	8,100	3.7	18	13%	16	1.18E-07	0.06
												Estimated Total VOC Mass for Strata:	**0.06**
												Estimated Total VOC Mass for PC-9 Area:	**0.06**
COC Specific Calculations by Strata													
cis-1,2-Dichloroethylene	PC-9	SSG	15.75	12.8	16.5	SSG	8,100	3.7	9	13%	7	1.18E-07	0.03
Tetrachloroethylene	PC-9	SSG	15.75	12.8	16.5	SSG	8,100	3.7	9	13%	8	1.18E-07	0.03
												Estimated Total Target COC Mass for PC-9 Area:	**0.06**

	Target Mass per COC (lbs)	SSG
cis-1,2-Dichloroethylene	0.03	0.03
Tetrachloroethylene	0.03	0.03
		0.06

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-10

	PC-10		PC-10		PC-10	
	SB-FS-PC-10-14.5-14.75		SB-FS-PC-10-17.5-17.75		SB-FS-PC-10-23.5-23.75	
	5/23/2012		6/8/2012		5/23/2012	
	Sand & Gravel		Sand		Sand & Gravel	
	15		15		0	
	0.1		0.1		0.1	
	10				12	
CONSTITUENTS						
1,1,1-Trichloroethane	2.4	U	9.4		61	
1,1,2,2-Tetrachloroethane	2.4	U	2.2	U	2.2	U
1,1,2-Trichloroethane	2.4	U	2.2	U	2.2	U
1,1-Dichloroethane	2.4	U	2.2	U	4	
1,1-Dichloroethylene	2.4	U	2.2	U	1.4	J
1,2,3-Trichlorobenzene	5.3		2.2	U	2.2	U
1,2,4-Trichlorobenzene	12		2.2	U	2.2	U
1,2-Dichlorobenzene	37		2.2	U	2.2	U
1,2-Dichloroethane	2.4	U	2.2	U	2.2	U
1,2-Dichloropropane	2.4	U	2.2	U	2.2	U
1,3-Dichlorobenzene	2.4	U	2.2	U	2.2	U
1,4-Dichlorobenzene	2.4	U	2.2	U	2.2	U
2-Hexanone	24	U	22	U	22	U
Acetone	240	UJ	220	U	220	UJ
Benzene	2.4	U	2.2	U	2.2	U
Bromochloromethane	2.4	U	2.2	U	2.2	U
Bromodichloromethane	2.4	U	2.2	U	2.2	U
Bromoform	2.4	U	2.2	U	2.2	U
Carbon Disulfide	2.4	U	2.2	U	2.2	U
Carbon Tetrachloride	2.4	U	2.2	U	2.2	U
Chlorobenzene	2.4	U	2.2	U	2.2	U
Chloroethane	4.9	U	4.3	U	4.5	U
Chloroform	2.4	U	2.2	U	2.2	U
cis-1,2-Dichloroethylene	10		46		220	
cis-1,3-Dichloropropene	2.4	U	2.2	U	2.2	U
Cyclohexane	24	U	22	U	22	U
DBCP	24	U	22	U	22	U
Dibromochloromethane	2.4	U	2.2	U	2.2	U
Dichlorodifluoromethane	4.9	U	4.3	U	4.5	U
Diethyl ether	2.4	U	2.2	U	2.2	U
Ethylene dibromide (EDB)	2.4	U	2.2	U	2.2	U
Ethylbenzene	2.4	U	2.2	U	2.2	U
Freon 113	12	U	11	U	11	U
Isopropylbenzene	4.5		2.2	U	2.2	U
Methyl Acetate	49	U	43	U	45	U
Methyl bromide	4.9	U	4.3	U	4.5	U
Methyl chloride	4.9	U	4.3	U	4.5	U
Methyl ethyl ketone (MEK)	24	UJ	22	U	22	UJ
Methyl isobutyl ketone	24	U	22	U	22	U
Methyl tert Butyl Ether (MTBE)	2.4	U	2.2	U	2.2	U
Methylcyclohexane	2.4	U	2.2	U	2.2	U
Methylene chloride	9.8	U	8.7	U	9	U
m-Xylene & p-Xylene	4.9	U	4.3	U	4.5	U
o-Xylene	2.6		2.2	U	2.2	U
Styrene	2.4	U	2.2	U	2.2	U
Tetrachloroethylene	18		2.2	U	2.2	U
Tetrahydrofuran	49	U	43	UJ	45	U
Toluene	2.4	U	2.2	U	2.2	U
Trans-1,2-Dichloroethene	2.4	U	2.2	U	3.1	
trans-1,3-Dichloropropene	2.4	U	2.2	U	2.2	U
Trichloroethylene	2.6		2.2	U	1.9	J
Trichlorofluoromethane	4.9	U	4.3	U	4.5	U
Vinyl chloride	2.4	U	4.2		13	
Xylene (total)	2.6		2.2	U	2.2	U
Sum of Constituents	**92**		**59.6**		**304.4**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-10	SSG	14.75	12.25	16.25	SSG	8,100	4.0	92	13%	80	1.18E-07	0.31
	PC-10	SSG	17.75	16.25	20.75	SSG	8,100	4.5	60	13%	52	1.18E-07	0.22
	PC-10	SSG	23.75	20.75	23.5	SSG	8,100	2.8	304	13%	265	1.18E-07	0.70
											Estimated Total VOC Mass for Strata:		**1.23**
											Estimated Total VOC Mass for PC-10 Area:		**1.23**
COC Specific Calculations by Strata													
cis-1,2-Dichloroethylene	PC-10	SSG	14.75	12.25	16.25	SSG	8,100	4.0	10	13%	9	1.18E-07	0.03
Tetrachloroethylene	PC-10	SSG	14.75	12.25	16.25	SSG	8,100	4.0	18	13%	16	1.18E-07	0.06
Trichloroethylene	PC-10	SSG	14.75	12.25	16.25	SSG	8,100	4.0	2.6	13%	2	1.18E-07	0.01
1,1,1-Trichloroethane	PC-10	SSG	17.75	16.25	20.75	SSG	8,100	4.5	9.4	13%	8	1.18E-07	0.04
cis-1,2-Dichloroethylene	PC-10	SSG	17.75	16.25	20.75	SSG	8,100	4.5	46	13%	40	1.18E-07	0.17
Vinyl chloride	PC-10	SSG	17.75	16.25	20.75	SSG	8,100	4.5	4.2	13%	4	1.18E-07	0.02
1,1,1-Trichloroethane	PC-10	SSG	23.75	20.75	23.5	SSG	8,100	2.8	61	13%	53	1.18E-07	0.14
1,1-Dichloroethane	PC-10	SSG	23.75	20.75	23.5	SSG	8,100	2.8	4	13%	3	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-10	SSG	23.75	20.75	23.5	SSG	8,100	2.8	220	13%	191	1.18E-07	0.50
Trans-1,2-Dichloroethene	PC-10	SSG	23.75	20.75	23.5	SSG	8,100	2.8	3.1	13%	3	1.18E-07	0.01
Vinyl chloride	PC-10	SSG	23.75	20.75	23.5	SSG	8,100	2.8	13	13%	11	1.18E-07	0.03
											Estimated Total Target COC Mass for PC-10 Area:		**1.01**

	Target Mass per COC (lbs)	SSG
1,1,1-Trichloroethane	0.17	0.17
1,1-Dichloroethane	0.01	0.01
cis-1,2-Dichloroethylene	0.71	0.71
Tetrachloroethylene	0.06	0.06
Trans-1,2-Dichloroethene	0.01	0.01
Trichloroethylene	0.01	0.01
Vinyl chloride	0.05	0.05
		1.01

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-11

	PC-11	
	SB-FS-PC-11-20.0-20.25	
	5/25/2012	
	Sand	
	10	
	0.1	
	23	
CONSTITUENTS		
1,1,1-Trichloroethane	20	
1,1,2,2-Tetrachloroethane	2.8	UJ
1,1,2-Trichloroethane	2.8	U
1,1-Dichloroethane	5.9	
1,1-Dichloroethylene	2.8	U
1,2,3-Trichlorobenzene	2.8	U
1,2,4-Trichlorobenzene	2.8	U
1,2-Dichlorobenzene	1.8	J
1,2-Dichloroethane	2.8	U
1,2-Dichloropropane	2.8	U
1,3-Dichlorobenzene	2.8	U
1,4-Dichlorobenzene	2.8	U
2-Hexanone	28	U
Acetone	280	UJ
Benzene	2.8	U
Bromochloromethane	2.8	U
Bromodichloromethane	2.8	U
Bromoform	2.8	U
Carbon Disulfide	2.8	U
Carbon Tetrachloride	2.8	U
Chlorobenzene	2.8	U
Chloroethane	5.6	UJ
Chloroform	2.8	U
cis-1,2-Dichloroethylene	96	
cis-1,3-Dichloropropene	2.8	U
Cyclohexane	28	U
DBCP	28	UJ
Dibromochloromethane	2.8	U
Dichlorodifluoromethane	5.6	U
Diethyl ether	2.8	U
Ethylene dibromide (EDB)	2.8	U
Ethylbenzene	2.8	U
Freon 113	14	U
Isopropylbenzene	8.8	
Methyl Acetate	56	UJ
Methyl bromide	5.6	U
Methyl chloride	5.6	U
Methyl ethyl ketone (MEK)	28	UJ
Methyl isobutyl ketone	28	U
Methyl tert Butyl Ether (MTBE)	2.8	U
Methylcyclohexane	2.8	U
Methylene chloride	11	U
m-Xylene & p-Xylene	5.6	U
o-Xylene	2.8	U
Styrene	2.8	U
Tetrachloroethylene	2.8	U
Tetrahydrofuran	56	U
Toluene	2.8	U
Trans-1,2-Dichloroethene	2.1	J
trans-1,3-Dichloropropene	2.8	U
Trichloroethylene	2.8	U
Trichlorofluoromethane	5.6	U
Vinyl chloride	33	J
Xylene (total)	2.8	U
Sum of Constituents	**167.6**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-11	SSG	20.25	11.5	21.5	SSG	8,100	10.0	168	13%	146	1.18E-07	1.39
												Estimated Total VOC Mass for Strata:	**1.39**
												Estimated Total VOC Mass for PC-11 Area:	**1.39**
COC Specific Calculations by Strata													
1,1,1-Trichloroethane	PC-11	SSG	20.25	11.5	21.5	SSG	8,100	10.0	20	13%	17	1.18E-07	0.17
1,1-Dichloroethane	PC-11	SSG	20.25	11.5	21.5	SSG	8,100	10.0	5.9	13%	5	1.18E-07	0.05
cis-1,2-Dichloroethylene	PC-11	SSG	20.25	11.5	21.5	SSG	8,100	10.0	96	13%	84	1.18E-07	0.80
Trans-1,2-Dichloroethene	PC-11	SSG	20.25	11.5	21.5	SSG	8,100	10.0	2.1	13%	2	1.18E-07	0.02
Vinyl chloride	PC-11	SSG	20.25	11.5	21.5	SSG	8,100	10.0	33	13%	29	1.18E-07	0.27
												Estimated Total Target COC Mass for PC-11 Area:	**1.31**

	Target Mass per COC (lbs)	SSG
1,1,1-Trichloroethane	0.17	0.17
1,1-Dichloroethane	0.05	0.05
cis-1,2-Dichloroethylene	0.80	0.80
Trans-1,2-Dichloroethene	0.02	0.02
Vinyl chloride	0.27	0.27
		1.31

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-12

	PC-12		PC-12	
	SB-FS-PC-12-14.0-		SB-FS-PC-12-21.5-	
	14.25		21.75	
	5/25/2012		5/25/2012	
	Sand		Sand	
	5		0	
	0.1		0.1	
	7.9		19	
CONSTITUENTS				
1,1,1-Trichloroethane	130	J	16	
1,1,2,2-Tetrachloroethane	130	U	2.1	UJ
1,1,2-Trichloroethane	130	U	2.1	U
1,1-Dichloroethane	130	U	2.6	
1,1-Dichloroethylene	130	U	2.1	U
1,2,3-Trichlorobenzene	130	U	2.1	U
1,2,4-Trichlorobenzene	130	U	2.1	U
1,2-Dichlorobenzene	130	U	1.1	J
1,2-Dichloroethane	130	U	2.1	U
1,2-Dichloropropane	130	U	2.1	U
1,3-Dichlorobenzene	130	U	2.1	U
1,4-Dichlorobenzene	130	U	2.1	U
2-Hexanone	1300	U	21	U
Acetone	13000	UJ	210	UJ
Benzene	130	U	2.1	U
Bromochloromethane	130	U	2.1	U
Bromodichloromethane	130	U	2.1	U
Bromoform	130	U	2.1	U
Carbon Disulfide	130	U	2.1	U
Carbon Tetrachloride	130	U	2.1	U
Chlorobenzene	130	U	2.1	U
Chloroethane	270	UJ	4.3	UJ
Chloroform	130	U	2.1	U
cis-1,2-Dichloroethylene	110	J	66	
cis-1,3-Dichloropropene	130	U	2.1	U
Cyclohexane	1300	U	21	U
DBCP	1300	U	21	UJ
Dibromochloromethane	130	U	2.1	U
Dichlorodifluoromethane	270	U	4.3	U
Diethyl ether	130	U	2.1	U
Ethylene dibromide (EDB)	130	U	2.1	U
Ethylbenzene	310		1.5	J
Freon 113	660	U	11	U
Isopropylbenzene	130	U	2.1	U
Methyl Acetate	2700	U	43	UJ
Methyl bromide	270	U	4.3	U
Methyl chloride	270	U	4.3	U
Methyl ethyl ketone (MEK)	1300	UJ	21	UJ
Methyl isobutyl ketone	1300	U	21	U
Methyl tert Butyl Ether (MTBE)	130	U	2.1	U
Methylcyclohexane	130	U	2.1	U
Methylene chloride	1200	U	8.6	U
m-Xylene & p-Xylene	270	U	4.3	U
o-Xylene	130	U	2.1	U
Styrene	130	U	2.1	U
Tetrachloroethylene	130	U	2.1	U
Tetrahydrofuran	2700	U	43	U
Toluene	130	U	2.1	U
Trans-1,2-Dichloroethene	130	U	1.3	J
trans-1,3-Dichloropropene	130	U	2.1	U
Trichloroethylene	130	U	2.1	U
Trichlorofluoromethane	270	U	4.3	U
Vinyl chloride	130	U	9.4	J
Xylene (total)	130	U	2.1	U
Sum of Constituents	**550**		**97.9**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density / 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-12	SSG	14.25	9.75	18	SSG	8,100	8.3	550	13%	479	1.18E-07	3.77
	PC-12	SSG	21.75	18	22	SSG	8,100	4.0	98	13%	85	1.18E-07	0.33
											Estimated Total VOC Mass for Strata:		**4.10**
											Estimated Total VOC Mass for PC-12 Area:		**4.10**

COC Specific Calculations by Strata

1,1,1-Trichloroethane	PC-12	SSG	14.25	9.75	18	SSG	8,100	8.3	130	13%	113	1.18E-07	0.89
cis-1,2-Dichloroethylene	PC-12	SSG	14.25	9.75	18	SSG	8,100	8.3	110	13%	96	1.18E-07	0.75
1,1,1-Trichloroethane	PC-12	SSG	21.75	18	22	SSG	8,100	4.0	16	13%	14	1.18E-07	0.05
1,1-Dichloroethane	PC-12	SSG	21.75	18	22	SSG	8,100	4.0	2.6	13%	2	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-12	SSG	21.75	18	22	SSG	8,100	4.0	66	13%	57	1.18E-07	0.22
Trans-1,2-Dichloroethene	PC-12	SSG	21.75	18	22	SSG	8,100	4.0	1.3	13%	1	1.18E-07	0.00
Vinyl chloride	PC-12	SSG	21.75	18	22	SSG	8,100	4.0	9.4	13%	8	1.18E-07	0.03
											Estimated Total Target COC Mass for PC-12 Area:		**1.96**

	Target Mass per COC (lbs)	SSG
1,1,1-Trichloroethane	0.95	0.95
1,1-Dichloroethane	0.01	0.01
cis-1,2-Dichloroethylene	0.97	0.97
Trans-1,2-Dichloroethene	0.004	0.004
Vinyl chloride	0.03	0.03
		1.96

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-13

	PC-13		PC-13		PC-13	
	SB-FS-PC-13-10.0-		SB-FS-PC-13-15.0-		SB-FS-PC-13-22.0-	
	10.25		15.25		22.25	
	6/4/2012		5/31/2012		5/31/2012	
	Sand & Gravel		Sand		Sand	
	5		15		15	
	0.1		0.1		0.1	
	7.3		14		10	
CONSTITUENTS						
1,1,1-Trichloroethane	2.5	U	3.7		2.3	J
1,1,2,2-Tetrachloroethane	2.5	U	2	U	2.6	U
1,1,2-Trichloroethane	2.5	U	2	U	2.6	U
1,1-Dichloroethane	2.5	U	1.5	J	2.4	J
1,1-Dichloroethylene	2.5	U	2	U	2.6	U
1,2,3-Trichlorobenzene	6.1		2	U	2.6	U
1,2,4-Trichlorobenzene	4.7		2	U	2.6	U
1,2-Dichlorobenzene	6.3		0.97	J	1.5	J
1,2-Dichloroethane	2.5	U	2	U	2.6	U
1,2-Dichloropropane	2.5	U	2	U	2.6	U
1,3-Dichlorobenzene	1.7	J	2	U	2.6	U
1,4-Dichlorobenzene	5.6		2	U	2.6	U
2-Hexanone	25	UJ	20	U	26	U
Acetone	250	UJ	200	UJ	260	UJ
Benzene	2.5	U	2	U	2.6	U
Bromochloromethane	2.5	U	2	U	2.6	U
Bromodichloromethane	2.5	U	2	U	2.6	U
Bromoform	2.5	U	2	U	2.6	U
Carbon Disulfide	2.5	U	3.4	J	2.6	J
Carbon Tetrachloride	2.5	U	2	U	2.6	U
Chlorobenzene	2.5	U	2	U	2.6	U
Chloroethane	5	U	4	U	5.2	U
Chloroform	2.5	U	2	U	2.6	U
cis-1,2-Dichloroethylene	3.2		7.6		14	
cis-1,3-Dichloropropene	2.5	U	2	U	2.6	U
Cyclohexane	25	U	20	U	26	U
DBCP	25	U	20	U	26	U
Dibromochloromethane	2.5	U	2	U	2.6	U
Dichlorodifluoromethane	5	U	4	U	5.2	U
Diethyl ether	2.5	U	2	U	2.6	U
Ethylene dibromide (EDB)	2.5	U	2	U	2.6	U
Ethylbenzene	9.5		19		12	
Freon 113	13	U	10	U	13	U
Isopropylbenzene	3.6		1.8	J	1.8	J
Methyl Acetate	50	U	40	U	52	U
Methyl bromide	5	U	4	U	5.2	U
Methyl chloride	5	U	4	U	5.2	U
Methyl ethyl ketone (MEK)	25	UJ	20	UJ	26	UJ
Methyl isobutyl ketone	25	U	20	U	26	U
Methyl tert Butyl Ether (MTBE)	2.5	U	2	U	2.6	U
Methylcyclohexane	2.5	U	2	U	2.6	U
Methylene chloride	10	U	6.3	J	6.7	J
m-Xylene & p-Xylene	5	U	4	U	5.2	U
o-Xylene	2.2	J	2	U	2.6	U
Styrene	2.5	U	2	U	2.6	U
Tetrachloroethylene	2.5	U	2	U	2.6	U
Tetrahydrofuran	50	UJ	40	UJ	52	UJ
Toluene	2.5	U	2	U	2.6	U
Trans-1,2-Dichloroethene	2.5	U	2	U	2.6	U
trans-1,3-Dichloropropene	2.5	U	2	U	2.6	U
Trichloroethylene	2.5	U	2	U	2.6	U
Trichlorofluoromethane	5	U	4	U	5.2	U
Vinyl chloride	2.5	U	9.8		8.8	
Xylene (total)	2.2	J	2	U	2.6	U
Sum of Constituents	**42.9**		**54.07**		**52.1**	

	NW3		NW3		NW4		NW4	
	10-11		20.5-21.5		14-15		22-22.5	
	10/7/2008		######		10/7/2008		10/7/2008	
CONSTITUENTS								
1,1,1-Trichloroethane	50	U	45	U	47	U	44	U
1,1,2,2-Tetrachloroethane	50	U	45	U	47	U	44	U
1,1,2-Trichloroethane	50	U	45	U	47	U	44	U
1,1-Dichloroethane	50	U	45	U	47	U	44	U
1,1-Dichloroethylene	50	U	45	U	47	U	44	U
1,2,4-Trichlorobenzene	**150**	**J**	45	U	47	U	44	U
1,2-Dichlorobenzene	50	U	45	U	**68**	**J**	44	U
1,2-Dichloroethane	50	U	45	U	47	U	44	U
1,2-Dichloropropane	50	U	45	U	47	U	44	U
1,3-Dichlorobenzene	50	U	45	U	47	U	44	U
1,4-Dichlorobenzene	50	U	45	U	**160**	**J**	44	U
2-Hexanone	150	U	140	U	140	U	130	U
Acetone	350	U	320	U	330	U	310	U
Benzene	25	U	23	U	23	U	22	U
Bromochloromethane	50	U	45	U	47	U	44	U
Bromodichloromethane	50	U	45	U	47	U	44	U
Bromoform	50	U	45	U	47	U	44	U
Carbon disulfide	50	U	45	U	47	U	44	U
Carbon tetrachloride	50	U	45	U	47	U	44	U
Chlorobenzene	50	U	45	U	47	U	44	U
Chloroethane	99	U	91	U	93	U	88	U
Chloroform	50	U	45	U	47	U	44	U
cis-1,2-Dichloroethylene	50	U	45	U	47	U	44	U
cis-1,3-Dichloropropene	50	U	45	U	47	U	44	U
DBCP	99	U	91	U	93	U	88	U
Dibromochloromethane	50	U	45	U	47	U	44	U
Dichlorodifluoromethane	99	U	91	U	93	U	88	U
Diethyl ether	50	U	45	U	47	U	44	U
EDB	50	U	45	U	47	U	44	U
Ethylbenzene	**56**	**J**	45	U	**480**		44	U
Isopropylbenzene	50	U	45	U	**90**	**J**	44	U
Methyl bromide	99	U	91	U	93	U	88	U
Methyl chloride	99	U	91	U	93	U	88	U
Methyl ethyl ketone (MEK)	200	U	180	U	190	U	180	U
Methyl isobutyl ketone	150	U	140	U	140	U	130	U
Methylene chloride	99	U	91	U	93	U	88	U
Styrene	50	U	45	U	47	U	44	U
Tetrachloroethylene	50	U	45	U	47	U	44	U
Tetrahydrofuran	200	U	180	U	190	U	180	U
Toluene	50	U	45	U	47	U	44	U
Trans-1,2-Dichloroethene	50	U	45	U	47	U	44	U
trans-1,3-Dichloropropene	50	U	45	U	47	U	44	U
Trichloroethylene	50	U	45	U	47	U	44	U
Trichlorofluoromethane	99	U	91	U	93	U	88	U
Vinyl chloride	50	U	45	U	47	U	44	U
Xylene (total)	50	U	45	U	**780**		44	U
Sum of Constituents	**206**		**0**		**1578**		**0**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thicknes s of Mass Unit	Total VOC Concentr ation (dry weight)	Moisture Content Results of Samples	Total VOC Concentr ation (wet weight)	Bulk Density / 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-13	SSG	10.25	8.5	12.75	SSG	8,100	4.3	124	13%	108	1.18E-07	0.44
	PC-13	SSG	15.25	12.75	18.75	SSG	8,100	6.0	816	13%	710	1.18E-07	4.07
	PC-13	SSG	22.25	18.75	25	SSG	8,100	6.3	52	13%	45	1.18E-07	0.27
												Estimated Total VOC Mass for Strata:	**4.78**
												Estimated Total VOC Mass for PC-13 Area:	**4.78**
COC Specific Calculations by Strata													
cis-1,2-Dichloroethylene	PC-13	SSG	10.25	8.5	12.75	SSG	8,100	4.3	3	13%	3	1.18E-07	0.01
1,1,1-Trichloroethane	PC-13	SSG	15.25	12.75	18.75	SSG	8,100	6.0	4	13%	3	1.18E-07	0.02
1,1-Dichloroethane	PC-13	SSG	15.25	12.75	18.75	SSG	8,100	6.0	2	13%	1	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-13	SSG	15.25	12.75	18.75	SSG	8,100	6.0	8	13%	7	1.18E-07	0.04
Vinyl chloride	PC-13	SSG	15.25	12.75	18.75	SSG	8,100	6.0	10	13%	9	1.18E-07	0.05
1,1,1-Trichloroethane	PC-13	SSG	22.25	18.75	25	SSG	8,100	6.3	2	13%	2	1.18E-07	0.01
1,1-Dichloroethane	PC-13	SSG	22.25	18.75	25	SSG	8,100	6.3	2	13%	2	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-13	SSG	22.25	18.75	25	SSG	8,100	6.3	14	13%	12	1.18E-07	0.07
Vinyl chloride	PC-13	SSG	22.25	18.75	25	SSG	8,100	6.3	9	13%	8	1.18E-07	0.05
												Estimated Total Target COC Mass for PC-13 Area:	**0.27**

	Target Mass per COC (lbs)	SSG
1,1,1-Trichloroethane	0.03	0.03
1,1-Dichloroethane	0.02	0.02
cis-1,2-Dichloroethylene	0.12	0.12
Vinyl chloride	0.09	0.09
		0.27

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-14

	PC-14		PC-14		PC-14		PC-14	
	SB-FS-PC-14-11.0-		SB-PCB-5		SB-FS-PC-14-15.0-		SB-FS-PC-14-19.5-	
	11.25		11.25		15.25		19.75	
	5/31/2012		5/31/2012		5/31/2012		5/31/2012	
	Sand		Sand		Sand		Sand	
	5		5		5		0	
	0.1		0.1		0.1		0.1	
	7.4		7.4		5		9.3	
CONSTITUENTS			Duplicate					
1,1,1-Trichloroethane	2.7	U	1.7	U	3.4		3.2	
1,1,2,2-Tetrachloroethane	2.7	U	1.7	U	2.3	U	2.3	U
1,1,2-Trichloroethane	2.7	U	1.7	U	2.3	U	2.3	U
1,1-Dichloroethane	2.7	U	1.7	U	2.3	U	2.4	
1,1-Dichloroethylene	2.7	U	1.7	U	2.3	U	2.3	U
1,2,3-Trichlorobenzene	2.7	U	1.7	U	2.3	U	2.3	U
1,2,4-Trichlorobenzene	2.7	U	1.7	U	2.3	U	2.3	U
1,2-Dichlorobenzene	2.9		2.4		2	J	1.5	J
1,2-Dichloroethane	2.7	U	1.7	U	2.3	U	2.3	U
1,2-Dichloropropane	2.7	U	1.7	U	2.3	U	2.3	U
1,3-Dichlorobenzene	2.7	U	1.7	U	2.3	U	2.3	U
1,4-Dichlorobenzene	2.1	J	1.6	J	2.3	U	2.3	U
2-Hexanone	27	U	17	U	23	U	23	U
Acetone	270	UJ	170	UJ	230	UJ	230	UJ
Benzene	2.7	U	1.7	U	2.3	U	2.3	U
Bromochloromethane	2.7	U	1.7	U	2.3	U	2.3	U
Bromodichloromethane	2.7	U	1.7	U	2.3	U	2.3	U
Bromoform	2.7	U	1.7	U	2.3	U	2.3	U
Carbon Disulfide	2.7	U	1.7	U	2.6	J	2.3	U
Carbon Tetrachloride	2.7	U	1.7	U	2.3	U	2.3	U
Chlorobenzene	2.7	U	1.7	U	2.3	U	2.3	U
Chloroethane	5.5	U	3.4	U	4.5	U	4.7	U
Chloroform	2.7	U	1.7	U	2.3	U	2.3	U
cis-1,2-Dichloroethylene	3.8		1.7	U	15		14	
cis-1,3-Dichloropropene	2.7	U	1.7	U	2.3	U	2.3	U
Cyclohexane	27	U	17	U	23	U	23	U
DBCP	27	U	17	U	23	U	23	U
Dibromochloromethane	2.7	U	1.7	U	2.3	U	2.3	U
Dichlorodifluoromethane	5.5	U	3.4	U	4.5	U	4.7	U
Diethyl ether	2.7	U	1.7	U	2.3	U	2.3	U
Ethylene dibromide (EDB)	2.7	U	1.7	U	2.3	U	2.3	U
Ethylbenzene	2.7	U	1.7	U	3.9		1.7	J
Freon 113	14	U	8.4	U	11	U	12	U
Isopropylbenzene	2.7	U	1.7	U	2.3	U	2.3	U
Methyl Acetate	55	U	34	U	45	U	47	U
Methyl bromide	5.5	U	3.4	U	4.5	U	4.7	U
Methyl chloride	5.5	U	3.4	U	4.5	U	4.7	U
Methyl ethyl ketone (MEK)	27	UJ	17	UJ	23	UJ	23	UJ
Methyl isobutyl ketone	27	U	17	U	23	U	23	U
Methyl tert Butyl Ether (MTBE)	2.7	U	1.7	U	2.3	U	2.3	U
Methylcyclohexane	2.7	U	1.7	U	2.3	U	2.3	U
Methylene chloride	7.9	J	6.1	J	5.2	J	6.5	J
m-Xylene & p-Xylene	5.5	U	3.4	U	4.5	U	4.7	U
o-Xylene	2.7	U	1.7	U	1.8	J	2.3	U
Styrene	2.7	U	1.7	U	2.3	U	2.3	U
Tetrachloroethylene	2.7	U	1.7	U	2.3	U	2.3	U
Tetrahydrofuran	55	UJ	34	UJ	45	UJ	47	UJ
Toluene	2.7	U	1.7	U	2.3	U	2.3	U
Trans-1,2-Dichloroethene	2.7	U	1.7	U	2.3	U	2.3	U
trans-1,3-Dichloropropene	2.7	U	1.7	U	2.3	U	2.3	U
Trichloroethylene	2.7	U	1.7	U	2.3	U	2.3	U
Trichlorofluoromethane	5.5	U	3.4	U	4.5	U	4.7	U
Vinyl chloride	2.7	U	1.7	U	6.9		7.3	
Xylene (total)	2.7	U	1.7	U	1.8	J	2.3	U
Sum of Constituents	**16.7**		**10.1**		**40.8**		**36.6**	

	NW2		NW2	
	11-12		16-16.5	
	######		10/7/2008	
CONSTITUENTS				
1,1,1-Trichloroethane	52	U	55	U
1,1,2,2-Tetrachloroethane	52	U	55	U
1,1,2-Trichloroethane	52	U	55	U
1,1-Dichloroethane	52	U	55	U
1,1-Dichloroethylene	52	U	55	U
1,2,4-Trichlorobenzene	52	U	55	U
1,2-Dichlorobenzene	52	U	55	U
1,2-Dichloroethane	52	U	55	U
1,2-Dichloropropane	52	U	55	U
1,3-Dichlorobenzene	52	U	55	U
1,4-Dichlorobenzene	52	U	55	U
2-Hexanone	160	U	160	U
Acetone	360	U	380	U
Benzene	26	U	27	U
Bromochloromethane	52	U	55	U
Bromodichloromethane	52	U	55	U
Bromoform	52	U	55	U
Carbon disulfide	52	U	55	U
Carbon tetrachloride	52	U	55	U
Chlorobenzene	52	U	55	U
Chloroethane	100	U	110	U
Chloroform	52	U	55	U
cis-1,2-Dichloroethylene	52	U	55	U
cis-1,3-Dichloropropene	52	U	55	U
DBCP	100	U	110	U
Dibromochloromethane	52	U	55	U
Dichlorodifluoromethane	100	U	110	U
Diethyl ether	52	U	55	U
EDB	52	U	55	U
Ethylbenzene	**75**	**J**	55	U
Isopropylbenzene	52	U	55	U
Methyl bromide	100	U	110	U
Methyl chloride	100	U	110	U
Methyl ethyl ketone (MEK)	210	U	220	U
Methyl isobutyl ketone	160	U	160	U
Methylene chloride	100	U	110	U
Styrene	52	U	55	U
Tetrachloroethylene	52	U	55	U
Tetrahydrofuran	210	U	220	U
Toluene	52	U	55	U
Trans-1,2-Dichloroethene	52	U	55	U
trans-1,3-Dichloropropene	52	U	55	U
Trichloroethylene	52	U	55	U
Trichlorofluoromethane	100	U	110	U
Vinyl chloride	52	U	55	U
Xylene (total)	52	U	55	U
Sum of Constituents	**75**		**0**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	)x(kg/1x10	(lbs)
						Sand / Sand and Gravel							
	PC-14/NW2	SSG	11.25	8	13.25	SSG	5,447	5.3	46	13%	40	1.18E-07	0.13
	PC-14	SSG	15.25	13.25	17.5	SSG	5,447	4.3	41	13%	35	1.18E-07	0.10
	PC-14	SSG	19.75	17.5	20	SSG	5,447	2.5	37	13%	32	1.18E-07	0.05
											Estimated Total VOC Mass for Strata:		0.28
											Estimated Total VOC Mass for PC-14 Area:		0.28
COC Specific Calculations by Strata													
cis-1,2-Dichloroethylene	PC-14	SSG	11.25	8	13.25	SSG	5,447	5.3	4	13%	3	1.18E-07	0.01
1,1,1-Trichloroethane	PC-14	SSG	15.25	13.25	17.5	SSG	5,447	4.3	3	13%	3	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-14	SSG	15.25	13.25	17.5	SSG	5,447	4.3	15	13%	13	1.18E-07	0.04
Vinyl chloride	PC-14	SSG	15.25	13.25	17.5	SSG	5,447	4.3	7	13%	6	1.18E-07	0.02
1,1,1-Trichloroethane	PC-14	SSG	19.75	17.5	20	SSG	5,447	2.5	3	13%	3	1.18E-07	0.00
1,1-Dichloroethane	PC-14	SSG	19.75	17.5	20	SSG	5,447	2.5	2	13%	2	1.18E-07	0.0034
cis-1,2-Dichloroethylene	PC-14	SSG	19.75	17.5	20	SSG	5,447	2.5	14	13%	12	1.18E-07	0.02
Vinyl chloride	PC-14	SSG	19.75	17.5	20	SSG	5,447	2.5	7	13%	6	1.18E-07	0.01
											Estimated Total Target COC Mass for PC-14 Area:		0.11

	Target Mass per COC (lbs)	SSG
1,1,1-Trichloroethane	0.01	0.01
1,1-Dichloroethane	0.003	0.003
cis-1,2-Dichloroethylene	0.07	0.07
Vinyl chloride	0.03	0.03
		0.11

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-15

	PC-15		PC-15	
	SB-FS-PC-15-14.5-		SB-FS-PC-15-16.5-	
	14.75		16.75	
	5/22/2012		5/22/2012	
	Gravel		Sand	
	5		25	
	0.1		0.1	
	10.4		10.8	
CONSTITUENTS				
1,1,1-Trichloroethane	120	U	2.5	U
1,1,2,2-Tetrachloroethane	120	U	2.5	U
1,1,2-Trichloroethane	120	U	2.5	U
1,1-Dichloroethane	120	U	2.5	U
1,1-Dichloroethylene	120	U	2.5	U
1,2,3-Trichlorobenzene	120	U	2.5	U
1,2,4-Trichlorobenzene	120	U	2.5	U
1,2-Dichlorobenzene	120	U	2.5	U
1,2-Dichloroethane	120	U	2.5	U
1,2-Dichloropropane	120	U	2.5	U
1,3-Dichlorobenzene	120	U	2.5	U
1,4-Dichlorobenzene	120	U	2.5	U
2-Hexanone	1200	U	25	U
Acetone	12000	UJ	250	UJ
Benzene	120	U	2.5	U
Bromochloromethane	120	U	2.5	U
Bromodichloromethane	120	U	2.5	U
Bromoform	120	U	2.5	U
Carbon Disulfide	120	U	2.5	U
Carbon Tetrachloride	120	U	2.5	U
Chlorobenzene	120	U	2.5	U
Chloroethane	250	UJ	4.9	U
Chloroform	120	U	2.5	U
cis-1,2-Dichloroethylene	120	U	2.5	U
cis-1,3-Dichloropropene	120	U	2.5	U
Cyclohexane	1200	U	25	U
DBCP	1200	U	25	U
Dibromochloromethane	120	U	2.5	U
Dichlorodifluoromethane	250	U	4.9	U
Diethyl ether	120	U	2.5	U
Ethylene dibromide (EDB)	120	U	2.5	U
Ethylbenzene	120	U	2.5	U
Freon 113	610	U	12	U
Isopropylbenzene	120	U	2.5	U
Methyl Acetate	2500	U	49	U
Methyl bromide	250	U	4.9	U
Methyl chloride	250	U	4.9	U
Methyl ethyl ketone (MEK)	1200	UJ	25	UJ
Methyl isobutyl ketone	1200	U	25	U
Methyl tert Butyl Ether (MTBE)	120	U	2.5	U
Methylcyclohexane	120	U	2.5	U
Methylene chloride	490	U	27	U
m-Xylene & p-Xylene	250	U	4.9	U
o-Xylene	120	U	2.5	U
Styrene	120	U	2.5	U
Tetrachloroethylene	120	U	2.5	U
Tetrahydrofuran	2500	U	49	U
Toluene	120	U	2.5	U
Trans-1,2-Dichloroethene	120	U	2.5	U
trans-1,3-Dichloropropene	120	U	2.5	U
Trichloroethylene	120	U	2.5	U
Trichlorofluoromethane	250	U	4.9	U
Vinyl chloride	120	U	2.5	U
Xylene (total)	120	U	2.5	U
Sum of Constituents	**0**		**0**	

	SE9		SE9	
	14-14.5		20-20.5	
	9/26/2008		9/26/2008	
CONSTITUENTS				
1,1,1-Trichloroethane	55	U	51	U
1,1,2,2-Tetrachloroethane	55	U	51	U
1,1,2-Trichloroethane	55	U	51	U
1,1-Dichloroethane	55	U	51	U
1,1-Dichloroethylene	55	U	51	U
1,2,4-Trichlorobenzene	55	U	51	U
1,2-Dichlorobenzene	55	U	51	U
1,2-Dichloroethane	55	U	51	U
1,2-Dichloropropane	55	U	51	U
1,3-Dichlorobenzene	55	U	51	U
1,4-Dichlorobenzene	55	U	51	U
2-Hexanone	170	U	150	U
Acetone	390	U	360	U
Benzene	28	U	26	U
Bromochloromethane	55	U	51	U
Bromodichloromethane	55	U	51	U
Bromoform	55	U	51	U
Carbon disulfide	55	U	51	U
Carbon tetrachloride	55	U	51	U
Chlorobenzene	55	U	51	U
Chloroethane	110	U	100	U
Chloroform	55	U	51	U
cis-1,2-Dichloroethylene	55	U	51	U
cis-1,3-Dichloropropene	55	U	51	U
DBCP	110	U	100	U
Dibromochloromethane	55	U	51	U
Dichlorodifluoromethane	110	U	100	U
Diethyl ether	55	U	51	U
EDB	55	U	51	U
Ethylbenzene	55	U	51	U
Isopropylbenzene	55	U	51	U
Methyl bromide	110	U	100	U
Methyl chloride	110	U	100	U
Methyl ethyl ketone (MEK)	220	U	200	U
Methyl isobutyl ketone	170	U	150	U
Methylene chloride	110	U	100	U
Styrene	55	U	51	U
Tetrachloroethylene	55	U	51	U
Tetrahydrofuran	220	U	200	U
Toluene	55	U	51	U
Trans-1,2-Dichloroethene	55	U	51	U
trans-1,3-Dichloropropene	55	U	51	U
Trichloroethylene	55	U	51	U
Trichlorofluoromethane	110	U	100	U
Vinyl chloride	55	U	51	U
Xylene (total)	55	U	51	U
Sum of Constituents	**0**		**0**	

Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
						(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
Sand / Sand and Gravel												
PC-15	SSG	14.75	13.25	15.75	SSG	8,100	2.5	0	13%	0	1.18E-07	0.00
PC-15	SSG	16.75	15.75	20	SSG	8,100	4.3	0	13%	0	1.18E-07	0.00
											Estimated Total VOC Mass for Strata:	**0.00**
											Estimated Total VOC Mass for PC-15 Area:	**0.00**

NO COC MASS

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-16

	PC-16		PC-16		PC-16	
	SB-FS-PC-16-16.0-16.25		SB-FS-PC-16-20.0-20.25		SB-FS-PC-16-25.0-25.25	
	5/23/2012		5/23/2012		5/23/2012	
	Sand		Sand & Silt		Sand & Silt	
	15		35		25	
	0.1		0.1		0.1	
	20		12		21	
CONSTITUENTS						
1,1,1-Trichloroethane	3	U	2.6	U	2.6	U
1,1,2,2-Tetrachloroethane	3	UJ	2.6	UJ	2.6	UJ
1,1,2-Trichloroethane	3	U	2.6	U	2.6	U
1,1-Dichloroethane	3	U	2.6	U	2.6	U
1,1-Dichloroethylene	3	U	2.6	U	2.6	U
1,2,3-Trichlorobenzene	3	U	2.6	U	2.6	U
1,2,4-Trichlorobenzene	3	U	2.6	U	2.6	U
1,2-Dichlorobenzene	3	U	2.6	U	2.6	U
1,2-Dichloroethane	3	U	2.6	U	2.6	U
1,2-Dichloropropane	3	U	2.6	U	2.6	U
1,3-Dichlorobenzene	3	U	2.6	U	2.6	U
1,4-Dichlorobenzene	3	U	2.6	U	2.6	U
2-Hexanone	30	U	26	U	26	U
Acetone	300	UJ	260	UJ	260	UJ
Benzene	3	U	2.6	U	2.6	U
Bromochloromethane	3	U	2.6	U	2.6	U
Bromodichloromethane	3	U	2.6	U	2.6	U
Bromoform	3	U	2.6	U	2.6	U
Carbon Disulfide	3	U	3.5		2.8	
Carbon Tetrachloride	3	U	2.6	U	2.6	U
Chlorobenzene	3	U	2.6	U	2.6	U
Chloroethane	6	U	5.1	U	5.3	U
Chloroform	3	U	2.6	U	2.6	U
cis-1,2-Dichloroethylene	3	U	2.6	U	2.6	U
cis-1,3-Dichloropropene	3	U	2.6	U	2.6	U
Cyclohexane	30	U	26	U	26	U
DBCP	30	UJ	26	UJ	26	UJ
Dibromochloromethane	3	U	2.6	U	2.6	U
Dichlorodifluoromethane	6	U	5.1	U	5.3	U
Diethyl ether	3	U	2.6	U	2.6	U
Ethylene dibromide (EDB)	3	U	2.6	U	2.6	U
Ethylbenzene	3	U	2.6	U	2.5	J
Freon 113	15	U	13	U	13	U
Isopropylbenzene	3	U	2.6	U	2.6	U
Methyl Acetate	60	U	51	U	53	U
Methyl bromide	6	U	5.1	U	5.3	U
Methyl chloride	6	U	5.1	U	5.3	U
Methyl ethyl ketone (MEK)	30	U	26	U	26	U
Methyl isobutyl ketone	30	U	26	U	26	U
Methyl tert Butyl Ether (MTBE)	3	U	2.6	U	2.6	U
Methylcyclohexane	3	U	2.6	U	2.6	U
Methylene chloride	12	U	10	U	11	U
m-Xylene & p-Xylene	6	U	5.1	U	5.3	U
o-Xylene	3	U	2.6	U	2.6	U
Styrene	3	U	2.6	U	2.6	U
Tetrachloroethylene	29		2.6	U	2.6	U
Tetrahydrofuran	60	U	51	U	53	U
Toluene	3	U	2.6	U	2.6	U
Trans-1,2-Dichloroethene	3	U	2.6	U	2.6	U
trans-1,3-Dichloropropene	3	U	2.6	U	2.6	U
Trichloroethylene	3.5		2.6	U	2.6	U
Trichlorofluoromethane	6	U	5.1	U	5.3	U
Vinyl chloride	3	U	2.6	U	8.8	
Xylene (total)	3	U	2.6	U	2.6	U
Sum of Constituents	**32.5**		**3.5**		**14.1**	

	SE5		SE5	
	16-16.5		20-20.5	
	9/29/2008		9/29/2008	
CONSTITUENTS				
1,1,1-Trichloroethane	53	U	48	U
1,1,2,2-Tetrachloroethane	53	U	48	U
1,1,2-Trichloroethane	53	U	48	U
1,1-Dichloroethane	53	U	48	U
1,1-Dichloroethylene	53	U	48	U
1,2,4-Trichlorobenzene	53	U	48	U
1,2-Dichlorobenzene	53	U	48	U
1,2-Dichloroethane	53	U	48	U
1,2-Dichloropropane	53	U	48	U
1,3-Dichlorobenzene	53	U	48	U
1,4-Dichlorobenzene	53	U	48	U
2-Hexanone	160	U	140	U
Acetone	370	U	340	U
Benzene	26	U	24	U
Bromochloromethane	53	U	48	U
Bromodichloromethane	53	U	48	U
Bromoform	53	U	48	U
Carbon disulfide	53	U	48	U
Carbon tetrachloride	53	U	48	U
Chlorobenzene	53	U	48	U
Chloroethane	110	U	96	U
Chloroform	53	U	48	U
cis-1,2-Dichloroethylene	53	U	48	U
cis-1,3-Dichloropropene	53	U	48	U
DBCP	110	U	96	U
Dibromochloromethane	53	U	48	U
Dichlorodifluoromethane	110	U	96	U
Diethyl ether	53	U	48	U
EDB	53	U	48	U
Ethylbenzene	53	U	48	U
Isopropylbenzene	53	U	48	U
Methyl bromide	110	U	96	U
Methyl chloride	110	U	96	U
Methyl ethyl ketone (MEK)	210	U	190	U
Methyl isobutyl ketone	160	U	140	U
Methylene chloride	110	U	96	U
Styrene	53	U	48	U
Tetrachloroethylene	53	U	48	U
Tetrahydrofuran	210	U	190	U
Toluene	53	U	48	U
Trans-1,2-Dichloroethene	53	U	48	U
trans-1,3-Dichloropropene	53	U	48	U
Trichloroethylene	53	U	48	U
Trichlorofluoromethane	110	U	96	U
Vinyl chloride	53	U	48	U
Xylene (total)	53	U	48	U
Sum of Constituents	**0**		**0**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thicknes s of Mass Unit	Total VOC Concentr ation (dry weight)	Moisture Content Results of Samples	Total VOC Concentr ation (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
	Grey Silty Sand/Silt												
	PC-16	GSSS	20.25	19.25	24.25	GSSS	8,100	5.0	4	13%	3	1.18E-07	0.01
	Estimated Total VOC Mass for Strata:												**0.01**
	Sand / Sand and Gravel												
	PC-16	SSG	16.25	14.25	19.25	SSG	8,100	5.0	33	13%	28	1.18E-07	0.14
	PC-16	SSG	25.25	24.25	26.5	SSG	8,100	2.3	14	13%	12	1.18E-07	0.03
	Estimated Total VOC Mass for Strata:												**0.16**
	Estimated Total VOC Mass for PC-16 Area:												**0.18**
COC Specific Calculations by Strata													
Tetrachloroethylene	PC-16	SSG	16.25	14.25	19.25	SSG	8,100	5.0	29	13%	25	1.18E-07	0.12
Trichloroethylene	PC-16	SSG	16.25	14.25	19.25	SSG	8,100	5.0	3.5	13%	3	1.18E-07	0.01
Vinyl chloride	PC-16	SSG	25.25	24.25	26.5	SSG	8,100	2.3	9	13%	8	1.18E-07	0.02
Estimated Total Target COC Mass for PC-16 Area:													**0.15**

	Target Mass per COC (lbs)	SSG
Tetrachloroethylene	0.12	0.12
Trichloroethylene	0.01	0.01
Vinyl chloride	0.02	0.02
		0.15

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-17

	PC-17	PC-17	PC-17	PC-17	PC-17
	SB-FS-PC-17-16.0-	SB-FS-PC-17-19.0-	SB-FS-PC-17-21.0-	SB-PCB-6	SB-FS-PC-17-23.5-
	16.25	19.25	21.25	21.25	23.75
	6/5/2012	6/5/2012	6/5/2012	6/5/2012	6/5/2012
	S&G / Sand	Sand & Gravel	Sand	Sand	Sand & Silt
	5	5	25	25	35
	0.1	0.1	0.1	0.1	0.1
	19	4.2	15	11	9.7
CONSTITUENTS				Duplicate	
1,1,1-Trichloroethane	7	3.5	3.5	3.4	2.4 U
1,1,2,2-Tetrachloroethane	3.3 U	2 U	3.3 U	2.4 U	2.4 U
1,1,2-Trichloroethane	3.3 U	2 U	3.3 U	2.4 U	2.4 U
1,1-Dichloroethane	3.3 U	2 U	3.3 U	2.4 U	2.4 U
1,1-Dichloroethylene	3.3 U	2 U	3.3 U	2.4 U	2.4 U
1,2,3-Trichlorobenzene	3.3 U	2 U	3.3 U	2.4 U	2.4 U
1,2,4-Trichlorobenzene	3.3 U	2 U	3.3 U	2.4 U	2.4 U
1,2-Dichlorobenzene	3.3 U	2 U	3.3 U	2.4 U	2.4 U
1,2-Dichloroethane	3.3 U	2 U	3.3 U	2.4 U	2.4 U
1,2-Dichloropropane	3.3 U	2 U	3.3 U	2.4 U	2.4 U
1,3-Dichlorobenzene	3.3 U	2 U	3.3 U	2.4 U	2.4 U
1,4-Dichlorobenzene	3.3 U	2 U	3.3 U	2.4 U	2.4 U
2-Hexanone	33 UJ	20 UJ	33 UJ	24 UJ	24 UJ
Acetone	330 UJ	200 UJ	330 UJ	240 UJ	240 UJ
Benzene	3.3 U	2 U	3.3 U	2.4 U	2.4 U
Bromochloromethane	3.3 U	2 U	3.3 U	2.4 U	2.4 U
Bromodichloromethane	3.3 U	2 U	3.3 U	2.4 U	2.4 U
Bromoform	3.3 U	2 U	3.3 U	2.4 U	2.4 U
Carbon Disulfide	5.2	7.7	3.3 U	2.4 U	2.4 U
Carbon Tetrachloride	3.3 U	2 U	3.3 U	2.4 U	2.4 U
Chlorobenzene	3.3 U	2 U	3.3 U	2.4 U	2.4 U
Chloroethane	6.6 U	4 U	6.6 U	4.8 U	4.8 U
Chloroform	3.3 U	2 U	3.3 U	2.4 U	2.4 U
cis-1,2-Dichloroethylene	46	19	3.6	3.5	2.4 U
cis-1,3-Dichloropropene	3.3 U	2 U	3.3 U	2.4 U	2.4 U
Cyclohexane	33 U	20 U	33 U	24 U	24 U
DBCP	33 U	20 U	33 U	24 U	24 U
Dibromochloromethane	3.3 U	2 U	3.3 U	2.4 U	2.4 U
Dichlorodifluoromethane	6.6 U	4 U	6.6 U	4.8 U	4.8 U
Diethyl ether	3.3 U	2 U	3.3 U	2.4 U	2.4 U
Ethylene dibromide (EDB)	3.3 U	2 U	3.3 U	2.4 U	2.4 U
Ethylbenzene	7.9	5.7	4.9	4.9	2 J
Freon 113	16 U	10 U	16 U	12 U	12 U
Isopropylbenzene	3.3 U	2 U	3.3 U	2.4 U	2.4 U
Methyl Acetate	66 U	40 U	66 U	48 U	48 U
Methyl bromide	6.6 U	4 U	6.6 U	4.8 U	4.8 U
Methyl chloride	6.6 U	4 U	6.6 U	4.8 U	4.8 U
Methyl ethyl ketone (MEK)	33 UJ	20 UJ	33 UJ	24 UJ	24 UJ
Methyl isobutyl ketone	33 U	20 U	33 U	24 U	24 U
Methyl tert Butyl Ether (MTBE)	3.3 U	2 U	3.3 U	2.4 U	2.4 U
Methylcyclohexane	3.3 U	2 U	3.3 U	2.4 U	2.4 U
Methylene chloride	13 U	8 U	13 U	9.6 U	9.6 U
m-Xylene & p-Xylene	6.6 U	3.7 J	6.6 U	4.8 U	4.8 U
o-Xylene	3.3 U	1.8 J	3.3 U	2.4 U	2.4 U
Styrene	3.3 U	2 U	3.3 U	2.4 U	2.4 U
Tetrachloroethylene	2.6 J	2 U	3.3 U	2.4 U	2.4 U
Tetrahydrofuran	66 UJ	40 UJ	66 UJ	48 UJ	48 UJ
Toluene	3.3 U	2 U	3.3 U	2.4 U	2.4 U
Trans-1,2-Dichloroethene	3.3 U	2 U	3.3 U	2.4 U	2.4 U
trans-1,3-Dichloropropene	3.3 U	2 U	3.3 U	2.4 U	2.4 U
Trichloroethylene	3.3 U	2 U	3.3 U	2.4 U	2.4 U
Trichlorofluoromethane	6.6 U	4 U	6.6 U	4.8 U	4.8 U
Vinyl chloride	7.4	2.8	7.6	8.4	2.3 J
Xylene (total)	3.3 U	5.5	3.3 U	2.4 U	2.4 U
Sum of Constituents	**76.1**	**44.2**	**19.6**	**20.2**	**4.3**

	SE1	SE2	SE2
	25-25.5	15-15.5	21-21.5
	9/29/2008	9/29/2008	9/29/2008
CONSTITUENTS			
1,1,1-Trichloroethane	56 U	44 U	50 U
1,1,2,2-Tetrachloroethane	56 U	44 U	50 U
1,1,2-Trichloroethane	56 U	44 U	50 U
1,1-Dichloroethane	56 U	44 U	50 U
1,1-Dichloroethylene	56 U	44 U	50 U
1,2,4-Trichlorobenzene	56 U	44 U	50 U
1,2-Dichlorobenzene	56 U	44 U	**74 J**
1,2-Dichloroethane	56 U	44 U	50 U
1,2-Dichloropropane	56 U	44 U	50 U
1,3-Dichlorobenzene	56 U	44 U	50 U
1,4-Dichlorobenzene	56 U	44 U	50 U
2-Hexanone	170 U	130 U	150 U
Acetone	390 U	310 U	350 U
Benzene	28 U	22 U	25 U
Bromochloromethane	56 U	44 U	50 U
Bromodichloromethane	56 U	44 U	50 U
Bromoform	56 U	44 U	50 U
Carbon disulfide	56 U	44 U	50 U
Carbon tetrachloride	56 U	44 U	50 U
Chlorobenzene	56 U	44 U	50 U
Chloroethane	110 U	89 U	99 U
Chloroform	56 U	44 U	50 U
cis-1,2-Dichloroethylene	56 U	44 U	**120 J**
cis-1,3-Dichloropropene	56 U	44 U	50 U
DBCP	110 U	89 U	99 U
Dibromochloromethane	56 U	44 U	50 U
Dichlorodifluoromethane	110 U	89 U	99 U
Diethyl ether	56 U	44 U	50 U
EDB	56 U	44 U	50 U
Ethylbenzene	56 U	44 U	**98 J**
Isopropylbenzene	56 U	44 U	**59 J**
Methyl bromide	110 U	89 U	99 U
Methyl chloride	110 U	89 U	99 U
Methyl ethyl ketone (MEK)	220 U	180 U	200 U
Methyl isobutyl ketone	170 U	130 U	150 U
Methylene chloride	110 U	89 U	99 U
Styrene	56 U	44 U	50 U
Tetrachloroethylene	56 U	**850**	**9500**
Tetrahydrofuran	220 U	180 U	200 U
Toluene	56 U	44 U	50 U
Trans-1,2-Dichloroethene	56 U	44 U	50 U
trans-1,3-Dichloropropene	56 U	44 U	50 U
Trichloroethylene	56 U	44 U	**330**
Trichlorofluoromethane	110 U	89 U	99 U
Vinyl chloride	56 U	44 U	50 U
Xylene (total)	**150 J**	44 U	**300**
Sum of Constituents	**150**	**850**	**10481**

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thicknes s of Mass Unit	Total VOC Concentr ation (dry weight)	Moisture Content Results of Samples	Total VOC Concentr ation (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	)x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-17/SE2	SSG	16.25	13.5	17.75	SSG	8,100	4.3	463	13%	403	1.18E-07	1.64
	PC-17	SSG	19.25	17.75	20.25	SSG	8,100	2.5	44	13%	38	1.18E-07	0.09
	PC-17/SE2	SSG	21.25	20.25	22.5	SSG	8,100	2.3	5,251	13%	4,568	1.18E-07	9.82
	PC-17/SE2	SSG	23.75	22.5	24	SSG	8,100	1.5	77	13%	67	1.18E-07	0.10
												Estimated Total VOC Mass for Strata:	**11.65**
												Estimated Total VOC Mass for PC-17 Area:	**11.65**
COC Specific Calculations by Strata													
1,1,1-Trichloroethane	PC-17	SSG	16.25	13.5	17.75	SSG	8,100	4.3	7	13%	6	1.18E-07	0.02
cis-1,2-Dichloroethylene	PC-17	SSG	16.25	13.5	17.75	SSG	8,100	4.3	46	13%	40	1.18E-07	0.16
Tetrachloroethylene	PC-17/SE2	SSG	16.25	13.5	17.75	SSG	8,100	4.3	426.3	13%	371	1.18E-07	1.51
Vinyl chloride	PC-17	SSG	16.25	13.5	17.75	SSG	8,100	4.3	7.4	13%	6	1.18E-07	0.03
1,1,1-Trichloroethane	PC-17	SSG	19.25	17.75	20.25	SSG	8,100	2.5	3.5	13%	3	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-17	SSG	19.25	17.75	20.25	SSG	8,100	2.5	19	13%	17	1.18E-07	0.04
Vinyl chloride	PC-17	SSG	19.25	17.75	20.25	SSG	8,100	2.5	2.8	13%	2	1.18E-07	0.01
1,1,1-Trichloroethane	PC-17	SSG	21.25	20.25	22.5	SSG	8,100	2.3	4	13%	3	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-17/SE2	SSG	21.25	20.25	22.5	SSG	8,100	2.3	62	13%	54	1.18E-07	0.12
Tetrachloroethylene	SE2	SSG	21.25	20.25	22.5	SSG	8,100	2.3	9500	13%	8,265	1.18E-07	17.77
Trichloroethylene	SE2	SSG	21.25	20.25	22.5	SSG	8,100	2.3	330	13%	287	1.18E-07	0.62
Vinyl chloride	PC-17	SSG	21.25	20.25	22.5	SSG	8,100	2.3	8	13%	7	1.18E-07	0.02
Vinyl chloride	PC-17	SSG	23.75	22.5	24	SSG	8,100	1.5	2	13%	2	1.18E-07	0.00
Estimated Total Target COC Mass for PC-17 Area:													**20.31**

Target Mass per COC (lbs)				SSG
1,1,1-Trichloroethane	0.04			0.04
cis-1,2-Dichloroethylene	0.32			0.32
Tetrachloroethylene	19.28			19.28
Trichloroethylene	0.62			0.62
Vinyl chloride	0.05			0.05
				20.31

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-18

	PC-18		PC-18		PC-18	
	SB-FS-PC-18-16.0-16.25		SB-FS-PC-18-20.0-20.25		SB-FS-PC-18-23.0-23.25	
	5/29/2012		5/29/2012		5/29/2012	
	Sand & Gravel		Sand		Sand & Silt	
	20		0		25	
	0.1		0.1		0.1	
	8.4		31		13	
CONSTITUENTS						
1,1,1-Trichloroethane	2	J	46		4.2	
1,1,2,2-Tetrachloroethane	2.5	U	3.4	UJ	2	UJ
1,1,2-Trichloroethane	2.5	U	3.4	U	2	U
1,1-Dichloroethane	2.5	U	5.2		2	U
1,1-Dichloroethylene	2.5	U	3.4	U	2	U
1,2,3-Trichlorobenzene	2.5	U	3.4	U	2	U
1,2,4-Trichlorobenzene	2.5	U	3.4	U	2	U
1,2-Dichlorobenzene	2.5	U	3.4	UJ	2	UJ
1,2-Dichloroethane	2.5	U	3.4	U	2	U
1,2-Dichloropropane	2.5	U	3.4	U	2	U
1,3-Dichlorobenzene	2.5	U	3.4	U	2	U
1,4-Dichlorobenzene	2.5	U	3.4	U	2	U
2-Hexanone	25	U*	34	U	20	U
Acetone	250	UJ	340	UJ	200	UJ
Benzene	2.5	U	3.4	U	2	U
Bromochloromethane	2.5	U	3.4	U	2	U
Bromodichloromethane	2.5	U	3.4	U	2	U
Bromoform	2.5	U	3.4	U	2	U
Carbon Disulfide	2.5	U*	4.8		1.6	J
Carbon Tetrachloride	2.5	U	3.4	U*	2	U*
Chlorobenzene	2.5	U	3.4	U	2	U
Chloroethane	5.1	U	6.7	UJ	4	UJ
Chloroform	2.5	U	3.4	U	2	U
cis-1,2-Dichloroethylene	3.5		71		7.3	
cis-1,3-Dichloropropene	2.5	U	3.4	U	2	U
Cyclohexane	25	U	34	U	20	U
DBCP	25	U	34	UJ	20	UJ
Dibromochloromethane	2.5	U	3.4	U	2	U
Dichlorodifluoromethane	5.1	U	6.7	U	4	U
Diethyl ether	2.5	U	3.4	U	2	U
Ethylene dibromide (EDB)	2.5	U	3.4	U	2	U
Ethylbenzene	2.4	J	33		1.5	J
Freon 113	13	U	17	U	9.9	U
Isopropylbenzene	2.5	U	3.4	U	2	U
Methyl Acetate	51	U	67	UJ	40	UJ
Methyl bromide	5.1	U	6.7	U	4	U
Methyl chloride	5.1	U	6.7	U	4	U
Methyl ethyl ketone (MEK)	25	UJ	34	UJ	20	UJ
Methyl isobutyl ketone	25	U	34	U	20	U
Methyl tert Butyl Ether (MTBE)	2.5	U	3.4	U	2	U
Methylcyclohexane	2.5	U	3.4	U	2	U
Methylene chloride	4.8	J	13	U	7.9	U
m-Xylene & p-Xylene	5.1	U	8.1		4	U
o-Xylene	2.5	U	2.6	J	2	U
Styrene	2.5	U	3.4	U	2	U
Tetrachloroethylene	2.5	U	3.4	U	2	U
Tetrahydrofuran	51	UJ	67	U	40	U
Toluene	2.5	U	3.4	U	2	U
Trans-1,2-Dichloroethene	2.5	U	2.8	J	2	U
trans-1,3-Dichloropropene	2.5	U	3.4	U	2	U
Trichloroethylene	2.5	U	3.4	U	2	U
Trichlorofluoromethane	5.1	U	6.7	U	4	U
Vinyl chloride	4.7		53	J	5.5	J
Xylene (total)	2.5	U	11		2	U
Sum of Constituents	**17.4**		**226.5**		**20.1**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{6})x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-18	SSG	16.25	12	18.25	SSG	8,100	6.3	17	13%	15	1.18E-07	0.09
	PC-18	SSG	20.25	18.25	21.75	SSG	8,100	3.5	227	13%	197	1.18E-07	0.66
	PC-18	SSG	23.25	21.75	23.5	SSG	8,100	1.8	20	13%	17	1.18E-07	0.03
												Estimated Total VOC Mass for Strata:	**0.78**
												Estimated Total VOC Mass for PC-18 Area:	**0.78**
COC Specific Calculations by Strata													
1,1,1-Trichloroethane	PC-18	SSG	16.25	12	18.25	SSG	8,100	6.3	2	13%	2	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-18	SSG	16.25	12	18.25	SSG	8,100	6.3	3.5	13%	3	1.18E-07	0.02
Vinyl chloride	PC-18	SSG	16.25	12	18.25	SSG	8,100	6.3	4.7	13%	4	1.18E-07	0.02
1,1,1-Trichloroethane	PC-18	SSG	20.25	18.25	21.75	SSG	8,100	3.5	46	13%	40	1.18E-07	0.13
1,1-Dichloroethane	PC-18	SSG	20.25	18.25	21.75	SSG	8,100	3.5	5.2	13%	5	1.18E-07	0.02
cis-1,2-Dichloroethylene	PC-18	SSG	20.25	18.25	21.75	SSG	8,100	3.5	71	13%	62	1.18E-07	0.21
Trans-1,2-Dichloroethene	PC-18	SSG	20.25	18.25	21.75	SSG	8,100	3.5	2.8	13%	2	1.18E-07	0.01
Vinyl chloride	PC-18	SSG	20.25	18.25	21.75	SSG	8,100	3.5	53	13%	46	1.18E-07	0.15
1,1,1-Trichloroethane	PC-18	SSG	23.25	21.75	23.5	SSG	8,100	1.8	4.2	13%	4	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-18	SSG	23.25	21.75	23.5	SSG	8,100	1.8	7.3	13%	6	1.18E-07	0.01
Vinyl chloride	PC-18	SSG	23.25	21.75	23.5	SSG	8,100	1.8	5.5	13%	5	1.18E-07	0.01
												Estimated Total Target COC Mass for PC-18 Area:	**0.60**

	Target Mass per COC (lbs)	SSG
1,1,1-Trichloroethane	0.15	0.15
1,1-Dichloroethane	0.02	0.02
cis-1,2-Dichloroethylene	0.24	0.24
Trans-1,2-Dichloroethene	0.01	0.01
Vinyl chloride	0.19	0.19
		0.60

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

	PC-19	PC-19	PC-19	PC-19	PC-19	PC-19
	SB-FS-PC-19-11.5-12.0	SB-PCB-3	SB-FS-PC-19-15.5-	SB-FS-PC-19-18.5-	SB-FS-PC-19-21.0-	SB-FS-PC-19-24.5-
	11.75	11.75	15.75	18.75	21.25	24.75
	5/29/2012	5/29/2012	6/5/2012	5/29/2012	6/5/2012	6/5/2012
	Sand/Silt/Peat	Sand/Silt/Peat	Sand & Silt	Sand	Sand	Sand
	70	70	50	0	0	0
	10	10	5	0.1	0.1	0.1
	35	33	15	7.5	14	8.4
CONSTITUENTS		Duplicate				
1,1,1-Trichloroethane	260 U	240 U	2 U	20	20	37
1,1,2,2-Tetrachloroethane	260 U	240 U	2 U	2 UJ	2.8 U	2.3 U
1,1,2-Trichloroethane	260 U	240 U	2 U	2 U	2.8 U	2.3 U
1,1-Dichloroethane	260 U	240 U	2.9	7.1	8.5	15
1,1-Dichloroethylene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
1,2,3-Trichlorobenzene	260 U	240 U	2 U	1.2 J	2.8 U	2.3 U
1,2,4-Trichlorobenzene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
1,2-Dichlorobenzene	260 U	240 U	2 U	2 UJ	2.8 U	2.3 U
1,2-Dichloroethane	260 U	240 U	2 U	2 U	2.8 U	2.3 U
1,2-Dichloropropane	260 U	240 U	2 U	2 U	2.8 U	2.3 U
1,3-Dichlorobenzene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
1,4-Dichlorobenzene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
2-Hexanone	2600 U	2400 U	20 UJ	20 UJ	28 UJ	23 UJ
Acetone	26000 UJ	24000 UJ	200 UJ	200 UJ	280 UJ	230 UJ
Benzene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Bromochloromethane	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Bromodichloromethane	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Bromoform	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Carbon Disulfide	260 U	240 U	2 U	2 U	2.8 U	2.4
Carbon Tetrachloride	260 U	240 U	2 U	2 U*	2.8 U	2.3 U
Chlorobenzene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Chloroethane	520 UJ	470 UJ	27	3.4 J	3.7 J	6.5
Chloroform	260 U	240 U	2 U	2 U	2.8 U	2.3 U
cis-1,2-Dichloroethylene	5600 J	4200 J	1.2 J	170 J	170	270
cis-1,3-Dichloropropene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Cyclohexane	2600 U	2400 U	20 U	20 U	28 U	23 U
DBCP	2600 U	2400 U	20 U	20 UJ	28 U	23 U
Dibromochloromethane	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Dichlorodifluoromethane	520 U	470 U	4 U	4 U	5.7 U	4.7 U
Diethyl ether	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Ethylene dibromide (EDB)	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Ethylbenzene	310 J	940 J	2.6	4.2	2.8 U	2.3 U
Freon 113	1300 U	1200 U	10 U	10 UJ	14 U	12 U
Isopropylbenzene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Methyl Acetate	5200 U	4700 U	40 U	40 UJ	57 U	47 U
Methyl bromide	520 U	470 U	4 U	4 U	5.7 U	4.7 U
Methyl chloride	520 U	470 U	4 U	4 U	5.7 U	4.7 U
Methyl ethyl ketone (MEK)	2600 UJ	2400 UJ	20 UJ	20 UJ	28 UJ	23 UJ
Methyl isobutyl ketone	2600 U	2400 U	20 U	20 U	28 U	23 U
Methyl tert Butyl Ether (MTBE)	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Methylcyclohexane	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Methylene chloride	1000 U	950 U	8 U	8 U	11 U	9.3 U
m-Xylene & p-Xylene	670 J	2200 J	5.7	4 U	5.7 U	4.7 U
o-Xylene	250 J	800 J	2.8	2 U	2.8 U	2.3 U
Styrene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Tetrachloroethylene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Tetrahydrofuran	5200 U	4700 U	40 UJ	40 U	57 UJ	47 UJ
Toluene	5900	9700	68	1.7 J	2.8 U	2.3 U
Trans-1,2-Dichloroethene	460	430	4.4	1.7 J	1.8 J	2.7
trans-1,3-Dichloropropene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Trichloroethylene	260 U	240 U	2 U	2 U	2.8 U	2.3 U
Trichlorofluoromethane	520 U*	470 U*	4 U	4 U	5.7 U	4.7 U
Vinyl chloride	260 U	250	2 U	7.8 J	11	22
Xylene (total)	920 J	3000 J	8.5	2 U	2.8 U	2.3 U
Sum of Constituents	**13190**	**18520**	**114.6**	**217.1**	**215**	**355.6**

	NE6	NE6	NE6
	11.5-12.25	14-15	26-27
	10/9/2008	10/9/2008	10/9/2008
CONSTITUENTS			
1,1,1-Trichloroethane	300 U	70 U	45 U
1,1,2,2-Tetrachloroethane	300 U	70 U	45 U
1,1,2-Trichloroethane	300 U	70 U	45 U
1,1-Dichloroethane	300 U	**74 J**	45 U
1,1-Dichloroethylene	300 U	70 U	45 U
1,2,4-Trichlorobenzene	300 U	70 U	45 U
1,2-Dichlorobenzene	300 U	70 U	45 U
1,2-Dichloroethane	300 U	70 U	45 U
1,2-Dichloropropane	300 U	70 U	45 U
1,3-Dichlorobenzene	300 U	70 U	45 U
1,4-Dichlorobenzene	300 U	70 U	45 U
2-Hexanone	890 U	210 U	140 U
Acetone	**2100 J**	490 U	320 U
Benzene	150 U	35 U	23 U
Bromochloromethane	300 U	70 U	45 U
Bromodichloromethane	300 U	70 U	45 U
Bromoform	300 U	70 U	45 U
Carbon disulfide	300 U	70 U	45 U
Carbon tetrachloride	300 U	70 U	45 U
Chlorobenzene	300 U	70 U	45 U
Chloroethane	590 U	140 U	90 U
Chloroform	300 U	70 U	45 U
cis-1,2-Dichloroethylene	300 U	**200 J**	**47 J**
cis-1,3-Dichloropropene	300 U	70 U	45 U
DBCP	590 U	140 U	90 U
Dibromochloromethane	300 U	70 U	45 U
Dichlorodifluoromethane	590 U	140 U	90 U
Diethyl ether	300 U	70 U	45 U
EDB	300 U	70 U	45 U
Ethylbenzene	300 U	**5100**	45 U
Isopropylbenzene	**4300**	70 U	45 U
Methyl bromide	590 U	140 U	90 U
Methyl chloride	590 U	140 U	90 U
Methyl ethyl ketone (MEK)	1200 U	280 U	180 U
Methyl isobutyl ketone	890 U	210 U	140 U
Methylene chloride	590 U	140 U	90 U
Styrene	300 U	70 U	45 U
Tetrachloroethylene	300 U	70 U	45 U
Tetrahydrofuran	1200 U	280 U	180 U
Toluene	300 U	**150 J**	45 U
Trans-1,2-Dichloroethene	300 U	70 U	45 U
trans-1,3-Dichloropropene	300 U	70 U	45 U
Trichloroethylene	300 U	70 U	45 U
Trichlorofluoromethane	590 U	140 U	90 U
Vinyl chloride	300 U	70 U	45 U
Xylene (total)	**2800**	**17000**	45 U
Sum of Constituents	**9200**	**22524**	**47**
	op	gsss	ssg

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area (ft^2)	Thickness of Mass Unit (ft)	Total VOC Concentration (dry weight) (ug/kg)	Moisture Content Results of Samples (%)	Total VOC Concentration (wet weight) (ug/kg)	Bulk Density/1e9 (lb/ft^3)x(kg/1x10^9 ug)	Mass of Total VOC (lbs)
	Organic Peat												
	PC-19/NE6	Peat	11.75	11.5	13	OP	8,100	1.5	13,860	44%	7,762	2.50E-08	2.36
	Estimated Total VOC Mass for Strata:												**2.36**
	Grey Silty Sand/Silt												
	PC-19/NE6	Silt	15.75	13	17	GSSS	8,100	4.0	11,319	20%	9,055	1.07E-07	31.39
	Estimated Total VOC Mass for Strata:												**31.39**
	Sand / Sand and Gravel												
	PC-19	SSG	18.75	17	20	SSG	8,100	3.0	217	13%	189	1.18E-07	0.54
	PC-19	SSG	21.25	20	23	SSG	8,100	3.0	215	13%	187	1.18E-07	0.54
	PC-19/NE6	SSG	24.75	23	25	SSG	8,100	2.0	201	13%	175	1.18E-07	0.33
	Estimated Total VOC Mass for Strata:												**1.41**
	Estimated Total VOC Mass for PC-19 Area:												**35.16**
	COC Specific Calculations by Strata												
1,1-Dichloroethane	NE6	Peat	11.75	11.5	13	OP	8100	1.5	74	44%	41	2.50E-08	0.01
cis-1,2-Dichloroethylene	PC-19	Peat	11.75	11.5	13	OP	8,100	1.5	5,600	44%	3,136	2.50E-08	0.95
Trans-1,2-Dichloroethene	PC-19	Peat	11.75	11.5	13	OP	8,100	1.5	460	44%	258	2.50E-08	0.08
Vinyl chloride	PC-19	Peat	11.75	11.5	13	OP	8,100	1.5	250	44%	140	2.50E-08	0.04
1,1-Dichloroethane	PC-19	Silt	15.75	13	17	GSSS	8,100	4.0	2.9	20%	2	1.07E-07	0.01
Chloroethane	PC-19	Silt	15.75	13	17	GSSS	8,100	4.0	27	20%	22	1.07E-07	0.07
cis-1,2-Dichloroethylene	PC-19/NE6	Silt	15.75	13	17	GSSS	8,100	4.0	100.6	20%	80	1.07E-07	0.28
Trans-1,2-Dichloroethene	PC-19	Silt	15.75	13	17	GSSS	8,100	4.0	4.4	20%	4	1.07E-07	0.01
1,1,1-Trichloroethane	PC-19	SSG	18.75	17	20	SSG	8,100	3.0	20	13%	17	1.18E-07	0.05
1,1-Dichloroethane	PC-19	SSG	18.75	17	20	SSG	8,100	3.0	7.1	13%	6	1.18E-07	0.02
Chloroethane	PC-19	SSG	18.75	17	20	SSG	8,100	3.0	3.4	13%	3	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-19	SSG	18.75	17	20	SSG	8,100	3.0	170	13%	148	1.18E-07	0.42
Trans-1,2-Dichloroethene	PC-19	SSG	18.75	17	20	SSG	8,100	3.0	1.7	13%	1	1.18E-07	0.00
Vinyl chloride	PC-19	SSG	18.75	17	20	SSG	8,100	3.0	7.8	13%	7	1.18E-07	0.02
1,1,1-Trichloroethane	PC-19	SSG	21.25	20	23	SSG	8,100	3.0	20	13%	17	1.18E-07	0.05
1,1-Dichloroethane	PC-19	SSG	21.25	20	23	SSG	8,100	3.0	8.5	13%	7	1.18E-07	0.02
Chloroethane	PC-19	SSG	21.25	20	23	SSG	8,100	3.0	3.7	13%	3	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-19	SSG	21.25	20	23	SSG	8,100	3.0	170	13%	148	1.18E-07	0.42
Trans-1,2-Dichloroethene	PC-19	SSG	21.25	20	23	SSG	8,100	3.0	1.8	13%	2	1.18E-07	0.00
Vinyl chloride	PC-19	SSG	21.25	20	23	SSG	8,100	3.0	11	13%	10	1.18E-07	0.03
1,1,1-Trichloroethane	PC-19	SSG	24.75	23	25	SSG	8,100	2.0	37	13%	32	1.18E-07	0.06
1,1-Dichloroethane	PC-19	SSG	24.75	23	25	SSG	8,100	2.0	15	13%	13	1.18E-07	0.02
Chloroethane	PC-19	SSG	24.75	23	25	SSG	8,100	2.0	6.5	13%	6	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-19/NE6	SSG	24.75	23	25	SSG	8,100	2.0	158.5	13%	138	1.18E-07	0.26
Trans-1,2-Dichloroethene	PC-19	SSG	24.75	23	25	SSG	8,100	2.0	2.7	13%	2	1.18E-07	0.00
Vinyl chloride	PC-19	SSG	24.75	23	25	SSG	8,100	2.0	22	13%	19	1.18E-07	0.04
Estimated Total Target COC Mass for PC-19 Area:													**2.91**

Target Mass per COC (lbs)				OP	GSSS	SSG
1,1,1-Trichloroethane	0.16			-	-	0.16
1,1-Dichloroethane	0.08			0.01	0.01	0.06
Chloroethane	0.10			-	0.07	0.03
cis-1,2-Dichloroethylene	2.34			0.95	0.28	1.11
Trans-1,2-Dichloroethene	0.10			0.08	0.01	0.01
Vinyl chloride	0.13			0.04	-	0.08
	2.92			**1.09**	**0.37**	**1.46**

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-20

	PC-20		PC-20		PC-20		PC-20	
	SB-FS-TB-PC-20-		SB-FS-PC-20-15.5-		SB-FS-PC-20-18.0-		SB-FS-PC-20-25.0-	
	9.25		15.75		18.25		25.25	
	5/29/2012		6/4/2012		6/4/2012		6/4/2012	
	Peat		Sand		Sand & Silt		Sand	
	60		20		35		5	
	15		0.1		0.1		0.1	
	31		9.5		11		9.9	
CONSTITUENTS								
1,1,1-Trichloroethane	240	U	4.9		2.6	U	20	
1,1,2,2-Tetrachloroethane	240	U	2.4	U	2.6	U	2.6	U
1,1,2-Trichloroethane	240	U	2.4	U	2.6	U	2.6	U
1,1-Dichloroethane	240	U	7.7		2	J	5.5	
1,1-Dichloroethylene	240	U	2.4	U	2.6	U	2.6	U
1,2,3-Trichlorobenzene	240	U	2.4	U	2.6	U	2.6	U
1,2,4-Trichlorobenzene	240	U	2.4	U	2.6	U	2.6	U
1,2-Dichlorobenzene	240	U	2.4	U	2.6	U	5.4	
1,2-Dichloroethane	240	U	2.4	U	2.6	U	2.6	U
1,2-Dichloropropane	240	U	2.4	U	2.6	U	2.6	U
1,3-Dichlorobenzene	240	U	2.4	U	2.6	U	2.6	U
1,4-Dichlorobenzene	240	U	2.4	U	2.6	U	2.6	U
2-Hexanone	2400	U	24	UJ	26	UJ	26	UJ
Acetone	24000	UJ	240	UJ	260	UJ	260	UJ
Benzene	240	U	2.4	U	2.6	U	2.6	U
Bromochloromethane	240	U	2.4	U	2.6	U	2.6	U
Bromodichloromethane	240	U	2.4	U	2.6	U	2.6	U
Bromoform	240	U	2.4	U	2.6	U	2.6	U
Carbon Disulfide	240	U	2.4	U	2.6	U	2.6	U
Carbon Tetrachloride	240	U	2.4	U	2.6	U	2.6	U
Chlorobenzene	240	U	2.4	U	2.6	U	2.6	U
Chloroethane	470	UJ	2.5	J	5.3	U	5.1	U
Chloroform	240	U	2.4	U	2.6	U	2.6	U
cis-1,2-Dichloroethylene	240	U	160		37		130	
cis-1,3-Dichloropropene	240	U	2.4	U	2.6	U	2.6	U
Cyclohexane	2400	U	24	U	26	U	26	U
DBCP	2400	U	24	U	26	U	26	U
Dibromochloromethane	240	U	2.4	U	2.6	U	2.6	U
Dichlorodifluoromethane	470	U	4.8	U	5.3	U	5.1	U
Diethyl ether	240	U	2.4	U	2.6	U	2.6	U
Ethylene dibromide (EDB)	240	U	2.4	U	2.6	U	2.6	U
Ethylbenzene	190	J	2.3	J	2.6	U	2.6	U
Freon 113	1200	U	12	U	13	U	13	U
Isopropylbenzene	240	U	2.4	U	2.6	U	2.6	U
Methyl Acetate	4700	U	48	U	53	U	51	U
Methyl bromide	470	U	4.8	U	5.3	U	5.1	U
Methyl chloride	470	U	4.8	U	5.3	U	5.1	U
Methyl ethyl ketone (MEK)	2400	U*	24	UJ	26	UJ	26	UJ
Methyl isobutyl ketone	2400	U	24	U	26	U	26	U
Methyl tert Butyl Ether (MTBE)	240	U	2.4	U	2.6	U	2.6	U
Methylcyclohexane	240	U	2.4	U	2.6	U	2.6	U
Methylene chloride	940	U	9.6	U	11	U	10	U
m-Xylene & p-Xylene	2400		4.8	U	5.3	U	5.1	U
o-Xylene	1200		2.4	U	2.6	U	2.6	U
Styrene	240	U	2.4	U	2.6	U	2.6	U
Tetrachloroethylene	240	U	2.4	U	2.6	U	2.6	U
Tetrahydrofuran	4700	U	48	UJ	53	UJ	51	UJ
Toluene	240	U	2.4	U	2.6	U	2.6	U
Trans-1,2-Dichloroethene	240	U	2.4		2.6	U	2	J
trans-1,3-Dichloropropene	240	U	2.4	U	2.6	U	2.6	U
Trichloroethylene	240	U	2.4	U	2.6	U	2.6	U
Trichlorofluoromethane	470	U*	4.8	U	5.3	U	5.1	U
Vinyl chloride	240	U	11		1.8	J	11	
Xylene (total)	3600		2.4	U	2.6	U	2.6	U
Sum of Constituents	**3790**		**190.8**		**40.8**		**173.9**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area (ft^2)	Thickness of Mass Unit (ft)	Total VOC Concentration (dry weight) (ug/kg)	Moisture Content Results of Samples (%)	Total VOC Concentration (wet weight) (ug/kg)	Bulk Density/1e9 (^{3})x(kg/1x10	Mass of Total VOC (lbs)
						Organic Peat							
	PC-20	OP	9.25	8.2	11	OP	8,100	2.8	3,790	44%	2,122	2.50E-08	1.20
												Estimated Total VOC Mass for Strata:	**1.20**
						Grey Silty Sand/Silt							
	PC-20	GSSS	18.25	16.5	21	GSSS	8,100	4.5	41	20%	33	1.07E-07	0.13
												Estimated Total VOC Mass for Strata:	**0.13**
						Sand / Sand and Gravel							
	PC-20	SSG	15.75	11	16.5	SSG	8,100	5.5	191	13%	166	1.18E-07	0.87
	PC-20	SSG	25.25	21	26	SSG	8,100	5.0	174	13%	151	1.18E-07	0.72
												Estimated Total VOC Mass for Strata:	**1.60**
												Estimated Total VOC Mass for PC-20 Area:	**2.93**
COC Specific Calculations by Strata													
1,1,1-Trichloroethane	PC-20	SSG	15.75	11	16.5	SSG	8,100	5.5	4.9	13%	4	1.18E-07	0.02
1,1-Dichloroethane	PC-20	SSG	15.75	11	16.5	SSG	8,100	5.5	7.7	13%	7	1.18E-07	0.04
Chloroethane	PC-20	SSG	15.75	11	16.5	SSG	8,100	5.5	2.5	13%	2	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-20	SSG	15.75	11	16.5	SSG	8,100	5.5	160	13%	139	1.18E-07	0.73
Trans-1,2-Dichloroethene	PC-20	SSG	15.75	11	16.5	SSG	8,100	5.5	2.4	13%	2	1.18E-07	0.01
Vinyl chloride	PC-20	SSG	15.75	11	16.5	SSG	8,100	5.5	11	13%	10	1.18E-07	0.05
1,1-Dichloroethane	PC-20	GSSS	18.25	16.5	21	GSSS	8,100	4.5	2	20%	2	1.07E-07	0.01
cis-1,2-Dichloroethylene	PC-20	GSSS	18.25	16.5	21	GSSS	8,100	4.5	37	20%	30	1.07E-07	0.12
Vinyl chloride	PC-20	GSSS	18.25	16.5	21	GSSS	8,100	4.5	1.8	20%	1	1.07E-07	0.01
1,1,1-Trichloroethane	PC-20	SSG	25.25	21	26	SSG	8,100	5.0	20	13%	17	1.18E-07	0.08
1,1-Dichloroethane	PC-20	SSG	25.25	21	26	SSG	8,100	5.0	5.5	13%	5	1.18E-07	0.02
cis-1,2-Dichloroethylene	PC-20	SSG	25.25	21	26	SSG	8,100	5.0	130	13%	113	1.18E-07	0.54
Trans-1,2-Dichloroethene	PC-20	SSG	25.25	21	26	SSG	8,100	5.0	2	13%	2	1.18E-07	0.01
Vinyl chloride	PC-20	SSG	25.25	21	26	SSG	8,100	5.0	11	13%	10	1.18E-07	0.05
												Estimated Total Target COC Mass for PC-20 Area:	**1.69**

	Target Mass per COC (lbs)	GSSS	SSG
1,1,1-Trichloroethane	0.11	-	0.11
1,1-Dichloroethane	0.06	0.01	0.06
Chloroethane	0.01	-	0.01
cis-1,2-Dichloroethylene	1.39	0.12	1.27
Trans-1,2-Dichloroethene	0.02	-	0.02
Vinyl chloride	0.10	0.01	0.10
	1.69	0.13	1.56

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-21

	PC-21		PC-21		PC-21	
	SB-FS-PC-21-6.5-6.75		SB-FS-PC-21-11.0-11.25		SB-FS-PC-21-12.5-12.75	
	5/31/2012		6/7/2012		6/7/2012	
	Gravel		Sand		Gravel	
	15		25		0	
	0.1		0.1		0.1	
	17					
CONSTITUENTS						
1,1,1-Trichloroethane	3.8		2.4	J	2.6	J
1,1,2,2-Tetrachloroethane	2.5	U	2.6	U	2.7	U
1,1,2-Trichloroethane	2.5	U	2.6	U	2.7	U
1,1-Dichloroethane	1.8	J	2.6	U	2.8	
1,1-Dichloroethylene	2.5	U	2.6	U	2.7	U
1,2,3-Trichlorobenzene	2.5	U	2.6	U	2.7	U
1,2,4-Trichlorobenzene	2.5	U	2.6	U	2.7	U
1,2-Dichlorobenzene	1.3	J	2.3	J	1.4	J
1,2-Dichloroethane	2.5	U	2.6	U	2.7	U
1,2-Dichloropropane	2.5	U	2.6	U	2.7	U
1,3-Dichlorobenzene	2.5	U	2.6	U	2.7	U
1,4-Dichlorobenzene	2.5	U	2.6	U	2.7	U
2-Hexanone	25	U	26	U	27	U
Acetone	250	UJ	260	U	270	UJ
Benzene	2.5	U	2.6	U	2.7	U
Bromochloromethane	2.5	U	2.6	U	2.7	U
Bromodichloromethane	2.5	U	2.6	U	2.7	U
Bromoform	2.5	U	2.6	U	2.7	U
Carbon Disulfide	2.5	U	2.6	U	2.7	U
Carbon Tetrachloride	2.5	U	2.6	U	2.7	U
Chlorobenzene	2.5	U	2.6	U	2.7	U
Chloroethane	5.1	U	5.2	U	5.5	U
Chloroform	2.5	U	2.6	U	2.7	U
cis-1,2-Dichloroethylene	19		13		10	
cis-1,3-Dichloropropene	2.5	U	2.6	U	2.7	U
Cyclohexane	25	U	26	U	27	U
DBCP	25	U	26	U	27	U
Dibromochloromethane	2.5	U	2.6	U	2.7	U
Dichlorodifluoromethane	5.1	U	5.2	U	5.5	U
Diethyl ether	2.5	U	2.6	U	2.7	U
Ethylene dibromide (EDB)	2.5	U	2.6	U	2.7	U
Ethylbenzene	2.5	U	3.8		2.7	U
Freon 113	13	U	13	U	14	U
Isopropylbenzene	2.5	U	2.6	U	2.7	U
Methyl Acetate	51	U	52	U	55	U
Methyl bromide	5.1	U	5.2	U	5.5	U
Methyl chloride	5.1	U	5.2	U	5.5	U
Methyl ethyl ketone (MEK)	25	UJ	26	U	27	U
Methyl isobutyl ketone	25	U	26	U	27	U
Methyl tert Butyl Ether (MTBE)	2.5	U	2.6	U	2.7	U
Methylcyclohexane	2.5	U	2.6	U	2.7	U
Methylene chloride	8.4	J	10	U	11	U
m-Xylene & p-Xylene	5.1	U	5.2	U	5.5	U
o-Xylene	2.5	U	2.6	U	2.7	U
Styrene	2.5	U	2.6	U	2.7	U
Tetrachloroethylene	2.5	U	2.6	U	2.7	U
Tetrahydrofuran	51	UJ	52	UJ	55	U
Toluene	2.5	U	2.6	U	2.7	U
Trans-1,2-Dichloroethene	2.5	U	2.6	U	2.7	U
trans-1,3-Dichloropropene	2.5	U	2.6	U	2.7	U
Trichloroethylene	2.5	U	2.6	U	2.7	U
Trichlorofluoromethane	5.1	U	5.2	U	5.5	U
Vinyl chloride	6.6		4.3		6.6	
Xylene (total)	2.5	U	2.6	U	2.7	U
Sum of Constituents	**40.9**		**25.8**		**23.4**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density / 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-21	SSG	6.75	6.5	9	SSG	6,926	2.5	41	13%	36	1.18E-07	0.07
	PC-21	SSG	11.25	9	12	SSG	6,926	3.0	26	13%	22	1.18E-07	0.06
	PC-21	SSG	12.75	12	17	SSG	6,926	5.0	23	13%	20	1.18E-07	0.08
												Estimated Total VOC Mass for Strata:	**0.21**
												Estimated Total VOC Mass for PC-21 Area:	**0.21**
COC Specific Calculations by Strata													
1,1,1-Trichloroethane	PC-21	SSG	6.75	6.5	9	SSG	6,926	2.5	3.8	13%	3	1.18E-07	0.01
1,1-Dichloroethane	PC-21	SSG	6.75	6.5	9	SSG	6,926	2.5	1.8	13%	2	1.18E-07	0.00
cis-1,2-Dichloroethylene	PC-21	SSG	6.75	6.5	9	SSG	6,926	2.5	19	13%	17	1.18E-07	0.03
Vinyl chloride	PC-21	SSG	6.75	6.5	9	SSG	6,926	2.5	6.6	13%	6	1.18E-07	0.01
1,1,1-Trichloroethane	PC-21	SSG	11.25	9	12	SSG	6,926	3.0	2.4	13%	2	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-21	SSG	11.25	9	12	SSG	6,926	3.0	13	13%	11	1.18E-07	0.03
Vinyl chloride	PC-21	SSG	11.25	9	12	SSG	6,926	3.0	4.3	13%	4	1.18E-07	0.01
1,1,1-Trichloroethane	PC-21	SSG	12.75	12	17	SSG	6,926	5.0	2.6	13%	2	1.18E-07	0.01
1,1-Dichloroethane	PC-21	SSG	12.75	12	17	SSG	6,926	5.0	2.8	13%	2	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-21	SSG	12.75	12	17	SSG	6,926	5.0	10	13%	9	1.18E-07	0.04
Vinyl chloride	PC-21	SSG	12.75	12	17	SSG	6,926	5.0	6.6	13%	6	1.18E-07	0.02
												Estimated Total Target COC Mass for PC-21 Area:	**0.18**

	Target Mass per COC (lbs)	SSG
1,1,1-Trichloroethane	0.02	0.02
1,1-Dichloroethane	0.01	0.01
cis-1,2-Dichloroethylene	0.10	0.10
Vinyl chloride	0.04	0.04
	0.18	

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-22

	PC-22		PC-22		PC-22	
	SB-FS-PC-22-13.5		SB-FS-PC-22-16.0		SB-FS-PC-22-28.5	
	13.75		16.25		28.75	
	5/23/2012		5/23/2012		5/23/2012	
	Sand & Silt		Sand		Sand	
	25		10		5	
	0.5		0.1		0.1	
	17		4.2		13	
CONSTITUENTS						
1,1,1-Trichloroethane	3	U	2.8	U	2.2	U
1,1,2,2-Tetrachloroethane	3	U	2.8	U	2.2	U
1,1,2-Trichloroethane	3	U	2.8	U	2.2	U
1,1-Dichloroethane	3	U	2.8	U	2.2	U
1,1-Dichloroethylene	3	U	2.8	U	2.2	U
1,2,3-Trichlorobenzene	3	U	2.8	U	2.2	U
1,2,4-Trichlorobenzene	3	U	2.8	U	2.2	U
1,2-Dichlorobenzene	3	U	2.8	U	2.2	U
1,2-Dichloroethane	3	U	2.8	U	2.2	U
1,2-Dichloropropane	3	U	2.8	U	2.2	U
1,3-Dichlorobenzene	3	U	2.8	U	2.2	U
1,4-Dichlorobenzene	3	U	2.8	U	2.2	U
2-Hexanone	30	U	28	U	22	U
Acetone	300	UJ	280	UJ	220	UJ
Benzene	3	U	2.8	U	2.2	U
Bromochloromethane	3	U	2.8	U	2.2	U
Bromodichloromethane	3	U	2.8	U	2.2	U
Bromoform	3	U	2.8	U	2.2	U
Carbon Disulfide	3	U	2.8	U	1.9	J
Carbon Tetrachloride	3	U	2.8	U	2.2	U
Chlorobenzene	3	U	2.8	U	2.2	U
Chloroethane	6	U	5.5	U	4.4	U
Chloroform	3	U	2.8	U	2.2	U
cis-1,2-Dichloroethylene	3	U	2.8	U	2.2	U
cis-1,3-Dichloropropene	3	U	2.8	U	2.2	U
Cyclohexane	30	U	28	U	22	U
DBCP	30	U	28	U	22	U
Dibromochloromethane	3	U	2.8	U	2.2	U
Dichlorodifluoromethane	6	U	5.5	U	4.4	U
Diethyl ether	3	U	2.8	U	2.2	U
Ethylene dibromide (EDB)	3	U	2.8	U	2.2	U
Ethylbenzene	3	U	2.8	U	2.2	U
Freon 113	15	U	14	U	11	U
Isopropylbenzene	3	U	2.8	U	2.2	U
Methyl Acetate	60	U	55	U	44	U
Methyl bromide	6	U	5.5	U	4.4	U
Methyl chloride	6	U	5.5	U	4.4	U
Methyl ethyl ketone (MEK)	30	UJ	28	UJ	22	UJ
Methyl isobutyl ketone	30	U	28	U	22	U
Methyl tert Butyl Ether (MTBE)	3	U	2.8	U	2.2	U
Methylcyclohexane	3	U	2.8	U	2.2	U
Methylene chloride	12	U	11	U	8.7	U
m-Xylene & p-Xylene	6	U	5.5	U	4.4	U
o-Xylene	3	U	2.8	U	2.2	U
Styrene	3	U	2.8	U	2.2	U
Tetrachloroethylene	3	U	4.2		2.2	U
Tetrahydrofuran	60	U	55	U	44	U
Toluene	3	U	2.8	U	2.2	U
Trans-1,2-Dichloroethene	3	U	2.8	U	2.2	U
trans-1,3-Dichloropropene	3	U	2.8	U	2.2	U
Trichloroethylene	3	U	2.8	U	2.2	U
Trichlorofluoromethane	6	U	5.5	U	4.4	U
Vinyl chloride	3	U	2.8	U	2.2	U
Xylene (total)	3	U	2.8	U	2.2	U
Sum of Constituents	**0**		**4.2**		**1.9**	

	SE11		SE11		SE11		SE14		SE14	
	12-13		15-16		20-21		10-11		19-20	
	######		######		######		######		######	
CONSTITUENTS										
1,1,1-Trichloroethane	61	U	48	U	46	U	50	U	58	U
1,1,2,2-Tetrachloroethane	61	U	48	U	46	U	50	U	58	U
1,1,2-Trichloroethane	61	U	48	U	46	U	50	U	58	U
1,1-Dichloroethane	61	U	48	U	46	U	50	U	58	U
1,1-Dichloroethylene	61	U	48	U	46	U	50	U	58	U
1,2,4-Trichlorobenzene	61	U	48	U	46	U	50	U	58	U
1,2-Dichlorobenzene	61	U	48	U	46	U	50	U	58	U
1,2-Dichloroethane	61	U	48	U	46	U	50	U	58	U
1,2-Dichloropropane	61	U	48	U	46	U	50	U	58	U
1,3-Dichlorobenzene	61	U	48	U	46	U	50	U	58	U
1,4-Dichlorobenzene	61	U	48	U	46	U	50	U	58	U
2-Hexanone	180	U	140	U	140	U	150	U	180	U
Acetone	430	U	340	U	320	U	350	U	410	U
Benzene	31	U	24	U	23	U	25	U	29	U
Bromochloromethane	61	U	48	U	46	U	50	U	58	U
Bromodichloromethane	61	U	48	U	46	U	50	U	58	U
Bromoform	61	U	48	U	46	U	50	U	58	U
Carbon disulfide	61	U	48	U	46	U	50	U	58	U
Carbon tetrachloride	61	U	48	U	46	U	50	U	58	U
Chlorobenzene	61	U	48	U	46	U	50	U	58	U
Chloroethane	120	U	96	U	91	U	100	U	120	U
Chloroform	61	U	48	U	46	U	50	U	58	U
cis-1,2-Dichloroethylene	61	U	48	U	46	U	50	U	58	U
cis-1,3-Dichloropropene	61	U	48	U	46	U	50	U	58	U
DBCP	120	U	96	U	91	U	100	U	120	U
Dibromochloromethane	61	U	48	U	46	U	50	U	58	U
Dichlorodifluoromethane	120	U	96	U	91	U	100	U	120	U
Diethyl ether	61	U	48	U	46	U	50	U	58	U
EDB	61	U	48	U	46	U	50	U	58	U
Ethylbenzene	61	U	48	U	46	U	50	U	58	U
Isopropylbenzene	61	U	48	U	46	U	50	U	58	U
Methyl bromide	120	U	96	U	91	U	100	U	120	U
Methyl chloride	120	U	96	U	91	U	100	U	120	U
Methyl ethyl ketone (MEK)	240	U	190	U	180	U	200	U	230	U
Methyl isobutyl ketone	180	U	140	U	140	U	150	U	180	U
Methylene chloride	120	U	96	U	91	U	100	U	120	U
Styrene	61	U	48	U	46	U	50	U	58	U
Tetrachloroethylene	61	U	48	U	46	U	50	U	58	U
Tetrahydrofuran	240	U	190	U	180	U	200	U	230	U
Toluene	61	U	48	U	46	U	50	U	58	U
Trans-1,2-Dichloroethene	61	U	48	U	46	U	50	U	58	U
trans-1,3-Dichloropropene	61	U	48	U	46	U	50	U	58	U
Trichloroethylene	61	U	48	U	46	U	50	U	58	U
Trichlorofluoromethane	120	U	96	U	91	U	100	U	120	U
Vinyl chloride	61	U	48	U	46	U	50	U	58	U
Xylene (total)	61	U	48	U	46	U	50	U	58	U
Sum of Constituents	**0**		**0**		**0**		**0**		**0**	

GSSS

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density / 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{9})x(kg/1x10	(lbs)
	Grey Silty Sand / Silt												
	PC-22	GSSS	13.75	10.25	15	GSSS	5,621	4.8	0	20%	0	1.07E-07	0.00
	Estimated Total VOC Mass for Strata:												**0.00**
	Sand / Sand and Gravel												
	PC-22	SSG	16.25	15	22.5	SSG	5,621	7.5	4	13%	4	1.18E-07	0.02
	PC-22	SSG	28.75	22.5	29	SSG	5,621	6.5	2	13%	2	1.18E-07	0.01
	Estimated Total VOC Mass for Strata:												**0.03**
	Estimated Total VOC Mass for PC-22 Area:												**0.03**
COC Specific Calculations by Strata													
Tetrachloroethylene	PC-22	SSG	16.25	15	22.5	SSG	5,621	7.5	4	13%	4	1.18E-07	0.02
	Estimated Total Target COC Mass for PC-22 Area:												**0.02**

	Target Mass per COC (lbs)	SSG
Tetrachloroethylene	0.02	0.02

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-23

	PC-23	PC-23	PC-23	PC-23	PC-23	PC-23
	SB-FS-PC-23-13.0-	SB-FS-PC-23-14.0-	SB-PCB-2	SB-FS-PC-23-18.0-	SB-FS-PC-23-24.0-	SB-FS-PC-23-29.0-
	13.25	14.25	14.25	18.25	24.25	29.25
	5/24/2012	5/24/2012	5/24/2012	5/24/2012	5/24/2012	5/24/2012
	Peat	Sand	Sand	Sand & Silt	Sand	Sand
	40	15	15	25	0	0
	15	1	1	5	0.1	0.1
	30	10	12	24	7.2	22
CONSTITUENTS			Duplicate			
1,1,1-Trichloroethane	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
1,1,2,2-Tetrachloroethane	3.1 UJ	2.7 UJ	2.6 UJ	3.1 UJ	2.2 UJ	2.7 UJ
1,1,2-Trichloroethane	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
1,1-Dichloroethane	81	3.8	3.1	2.3 J	2.2 U	2.7 U
1,1-Dichloroethylene	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
1,2,3-Trichlorobenzene	3.1 UJ	2.7 U	2.6 U	3.1 UJ	2.2 U	2.7 U
1,2,4-Trichlorobenzene	3.1 UJ	2.7 U	2.6 U	3.1 UJ	2.2 U	2.7 U
1,2-Dichlorobenzene	3.1 UJ	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
1,2-Dichloroethane	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
1,2-Dichloropropane	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
1,3-Dichlorobenzene	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
1,4-Dichlorobenzene	3.1 UJ	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
2-Hexanone	31 U	27 U	26 U	31 U	22 U	27 U
Acetone	310 UJ	270 UJ	260 UJ	310 UJ	220 UJ	270 UJ
Benzene	4.6	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Bromochloromethane	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Bromodichloromethane	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Bromoform	3.1 UJ	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Carbon Disulfide	3 J	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Carbon Tetrachloride	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Chlorobenzene	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Chloroethane	16	5.4 U	5.3 U	6.2 U	4.3 U	5.4 U
Chloroform	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
cis-1,2-Dichloroethylene	8.1	2.7 U	2.6 U	18	2.2 U	2.7 U
cis-1,3-Dichloropropene	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Cyclohexane	31 U	27 U	26 U	31 U	22 U	27 U
DBCP	31 UJ	27 UJ	26 UJ	31 UJ	22 UJ	27 UJ
Dibromochloromethane	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Dichlorodifluoromethane	6.2 U	5.4 U	5.3 U	6.2 U	4.3 U	5.4 U
Diethyl ether	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Ethylene dibromide (EDB)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Ethylbenzene	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Freon 113	16 U	14 U	13 U	15 U	11 U	14 U
Isopropylbenzene	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Methyl Acetate	62 U	54 U	53 U	62 U	43 U	54 U
Methyl bromide	6.2 U	5.4 U	5.3 U	6.2 U	4.3 U	5.4 U
Methyl chloride	6.2 U	5.4 U	5.3 U	6.2 U	4.3 U	5.4 U
Methyl ethyl ketone (MEK)	31 U	27 U	26 U	31 UJ	22 U	27 U
Methyl isobutyl ketone	31 U	27 U	26 U	31 U	22 U	27 U
Methyl tert Butyl Ether (MTBE)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Methylcyclohexane	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Methylene chloride	12 U	11 U	11 U	12 U	8.7 U	11 U
m-Xylene & p-Xylene	6.2 U	5.4 U	5.3 U	6.2 U	4.3 U	5.4 U
o-Xylene	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Styrene	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Tetrachloroethylene	17	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Tetrahydrofuran	62 U	54 U	53 U	62 U	43 U	54 U
Toluene	10	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Trans-1,2-Dichloroethene	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
trans-1,3-Dichloropropene	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Trichloroethylene	13	2.7 U	2.6 U	37	2.2 U	2.7 U
Trichlorofluoromethane	6.2 U	5.4 U	5.3 U	6.2 U	4.3 U	5.4 U
Vinyl chloride	3.1 U	2.7 U	2.6 U	2.1 J	2.2 U	2.7 U
Xylene (total)	3.1 U	2.7 U	2.6 U	3.1 U	2.2 U	2.7 U
Sum of Constituents	**152.7**	**3.8**	**3.1**	**59.4**	**0**	**0**

	SE6	SE6	SE7	SE7	SE7	SE8	SE8	SE8	SE8
	14-15	29-29.5	12-12.5	14.5-15	29.5-30	11-11.5	15-16	25-25.5	37.5-38
CONSTITUENTS	######	10/3/2008	10/2/2008	######	10/2/2008	10/2/2008	######	10/2/2008	10/2/2008
1,1,1-Trichloroethane	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
1,1,2,2-Tetrachloroethane	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
1,1,2-Trichloroethane	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
1,1-Dichloroethane	50 U	53 U	**150 J**	53 U	49 U	55 U	50 U	44 U	53 U
1,1-Dichloroethylene	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
1,2,4-Trichlorobenzene	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
1,2-Dichlorobenzene	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
1,2-Dichloroethane	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
1,2-Dichloropropane	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
1,3-Dichlorobenzene	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
1,4-Dichlorobenzene	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
2-Hexanone	150 U	160 U	180 U	160 U	150 U	160 U	150 U	130 U	160 U
Acetone	350 U	370 U	420 U	370 U	340 U	380 U	350 U	310 U	370 U
Benzene	25 U	26 U	30 U	27 U	25 U	27 U	25 U	22 U	27 U
Bromochloromethane	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
Bromodichloromethane	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
Bromoform	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
Carbon disulfide	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
Carbon tetrachloride	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
Chlorobenzene	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
Chloroethane	100 U	110 U	120 U	110 U	98 U	110 U	100 U	88 U	110 U
Chloroform	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
cis-1,2-Dichloroethylene	50 U	53 U	**270 J**	53 U	49 U	55 U	50 U	44 U	53 U
cis-1,3-Dichloropropene	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
DBCP	100 U	110 U	120 U	110 U	98 U	110 U	100 U	88 U	110 U
Dibromochloromethane	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
Dichlorodifluoromethane	100 U	110 U	120 U	110 U	98 U	110 U	100 U	88 U	110 U
Diethyl ether	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
EDB	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
Ethylbenzene	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
Isopropylbenzene	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
Methyl bromide	100 U	110 U	120 U	110 U	98 U	110 U	100 U	88 U	110 U
Methyl chloride	100 U	110 U	120 U	110 U	98 U	110 U	100 U	88 U	110 U
Methyl ethyl ketone (MEK)	200 U	210 U	240 U	210 U	200 U	220 U	200 U	180 U	210 U
Methyl isobutyl ketone	150 U	160 U	180 U	160 U	150 U	160 U	150 U	130 U	160 U
Methylene chloride	100 U	110 U	120 U	110 U	98 U	110 U	100 U	88 U	110 U
Styrene	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
Tetrachloroethylene	50 U	53 U	60 U	53 U	49 U	**67 J**	50 U	44 U	53 U
Tetrahydrofuran	200 U	210 U	240 U	210 U	200 U	220 U	200 U	180 U	210 U
Toluene	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
Trans-1,2-Dichloroethene	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
trans-1,3-Dichloropropene	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
Trichloroethylene	50 U	53 U	60 U	53 U	49 U	**75 J**	50 U	44 U	53 U
Trichlorofluoromethane	100 U	110 U	120 U	110 U	98 U	110 U	100 U	88 U	110 U
Vinyl chloride	50 U	53 U	**130 J**	53 U	49 U	55 U	50 U	44 U	53 U
Xylene (total)	50 U	53 U	60 U	53 U	49 U	55 U	50 U	44 U	53 U
Sum of Constituents	**0**	**0**	**550**	**0**	**0**	**142**	**0**	**0**	**0**
	GSSS		**OP**	**GSSS**		**OP**	**GSSS**		

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	ft^3)x(kg/1x10^9	(lbs)
	Organic Peat												
	PC-23/SE6	OP	13.25	13	13.5	OP	7,918	0.5	351	44%	197	2.50E-08	0.02
						Estimated Total VOC Mass for Strata:							**0.02**
	Grey Silty Sand/Silt												
	PC-23	GSSS	18.25	17.5	21	GSSS	7,918	3.5	59	20%	48	1.07E-07	0.14
						Estimated Total VOC Mass for Strata:							**0.14**
	Sand / Sand and Gravel												
	PC-23/SE8	SSG	14.25	13.5	17.5	GSSS	7,918	4.0	73	13%	63	1.18E-07	0.24
	PC-23	SSG	24.25	17.5	26.75	SSG	7,918	9.3	0	13%	0	1.18E-07	0.00
	PC-23	SSG	29.25	26.75	34.5	SSG	7,918	7.8	0	13%	0	1.18E-07	0.00
						Estimated Total VOC Mass for Strata:							**0.24**
Compound						**Estimated Total VOC Mass for PC-23 Area:**							**0.40**
COC Specific Calculations by Strata													
1,1-Dichloroethane	PC-23/SE7	OP	13.25	13	13.5	OP	7,918	0.5	115.5	44%	65	2.50E-08	0.01
Chloroethane	PC-23	OP	13.25	13	13.5	OP	7,918	0.5	16	44%	9	2.50E-08	0.001
cis-1,2-Dichloroethylene	PC-23/SE7	OP	13.25	13	13.5	OP	7,918	0.5	139.05	44%	78	2.50E-08	0.01
Tetrachloroethylene	PC-23	OP	13.25	13	13.5	OP	7,918	0.5	17	44%	10	2.50E-08	0.001
Trichloroethylene	PC-23	OP	13.25	13	13.5	OP	7,918	0.5	13	44%	7	2.50E-08	0.00
Vinyl chloride	PC-23/SE7	OP	13.25	13	13.5	OP	7,918	0.5	66.05	44%	37	2.50E-08	0.00
1,1-Dichloroethane	PC-23	SSG	14.25	13.5	17.5	SSG	7,918	4.0	3.8	13%	3	1.18E-07	0.01
Tetrachloroethylene	SE8	SSG	14.25	13.5	17.5	SSG	7,918	4.0	67	13%	58	1.18E-07	0.22
Trichloroethylene	SE8	SSG	14.25	13.5	17.5	SSG	7,918	4.0	75	13%	65	1.18E-07	0.24
1,1-Dichloroethane	PC-23	GSSS	18.25	17.5	21	GSSS	7,918	3.5	2.3	20%	2	1.07E-07	0.01
cis-1,2-Dichloroethylene	PC-23	GSSS	18.25	17.5	21	GSSS	7,918	3.5	18	20%	14	1.07E-07	0.04
Trichloroethylene	PC-23	GSSS	18.25	17.5	21	GSSS	7,918	3.5	37	20%	30	1.07E-07	0.09
Vinyl chloride	PC-23	GSSS	18.25	17.5	21	GSSS	7,918	3.5	2.1	20%	2	1.07E-07	0.00
Estimated Total Target COC Mass for PC-23 Area:													**0.64**

Target Mass per COC (lbs)				OP	GSSS	SSG
1,1-Dichloroethane	0.02			0.01	0.01	0.01
Chloroethane	0.001			0.001	-	-
cis-1,2-Dichloroethylene	0.05			0.01	0.04	-
Tetrachloroethylene	0.219			0.00	-	0.22
Trichloroethylene	0.33			0.00	0.09	0.24
Vinyl chloride	0.009			0.00	0.00	-
	0.64			0.02	0.14	0.47

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

CONSTITUENTS	PC-24		PC-24		PC-24		PC-24		PC-24	
	SB-FS-PC-24-12.5-		SB-FS-PC-24-14.5-		SB-FS-PC-24-18.0-		SB-FS-PC-24-24.0-		SB-FS-PC-24-34.0-	
	12.75		14.75		18.25		24.25		34.25	
	5/30/2012		5/30/2012		6/8/2012		5/30/2012		5/30/2012	
	Peat		Sand & Silt		Sand		Sand		Sand & Gravel	
	30		45		0		0		0	
	15		5		0.1		0.1		0.1	
			17				21		8	
1,1,1-Trichloroethane	880	UJ	170	U	2.5	U	2.7	U	2.3	U
1,1,2,2-Tetrachloroethane	880	UJ	170	U	2.5	U	2.7	U	2.3	U
1,1,2-Trichloroethane	880	UJ	170	U	2.5	U	2.7	U	2.3	U
1,1-Dichloroethane	880	UJ	170	U	2.5	U	2.7	U	2.3	U
1,1-Dichloroethylene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
1,2,3-Trichlorobenzene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
1,2,4-Trichlorobenzene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
1,2-Dichlorobenzene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
1,2-Dichloroethane	880	UJ	170	U	2.5	U	2.7	U	2.3	U
1,2-Dichloropropane	880	UJ	170	U	2.5	U	2.7	U	2.3	U
1,3-Dichlorobenzene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
1,4-Dichlorobenzene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
2-Hexanone	8800	UJ	1700	UJ	25	U	27	U*	23	U*
Acetone	88000	UJ	17000	UJ	250	U	270	U*	230	U*
Benzene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Bromochloromethane	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Bromodichloromethane	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Bromoform	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Carbon Disulfide	880	UJ	170	U	2.5	U	2.7	U*	2.3	U*
Carbon Tetrachloride	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Chlorobenzene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Chloroethane	1800	UJ	340	U	4.9	U	5.5	U	4.6	U
Chloroform	880	UJ	170	U	2.5	U	2.7	U	2.3	U
cis-1,2-Dichloroethylene	68000	J	1100		2.5		2.5	J	2.3	U
cis-1,3-Dichloropropene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Cyclohexane	8800	UJ	1700	U	25	U	27	U	23	U
DBCP	8800	UJ	1700	U	25	U	27	U	23	U
Dibromochloromethane	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Dichlorodifluoromethane	1800	UJ	340	U	4.9	U	5.5	U	4.6	U
Diethyl ether	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Ethylene dibromide (EDB)	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Ethylbenzene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Freon 113	4400	UJ	850	U	12	U	14	U	12	U
Isopropylbenzene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Methyl Acetate	18000	UJ	3400	U	49	U	55	U	46	U
Methyl bromide	1800	UJ	340	U	4.9	U	5.5	U	4.6	U
Methyl chloride	1800	UJ	340	U	4.9	U	5.5	U	4.6	U
Methyl ethyl ketone (MEK)	8800	UJ	1700	UJ	25	U	27	U*	23	U*
Methyl isobutyl ketone	8800	UJ	1700	U	25	U	27	U	23	U
Methyl tert Butyl Ether (MTBE)	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Methylcyclohexane	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Methylene chloride	4200	UJ	830	U	9.8	U	8	J	7.1	J
m-Xylene & p-Xylene	1800	UJ	340	U	4.9	U	5.5	U	4.6	U
o-Xylene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Styrene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Tetrachloroethylene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Tetrahydrofuran	18000	UJ	3400	UJ	49	UJ	55	U	46	U
Toluene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Trans-1,2-Dichloroethene	4000	J	170	U	2.5	U	2.7	U	2.3	U
trans-1,3-Dichloropropene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Trichloroethylene	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Trichlorofluoromethane	1800	UJ	340	U	4.9	U	5.5	U	4.6	U
Vinyl chloride	2400	J	170	U	1.6	J	8.3		2.3	U
Xylene (total)	880	UJ	170	U	2.5	U	2.7	U	2.3	U
Sum of Constituents	**74400**		**1100**		**4.1**		**18.8**		**7.1**	

CONSTITUENTS	SE4		SE4		SE4	
	14.5-15		16-16.5		27-27.5	
	9/29/2008		9/29/2008		9/29/2008	
1,1,1-Trichloroethane	84	U	60	U	51	U
1,1,2,2-Tetrachloroethane	84	U	60	U	51	U
1,1,2-Trichloroethane	84	U	60	U	51	U
1,1-Dichloroethane	84	U	60	U	51	U
1,1-Dichloroethylene	84	U	60	U	51	U
1,2,4-Trichlorobenzene	84	U	60	U	51	U
1,2-Dichlorobenzene	84	U	60	U	51	U
1,2-Dichloroethane	84	U	60	U	51	U
1,2-Dichloropropane	84	U	60	U	51	U
1,3-Dichlorobenzene	84	U	60	U	51	U
1,4-Dichlorobenzene	84	U	60	U	51	U
2-Hexanone	250	U	180	U	150	U
Acetone	**610**	**J**	420	U	360	U
Benzene	42	U	30	U	25	U
Bromochloromethane	84	U	60	U	51	U
Bromodichloromethane	84	U	60	U	51	U
Bromoform	84	U	60	U	51	U
Carbon disulfide	84	U	60	U	51	U
Carbon tetrachloride	84	U	60	U	51	U
Chlorobenzene	84	U	60	U	51	U
Chloroethane	170	U	120	U	100	U
Chloroform	84	U	60	U	51	U
cis-1,2-Dichloroethylene	84	U	60	U	51	U
cis-1,3-Dichloropropene	84	U	60	U	51	U
DBCP	170	U	120	U	100	U
Dibromochloromethane	84	U	60	U	51	U
Dichlorodifluoromethane	170	U	120	U	100	U
Diethyl ether	84	U	60	U	51	U
EDB	84	U	60	U	51	U
Ethylbenzene	84	U	60	U	51	U
Isopropylbenzene	84	U	60	U	51	U
Methyl bromide	170	U	120	U	100	U
Methyl chloride	170	U	120	U	100	U
Methyl ethyl ketone (MEK)	340	U	240	U	200	U
Methyl isobutyl ketone	250	U	180	U	150	U
Methylene chloride	170	U	120	U	100	U
Styrene	84	U	60	U	51	U
Tetrahydrofuran	340	U	240	U	200	U
Tetrachloroethylene	84	U	60	U	51	U
Toluene	**240**	**J**	60	U	51	U
Trans-1,2-Dichloroethene	84	U	60	U	51	U
trans-1,3-Dichloropropene	84	U	60	U	51	U
Trichloroethylene	84	U	60	U	51	U
Trichlorofluoromethane	170	U	120	U	100	U
Vinyl chloride	84	U	60	U	51	U
Xylene (total)	**150**	**J**	60	U	51	U
Sum of Constituents	**1000**		**0**		**0**	
	OP		**GSSS**			

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	($(lb/ft^3)x(kg/1x10^9 ug)$)	(lbs)
	Organic Peat												
	PC-24/SE4	OP	12.75	12	13.5	OP	8,100	1.5	37,700	44%	21,112	2.50E-08	6.41
	Estimated Total VOC Mass for Strata:												**6.41**
	Grey Silty Sand/Silt												
	PC-24	GSSS	14.75	13.5	18	GSSS	8,100	4.5	1,100	17%	913	1.07E-07	3.56
	Estimated Total VOC Mass for Strata:												**3.56**
	Sand / Sand and Gravel												
	PC-24	SSG	18.25	18	21.25	SSG	8,100	3.3	4	15%	3	1.18E-07	0.01
	PC-24	SSG	24.25	21.25	29.25	SSG	8,100	8.0	19	21%	15	1.18E-07	0.11
	PC-24	SSG	34.25	29.25	38.5	SSG	8,100	9.3	7	8%	7	1.18E-07	0.06
	Estimated Total VOC Mass for Strata:												**0.18**
	Estimated Total VOC Mass for PC-24 Area:												**10.16**
	COC Specific Calculations by Strata												
cis-1,2-Dichloroethylene	PC-24	OP	12.75	12	13.5	OP	8,100	1.5	68000	44%	38,080	2.50E-08	11.57
Trans-1,2-Dichloroethene	PC-24	OP	12.75	12	13.5	OP	8,100	1.5	4000	44%	2,240	2.50E-08	0.68
Vinyl chloride	PC-24	OP	12.75	12	13.5	OP	8,100	1.5	2400	44%	1,344	2.50E-08	0.41
cis-1,2-Dichloroethylene	PC-24	GSSS	14.75	13.5	18	GSSS	8,100	4.5	1100	20%	880	1.07E-07	3.43
cis-1,2-Dichloroethylene	PC-24	SSG	18.25	18	21.25	SSG	8,100	3.3	2.5	13%	2	1.18E-07	0.01
Vinyl chloride	PC-24	SSG	18.25	18	21.25	SSG	8,100	3.3	1.6	13%	1	1.18E-07	0.00
cis-1,2-Dichloroethylene	PC-24	SSG	24.25	21.25	29.25	SSG	8,100	8.0	2.5	13%	2	1.18E-07	0.02
Vinyl chloride	PC-24	SSG	24.25	21.25	29.25	SSG	8,100	8.0	8.3	13%	7	1.18E-07	0.06
	Estimated Total Target COC Mass for PC-24 Area:												**16.17**

	Target Mass per COC (lbs)	OP	GSSS	SSG
cis-1,2-Dichloroethylene	15.02	11.57	3.43	0.02
Trans-1,2-Dichloroethene	0.68	0.68	-	-
Vinyl chloride	0.47	0.41	-	0.06
	16.17	12.66	3.43	0.08

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-25

CONSTITUENTS	PC-25 SB-FS-PC-25-11.5- 11.75 5/24/2012 Peat 30 15 71		PC-25 SB-FS-PC-25-12.5- 12.75 5/24/2012 Silt & Clay 90 5 56		PC-25 SB-FS-PC-25-27.0- 27.25 5/24/2012 Sand 0 0.1 8.7		PC-25 SB-FS-PC-25-35.0- 35.25 5/24/2012 Sand 0 0.1 26	
1,1,1-Trichloroethane	740	UJ	5.8	U	2.3	U	2.6	U
1,1,2,2-Tetrachloroethane	740	UJ	5.8	UJ	2.3	UJ	2.6	UJ
1,1,2-Trichloroethane	740	UJ	5.8	U	2.3	U	2.6	U
1,1-Dichloroethane	1700	J	39		2.3	U	2.6	U
1,1-Dichloroethylene	740	UJ	5.8	U	2.3	U	2.6	U
1,2,3-Trichlorobenzene	740	UJ	5.8	U	2.3	U	2.6	U
1,2,4-Trichlorobenzene	740	UJ	5.8	U	2.3	U	2.6	U
1,2-Dichlorobenzene	740	UJ	5.8	U	2.3	U	2.6	U
1,2-Dichloroethane	740	UJ	5.8	U	2.3	U	2.6	U
1,2-Dichloropropane	740	UJ	5.8	U	2.3	U	2.6	U
1,3-Dichlorobenzene	740	UJ	5.8	U	2.3	U	2.6	U
1,4-Dichlorobenzene	740	UJ	5.8	U	2.3	U	2.6	U
2-Hexanone	7400	UJ	58	U	23	U	26	U
Acetone	74000	UJ	580	UJ	230	UJ	260	UJ
Benzene	740	UJ	5.8	U	2.3	U	2.6	U
Bromochloromethane	740	UJ	5.8	U	2.3	U	2.6	U
Bromodichloromethane	740	UJ	5.8	U	2.3	U	2.6	U
Bromoform	740	UJ	5.8	U	2.3	U	2.6	U
Carbon Disulfide	740	UJ	5.8	U	2.3	U	12	
Carbon Tetrachloride	740	UJ	5.8	U	2.3	U	2.6	U
Chlorobenzene	740	UJ	5.8	U	2.3	U	2.6	U
Chloroethane	1500	UJ	16		4.5	U	5.2	U
Chloroform	740	UJ	5.8	U	2.3	U	2.6	U
cis-1,2-Dichloroethylene	15000	J	130		2.3	U	1.5	J
cis-1,3-Dichloropropene	740	UJ	5.8	U	2.3	U	2.6	U
Cyclohexane	7400	UJ	58	U	23	U	26	U
DBCP	7400	UJ	58	UJ	23	UJ	26	UJ
Dibromochloromethane	740	UJ	5.8	U	2.3	U	2.6	U
Dichlorodifluoromethane	1500	UJ	12	U	4.5	U	5.2	U
Diethyl ether	740	UJ	5.8	U	2.3	U	2.6	U
Ethylene dibromide (EDB)	740	UJ	5.8	U	2.3	U	2.6	U
Ethylbenzene	740	UJ	5.8	U	2.3	U	2.9	
Freon 113	3700	UJ	29	U	11	U	13	U
Isopropylbenzene	740	UJ	5.8	U	2.3	U	2.6	U
Methyl Acetate	15000	UJ	120	U	45	U	52	U
Methyl bromide	1500	UJ	12	U	4.5	U	5.2	U
Methyl chloride	1500	UJ	12	U	4.5	U	5.2	U
Methyl ethyl ketone (MEK)	7400	UJ	51	J	23	U	26	U
Methyl isobutyl ketone	7400	UJ	58	U	23	U	26	U
Methyl tert Butyl Ether (MTBE)	740	UJ	5.8	U	2.3	U	2.6	U
Methylcyclohexane	740	UJ	5.8	U	2.3	U	2.6	U
Methylene chloride	2900	UJ	23	U	9.1	U	10	U
m-Xylene & p-Xylene	1500	UJ	12	U	4.5	U	5.2	U
o-Xylene	740	UJ	5.8	U	2.3	U	2.6	U
Styrene	740	UJ	5.8	U	2.3	U	2.6	U
Tetrachloroethylene	590	J	5.8	U	2.3	U	2.6	U
Tetrahydrofuran	15000	UJ	120	U	45	U	52	U
Toluene	740	UJ	5.8	U	2.3	U	2.6	U
Trans-1,2-Dichloroethene	570	J	11		2.3	U	2.6	U
trans-1,3-Dichloropropene	740	UJ	5.8	U	2.3	U	2.6	U
Trichloroethylene	2200	J	5.8	U	2.3	U	2.6	U
Trichlorofluoromethane	1500	UJ	12	U	4.5	U	5.2	U
Vinyl chloride	950	J	100		6.4		6.7	
Xylene (total)	740	UJ	5.8	U	2.3	U	2.6	U
Sum of Constituents	**21010**		**347**		**6.4**		**23.1**	

CONSTITUENTS	NE5 11.5-12 9/30/2008		NE5 19.5-20 9/30/2008		NE5 28.5-29 9/30/2008	
1,1,1-Trichloroethane	150	U	57	U	63	U
1,1,2,2-Tetrachloroethane	150	U	57	U	63	U
1,1,2-Trichloroethane	150	U	57	U	63	U
1,1-Dichloroethane	**660**	**J**	57	U	63	U
1,1-Dichloroethylene	150	U	57	U	63	U
1,2,4-Trichlorobenzene	150	U	57	U	63	U
1,2-Dichlorobenzene	150	U	57	U	63	U
1,2-Dichloroethane	150	U	57	U	63	U
1,2-Dichloropropane	150	U	57	U	63	U
1,3-Dichlorobenzene	150	U	57	U	63	U
1,4-Dichlorobenzene	150	U	57	U	63	U
2-Hexanone	440	U	170	U	190	U
Acetone	**1000**	**J**	400	U	440	U
Benzene	73	U	28	U	31	U
Bromochloromethane	150	U	57	U	63	U
Bromodichloromethane	150	U	57	U	63	U
Bromoform	150	U	57	U	63	U
Carbon disulfide	150	U	57	U	63	U
Carbon tetrachloride	150	U	57	U	63	U
Chlorobenzene	150	U	57	U	63	U
Chloroethane	290	U	110	U	130	U
Chloroform	150	U	57	U	63	U
cis-1,2-Dichloroethylene	**190**	**J**	57	U	63	U
cis-1,3-Dichloropropene	150	U	57	U	63	U
DBCP	290	U	110	U	130	U
Dibromochloromethane	150	U	57	U	63	U
Dichlorodifluoromethane	290	U	110	U	130	U
Diethyl ether	150	U	57	U	63	U
EDB	150	U	57	U	63	U
Ethylbenzene	150	U	57	U	63	U
Isopropylbenzene	150	U	57	U	63	U
Methyl bromide	290	U	110	U	130	U
Methyl chloride	290	U	110	U	130	U
Methyl ethyl ketone (MEK)	580	U	230	U	250	U
Methyl isobutyl ketone	440	U	170	U	190	U
Methylene chloride	290	U	110	U	130	U
Styrene	150	U	57	U	63	U
Tetrachloroethylene	150	U	57	U	63	U
Tetrahydrofuran	580	U	230	U	250	U
Toluene	150	U	57	U	63	U
Trans-1,2-Dichloroethene	150	U	57	U	63	U
trans-1,3-Dichloropropene	150	U	57	U	63	U
Trichloroethylene	**190**	**J**	57	U	63	U
Trichlorofluoromethane	290	U	110	U	130	U
Vinyl chloride	150	U	57	U	63	U
Xylene (total)	150	U	57	U	63	U
Sum of Constituents	**2040**		**0**		**0**	

OP

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area (ft^2)	Thicknes s of Mass Unit (ft)	Total VOC Concentr ation (dry weight) (ug/kg)	Moisture Content Results of Samples (%)	Total VOC Concentr ation (wet weight) (ug/kg)	Bulk Density/1 e9 (ft^3)x(kg/1x10^9)	Mass of Total VOC (lbs)
	Organic Peat												
	PC-25/NE5	OP	11.75	11	12	OP	7,109	1.0	11,525	44%	6,454	2.50E-08	1.15
	Estimated Total VOC Mass for Strata:												**1.15**
	Grey Silty Sand/Silt												
	PC-25	GSSS	12.75	12	13.5	GSSS	7,109	1.5	347	20%	278	1.07E-07	0.32
	Estimated Total VOC Mass for Strata:												**0.32**
	Sand / Sand and Gravel												
	PC-25	SSG	27.25	13.5	31.25	SSG	7,109	17.8	6	13%	6	1.18E-07	0.08
	PC-25	SSG	35.25	31.25	40	SSG	7,109	8.8	23	13%	20	1.18E-07	0.15
	Estimated Total VOC Mass for Strata:												**0.23**
	Estimated Total VOC Mass for PC-25 Area:												**1.69**
	COC Specific Calculations by Strata												
1,1-Dichloroethane	PC-25/NE5	OP	11.75	11	12	OP	7,109	1.0	1180	44%	661	2.50E-08	0.12
cis-1,2-Dichloroethylene	PC-25/NE5	OP	11.75	11	12	OP	7,109	1.0	7595	44%	4,253	2.50E-08	0.76
Tetrachloroethylene	PC-25	OP	11.75	11	12	OP	7,109	1.0	590	44%	330	2.50E-08	0.06
Trans-1,2-Dichloroethene	PC-25	OP	11.75	11	12	OP	7,109	1.0	570	44%	319	2.50E-08	0.06
Trichloroethylene	PC-25/NE5	OP	11.75	11	12	OP	7,109	1.0	1195	44%	669	2.50E-08	0.12
Vinyl chloride	PC-25	OP	11.75	11	12	OP	7,109	1.0	950	44%	532	2.50E-08	0.09
1,1-Dichloroethane	PC-25	GSSS	12.75	12	13.5	GSSS	7,109	1.5	39	20%	31	1.07E-07	0.04
Chloroethane	PC-25	GSSS	12.75	12	13.5	GSSS	7,109	1.5	16	20%	13	1.07E-07	0.01
cis-1,2-Dichloroethylene	PC-25	GSSS	12.75	12	13.5	GSSS	7,109	1.5	130	20%	104	1.07E-07	0.12
Trans-1,2-Dichloroethene	PC-25	GSSS	12.75	12	13.5	GSSS	7,109	1.5	11	20%	9	1.07E-07	0.01
Vinyl chloride	PC-25	GSSS	12.75	12	13.5	GSSS	7,109	1.5	100	20%	80	1.07E-07	0.09
Vinyl chloride	PC-25	SSG	27.25	13.5	31.25	SSG	7,109	17.8	6.4	13%	6	1.18E-07	0.08
cis-1,2-Dichloroethylene	PC-25	SSG	35.25	31.25	40	SSG	7,109	8.8	1.5	13%	1	1.18E-07	0.01
Vinyl chloride	PC-25	SSG	35.25	31.25	40	SSG	7,109	8.8	6.7	13%	6	1.18E-07	0.04
	Estimated Total Target COC Mass for PC-25 Area:												**1.61**

Target Mass per COC (lbs)	OP	GSSS	SSG
1,1-Dichloroethane	0.15	0.12	0.04	-
Chloroethane	0.01	-	0.01	-
cis-1,2-Dichloroethylene	0.88	0.76	0.12	0.01
Tetrachloroethylene	0.06	0.06	-	-
Trans-1,2-Dichloroethene	0.07	0.06	0.01	-
Trichloroethylene	0.12	0.12	-	-
Vinyl chloride	0.31	0.09	0.09	0.13
	1.61	1.20	0.27	0.14

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-26

	PC-26		PC-26		PC-26		PC-26		PC-26	
	SB-FS-PC-26-10.0-		SB-FS-PC-26-14.0-		SB-FS-PC-26-19.5-		SB-FS-PC-26-27.0-		SB-FS-PC-26-32.5-	
	10.25		14.25		19.75		27.25		32.75	
	6/6/2012		6/6/2012		6/6/2012		6/6/2012		6/6/2012	
	Sand		Sand		Sand		Sand		Sand & Gravel	
	0		0		0		0		15	
	0.1		0.1		0.1		0.1		0.1	
	16		19		9.3		6.6		14	
CONSTITUENTS										
1,1,1-Trichloroethane	2.8	U	3	U	2.4	J	2.3	U	2.4	
1,1,2,2-Tetrachloroethane	2.8	U	3	U	2.5	U	2.3	U	2.1	U
1,1,2-Trichloroethane	2.8	U	3	U	2.5	U	2.3	U	2.1	U
1,1-Dichloroethane	2.8	U	3	U	2.5	U	2.3	U	2.1	U
1,1-Dichloroethylene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
1,2,3-Trichlorobenzene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
1,2,4-Trichlorobenzene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
1,2-Dichlorobenzene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
1,2-Dichloroethane	2.8	U	3	U	2.5	U	2.3	U	2.1	U
1,2-Dichloropropane	2.8	U	3	U	2.5	U	2.3	U	2.1	U
1,3-Dichlorobenzene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
1,4-Dichlorobenzene	6		3	U	2.5	U	2.3	U	2.1	U
2-Hexanone	28	U	30	UJ	25	U	23	UJ	21	UJ
Acetone	280	U	300	UJ	250	U	230	UJ	210	UJ
Benzene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Bromochloromethane	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Bromodichloromethane	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Bromoform	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Carbon Disulfide	2.8	U	3	U	2.5	U	2.3	U	7.8	
Carbon Tetrachloride	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Chlorobenzene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Chloroethane	5.6	U	6	U	5	U	4.5	U	4.1	U
Chloroform	2.8	U	3	U	2.5	U	2.3	U	2.1	U
cis-1,2-Dichloroethylene	2.8	U	5.7		5.6		2.3	U	3.7	
cis-1,3-Dichloropropene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Cyclohexane	28	U	30	U	25	U	23	U	21	U
DBCP	28	U	30	U	25	U	23	U	21	U
Dibromochloromethane	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Dichlorodifluoromethane	5.6	U	6	U	5	U	4.5	U	4.1	U
Diethyl ether	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Ethylene dibromide (EDB)	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Ethylbenzene	2.8	U	3	U	2.1	J	2.3	U	2.1	
Freon 113	14	U	15	U	13	U	11	U	10	U
Isopropylbenzene	8.6		3	U	2.5	U	2.3	U	2.1	U
Methyl Acetate	56	U	60	U	50	U	45	U	41	U
Methyl bromide	5.6	U	6	U	5	U	4.5	U	4.1	U
Methyl chloride	5.6	U	6	U	5	U	4.5	U	4.1	U
Methyl ethyl ketone (MEK)	28	U	30	UJ	25	U	23	UJ	21	UJ
Methyl isobutyl ketone	28	U	30	U	25	U	23	U	21	U
Methyl tert Butyl Ether (MTBE)	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Methylcyclohexane	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Methylene chloride	11	U	3.3	U	10	U	9.1	U	2.1	U
m-Xylene & p-Xylene	7.5		6	U	5	U	4.5	U	4.1	U
o-Xylene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Styrene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Tetrachloroethylene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Tetrahydrofuran	56	UJ	60	UJ	50	UJ	45	UJ	41	UJ
Toluene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Trans-1,2-Dichloroethene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
trans-1,3-Dichloropropene	2.8	U	3	U	2.5	U	2.3	U	2.1	U
Trichloroethylene	2.8	U	5		2.5	U	2.3	U	2.1	U
Trichlorofluoromethane	5.6	U	6	U	5	U	4.5	U	4.1	U
Vinyl chloride	2.8	U	3.4		11		2.3	U	5	
Xylene (total)	7.5		3	U	2.5	U	2.3	U	2.1	U
Sum of Constituents	**22.1**		**14.1**		**21.1**		**0**		**21**	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/ 1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	^{3})x(kg/1x10	(lbs)
	Sand / Sand and Gravel												
	PC-26	SSG	10.25	6.75	12.25	SSG	5,378	5.5	22	16%	19	1.18E-07	0.06
	PC-26	SSG	14.25	12.25	17	SSG	5,378	4.8	14	19%	11	1.18E-07	0.03
	PC-26	SSG	19.75	17	23.5	SSG	5,378	6.5	21	9%	19	1.18E-07	0.08
	PC-26	SSG	27.25	23.5	30	SSG	5,378	6.5	0	7%	0	1.18E-07	0.00
	PC-26	SSG	32.75	30	36	SSG	5,378	6.0	21	14%	18	1.18E-07	0.07
												Estimated Total VOC Mass for Strata:	**0.25**
												Estimated Total VOC Mass for PC-28 Area:	**0.25**
COC Specific Calculations by Strata													
cis-1,2-Dichloroethylene	PC-26	SSG	14.25	12.25	17	SSG	5,378	4.8	5.7	13%	5	1.18E-07	0.01
Trichloroethylene	PC-26	SSG	14.25	12.25	17	SSG	5,378	4.8	5	13%	4	1.18E-07	0.01
Vinyl chloride	PC-26	SSG	14.25	12.25	17	SSG	5,378	4.8	3.4	13%	3	1.18E-07	0.01
							5,378						
1,1,1-Trichloroethane	PC-26	SSG	19.75	17	23.5	SSG	5,378	6.5	2.4	13%	2	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-26	SSG	19.75	17	23.5	SSG	5,378	6.5	5.6	13%	5	1.18E-07	0.02
Vinyl chloride	PC-26	SSG	19.75	17	23.5	SSG	5,378	6.5	11	13%	10	1.18E-07	0.04
							5,378						
1,1,1-Trichloroethane	PC-26	SSG	32.75	30	36	SSG	5,378	6.0	2.4	13%	2	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-26	SSG	32.75	30	36	SSG	5,378	6.0	3.7	13%	3	1.18E-07	0.01
Vinyl chloride	PC-26	SSG	32.75	30	36	SSG	5,378	6.0	5	13%	4	1.18E-07	0.02
												Estimated Total Target COC Mass for PC-26 Area:	**0.14**

	Target COC Mass (lbs)	SSG
1,1,1-Trichloroethane	0.02	0.02
cis-1,2-Dichloroethylene	0.05	0.05
Trichloroethylene	0.01	0.01
Vinyl chloride	0.06	0.06
	0.14	

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Mass Calculation Worksheets
Boring PC-27

	PC-27	PC-27	PC-27	PC-27
	SB-FS-PC-27-6.0-6.25	SB-FS-PC-27-10.5-10.75	SB-FS-PC-27-19.5-19.75	SB-FS-PC-27-35.5-35.75
	5/30/2012	5/30/2012	5/30/2012	5/30/2012
	Peat	Sand	Sand	Sand
	35	25	15	
	15	5	0.1	
	68	23	14	12
CONSTITUENTS				
1,1,1-Trichloroethane	7.6 U	2.8 U	3.1	2.9 U
1,1,2,2-Tetrachloroethane	7.6 U	2.8 U	2.3 U	2.9 U
1,1,2-Trichloroethane	7.6 U	2.8 U	2.3 U	2.9 U
1,1-Dichloroethane	7.6 U	2.8	1.9 J	2.9 U
1,1-Dichloroethylene	7.6 U	2.8 U	2.3 U	2.9 U
1,2,3-Trichlorobenzene	7.6 U	2.8 U	2.3 U	2.9 U
1,2,4-Trichlorobenzene	7.6 U	2.8 U	2.3 U	2.9 U
1,2-Dichlorobenzene	7.6 U	2.8 U	2.3 U	2.9 U
1,2-Dichloroethane	7.6 U	2.8 U	2.3 U	2.9 U
1,2-Dichloropropane	7.6 U	2.8 U	2.3 U	2.9 U
1,3-Dichlorobenzene	7.6 U	2.8 U	2.3 U	2.9 U
1,4-Dichlorobenzene	7.6 U	2.8 U	2.3 U	2.9 U
2-Hexanone	76 U	28 U	23 U	29 U
Acetone	760 UJ	280 UJ	230 UJ	290 UJ
Benzene	7.6 U	2.8 U	2.3 U	2.9 U
Bromochloromethane	7.6 U	2.8 U	2.3 U	2.9 U
Bromodichloromethane	7.6 U	2.8 U	2.3 U	2.9 U
Bromoform	7.6 U	2.8 U	2.3 U	2.9 U
Carbon Disulfide	7.6 U	2.8 U	2.3 U	2.9 U
Carbon Tetrachloride	7.6 U	2.8 U	2.3 U	2.9 U
Chlorobenzene	7.6 U	2.8 U	2.3 U	2.9 U
Chloroethane	15 U	5.6 U	4.6 U	5.7 U
Chloroform	7.6 U	2.8 U	2.3 U	2.9 U
cis-1,2-Dichloroethylene	7.6 U	20	6.5	1.5 J
cis-1,3-Dichloropropene	7.6 U	2.8 U	2.3 U	2.9 U
Cyclohexane	76 U	28 U	23 U	29 U
DBCP	76 U	28 U	23 U	29 U
Dibromochloromethane	7.6 U	2.8 U	2.3 U	2.9 U
Dichlorodifluoromethane	15 U	5.6 U	4.6 U	5.7 U
Diethyl ether	7.6 U	2.8 U	2.3 U	2.9 U
Ethylene dibromide (EDB)	7.6 U	2.8 U	2.3 U	2.9 U
Ethylbenzene	7.6 U	2.8 U	2.3 U	2.9 U
Freon 113	38 U	14 U	12 U	14 U
Isopropylbenzene	35	2.8 U	2.3 U	2.9 U
Methyl Acetate	150 U	56 U	46 U	57 U
Methyl bromide	15 U	5.6 U	4.6 U	5.7 U
Methyl chloride	15 U	5.6 U	4.6 U	5.7 U
Methyl ethyl ketone (MEK)	110 J	28 UJ	23 UJ	29 UJ
Methyl isobutyl ketone	76 U	28 U	23 U	29 U
Methyl tert Butyl Ether (MTBE)	7.6 U	2.8 U	2.3 U	2.9 U
Methylcyclohexane	7.6 U	2.8 U	2.3 U	2.9 U
Methylene chloride	23 J	6 J	7.7 J	7.7 J
m-Xylene & p-Xylene	10 J	5.6 U	4.6 U	5.7 U
o-Xylene	5.8 J	2.8 U	2.3 U	2.9 U
Styrene	7.6 U	2.8 U	2.3 U	2.9 U
Tetrachloroethylene	7.6 U	2.8 U	2.3 U	2.9 U
Tetrahydrofuran	150 UJ	56 UJ	46 UJ	57 UJ
Toluene	7.6 U	2.8 U	2.3 U	2.9 U
Trans-1,2-Dichloroethene	7.6 U	2.8 U	2.3 U	2.9 U
trans-1,3-Dichloropropene	7.6 U	2.8 U	2.3 U	2.9 U
Trichloroethylene	7.6 U	2.8 U	2.3 U	2.9 U
Trichlorofluoromethane	15 U	5.6 U	4.6 U	5.7 U
Vinyl chloride	7.6 U	4.7	9.3	2.9 U
Xylene (total)	16	2.8 U	2.3 U	2.9 U
Sum of Constituents	**184**	**33.5**	**28.5**	**9.2**

	NE3	NE3	NE3	NE4	NE4	NE4
	7-7.5	12-12.5	26-26.5	11-12	18-18.5	30-31
	10/6/2008	10/6/2008	######	10/3/2008	10/3/2008	######
CONSTITUENTS						
1,1,1-Trichloroethane	79 U	140 U	44 U	51 U	66 U	53 U
1,1,2,2-Tetrachloroethane	79 U	140 U	44 U	51 U	66 U	53 U
1,1,2-Trichloroethane	79 U	140 U	44 U	51 U	66 U	53 U
1,1-Dichloroethane	79 U	140 U	44 U	51 U	**82 J**	53 U
1,1-Dichloroethylene	79 U	140 U	44 U	51 U	66 U	53 U
1,2,4-Trichlorobenzene	79 U	140 U	44 U	51 U	66 U	53 U
1,2-Dichlorobenzene	79 U	140 U	44 U	51 U	66 U	53 U
1,2-Dichloroethane	79 U	140 U	44 U	51 U	66 U	53 U
1,2-Dichloropropane	79 U	140 U	44 U	51 U	66 U	53 U
1,3-Dichlorobenzene	79 U	140 U	44 U	51 U	66 U	53 U
1,4-Dichlorobenzene	79 U	140 U	44 U	51 U	66 U	53 U
2-Hexanone	240 U	420 U	130 U	150 U	200 U	160 U
Acetone	560 U	980 U	310 U	360 U	460 U	370 U
Benzene	40 U	70 U	22 U	25 U	33 U	27 U
Bromochloromethane	79 U	140 U	44 U	51 U	66 U	53 U
Bromodichloromethane	79 U	140 U	44 U	51 U	66 U	53 U
Bromoform	79 U	140 U	44 U	51 U	66 U	53 U
Carbon disulfide	79 U	140 U	44 U	**120 J**	66 U	53 U
Carbon tetrachloride	79 U	140 U	44 U	51 U	66 U	53 U
Chlorobenzene	79 U	140 U	44 U	51 U	66 U	53 U
Chloroethane	160 U	280 U	88 U	100 U	130 U	110 U
Chloroform	79 U	140 U	44 U	51 U	66 U	53 U
cis-1,2-Dichloroethylene	79 U	140 U	44 U	**120 J**	**120 J**	53 U
cis-1,3-Dichloropropene	79 U	140 U	44 U	51 U	66 U	53 U
DBCP	160 U	280 U	88 U	100 U	130 U	110 U
Dibromochloromethane	79 U	140 U	44 U	51 U	66 U	53 U
Dichlorodifluoromethane	160 U	280 U	88 U	100 U	130 U	110 U
Diethyl ether	79 U	140 U	44 U	51 U	66 U	53 U
EDB	79 U	140 U	44 U	51 U	66 U	53 U
Ethylbenzene	**250 J**	140 U	44 U	51 U	66 U	53 U
Isopropylbenzene	79 U	140 U	44 U	51 U	66 U	53 U
Methyl bromide	160 U	280 U	88 U	100 U	130 U	110 U
Methyl chloride	160 U	280 U	88 U	100 U	130 U	110 U
Methyl ethyl ketone (MEK)	320 U	560 U	180 U	200 U	260 U	210 U
Methyl isobutyl ketone	240 U	420 U	130 U	150 U	200 U	160 U
Methylene chloride	160 U	280 U	88 U	100 U	130 U	110 U
Styrene	79 U	140 U	44 U	51 U	66 U	53 U
Tetrachloroethylene	79 U	140 U	44 U	51 U	**1600**	53 U
Tetrahydrofuran	320 U	560 U	180 U	200 U	260 U	210 U
Toluene	**160 J**	140 U	44 U	51 U	66 U	53 U
Trans-1,2-Dichloroethene	79 U	140 U	44 U	51 U	66 U	53 U
trans-1,3-Dichloropropene	79 U	140 U	44 U	51 U	66 U	53 U
Trichloroethylene	**90 J**	140 U	44 U	**87 J**	**240 J**	53 U
Trichlorofluoromethane	160 U	280 U	88 U	100 U	130 U	110 U
Vinyl chloride	79 U	140 U	44 U	51 U	66 U	53 U
Xylene (total)	**510**	140 U	44 U	51 U	66 U	53 U
Sum of Constituents	**1010**	**0**	**0**	**327**	**2042**	**0**
	OP	**OP**				

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	(ft^3)x(kg/1x10^9)	(lbs)
	Organic Peat												
	PC-27/NE3	OP	6.25	5.5	7	OP	6,458	1.5	597	68%	191	2.50E-08	0.05
	Estimated Total VOC Mass for Strata:												**0.05**
	Sand / Sand and Gravel												
	PC-27/NE4	SSG	10.75	7	15.25	SSG	6,458	8.3	180	23%	139	1.18E-07	0.87
	PC-27/NE4	SSG	19.75	15.25	27.75	SSG	6,458	12.5	1,035	14%	890	1.18E-07	8.48
	PC-27	SSG	35.75	27.75	36.5	SSG	6,458	8.8	9	12%	8	1.18E-07	0.05
	Estimated Total VOC Mass for Strata:												**9.41**
	Estimated Total VOC Mass for PC-27 Area:												**9.45**
COC Specific Calculations by Strata													
Trichloroethylene	NE3	OP	6.25	5.5	7	OP	6458	1.5	90	68%	29	2.50E-08	0.01
1,1-Dichloroethane	PC-27	SSG	10.75	7	15.25	SSG	6,458	8.3	2.8	13%	2	1.18E-07	0.02
cis-1,2-Dichloroethylene	PC-27/NE4	SSG	10.75	7	15.25	SSG	6,458	8.3	70	13%	61	1.18E-07	0.38
Trichloroethylene	NE4	SSG	10.75	7	15.25	SSG	6,458	8.3	53.5	13%	47	1.18E-07	0.29
Vinyl chloride	PC-27	SSG	10.75	7	15.25	SSG	6,458	8.3	4.7	13%	4	1.18E-07	0.03
1,1,1-Trichloroethane	PC-27	SSG	19.75	15.25	27.75	SSG	6,458	12.5	3.1	13%	3	1.18E-07	0.03
1,1-Dichloroethane	PC-27/NE4	SSG	19.75	15.25	27.75	SSG	6,458	12.5	41.95	13%	36	1.18E-07	0.35
cis-1,2-Dichloroethylene	PC-27/NE4	SSG	19.75	15.25	27.75	SSG	6,458	12.5	63.25	13%	55	1.18E-07	0.52
Tetrachloroethylene	NE-4	SSG		15.25	27.75	SSG	6,458	12.5	1600	13%	1,392	1.18E-07	13.26
Trichloroethylene	NE4	SSG		15.25	27.75	SSG	6,458	12.5	240	13%	209	1.18E-07	1.99
Vinyl chloride	PC-27	SSG	19.75	15.25	27.75	SSG	6,458	12.5	9.3	13%	8	1.18E-07	0.08
Estimated Total Target COC Mass for PC-27 Area:													**16.95**

Target Mass per COC (lbs)		OP	SSG
Trichloroethylene	2.29	0.01	2.28
Tetrachloroethylene	13.26		13.26
1,1,1-Trichloroethane	0.03	-	0.03
1,1-Dichloroethane	0.36	-	0.36
cis-1,2-Dichloroethylene	0.91	-	0.91
Vinyl chloride	0.10	-	0.10
	16.95		16.94

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

	PC-28	PC-28	PC-28	PC-28	PC-28	PC-28
	SB-FS-PC-28-4.5-	SB-FS-PC-28-6.5-	SB-FS-PC-28-9.0-	SB-FS-PC-28-12.5-	SB-FS-PC-28-19.0-	SB-FS-PC-28-30.5-
	4.75	6.75	9.25	12.75	19.25	30.75
	5/30/2012	5/30/2012	5/30/2012	6/7/2012	5/30/2012	5/30/2012
	Peat	Silt	Sand & Silt	Sand	Sand	Sand & Gravel
	35	65	35	5	0	0
	15	5	5	0.1	0.1	0.1
	46	16	11		18	19
CONSTITUENTS						
1,1,1-Trichloroethane	330 U	160 U	1.9 U	8.4	16	7
1,1,2,2-Tetrachloroethane	330 U	160 U	1.9 UJ	2.8 U	2.8 UJ	3 UJ
1,1,2-Trichloroethane	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
1,1-Dichloroethane	330 U	160 U	1.9 U	11	11	6.3
1,1-Dichloroethylene	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
1,2,3-Trichlorobenzene	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
1,2,4-Trichlorobenzene	170 J	160 U	1.9 U	2.8 U	2.8 U	3 U
1,2-Dichlorobenzene	3200	88 J	1.9 U	1.2 J	1.6 J	3 U
1,2-Dichloroethane	330 U	160 U	1.9 UJ	2.8 U	2.8 UJ	3 UJ
1,2-Dichloropropane	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
1,3-Dichlorobenzene	130 J	160 U	1.9 U	2.8 U	2.8 U	3 U
1,4-Dichlorobenzene	1000	160 U	1.9 U	2.8 U	2.8 U	3 U
2-Hexanone	3300 U	1600 U	19 U	28 U	28 U	30 U
Acetone	33000 UJ	16000 UJ	190 UJ	280 U	280 UJ	300 UJ
Benzene	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Bromochloromethane	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Bromodichloromethane	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Bromoform	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Carbon Disulfide	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Carbon Tetrachloride	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Chlorobenzene	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Chloroethane	660 UJ	310 UJ	3.8 UJ	2.5 J	2.7 J	6 UJ
Chloroform	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
cis-1,2-Dichloroethylene	330 U	160 U	1.7 J	99	150	72
cis-1,3-Dichloropropene	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Cyclohexane	280 J	1600 U	19 U	28 U	28 U	30 U
DBCP	3300 U	1600 U	19 UJ	28 U	28 UJ	30 UJ
Dibromochloromethane	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Dichlorodifluoromethane	660 U	310 U	3.8 U	5.7 U	5.5 U	6 U
Diethyl ether	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Ethylene dibromide (EDB)	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Ethylbenzene	14000	160 U	1.9 U	2.8 U	2.8 U	3 U
Freon 113	1600 U	780 U	9.5 U	14 U	14 U	15 U
Isopropylbenzene	390	160 U	1.9 U	2.8 U	2.8 U	3 U
Methyl Acetate	6600 U	3100 U	38 UJ	57 U	55 UJ	60 UJ
Methyl bromide	660 U	310 U	3.8 U	5.7 U	5.5 U	6 U
Methyl chloride	660 U	310 U	3.8 U	5.7 U	5.5 U	6 U
Methyl ethyl ketone (MEK)	3300 UJ	1600 UJ	19 UJ	28 U	28 UJ	30 UJ
Methyl isobutyl ketone	3300 U	1600 U	19 U	28 U	28 U	30 U
Methyl tert Butyl Ether (MTBE)	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Methylcyclohexane	1800	160 U	1.9 U	2.8 U	2.8 U	3 U
Methylene chloride	1300 U	630 U	7.6 U	11 U	11 U	12 U
m-Xylene & p-Xylene	49000	2700	3.8 U	5.7 U	5.5 U	6 U
o-Xylene	18000	640	1.9 U	2.8 U	2.8 U	3 U
Styrene	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Tetrachloroethylene	330 U	160 U	1.9 U	4.2	2.8 U	3 U
Tetrahydrofuran	6600 U	3100 U	38 U	57 UJ	55 U	60 U
Toluene	1500	160 U	1.9 U	2.8 U	2.8 U	3 U
Trans-1,2-Dichloroethene	330 U	160 U	1.9 U	2.8 U	3.5	1.7 J
trans-1,3-Dichloropropene	330 U	160 U	1.9 U	2.8 U	2.8 U	3 U
Trichloroethylene	330 U	160 U	1.9 U	2.5 J	2.8 U	3 U
Trichlorofluoromethane	660 U*	310 U	3.8 U	5.7 U	5.5 U	6 U
Vinyl chloride	330 U	160 U	1.9 UJ	33	31 J	16 J
Xylene (total)	67000	3300	1.9 U	2.8 U	2.8 U	3 U
Sum of Constituents	**89470**	**3428**	**1.7**	**161.8**	**215.8**	**103**

	NE1	NE1	NE2	NE2	NE2
	20-21	24-25	5-6	10-11	28-28.5
	10/6/2008	10/6/2008	10/6/2008	10/6/2008	10/6/2008
CONSTITUENTS					
1,1,1-Trichloroethane	58 U	48 U	340 U	91 U	63 U
1,1,2,2-Tetrachloroethane	58 U	48 U	340 U	91 U	63 U
1,1,2-Trichloroethane	58 U	48 U	340 U	91 U	63 U
1,1-Dichloroethane	58 U	48 U	340 U	91 U	63 U
1,1-Dichloroethylene	58 U	48 U	340 U	91 U	63 U
1,2,4-Trichlorobenzene	58 U	48 U	340 U	91 U	63 U
1,2-Dichlorobenzene	58 U	48 U	340 U	91 U	63 U
1,2-Dichloroethane	58 U	48 U	340 U	91 U	63 U
1,2-Dichloropropane	58 U	48 U	340 U	91 U	63 U
1,3-Dichlorobenzene	58 U	48 U	340 U	91 U	63 U
1,4-Dichlorobenzene	58 U	48 U	340 U	91 U	63 U
2-Hexanone	170 U	140 U	1000 U	270 U	190 U
Acetone	410 U	330 U	2400 U	630 U	440 U
Benzene	29 U	24 U	170 U	45 U	32 U
Bromochloromethane	58 U	48 U	340 U	91 U	63 U
Bromodichloromethane	58 U	48 U	340 U	91 U	63 U
Bromoform	58 U	48 U	340 U	91 U	63 U
Carbon disulfide	58 U	48 U	340 U	91 U	63 U
Carbon tetrachloride	58 U	48 U	340 U	91 U	63 U
Chlorobenzene	58 U	48 U	340 U	91 U	63 U
Chloroethane	120 U	96 U	690 U	180 U	130 U
Chloroform	58 U	48 U	340 U	91 U	63 U
cis-1,2-Dichloroethylene	**120 J**	**180 J**	340 U	91 U	63 U
cis-1,3-Dichloropropene	58 U	48 U	340 U	91 U	63 U
DBCP	120 U	96 U	690 U	180 U	130 U
Dibromochloromethane	58 U	48 U	340 U	91 U	63 U
Dichlorodifluoromethane	120 U	96 U	690 U	180 U	130 U
Diethyl ether	58 U	48 U	340 U	91 U	63 U
EDB	58 U	48 U	340 U	91 U	63 U
Ethylbenzene	58 U	48 U	**2100**	**590**	63 U
Isopropylbenzene	58 U	48 U	340 U	91 U	63 U
Methyl bromide	120 U	96 U	690 U	180 U	130 U
Methyl chloride	120 U	96 U	690 U	180 U	130 U
Methyl ethyl ketone (MEK)	230 U	190 U	1400 U	360 U	250 U
Methyl isobutyl ketone	170 U	140 U	1000 U	270 U	190 U
Methylene chloride	120 U	96 U	690 U	180 U	130 U
Styrene	58 U	48 U	340 U	91 U	63 U
Tetrachloroethylene	58 U	48 U	340 U	91 U	63 U
Tetrahydrofuran	230 U	190 U	1400 U	360 U	250 U
Toluene	58 U	48 U	340 U	91 U	63 U
Trans-1,2-Dichloroethene	58 U	48 U	340 U	91 U	63 U
trans-1,3-Dichloropropene	58 U	48 U	340 U	91 U	63 U
Trichloroethylene	58 U	48 U	340 U	91 U	63 U
Trichlorofluoromethane	120 U	96 U	690 U	180 U	130 U
Vinyl chloride	58 U	**55 J**	340 U	91 U	63 U
Xylene (total)	58 U	48 U	**1100 J**	**320 J**	63 U
Sum of Constituents	**120**	**235**	**3200**	**910**	**0**
			OP	OP	

Compound	Boring	Strata	Sample Depth (ft)	Strat Top	Strat Bottom	Strata	Cell Area	Thickness of Mass Unit	Total VOC Concentration (dry weight)	Moisture Content Results of Samples	Total VOC Concentration (wet weight)	Bulk Density/1e9	Mass of Total VOC
							(ft^2)	(ft)	(ug/kg)	(%)	(ug/kg)	ft^3x(kg/1x10^9)	(lbs)
						Organic Peat							
	PC-28/NE2	OP	4.75	4.5	5.5	OP	7,752	1.0	31,193	44%	17,468	2.50E-08	3.39
												Estimated Total VOC Mass for Strata:	**3.39**
						Grey Silty Sand / Silt							
	PC-28	GSSS	6.75	5.5	8	GSSS	7,752	2.5	3,388	20%	2,710	1.07E-07	5.62
	PC-28	GSSS	9.25	8	10	GSSS	7,752	2.0	2	20%	1	1.07E-07	0.00
												Estimated Total VOC Mass for Strata:	**5.62**
						Sand / Sand and Gravel							
	PC-28	SSG	12.75	10	16	SSG	7,752	6.0	162	13%	141	1.18E-07	0.77
	PC-28/NE1	SSG	19.25	16	25	SSG	7,752	9.0	190	13%	166	1.18E-07	1.36
	PC-28	SSG	30.75	25	34	SSG	7,752	9.0	103	13%	90	1.18E-07	0.74
												Estimated Total VOC Mass for Strata:	**2.87**
												Estimated Total VOC Mass for PC-28 Area:	**11.88**
						COC Specific Calculations by Strata							
cis-1,2-Dichloroethylene	PC-28	GSSS	6.75	5.5	8	GSSS	7,752	2.5	2	20%	1	1.07E-07	0.00
1,1,1-Trichloroethane	PC-28	SSG	12.75	10	16	SSG	7,752	6.0	8	13%	7	1.18E-07	0.04
1,1-Dichloroethane	PC-28	SSG	12.75	10	16	SSG	7,752	6.0	11	13%	10	1.18E-07	0.05
Chloroethane	PC-28	SSG	12.75	10	16	SSG	7,752	6.0	3	13%	2	1.18E-07	0.01
cis-1,2-Dichloroethylene	PC-28	SSG	12.75	10	16	SSG	7,752	6.0	99	13%	86	1.18E-07	0.47
Tetrachloroethylene	PC-28	SSG	12.75	10	16	SSG	7,752	6.0	4	13%	4	1.18E-07	0.02
Trichloroethylene	PC-28	SSG	12.75	10	16	SSG	7,752	6.0	3	13%	2	1.18E-07	0.01
Vinyl chloride	PC-28	SSG	12.75	10	16	SSG	7,752	6.0	33	13%	29	1.18E-07	0.16
1,1,1-Trichloroethane	PC-28	SSG	19.25	16	25	SSG	7,752	9.0	16	13%	14	1.18E-07	0.11
1,1-Dichloroethane	PC-28	SSG	19.25	16	25	SSG	7,752	9.0	11	13%	10	1.18E-07	0.08
Chloroethane	PC-28	SSG	19.25	16	25	SSG	7,752	9.0	2.7	13%	2	1.18E-07	0.02
cis-1,2-Dichloroethylene	PC-28/NE1	SSG	19.25	16	25	SSG	7,752	9.0	150	13%	131	1.18E-07	1.07
Trans-1,2-Dichloroethene	PC-28	SSG	19.25	16	25	SSG	7,752	9.0	3.5	13%	3	1.18E-07	0.03
Vinyl chloride	PC-28/NE1	SSG	19.25	16	25	SSG	7,752	9.0	43	13%	37	1.18E-07	0.31
1,1,1-Trichloroethane	PC-28	SSG	30.75	25	34	SSG	7,752	9.0	7	13%	6	1.18E-07	0.05
1,1-Dichloroethane	PC-28	SSG	30.75	25	34	SSG	7,752	9.0	6.3	13%	5	1.18E-07	0.05
cis-1,2-Dichloroethylene	PC-28	SSG	30.75	25	34	SSG	7,752	9.0	72	13%	63	1.18E-07	0.52
Trans-1,2-Dichloroethene	PC-28	SSG	30.75	25	34	SSG	7,752	9.0	1.7	13%	1	1.18E-07	0.01
Vinyl chloride	PC-28	SSG	30.75	25	34	SSG	7,752	9.0	16	13%	14	1.18E-07	0.11
												Estimated Total Target COC Mass for PC-28 Area:	**3.13**

	Target Mass per COC (lbs)	OP	GSSS	SSG
1,1,1-Trichloroethane	0.20	-	-	0.20
1,1-Dichloroethane	0.18	-	-	0.18
Chloroethane	0.03	-	-	0.03
cis-1,2-Dichloroethylene	2.07	-	0.00	2.06
Tetrachloroethylene	0.02	-	-	0.02
Trans-1,2-Dichloroethene	0.04	-	-	0.04
Trichloroethylene	0.01	-	-	0.01
Vinyl chloride	0.58	-	-	0.58

3.13

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
ppm = parts per million
ug/kg = micrograms per kilogram
ft = feet
lbs = pounds

Appendix K

Phase 4 Analytical Results and Soil Boring Logs (Provided on CD)

TABLE 5-2
SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS - SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location				**NE1**	**NE1**	**NE2**	**NE2**	**NE2**	**NE3**	**NE3**	**NE3**
Sample Depth (feet)				**20-21**	**24-25**	**5-6**	**10-11**	**28-28.5**	**7-7.5**	**12-12.5**	**26-26.5**
Sample Date				**10/6/2008**	**10/6/2008**	**10/6/2008**	**10/6/2008**	**10/6/2008**	**10/6/2008**	**10/6/2008**	**10/6/2008**
CONSTITUENTS	**P/F**	**RI GAL**	**Units**								
1,1-Dichloroethane	Total		(ug/kg)	58 U	48 U	340 U	91 U	63 U	79 U	140 U	44 U
1,2,4-Trichlorobenzene	Total	140000	(ug/kg)	58 U	48 U	340 U	91 U	63 U	79 U	140 U	44 U
1,2-Dichlorobenzene	Total	41000	(ug/kg)	58 U	48 U	340 U	91 U	63 U	79 U	140 U	44 U
1,4-Dichlorobenzene	Total	41000	(ug/kg)	58 U	48 U	340 U	91 U	63 U	79 U	140 U	44 U
Acetone	Total		(ug/kg)	410 U	330 U	2400 U	630 U	440 U	560 U	980 U	310 U
Carbon disulfide	Total		(ug/kg)	58 U	48 U	340 U	91 U	63 U	79 U	140 U	44 U
Chlorobenzene	Total	3200	(ug/kg)	58 U	48 U	340 U	91 U	63 U	79 U	140 U	44 U
cis-1,2-Dichloroethylene	Total	1700	(ug/kg)	**120 J**	**180 J**	340 U	91 U	63 U	79 U	140 U	44 U
Ethylbenzene	Total	27000	(ug/kg)	58 U	48 U	**2100**	**590**	63 U	**250 J**	140 U	44 U
Isopropylbenzene	Total		(ug/kg)	58 U	48 U	340 U	91 U	63 U	79 U	140 U	44 U
Tetrachloroethylene	Total	100	(ug/kg)	58 U	48 U	340 U	91 U	63 U	79 U	140 U	44 U
Toluene	Total	32000	(ug/kg)	58 U	48 U	340 U	91 U	63 U	**160 J**	140 U	44 U
Trichloroethylene	Total	200	(ug/kg)	58 U	48 U	340 U	91 U	63 U	**90 J**	140 U	44 U
Vinyl chloride	Total	300	(ug/kg)	58 U	**55 J**	340 U	91 U	63 U	79 U	140 U	44 U
Xylene (total)	Total	540000	(ug/kg)	58 U	48 U	**1100 J**	**320 J**	63 U	**510**	140 U	44 U
Sum of Constituents	**P/F**		**(ug/kg)**	**120**	**235**	**3200**	**910**	**0**	**1010**	**0**	**0**

Field Headspace	ppm	**70.6**	**62.9**	**1002.0**	**429.5**	**11.4**	**1198.0**	**195.5**	**43.4**

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
RI GAL = Rhode Island Method 1 GA Leachability Criteria
ppm = parts per million
ug/kg = micrograms per kilogram
-- = No reading taken
Field Headspace readings collected with a Photovace Micro Flame Ionization
Detector calibrated to 100 ppm Methane
Detections are in **Bold**
Exceedance of the RI GAL are shaded

TABLE 5-2
SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS - SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location				**NE4**	**NE4**	**NE4**	**NE4**	**NE5**	**NE5**	**NE5**
Sample Depth (feet)				**4.5-5**	**11-12**	**18-18.5**	**30-31**	**11.5-12**	**19.5-20**	**28.5-29**
Sample Date				**10/3/2008**	**10/3/2008**	**10/3/2008**	**10/3/2008**	**9/30/2008**	**9/30/2008**	**9/30/2008**
CONSTITUENTS	**P/F**	**RI GAL**	**Units**							
1,1-Dichloroethane	Total		(ug/kg)	55 U	51 U	**82 J**	53 U	**660 J**	57 U	63 U
1,2,4-Trichlorobenzene	Total	140000	(ug/kg)	55 U	51 U	66 U	53 U	150 U	57 U	63 U
1,2-Dichlorobenzene	Total	41000	(ug/kg)	55 U	51 U	66 U	53 U	150 U	57 U	63 U
1,4-Dichlorobenzene	Total	41000	(ug/kg)	55 U	51 U	66 U	53 U	150 U	57 U	63 U
Acetone	Total		(ug/kg)	380 U	360 U	460 U	370 U	**1000 J**	400 U	440 U
Carbon disulfide	Total		(ug/kg)	55 U	**120 J**	66 U	53 U	150 U	57 U	63 U
Chlorobenzene	Total	3200	(ug/kg)	55 U	51 U	66 U	53 U	150 U	57 U	63 U
cis-1,2-Dichloroethylene	Total	1700	(ug/kg)	55 U	**120 J**	**120 J**	53 U	**190 J**	57 U	63 U
Ethylbenzene	Total	27000	(ug/kg)	55 U	51 U	66 U	53 U	150 U	57 U	63 U
Isopropylbenzene	Total		(ug/kg)	55 U	51 U	66 U	53 U	150 U	57 U	63 U
Tetrachloroethylene	Total	100	(ug/kg)	55 U	51 U	**1600**	53 U	150 U	57 U	63 U
Toluene	Total	32000	(ug/kg)	55 U	51 U	66 U	53 U	150 U	57 U	63 U
Trichloroethylene	Total	200	(ug/kg)	55 U	**87 J**	**240 J**	53 U	**190 J**	57 U	63 U
Vinyl chloride	Total	300	(ug/kg)	55 U	51 U	66 U	53 U	150 U	57 U	63 U
Xylene (total)	Total	540000	(ug/kg)	55 U	51 U	66 U	53 U	150 U	57 U	63 U
Sum of Constituents	**P/F**		**(ug/kg)**	**0**	**327**	**2042**	**0**	**2040**	**0**	**0**

Field Headspace	ppm	**759.0**	**607.2**	**148.0**	**24.7**	**1696.0**	**238.2**	**3.6**

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Field Headspace readings collected with a Photovace Micro Flame Ionization
Detector calibrated to 100 ppm Methane
Detections are in **Bold**
Exceedance of the RI GAL are shaded

TABLE 5-2
SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS - SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location				**NE6**	**NE6**	**NE6**	**NE6**	**NW1**	**NW1**	**NW2**	**NW2**
Sample Depth (feet)				**7-8**	**11.5-12.25**	**14-15**	**26-27**	**14-15**	**16-17**	**11-12**	**16-16.5**
Sample Date				**10/9/2008**	**10/9/2008**	**10/9/2008**	**10/9/2008**	**10/7/2008**	**10/7/2008**	**10/7/2008**	**10/7/2008**
CONSTITUENTS	**P/F**	**RI GAL**	**Units**								
1,1-Dichloroethane	Total		(ug/kg)	50 U	300 U	**74 J**	45 U	39 U	60 U	52 U	55 U
1,2,4-Trichlorobenzene	Total	140000	(ug/kg)	50 U	300 U	70 U	45 U	39 U	60 U	52 U	55 U
1,2-Dichlorobenzene	Total	41000	(ug/kg)	50 U	300 U	70 U	45 U	39 U	60 U	52 U	55 U
1,4-Dichlorobenzene	Total	41000	(ug/kg)	50 U	300 U	70 U	45 U	**77 J**	**70 J**	52 U	55 U
Acetone	Total		(ug/kg)	350 U	**2100 J**	490 U	320 U	270 U	420 U	360 U	380 U
Carbon disulfide	Total		(ug/kg)	50 U	300 U	70 U	45 U	39 U	60 U	52 U	55 U
Chlorobenzene	Total	3200	(ug/kg)	50 U	300 U	70 U	45 U	39 U	60 U	52 U	55 U
cis-1,2-Dichloroethylene	Total	1700	(ug/kg)	50 U	300 U	**200 J**	**47 J**	39 U	60 U	52 U	55 U
Ethylbenzene	Total	27000	(ug/kg)	50 U	300 U	**5100**	45 U	39 U	60 U	**75 J**	55 U
Isopropylbenzene	Total		(ug/kg)	50 U	**4300**	70 U	45 U	39 U	60 U	52 U	55 U
Tetrachloroethylene	Total	100	(ug/kg)	50 U	300 U	70 U	45 U	39 U	60 U	52 U	55 U
Toluene	Total	32000	(ug/kg)	50 U	300 U	**150 J**	45 U	39 U	60 U	52 U	55 U
Trichloroethylene	Total	200	(ug/kg)	50 U	300 U	70 U	45 U	39 U	60 U	52 U	55 U
Vinyl chloride	Total	300	(ug/kg)	50 U	300 U	70 U	45 U	39 U	60 U	52 U	55 U
Xylene (total)	Total	540000	(ug/kg)	50 U	**2800**	**17000**	45 U	**140 J**	60 U	52 U	55 U
Sum of Constituents	**P/F**		**(ug/kg)**	**0**	**9200**	**22524**	**47**	**217**	**70**	**75**	**0**

Field Headspace	ppm	**1427.0**	**2080.0**	**1075.0**	**8.8**	**53.3**	**24.7**	**3.3**	**7.0**

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ug/kg = micrograms per kilogram
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Field Headspace readings collected with a Photovace Micro Flame Ionization
Detector calibrated to 100 ppm Methane
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TABLE 5-2
SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS - SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location				**NW3**	**NW3**	**NW4**	**NW4**	**NW5**	**NW5**	**NW6**	**NW6**
Sample Depth (feet)				**10-11**	**20.5-21.5**	**14-15**	**22-22.5**	**13.13.5**	**19-19.5**	**14-15**	**18-18.5**
Sample Date				**10/7/2008**	**10/7/2008**	**10/7/2008**	**10/7/2008**	**10/8/2008**	**10/8/2008**	**10/8/2008**	**10/8/2008**
CONSTITUENTS	**P/F**	**RI GAL**	**Units**								
1,1-Dichloroethane	Total		(ug/kg)	50 U	45 U	47 U	44 U	49 U	57 U	50 U	57 U
1,2,4-Trichlorobenzene	Total	140000	(ug/kg)	**150 J**	45 U	47 U	44 U	49 U	57 U	50 U	57 U
1,2-Dichlorobenzene	Total	41000	(ug/kg)	50 U	45 U	**68 J**	44 U	49 U	57 U	50 U	57 U
1,4-Dichlorobenzene	Total	41000	(ug/kg)	50 U	45 U	**160 J**	44 U	**500**	57 U	50 U	57 U
Acetone	Total		(ug/kg)	350 U	320 U	330 U	310 U	340 U	400 U	350 U	400 U
Carbon disulfide	Total		(ug/kg)	50 U	45 U	47 U	44 U	49 U	57 U	50 U	57 U
Chlorobenzene	Total	3200	(ug/kg)	50 U	45 U	47 U	44 U	49 U	57 U	50 U	57 U
cis-1,2-Dichloroethylene	Total	1700	(ug/kg)	50 U	45 U	47 U	44 U	49 U	57 U	50 U	57 U
Ethylbenzene	Total	27000	(ug/kg)	**56 J**	45 U	**480**	44 U	49 U	57 U	50 U	57 U
Isopropylbenzene	Total		(ug/kg)	50 U	45 U	**90 J**	44 U	49 U	57 U	50 U	57 U
Tetrachloroethylene	Total	100	(ug/kg)	50 U	45 U	47 U	44 U	49 U	57 U	50 U	57 U
Toluene	Total	32000	(ug/kg)	50 U	45 U	47 U	44 U	49 U	57 U	50 U	57 U
Trichloroethylene	Total	200	(ug/kg)	50 U	45 U	47 U	44 U	49 U	57 U	50 U	57 U
Vinyl chloride	Total	300	(ug/kg)	50 U	45 U	47 U	44 U	49 U	57 U	50 U	57 U
Xylene (total)	Total	540000	(ug/kg)	50 U	45 U	**780**	44 U	**140 J**	57 U	50 U	57 U
Sum of Constituents	**P/F**		**(ug/kg)**	**206**	**0**	**1578**	**0**	**640**	**0**	**0**	**0**

Field Headspace	ppm	**106.6**	**7.5**	**203.6**	**10.5**	**73.4**	**--**	**48.0**	**10.8**

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ug/kg = micrograms per kilogram
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Field Headspace readings collected with a Photovace Micro Flame Ionization
Detector calibrated to 100 ppm Methane
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TABLE 5-2
SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS - SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location				**NW7**	**NW7**	**NW8**	**NW8**	**SE1**	**SE11**	**SE11**	**SE11**
Sample Depth (feet)				**15-16**	**20-20.5**	**5-6**	**24-25**	**25-25.5**	**12-13**	**15-16**	**20-21**
Sample Date				**10/8/2008**	**10/8/2008**	**10/8/2008**	**10/8/2008**	**9/29/2008**	**10/1/2008**	**10/1/2008**	**10/1/2008**
CONSTITUENTS	**P/F**	**RI GAL**	**Units**								
1,1-Dichloroethane	Total		(ug/kg)	66 U	52 U	58 U	65 U	56 U	61 U	48 U	46 U
1,2,4-Trichlorobenzene	Total	140000	(ug/kg)	66 U	52 U	58 U	65 U	56 U	61 U	48 U	46 U
1,2-Dichlorobenzene	Total	41000	(ug/kg)	66 U	52 U	58 U	65 U	56 U	61 U	48 U	46 U
1,4-Dichlorobenzene	Total	41000	(ug/kg)	66 U	52 U	58 U	65 U	56 U	61 U	48 U	46 U
Acetone	Total		(ug/kg)	460 U	360 U	410 U	450 U	390 U	430 U	340 U	320 U
Carbon disulfide	Total		(ug/kg)	66 U	52 U	58 U	65 U	56 U	61 U	48 U	46 U
Chlorobenzene	Total	3200	(ug/kg)	66 U	52 U	58 U	65 U	56 U	61 U	48 U	46 U
cis-1,2-Dichloroethylene	Total	1700	(ug/kg)	66 U	52 U	58 U	65 U	56 U	61 U	48 U	46 U
Ethylbenzene	Total	27000	(ug/kg)	66 U	52 U	58 U	65 U	56 U	61 U	48 U	46 U
Isopropylbenzene	Total		(ug/kg)	66 U	52 U	58 U	65 U	56 U	61 U	48 U	46 U
Tetrachloroethylene	Total	100	(ug/kg)	66 U	52 U	**170 J**	65 U	56 U	61 U	48 U	46 U
Toluene	Total	32000	(ug/kg)	66 U	52 U	58 U	65 U	56 U	61 U	48 U	46 U
Trichloroethylene	Total	200	(ug/kg)	66 U	52 U	58 U	65 U	56 U	61 U	48 U	46 U
Vinyl chloride	Total	300	(ug/kg)	66 U	52 U	58 U	65 U	56 U	61 U	48 U	46 U
Xylene (total)	Total	540000	(ug/kg)	66 U	52 U	58 U	65 U	**150 J**	61 U	48 U	46 U
Sum of Constituents	**P/F**		**(ug/kg)**	**0**	**0**	**170**	**0**	**150**	**0**	**0**	**0**

Field Headspace	ppm	**8.3**	**4.4**	**117.7**	**2.4**	**0.0**	**18.2**	**9.8**	**0.4**

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TABLE 5-2
SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS - SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location				**SE12**	**SE13**	**SE13**	**SE14**	**SE14**	**SE2**	**SE2**
Sample Depth (feet)				**12-13**	**9.5-10**	**18-18.5**	**10-11**	**19-20**	**15-15.5**	**21-21.5**
Sample Date				**10/1/2008**	**10/2/2008**	**10/2/2008**	**10/9/2008**	**10/9/2008**	**9/29/2008**	**9/29/2008**
CONSTITUENTS	**P/F**	**RI GAL**	**Units**							
1,1-Dichloroethane	Total		(ug/kg)	55 U	52 U	53 U	50 U	58 U	44 U	50 U
1,2,4-Trichlorobenzene	Total	140000	(ug/kg)	55 U	52 U	53 U	50 U	58 U	44 U	50 U
1,2-Dichlorobenzene	Total	41000	(ug/kg)	55 U	52 U	53 U	50 U	58 U	44 U	**74 J**
1,4-Dichlorobenzene	Total	41000	(ug/kg)	55 U	52 U	53 U	50 U	58 U	44 U	50 U
Acetone	Total		(ug/kg)	380 U	370 U	370 U	350 U	410 U	310 U	350 U
Carbon disulfide	Total		(ug/kg)	55 U	52 U	53 U	50 U	58 U	44 U	50 U
Chlorobenzene	Total	3200	(ug/kg)	55 U	52 U	53 U	50 U	58 U	44 U	50 U
cis-1,2-Dichloroethylene	Total	1700	(ug/kg)	55 U	52 U	53 U	50 U	58 U	44 U	**120 J**
Ethylbenzene	Total	27000	(ug/kg)	55 U	52 U	53 U	50 U	58 U	44 U	**98 J**
Isopropylbenzene	Total		(ug/kg)	55 U	52 U	53 U	50 U	58 U	44 U	**59 J**
Tetrachloroethylene	Total	100	(ug/kg)	55 U	52 U	**100 J**	50 U	58 U	**850**	**9500**
Toluene	Total	32000	(ug/kg)	55 U	52 U	53 U	50 U	58 U	44 U	50 U
Trichloroethylene	Total	200	(ug/kg)	55 U	52 U	53 U	50 U	58 U	44 U	**330**
Vinyl chloride	Total	300	(ug/kg)	55 U	52 U	53 U	50 U	58 U	44 U	50 U
Xylene (total)	Total	540000	(ug/kg)	55 U	52 U	53 U	50 U	58 U	44 U	**300**
Sum of Constituents	**P/F**		**(ug/kg)**	**0**	**0**	**100**	**0**	**0**	**850**	**10481**

Field Headspace	ppm	**2.3**	**2.7**	**2.5**	**58.2**	**1.6**	**490.0**	**68.4**

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Field Headspace readings collected with a Photovace Micro Flame Ionization
Detector calibrated to 100 ppm Methane
Detections are in **Bold**
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TABLE 5-2
SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS - SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location				**SE4**	**SE4**	**SE4**	**SE5**	**SE5**	**SE6**	**SE6**
Sample Depth (feet)				**14.5-15**	**16-16.5**	**27-27.5**	**16-16.5**	**20-20.5**	**14-15**	**29-29.5**
Sample Date				**9/29/2008**	**9/29/2008**	**9/29/2008**	**9/29/2008**	**9/29/2008**	**10/3/2008**	**10/3/2008**
CONSTITUENTS	**P/F**	**RI GAL**	**Units**							
1,1-Dichloroethane	Total		(ug/kg)	84 U	60 U	51 U	53 U	48 U	50 U	53 U
1,2,4-Trichlorobenzene	Total	140000	(ug/kg)	84 U	60 U	51 U	53 U	48 U	50 U	53 U
1,2-Dichlorobenzene	Total	41000	(ug/kg)	84 U	60 U	51 U	53 U	48 U	50 U	53 U
1,4-Dichlorobenzene	Total	41000	(ug/kg)	84 U	60 U	51 U	53 U	48 U	50 U	53 U
Acetone	Total		(ug/kg)	**610 J**	420 U	360 U	370 U	340 U	350 U	370 U
Carbon disulfide	Total		(ug/kg)	84 U	60 U	51 U	53 U	48 U	50 U	53 U
Chlorobenzene	Total	3200	(ug/kg)	84 U	60 U	51 U	53 U	48 U	50 U	53 U
cis-1,2-Dichloroethylene	Total	1700	(ug/kg)	84 U	60 U	51 U	53 U	48 U	50 U	53 U
Ethylbenzene	Total	27000	(ug/kg)	84 U	60 U	51 U	53 U	48 U	50 U	53 U
Isopropylbenzene	Total		(ug/kg)	84 U	60 U	51 U	53 U	48 U	50 U	53 U
Tetrachloroethylene	Total	100	(ug/kg)	84 U	60 U	51 U	53 U	48 U	50 U	53 U
Toluene	Total	32000	(ug/kg)	**240 J**	60 U	51 U	53 U	48 U	50 U	53 U
Trichloroethylene	Total	200	(ug/kg)	84 U	60 U	51 U	53 U	48 U	50 U	53 U
Vinyl chloride	Total	300	(ug/kg)	84 U	60 U	51 U	53 U	48 U	50 U	53 U
Xylene (total)	Total	540000	(ug/kg)	**150 J**	60 U	51 U	53 U	48 U	50 U	53 U
Sum of Constituents	**P/F**		**(ug/kg)**	**1000**	**0**	**0**	**0**	**0**	**0**	**0**

Field Headspace	ppm	**1567.0**	**434.7**	**0.0**	**0.0**	**0.0**	**497.7**	**0.3**

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TABLE 5-2
SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS - SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location				**SE7**	**SE7**	**SE7**	**SE8**	**SE8**	**SE8**	**SE8**
Sample Depth (feet)				**12-12.5**	**14.5-15**	**29.5-30**	**11-11.5**	**15-16**	**25-25.5**	**37.5-38**
Sample Date				**10/2/2008**	**10/2/2008**	**10/2/2008**	**10/2/2008**	**10/2/2008**	**10/2/2008**	**10/2/2008**
CONSTITUENTS	**P/F**	**RI GAL**	**Units**							
1,1-Dichloroethane	Total		(ug/kg)	**150 J**	53 U	49 U	55 U	50 U	44 U	53 U
1,2,4-Trichlorobenzene	Total	140000	(ug/kg)	60 U	53 U	49 U	55 U	50 U	44 U	53 U
1,2-Dichlorobenzene	Total	41000	(ug/kg)	60 U	53 U	49 U	55 U	50 U	44 U	53 U
1,4-Dichlorobenzene	Total	41000	(ug/kg)	60 U	53 U	49 U	55 U	50 U	44 U	53 U
Acetone	Total		(ug/kg)	420 U	370 U	340 U	380 U	350 U	310 U	370 U
Carbon disulfide	Total		(ug/kg)	60 U	53 U	49 U	55 U	50 U	44 U	53 U
Chlorobenzene	Total	3200	(ug/kg)	60 U	53 U	49 U	55 U	50 U	44 U	53 U
cis-1,2-Dichloroethylene	Total	1700	(ug/kg)	**270 J**	53 U	49 U	55 U	50 U	44 U	53 U
Ethylbenzene	Total	27000	(ug/kg)	60 U	53 U	49 U	55 U	50 U	44 U	53 U
Isopropylbenzene	Total		(ug/kg)	60 U	53 U	49 U	55 U	50 U	44 U	53 U
Tetrachloroethylene	Total	100	(ug/kg)	60 U	53 U	49 U	**67 J**	50 U	44 U	53 U
Toluene	Total	32000	(ug/kg)	60 U	53 U	49 U	55 U	50 U	44 U	53 U
Trichloroethylene	Total	200	(ug/kg)	60 U	53 U	49 U	**75 J**	50 U	44 U	53 U
Vinyl chloride	Total	300	(ug/kg)	**130 J**	53 U	49 U	55 U	50 U	44 U	53 U
Xylene (total)	Total	540000	(ug/kg)	60 U	53 U	49 U	55 U	50 U	44 U	53 U
Sum of Constituents	**P/F**		**(ug/kg)**	**550**	**0**	**0**	**142**	**0**	**0**	**0**

Field Headspace	ppm	**1635.0**	**111.3**	**0.0**	**35.3**	**165.4**	**1.5**	**1.1**

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Field Headspace readings collected with a Photovace Micro Flame Ionization
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Detections are in **Bold**
Exceedance of the RI GAL are shaded

TABLE 5-2
SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS - SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location				**SE9**	**SE9**	**SW1**	**SW11**	**SW2**	**SW2**	**SW3**	**SW3**
Sample Depth (feet)				**14-14.5**	**20-20.5**	**16-17**	**17-17.5**	**17-17.5**	**28-28.5**	**18-18.5**	**21-21.5**
Sample Date				**9/26/2008**	**9/26/2008**	**9/23/2008**	**9/25/2008**	**9/25/2008**	**9/25/2008**	**9/24/2008**	**9/24/2008**
CONSTITUENTS	**P/F**	**RI GAL**	**Units**								
1,1-Dichloroethane	Total		(ug/kg)	55 U	51 U	51 U	82 U	57 U	55 U	50 U	51 U
1,2,4-Trichlorobenzene	Total	140000	(ug/kg)	55 U	51 U	51 U	82 U	**86 J**	55 U	50 U	51 U
1,2-Dichlorobenzene	Total	41000	(ug/kg)	55 U	51 U	51 U	82 U	**5400**	55 U	50 U	51 U
1,4-Dichlorobenzene	Total	41000	(ug/kg)	55 U	51 U	51 U	82 U	**84 J**	55 U	50 U	51 U
Acetone	Total		(ug/kg)	390 U	360 U	360 U	570 U	400 U	380 U	350 U	360 U
Carbon disulfide	Total		(ug/kg)	55 U	51 U	51 U	82 U	57 U	55 U	50 U	51 U
Chlorobenzene	Total	3200	(ug/kg)	55 U	51 U	51 U	82 U	**60 J**	55 U	50 U	51 U
cis-1,2-Dichloroethylene	Total	1700	(ug/kg)	55 U	51 U	51 U	82 U	57 U	**190 J**	50 U	51 U
Ethylbenzene	Total	27000	(ug/kg)	55 U	51 U	51 U	82 U	57 U	55 U	50 U	51 U
Isopropylbenzene	Total		(ug/kg)	55 U	51 U	51 U	82 U	57 U	55 U	50 U	51 U
Tetrachloroethylene	Total	100	(ug/kg)	55 U	51 U	51 U	82 U	**80 J**	55 U	50 U	51 U
Toluene	Total	32000	(ug/kg)	55 U	51 U	51 U	82 U	57 U	55 U	50 U	51 U
Trichloroethylene	Total	200	(ug/kg)	55 U	51 U	51 U	82 U	57 U	55 U	50 U	51 U
Vinyl chloride	Total	300	(ug/kg)	55 U	51 U	51 U	82 U	57 U	55 U	50 U	51 U
Xylene (total)	Total	540000	(ug/kg)	55 U	51 U	51 U	82 U	57 U	55 U	50 U	51 U
Sum of Constituents	**P/F**		**(ug/kg)**	**0**	**0**	**0**	**0**	**5710**	**190**	**0**	**0**

Field Headspace	ppm	**0.0**	**--**	**4.5**	**250.0**	**26.7**	**0.0**	**0.0**	**0.0**

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
RI GAL = Rhode Island Method 1 GA Leachability Criteria
ppm = parts per million
ug/kg = micrograms per kilogram
-- = No reading taken
Field Headspace readings collected with a Photovace Micro Flame Ionization
Detector calibrated to 100 ppm Methane
Detections are in **Bold**
Exceedance of the RI GAL are shaded

TABLE 5-2
SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS - SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location				**SW4**	**SW4**	**SW5**	**SW5**	**SW5**	**SW6**	**SW6**	**SW7**
Sample Depth (feet)				**12-12.5**	**21-21.5**	**14.5-15**	**16.5-17**	**20.5-21**	**19.5-20**	**26.5-27**	**15-15.5**
Sample Date				**9/24/2008**	**9/24/2008**	**9/25/2008**	**9/25/2008**	**9/25/2008**	**9/30/2008**	**9/30/2008**	**9/30/2008**
CONSTITUENTS	**P/F**	**RI GAL**	**Units**								
1,1-Dichloroethane	Total		(ug/kg)	56 U	53 U	43 U	66 U	57 U	47 U	63 U	48 U
1,2,4-Trichlorobenzene	Total	140000	(ug/kg)	56 U	53 U	**930**	**87 J**	**240 J**	**110 J**	63 U	48 U
1,2-Dichlorobenzene	Total	41000	(ug/kg)	56 U	53 U	43 U	66 U	57 U	47 U	63 U	48 U
1,4-Dichlorobenzene	Total	41000	(ug/kg)	56 U	53 U	**44 J**	66 U	57 U	47 U	63 U	48 U
Acetone	Total		(ug/kg)	390 U	370 U	300 U	460 U	400 U	330 U	440 U	340 U
Carbon disulfide	Total		(ug/kg)	56 U	53 U	**110 J**	**130 J**	**250 J**	47 U	63 U	48 U
Chlorobenzene	Total	3200	(ug/kg)	56 U	53 U	43 U	66 U	57 U	47 U	63 U	48 U
cis-1,2-Dichloroethylene	Total	1700	(ug/kg)	56 U	53 U	**56 J**	**110 J**	57 U	47 U	63 U	48 U
Ethylbenzene	Total	27000	(ug/kg)	56 U	53 U	**2200**	**120 J**	**320**	**320**	63 U	48 U
Isopropylbenzene	Total		(ug/kg)	56 U	53 U	**360**	66 U	57 U	**63 J**	63 U	48 U
Tetrachloroethylene	Total	100	(ug/kg)	56 U	**53 J**	**52 J**	**84 J**	57 U	47 U	63 U	48 U
Toluene	Total	32000	(ug/kg)	56 U	53 U	43 U	66 U	57 U	47 U	63 U	48 U
Trichloroethylene	Total	200	(ug/kg)	56 U	53 U	43 U	66 U	57 U	47 U	63 U	48 U
Vinyl chloride	Total	300	(ug/kg)	56 U	53 U	43 U	66 U	57 U	47 U	63 U	48 U
Xylene (total)	Total	540000	(ug/kg)	56 U	53 U	**3400**	**260 J**	**570**	**620**	63 U	48 U
Sum of Constituents	**P/F**		**(ug/kg)**	**0**	**53**	**7152**	**791**	**1380**	**1113**	**0**	**0**

Field Headspace	ppm	**188.9**	**0.0**	**762.4**	**232.0**	**36.4**	**236.6**	**82.8**	**3.0**

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
RI GAL = Rhode Island Method 1 GA Leachability Criteria
ppm = parts per million
ug/kg = micrograms per kilogram
-- = No reading taken
Field Headspace readings collected with a Photovace Micro Flame Ionization
Detector calibrated to 100 ppm Methane
Detections are in **Bold**
Exceedance of the RI GAL are shaded

TABLE 5-2
SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS - SOIL
Davis Liquid Waste Superfund Site
Smithfield, Rhode Island

Boring Location				**SW8**		**SW8**		**SW9**	
Sample Depth (feet)				**11.5-12**		**16-16.5**		**17-17.5**	
Sample Date				**9/25/2008**		**9/25/2008**		**9/24/2008**	
CONSTITUENTS	**P/F**	**RI GAL**	**Units**						
1,1-Dichloroethane	Total		(ug/kg)	43	U	48	U	59	U
1,2,4-Trichlorobenzene	Total	140000	(ug/kg)	43	U	48	U	59	U
1,2-Dichlorobenzene	Total	41000	(ug/kg)	43	U	48	U	59	U
1,4-Dichlorobenzene	Total	41000	(ug/kg)	43	U	48	U	59	U
Acetone	Total		(ug/kg)	300	U	340	U	410	U
Carbon disulfide	Total		(ug/kg)	43	U	48	U	59	U
Chlorobenzene	Total	3200	(ug/kg)	43	U	48	U	59	U
cis-1,2-Dichloroethylene	Total	1700	(ug/kg)	43	U	48	U	59	U
Ethylbenzene	Total	27000	(ug/kg)	43	U	48	U	59	U
Isopropylbenzene	Total		(ug/kg)	43	U	48	U	59	U
Tetrachloroethylene	Total	100	(ug/kg)	**230**		**810**		59	U
Toluene	Total	32000	(ug/kg)	43	U	48	U	59	U
Trichloroethylene	Total	200	(ug/kg)	43	U	48	U	59	U
Vinyl chloride	Total	300	(ug/kg)	43	U	48	U	59	U
Xylene (total)	Total	540000	(ug/kg)	43	U	48	U	59	U
Sum of Constituents	**P/F**		**(ug/kg)**	**230**		**810**		**0**	

Field Headspace	ppm	**212.1**	**230.1**	**0.0**

Notes:
U = Compound was not detected at detection limit presented
J = Estimated Value
D = Compound was quantitated based on a diluted sample
RI GAL = Rhode Island Method 1 GA Leachability Criteria
ppm = parts per million
ug/kg = micrograms per kilogram
-- = No reading taken
Field Headspace readings collected with a Photovace Micro Flame Ionization
Detector calibrated to 100 ppm Methane
Detections are in **Bold**
Exceedance of the RI GAL are shaded

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

401 Wampanoag Trail
Suite 400
East Providence
Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 6, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: **NE-1**
Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 409.879

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.8/5.0			0.0	0	Moist, dark brown, loose, LOAM		0
							0.0		Dry, brown, loose, FINE AND MEDIUM SAND, some fine and coarse sub-round gravel		
							0.0		Dry, tan, loose, FINE SAND, some medium sand, trace coarse sand, little fine sub-round gravel, trace coarse, sub-round gravel		
							0.0				
							0.0				
5				2.7/5.0			0.4	-5	Dry, tan/gray, loose, FINE SAND, trace medium sand, trace coarse sand, little fine sub-angular gravel, trace coarse sub-round gravel		5
							0.2				
							1.5				
							0.0		Moist, brown/gray, FINE SAND, trace medium to coarse sand, little fine and coarse sub-round gravel, trace cobbles, iron stained upper 0.5'.		
							4.1				
10				3.4/5.0			3.8	-10	Wet, light brown, very loose, COARSE SAND, some fine and coarse sub-round gravel, trace cobbles, little fine sand and silt		10
							5.1				
							3.2				
							3.9		Wet, gray, loose, COARSE SAND, some fine and coarse sub-round gravel, trace cobbles, little sand and silt		
							4.5				

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 1345, ended at 1420
Samples SB-NE-1(20'-21'),SB-NE-1(24'-25')
Samples Collected for VOC's
Bedrock @26.0'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
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Consultants

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02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 6, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: **NE-1**
Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 409.879

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
15				1.6/5.0			10.2	-15	Wet, gray, very loose, MEDIUM AND COARSE SAND, trace fine sand and silt, trace fine and coarse sub-round gravel, some cobbles		15
							20.0				
							14.7				
20	SB-NE-1 (20'-21')			2.2/5.0			70.6	-20	Wet, dark gray, loose, FINE AND MEDIUM SAND, trace coarse sand, little fine sub-angular gravel		20
							40.2				
							19.9				
							64.1				
	SB-NE-1 (24'-25')						62.9		Wet, gray, loose, FINE SAND, trace medium sand. Refusal @ 25 feet.		
25								-25			25

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Started at 1345, ended at 1420
Samples SB-NE-1(20'-21'),SB-NE-1(24'-25')
Samples Collected for VOC's
Bedrock @26.0'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

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East Providence
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p 401.434.5560
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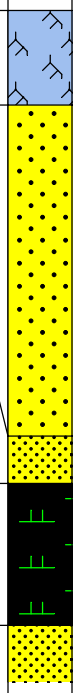
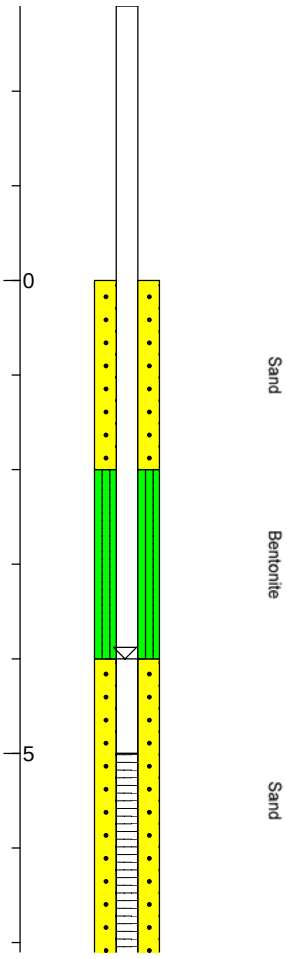
Site:	Davis Superfund Site	Boring/Well No:	**NE-2/OW-303**
Client Name:	Ashland	Depth to Water (ft):	~4.0
Date(s):	October 6, 2008	Well Diameter (inches):	2"
Drilling Company:	Boart Longyear	Well Screen Slot Size:	10
Drilling Method:	Rotasonic	Measuring Point:	PVC
Sampling Method:	Sonic Core	Measuring Point Elevation:	411.421
ESS Observer:	McLevy, Purdy	Ground Surface Elevation:	408.587

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
0				1.5/5.0			0.0	0	Wet, dark brown, LOAM
							0.0		Dry, tan, loose, FINE AND MEDIUM SAND, trace coarse sand, trace fine rounded gravel, trace cobbles
							19.3		Wet, brown, medium dense, FINE SAND, little silt, little clay, liitle fine and coarse sub-round gravel and organic material
5	SB-NE-2 (5'-6')			4.6/5.0			1002	-5	Wet, dark brown, medium dense, PEAT
							430.4		Moist, gray, dense, FINE SAND, some silt, trace organics

Graphical Log



Well Construction



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Started at 0945, ended at 1115
Samples SB-NE-2(5'-6'),SB-NE-2(10'-11'), SB-NE-2(28'-28.5')
Samples Collected for VOC's,SB-NE-2(5'-6') for TOC also
Bedrock @36.0'
Well installed with PVC, stickup with no protective casing. Concrete at ground surface.
Photovac Micro FID calibrated to 100ppm methane

BORING AND WELL CONSTRUCTION LOG

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02915

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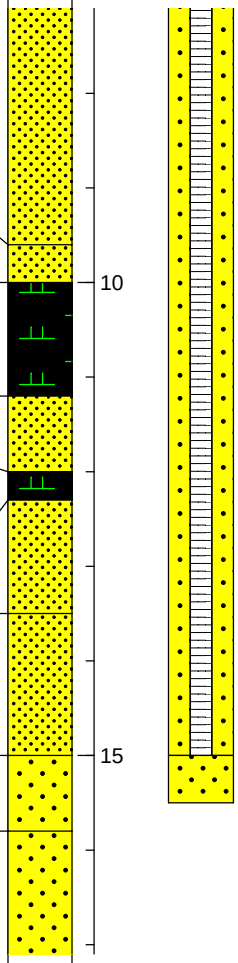
Site:	Davis Superfund Site	Boring/Well No:	**NE-2/OW-303**
Client Name:	Ashland	Depth to Water (ft):	~4.0
Date(s):	October 6, 2008	Well Diameter (inches):	2"
Drilling Company:	Boart Longyear	Well Screen Slot Size:	10
Drilling Method:	Rotasonic	Measuring Point:	PVC
Sampling Method:	Sonic Core	Measuring Point Elevation:	411.421
ESS Observer:	McLevy, Purdy	Ground Surface Elevation:	408.587

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
							624.0		
							529.4		
							188.0		Wet, tan, loose, FINE SAND, trace medium sand
10	SB-NE-2 (10'-11')			4.0/5.0			429.5	-10	Wet, dark brown, medium dense, PEAT
							253.0		Wet, olive gray, medium dense, FINE SAND AND SILT, trace clay, trace organics
							240.4		Wet, dark brown, medium dense, PEAT
							26.7		Wet, tan, medium dense, FINE SAND, some silt, trace organics
							30.4		Wet, light gray, loose, FINE SAND, some medium sand. Cobble @ bottom.
15				4.1/5.0			5.8	-15	Wet, tan, gray, very loose, COARSE SAND
							0.2		Wet, tan/gray, very loose, COARSE SAND, trace fine sand, some fine and coarse rounded gravel, iron staining from 18'-18.5'.

Graphical Log

Well Construction



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Started at 0945, ended at 1115
Samples SB-NE-2(5'-6'),SB-NE-2(10'-11'), SB-NE-2(28'-28.5')
Samples Collected for VOC's,SB-NE-2(5'-6') for TOC also
Bedrock @36.0'
Well installed with PVC, stickup with no protective casing. Concrete at ground surface.
Photovac Micro FID calibrated to 100ppm methane

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
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Consultants

401 Wampanoag Trail
Suite 400
East Providence
Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 6, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: **NE-2/OW-303**
Depth to Water (ft): ~4.0
Well Diameter (inches): 2"
Well Screen Slot Size: 10
Measuring Point: PVC
Measuring Point Elevation: 411.421
Ground Surface Elevation: 408.587

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
							0.2				
							1.3				
							3.8		Wet, tan, loose, MEDIUM SAND, little fine sand, trace fine rounded gravel		
20				4.0/5.0			2.9	-20	Wet, tan, very loose, MEDIUM AND COARSE SAND, trace fine sand, trace fine rounded gravel		20
							2.2		Wet, tan, very loose, COARSE SAND, little fine and coarse rounded gravel		
							1.1		Wet, tan, very loose, MEDIUM SAND, little coarse sand, little fine and coarse rounded gravel, trace fine sand		
							23.7		Wet, tan, loose, FINE SAND, trace silt		
							0.0		Wet, tan, very loose, COARSE AND MEDIUM SAND, little fine and coarse rounded gravel		
25				4.5/5.0			10.1	-25	Wet, tan, loose, FINE SAND, little medium sand, trace fine rounded gravel		25
									Wet, tan, loose, MEDIUM SAND, little coarse sand, trace fine rounded gravel		
							2.0		Wet, tan, very loose, COARSE SAND, little medium sand, trace fine sand, trace fine rounded gravel		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 0945, ended at 1115
Samples SB-NE-2(5'-6'),SB-NE-2(10'-11'), SB-NE-2(28'-28.5')
Samples Collected for VOC's,SB-NE-2(5'-6') for TOC also
Bedrock @36.0'
Well installed with PVC, stickup with no protective casing. Concrete at ground surface.
Photovac Micro FID calibrated to 100ppm methane

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

401 Wampanoag Trail
Suite 400
East Providence
Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 6, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: **NE-2/OW-303**
Depth to Water (ft): ~4.0
Well Diameter (inches): 2"
Well Screen Slot Size: 10
Measuring Point: PVC
Measuring Point Elevation: 411.421
Ground Surface Elevation: 408.587

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
							6.4		Wet, tan, loose, COARSE SAND, trace fine sand, little coarse and fine gravel		
	SB-NE-2 (28'-28.5')						11.4		Wet, orange, loose, FINE SAND		
							0.6		Wet, tan, loose, MEDIUM SAND, trace coarse sand, some cobbles		
30				4.7/6.0			0.0	-30	Wet, brown, very dense, FINE AND MEDIUM SAND, trace fine rounded gravel		30
							1.6				
							0.0		Wet, dark gray, very dense, SILT AND FINE SAND, trace fine gravel and cobbles, (TILL)		
							0.0		Refusal @ 36 feet		
							0.0				
35							0.0	-35			35

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Started at 0945, ended at 1115
Samples SB-NE-2(5'-6'),SB-NE-2(10'-11'), SB-NE-2(28'-28.5')
Samples Collected for VOC's,SB-NE-2(5'-6') for TOC also
Bedrock @36.0'
Well installed with PVC, stickup with no protective casing. Concrete at ground surface.
Photovac Micro FID calibrated to 100ppm methane

BORING AND WELL CONSTRUCTION LOG

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02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 6, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: NE-3

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 411.511

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.3/5.0			0.0	0	Wet, dark brown, medium dense, LOAM		0
							0.0		Dry, brown, loose, MEDIUM SAND, trace fine sand, trace coarse sand, little fine rounded and sub-angular gravel		
							0.0				
							0.3				
							0.5		Dry, dark brown, loose, LOAM, little fine and coarse sub-angular gravel		
5				3.5/5.0			65.4	-5	Dry, tan, loose, FINE AND MEDIUM SAND, little coarse sand, little fine sub-round gravel, trace cobble		5
							46.1		Wet, tan, loose, FINE AND MEDIUM SAND, little coarse sand, little fine sub-round gravel. Cobble @ bottom.		
									Wet, dark brown dense, PEAT		
	SB-NE-3 (7'-7.5')						1198		Wet, light gray, dense, FINE SAND, some silt		
							416.0		Wet, gray, loose, FINE SAND, trace silt, trace medium sand		
							163.1		Wet, tan/gray, loose, FINE AND MEDIUM SAND, little coarse sand and cobble		
10								-10	Wet, gray, loose, FINE AND MEDIUM SAND,		10

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 0745, ended at 0900
Samples SB-NE-3(7'-7.5'),SB-NE-3(12'-12.5'),, SB-NE-3(26'-26.5')
Samples Collected for VOC's, SB-NE-3(7'-7.5') for TOC also
Bedrock @ 34.5'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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02915

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 6, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: NE-3

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 411.511

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10				3.5/5.0			48.0	-10	trace coarse sand, trace fine round gravel		10
									Wet, tan, loose, FINE AND MEDIUM SAND, trace silt, trace coarse sand, trace coarse gravel		
							65.3				
	SB-NE-3 (12'-12.5')						195.5		Wet, dark brown, medium dense, PEAT		
									Wet, gray, loose, FINE SAND, little silt, trace coarse sand, trace coarse sub-angular gravel		
							80.3				
									Moist, tan/gray, FINE AND MEDIUM SAND, little coarse sand, little fine rounded gravel, some cobbles		
							2.9				
15				1.6/5.0			24.1	-15	Wet, olive gray, loose, COARSE AND FINE SAND, little fine and coarse round gravel		15
							46.2				
							43.4				
									Wet, gray, loose, COARSE SAND, some fine round gravel, little silt, trace cobble		
							19.6				
							30.2				

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 0745, ended at 0900
Samples SB-NE-3(7'-7.5'),SB-NE-3(12'-12.5'),, SB-NE-3(26'-26.5')
Samples Collected for VOC's, SB-NE-3(7'-7.5') for TOC also
Bedrock @ 34.5'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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02915

p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 6, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: NE-3

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 411.511

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
20				3.1/5.0			40.8	-20	Wet, dark gray, loose, FINE SAND		20
									Wet, dark gray, loose, MEDIUM AND COARSE SAND, trace silt		
							27.7		Wet, dark gray, loose, COARSE SAND, liitle fine sand, some fine and coarse gravel, trace cobble		
							15.5				
							12.4		Wet, dark gray, loose, FINE AND MEDIUM SAND, liitle coarse sand, some coarse angular gravel, trace cobble		
							5.6				
25				3.8/5.0			23.0	-25	Wet, gray, loose, SILT		25
	SB-NE-3 (26'-26.5')						43.4		Wet,gray, loose, MEDIUM AND COARSE SAND, trace fine sand		
							10.4				
							29.5		Wet, gray, loose, COARSE SAND, liitle fine sand, some fine rounded gravel, trace cobble		
							5.0				
									Wet, gray, loose, COARSE SAND, liitle fine sand,		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 0745, ended at 0900
Samples SB-NE-3(7'-7.5'),SB-NE-3(12'-12.5'),, SB-NE-3(26'-26.5')
Samples Collected for VOC's, SB-NE-3(7'-7.5') for TOC also
Bedrock @ 34.5'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
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Rhode Island
02915

p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 6, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: **NE-3**
Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 411.511

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description Soils: moisture, density[1], color, size, major and minor constituents[2] Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing	Graphical Log	Well Construction
30				4.3/4.5			6.4	-30	some fine rounded gravel, trace cobble		30
									Wet, gray, very dense, FINE SAND, silt and cobbles (TILL)		
							16.1				
							13.8				
							9.9				
									Dry, FINE SAND AND COBBLES Refusal @ 34.5 feet		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 0745, ended at 0900
Samples SB-NE-3(7'-7.5'),SB-NE-3(12'-12.5'),, SB-NE-3(26'-26.5')
Samples Collected for VOC's, SB-NE-3(7'-7.5') for TOC also
Bedrock @ 34.5'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 3, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: NE-4

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 410.333

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.8/5.0			14.3	0	Wet, dark brown, medium dense, LOAM		0
							34.1		Dry, light brown, loose, MEDIUM SAND, little coarse sand, little fine and course sub-round gravel, trace cobbles		
							4.8		Dry, tan, loose, FINE TO MEDIUM SAND, trace coarse sand, little coarse sub-round gravel		
							159.2		Dry, brown, loose, FINE TO MEDIUM SAND AND FINE AND COARSE SUB-ROUND GRAVEL, trace coarse sand		
	SB-NE-4 (4.5'-5')						759.0		Moist, dark brown, medium dense, FINE SAND AND SILT, trace medium to coarse sand, some coarse sub-round gravel		
5				1.0/1.0			NA	-5	Boulder		5
				1.4/2.5					Boulder		
				0/2.5					No Recovery		
10								-10			10

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 1000, ended at 1215
Samples SB-NE-4(4.5'-5'),SB-NE-4(11'-12'),, SB-NE-4(18'-18.5'), SB-NE-4(30'-31')
Samples Collected for VOC's
Bedrock @ 42.5'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

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Suite 400
East Providence
Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 3, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: **NE-4**
Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 410.333

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10				5.4/5.0			522.0	-10	Wet, gray, dense, FINE SAND, trace silt		10
	SB-NE-4 (11'-12')						607.2				
							347.5				
							315.2				
							444.9		Wet, olive gray, medium dense, FINE SAND, little clay, trace medium sand and sticks		
15				3.7/5.0			113.9	-15	Wet, gray, medium dense, interbedded MEDIUM TO COARSE SAND AND FINE SAND, little silt		15
							116.5				
							104.2		Wet, olive gray, dense, FINE SAND, iron staining, trace silt		
	SB-NE-4 (18'-18.5')						148.0				
							62.8				

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Started at 1000, ended at 1215
Samples SB-NE-4(4.5'-5'),SB-NE-4(11'-12'),, SB-NE-4(18'-18.5'), SB-NE-4(30'-31')
Samples Collected for VOC's
Bedrock @ 42.5'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 3, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: **NE-4**
Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 410.333

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description: Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing	Graphical Log	Well Construction
20				3.3/5.0			21.6	-20	Wet, tan very loose, COARSE SAND		20
							10.0				
							5.9				
							25.7		Wet, tan, loose, FINE AND MEDIUM SAND, trace coarse sand, little coarse round gravel, little fine round gravel. Cobble @ bottom.		
							9.3				
25				4.0/5.0			8.7	-25	Wet, tan, very loose, COARSE SAND, trace fine sand		25
							1.0				
							1.3		Wet, tan, very loose, COARSE SAND, some fine sand, little fine sub-angular gravel		
							3.1				
							9.3		Wet, tan, very loose, MEDIUM AND COARSE SAND, trace coarse sub-round gravel, trace cobble.		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 1000, ended at 1215
Samples SB-NE-4(4.5'-5'),SB-NE-4(11'-12'),, SB-NE-4(18'-18.5'), SB-NE-4(30'-31')
Samples Collected for VOC's
Bedrock @ 42.5'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

401 Wampanoag Trail
Suite 400
East Providence
Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 3, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: NE-4

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 410.333

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
30	SB-NE-4 (30'-31')			4.8/5.0			24.7	-30	Wet, tan, very loose, MEDIUM TO COARSE SAND, trace fine sand and coarse round gravel		30
							6.0				
							1.9		Wet, gray/brown, dense, weathered rock		
							1.8				
							4.4				
35				3.5/7.5			2.0	-35	Wet, gray, loose, MEDIUM AND COARSE SAND, trace fine sand		35
							1.7				
							7.8				
							1.4		Wet, dark gray, loose, FINE SAND, trace silt, trace fine sub-rounded gravel		
							8.1				

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 1000, ended at 1215
Samples SB-NE-4(4.5'-5'),SB-NE-4(11'-12'),, SB-NE-4(18'-18.5'), SB-NE-4(30'-31')
Samples Collected for VOC's
Bedrock @ 42.5'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

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East Providence
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02915

p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 3, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: **NE-4**
Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 410.333

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description Soils: moisture, density[1], color, size, major and minor constituents[2] Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing	Graphical Log	Well Construction
40								-40	Dry, tan, loose, FINE SILTY SAND AND COBBLES		40
									Wet, gray, dense, FINE SAND AND SILT. Broken rock		
				2.0/5.0					Grey, gneissic, BEDROCK - Low RQD		
45								-45			45

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 1000, ended at 1215
Samples SB-NE-4(4.5'-5'),SB-NE-4(11'-12'),, SB-NE-4(18'-18.5'), SB-NE-4(30'-31')
Samples Collected for VOC's
Bedrock @ 42.5'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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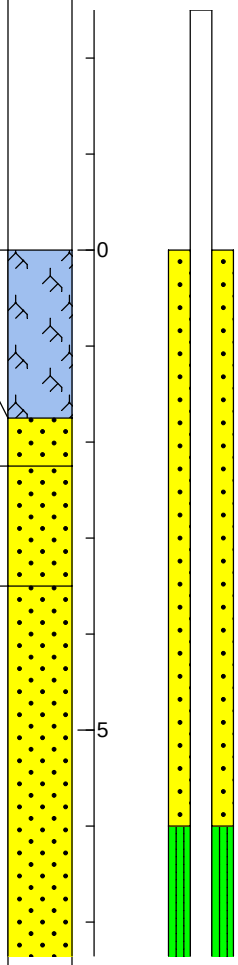
Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 30, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: **NE-5/OW-302**
Depth to Water (ft): ~10.0
Well Diameter (inches): 2"
Well Screen Slot Size: 10
Measuring Point: PVC
Measuring Point Elevation: 416.026
Ground Surface Elevation: 413.502

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
0				4.3/5.0			0.0	0	Wet, light gray, loose, SILTY FINE SAND
							0.0		
							2.1		Dry, light brown, loose, MEDIUM SAND, trace coarse sand, trace fine rounded gravel
							4.3		Dry, brown, loose, MEDIUM AND FINE SAND, trace coarse sand
							7.2		Dry, loose, tan/gray, FINE AND MEDIUM SAND, little coarse sand, trace coarse sub-rounded gravel
5				1.3/5.0			43.4	-5	
							6.7		

Graphical Log

Well Construction



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Started at 0820, ended at 1200
Samples SB-NE-5(11.5'-12'),SB-NE-5(19.5'-20'), SB-NE-5(28.5'-29')
Samples Collected for VOC's,SB-NE-5(11.5'-12') for TOC also
Bedrock @44.0'
Well installed with PVC, stickup with no protective casing. Concrete at ground surface.
Photovac Micro FID calibrated to 100ppm methane

BORING AND WELL CONSTRUCTION LOG

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401 Wampanoag Trail
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 30, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

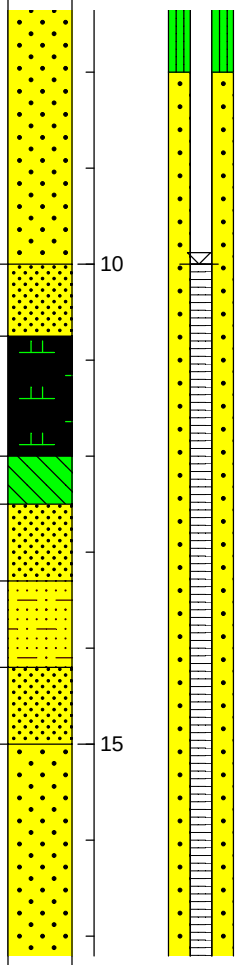
Boring/Well No: NE-5/OW-302

Depth to Water (ft): ~10.0
Well Diameter (inches): 2"
Well Screen Slot Size: 10
Measuring Point: PVC
Measuring Point Elevation: 416.026
Ground Surface Elevation: 413.502

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
							203.6		
10				5.9/5.0			305.6	-10	Wet, tan, loose, FINE SAND, trace medium sand, trace fine sub-round gravel
	SB-NE-5 (11.5'-12')						1696		Wet, black, medium dense, PEAT
							1214		Wet, light brown, dense, CLAY
							586.9		Wet, gray, medium dense, FINE SAND, little clay
							704.4		Wet, gray, dense, FINE SAND AND SILT, trace clay
									Wet, tan, medium dense, FINE SAND, trace silt, iron staining
15				4.3/5.0			28.0	-15	Wet, tan, loose, MEDIUM SAND, little coarse sand, liitle fine sand. Layer of fine sand from 19.3'-19.7'
							14.6		

Graphical Log

Well Construction



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 0820, ended at 1200
Samples SB-NE-5(11.5'-12'),SB-NE-5(19.5'-20'), SB-NE-5(28.5'-29')
Samples Collected for VOC's,SB-NE-5(11.5'-12') for TOC also
Bedrock @44.0'
Well installed with PVC, stickup with no protective casing. Concrete at ground surface.
Photovac Micro FID calibrated to 100ppm methane

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
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Consultants

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Suite 400
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Rhode Island
02915

p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 30, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: NE-5/OW-302

Depth to Water (ft): ~10.0
Well Diameter (inches): 2"
Well Screen Slot Size: 10
Measuring Point: PVC
Measuring Point Elevation: 416.026
Ground Surface Elevation: 413.502

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
							62.1				
							152.6				
	SB-NE-5 (19.5'-20')						238.2				
20				4.0/5.0			34.0	-20	Wet, tan, loose, MEDIUM SAND, little coarse sand, trace fine sand		20
							17.5				
							16.7		Wet, tan/gray, medium dense, FINE SAND, trace silt, iorn staining @ the top		
							13.8				
							5.6		Wet, tan, loose, MEDIUM SAND, trace coarse sand		
									Wet, tan, FINE SAND		
25				4.0/5.0			10.3	-25	Wet, tan, loose, FINE AND MEDIUM SAND, trace coarse sand, trace silt		25
							7.9				

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Started at 0820, ended at 1200
Samples SB-NE-5(11.5'-12'),SB-NE-5(19.5'-20'), SB-NE-5(28.5'-29')
Samples Collected for VOC's,SB-NE-5(11.5'-12') for TOC also
Bedrock @44.0'
Well installed with PVC, stickup with no protective casing. Concrete at ground surface.
Photovac Micro FID calibrated to 100ppm methane

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

401 Wampanoag Trail
Suite 400
East Providence
Rhode Island
02915

p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 30, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: **NE-5/OW-302**
Depth to Water (ft): ~10.0
Well Diameter (inches): 2"
Well Screen Slot Size: 10
Measuring Point: PVC
Measuring Point Elevation: 416.026
Ground Surface Elevation: 413.502

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
							8.1				
	SB-NE-5 (28.5'-29')						3.6		Wet, tan, medium dense, FINE SAND, little silt, iron staining		
							6.0		Wet, tan medium dense, FINE SAND, little silt and coarse sub-rounded gravel		
30				2.0/5.0			2.9	-30	Wet, gray, loose, MEDIUM AND COARSE SAND, trace fine sand, trace coarse gravel		30
							1.2				
							1.4				
							0.3		Wet, gray, loose, MEDIUM SAND, little coarse sand, trace fine sub-rounded gravel		
							6.9				
35				3.5/5.0			0.0	-35	Wet, gray, loose, MEDIUM SAND, little coarse sand, trace fine sand		35
							0.0		Wet, gray, loose, MEDIUM AND COARSE SAND, some fine sub-rounded gravel		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 0820, ended at 1200
Samples SB-NE-5(11.5'-12'),SB-NE-5(19.5'-20'), SB-NE-5(28.5'-29')
Samples Collected for VOC's,SB-NE-5(11.5'-12') for TOC also
Bedrock @44.0'
Well installed with PVC, stickup with no protective casing. Concrete at ground surface.
Photovac Micro FID calibrated to 100ppm methane

BORING AND WELL CONSTRUCTION LOG

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p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 30, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: **NE-5/OW-302**
Depth to Water (ft): ~10.0
Well Diameter (inches): 2"
Well Screen Slot Size: 10
Measuring Point: PVC
Measuring Point Elevation: 416.026
Ground Surface Elevation: 413.502

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
							0.0				
							0.0		Wet, tan/gray, loose, MEDIUM SAND, trace fine and coarse rounded gravel		
							0.0				
40				4.6/4.0			0.9	-40	Wet, gray, loose, MEDIUM SAND, little coarse sand, trace fine sand		40
							0.0		Wet, tan/gray, loose, MEDIUM SAND, trace fine and coarse rounded gravel		
							0.0		Wet, dark gray, loose, FINE SAND, trace coarse sand, some cobbles and coarse gravel		
							0.0		Weathered rock, iron stained		
							0.0		Wet, light gray, loose, fine silty sand		
									Wet, light gray, loose, SILTY FINE SAND Refusal @ 44 feet		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 0820, ended at 1200
Samples SB-NE-5(11.5'-12'),SB-NE-5(19.5'-20'), SB-NE-5(28.5'-29')
Samples Collected for VOC's,SB-NE-5(11.5'-12') for TOC also
Bedrock @44.0'
Well installed with PVC, stickup with no protective casing. Concrete at ground surface.
Photovac Micro FID calibrated to 100ppm methane

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
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02915

p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 9, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: NE-6

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 413.952

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				4.5/5.0			0.0	0	Dry, brown to dark brown, loose, Loam		0
							0.0		Dry, light brown, loose, FINE AND MEDIUM SAND, trace coarse sand, some fine rounded gravel		
							0.0				
							0.0				
							39.4		Dry, light gray, loose, FINE SAND, little medium sand, trace coarse sand, little fine sub-round gravel, tire fragments		
							1.3				
5				4.5/5.0			36.6	-5	Moist, light brown, dense, FINE AND MEDIUM SAND, trace coarse sand, little fine and coarse sub-angular gravel		5
							134.4				
	SB-NE-6 (7'-8')						1427		Moist, olive/gray, medium dense, FINE SAND, little medium sand, little fine and coarse sub-angular gravel, trace cobble		
							913.8		Moist, gray-brown, medium dense, FINE AND MEDIUM SAND, trace coarse sand, little fine round gravel, trace coare sub-rounded gravel, trace cobble		
							1461		Moist, dark browm, dense, FINE SAND, trace silt, trace coarse sand, some fine and coarse sub-angular gravel, trace cobble. Organic material mixed in & piece of plastic sheeting		
10								-10			10

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 0800, ended at 0930
Samples SB-NE-6(7'-8'),SB-NE-6(11.5'-12.25'),SB-NE-6(14'-15'),SB-NE-6(26'-27')
Samples Collected for VOC's, SB-NE-6(11.5'-12.25') and SB-NE-6(14'-15') collected for TOC also
Bedrock @ 27'. Cored 1' into bedrock.
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

401 Wampanoag Trail
Suite 400
East Providence
Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 9, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: NE-6

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 413.952

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10				4.9/5.0			386.7	-10	Wet, olive gray, medium dense, FINE AND COARSE SUB-ANGULAR GRAVEL, some fine and medium sand, trace cobbles, trace coarse sand		10
							213.5		Wet, light brown, medium dense, FINE AND MEDIUM SAND, trace coarse sand, little fine sub-rounded gravel		
	SB-NE-6 (11.5'-12.25')						2080				
							1430		Wet, dark brown, medium dense, PEAT		
							877.8		Wet, olive gray, dense, FINE SAND, little clay, trace medium to coarse sand		
									Wet, light gray, dense, FINE SAND, trace silt		
	SB-NE-6 (14'-15')						1075		Wet, light brown, dense, SILT AND CLAY		
15				4.6/5.0			26.1	-15	Wet, gray, loose, FINE AND MEDIUM SAND		15
									Wet, gray, loose, MEDIUM SAND, some coarse sand		
							37.7		Wet, light gray, medium dense, FINE SAND, little medium sand		
							8.5		Wet, gray, loose, MEDIUM AND COARSE SAND, little fine angular gravel, trace coarse sub-rounded gravel		
							1.6		Wet, dark gray, loose, MEDIUM SAND, some coarse sand, some cobbles, trace fine and coarse sub-rounded gravel		
							10.0		Wet, light brown, very dense, FINE SAND AND SILT, little fine and coarse angular gravel		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Started at 0800, ended at 0930
Samples SB-NE-6(7'-8'),SB-NE-6(11.5'-12.25'),SB-NE-6(14'-15'),SB-NE-6(26'-27')
Samples Collected for VOC's, SB-NE-6(11.5'-12.25') and SB-NE-6(14'-15') collected for TOC also
Bedrock @ 27'. Cored 1' into bedrock.
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
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401 Wampanoag Trail
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02915

p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 9, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: NE-6

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 413.952

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
20				1.3/5.0			5.4	-20	Wet, loose, gray, FINE AND COARSE SILT, some silt		20
							3.5		Wet, gray, loose, COARSE SAND, some fine sand, little silt, little fine and coarse sub-rounded gravel		
25				2.0/3.0			2.3	-25	Wet, gray, loose, COARSE SAND, some fine sand, little round gravel, trace coarse sub-rounded gravel, trace cobbles		25
	SB-NE-6 (26'-27')						8.8		Wet, gray, very dense, FINE SAND AND SILT, some cobbles, trace coarse angular gravel		
									Grey, gneissic, BEDROCK		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 0800, ended at 0930
Samples SB-NE-6(7'-8'),SB-NE-6(11.5'-12.25'),SB-NE-6(14'-15'),SB-NE-6(26'-27')
Samples Collected for VOC's, SB-NE-6(11.5'-12.25') and SB-NE-6(14'-15') collected for TOC also
Bedrock @ 27'. Cored 1' into bedrock.
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 7, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Hershberger

Boring/Well No: **NW-1**
Depth to Water (ft): ~5.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 410.478

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.3/5.0				0	Wet, dark brown, loose, LOAM		0
							0.0		Dry, tan, loose, FINE SAND, trace coarse sand, little fine and coarse sub-round gravel		
							0.0				
5				1.1/5.0				-5	Wet, loose, COBBLES, trace coarse sand at bottom. Poor recovery		5
							5.2				
10				1.7/5.0				-10	Wet, loose, COBBLES, little fine sand, little coarse sand		10

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 0945, ended at 1045
Samples SB-NW-1(14'-15'),SB-NW-1(16'-17')
Samples Collected for VOC's
Bedrock @18.5'. Cored into rock to 22.5'. Rock sample fell out of barrel.
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
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401 Wampanoag Trail
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East Providence
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02915

p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 7, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Hershberger

Boring/Well No: **NW-1**
Depth to Water (ft): ~5.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 410.478

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
							53.3				
	SB-NW-1 (14'-15')										
15				2.0/4.0				-15	Wet, dark gray, loose, COARSE SAND AND FINE AND COARSE SUB-ROUND GRAVEL, trace fine sand and silt.		15
	SB-NW-1 (16'-17')						24.7				
							5.4				
									Grey, gneissic, BEDROCK		
20								-20			20

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 0945, ended at 1045
Samples SB-NW-1(14'-15'),SB-NW-1(16'-17')
Samples Collected for VOC's
Bedrock @18.5'. Cored into rock to 22.5'. Rock sample fell out of barrel.
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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401 Wampanoag Trail
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East Providence
Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 7, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: NW-2

Depth to Water (ft): ~5.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 412.225

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.2/5.0			0.5	0	Dry, dark brown, loose, LOAM		0
							0.0		Dry, brow, loose, FINE AND MEDIUM SAND, little coarse sand, liitle fine sub-round gravel		
							0.0				
5				0.8/5.0				-5	Wet, brown, loose, FINE SAND AND COBBLES, some coarse sand, some fine and coarse sub-angular gravel		5
10				3.8/5.0			1.1	-10	Wet, brown, loose, COBBLES, some coarse sand, trace fine sand, some fine and coarse angular gravel		10
	SB-NW-2 (11'-12')						3.3				
							2.9		Wet, dark gray to brown, dense, FINE AND		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 0745, ended at 0845
Samples SB-NW-2(11'-12'),SB-NW-2(16'-16.5')
Samples Collected for VOC's, SB-NW-2(16'-16.5') for TOC also
Bedrock @20.0'
Photovac Micro FID calibrated to 100ppm methane gas
Estimated Density

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
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Suite 400
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02915

p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 7, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: NW-2

Depth to Water (ft): ~5.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 412.225

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
									MEDIUM SAND, some cobbles, some fine and coarse sub-round gravel		
							0.3				
									Wet, brown, dense, FINE SAND, trace silt, some cobbles, trace fine rounded gravel. Cobbles at bottom.		
15				3.0/5.0			7.0	-15	Wet, tan, medium dense, FINE SAND		15
									Wet, tan, loose, COARSE SAND		
	SB-NW-2 (16'-16.5')						2.8		Wet, tan, loose, COARSE SAND AND FINE SUB-ANGULAR GRAVEL, little coarse angular gravel		
									Wet, brown , dense to very dense, FINE SAND, little medium sand, trace coarse sand, trace cobbles		
							6.8				
									Wet, dark gray, dense, SILT		
20				1.6/3.0				-20	Grey, gneissic, BEDROCK, horizontal fractures		20

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 0745, ended at 0845
Samples SB-NW-2(11'-12'),SB-NW-2(16'-16.5')
Samples Collected for VOC's, SB-NW-2(16'-16.5') for TOC also
Bedrock @20.0'
Photovac Micro FID calibrated to 100ppm methane gas
Estimated Density

BORING AND WELL CONSTRUCTION LOG

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p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 7, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Hershberger

Boring/Well No: **NW-3**
Depth to Water (ft): ~9.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 412.883

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				4.0/5.0				0	Moist, brown to gray, loose, FINE AND MEDIUM SAND, little fine sub-rounded gravel, trace coarse sand		0
							0.6				
							3.8				
									Dry, tan, loose, FINE SAND AND COBBLES, trace coarse sand		
5				2.3/5.0				-5	Moist to wet, olive/gray - brown, loose, COBBLES AND MEDIUM SAND, trace fine sand, trace coarse sand, trace fine and coarse gravel		5
							5.6				
							2.5				
10								-10			10

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 1340, ended at 1445
Samples SB-NW-3(10'-11'),SB-NW-3(20.5'-21.5')
Samples Collected for VOC's
Bedrock @ 26'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

401 Wampanoag Trail
Suite 400
East Providence
Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 7, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Hershberger

Boring/Well No: **NW-3**
Depth to Water (ft): ~9.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 412.883

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10	SB-NW-3 (10'-11')			2.4/5.0			106.6	-10	Wet, medium dense, FINE SAND AND COBBLES, little fine and coarse sub-rounded gravel, trace coarse sand		10
							20.0				
									COBBLES		
15				2.2/5.0			12.2	-15	Wet, gray, loose, COARSE SAND, little fine sub-rounded gravel, little coarse sub-rounded gravel, some cobbles		15
							8.5				
									Wet, brown, dense, MEDIUM SAND, trace fine sand and silt, little fine and coarse sub-angular gravel		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 1340, ended at 1445
Samples SB-NW-3(10'-11'),SB-NW-3(20.5'-21.5')
Samples Collected for VOC's
Bedrock @ 26'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 7, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Hershberger

Boring/Well No: **NW-3**
Depth to Water (ft): ~9.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 412.883

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description	Graphical Log	Well Construction
20				4.1/5.0			7.5	-20	Wet, brown/gray, medium dense, FINE AND MEDIUM SAND, little coarse sand, trace fine and coarse gravel		20
	SB-NW-3 (20.5'-21.5')								Wet, dark gray, medium dense, MEDIUM SAND, trace silt, trace coarse sand, trace coarse sub-angular gravel		
							4.1		Wet, gray, dense, FINE SAND AND SILT, and cobbles, some angular coarse gravel		
							5.4				
							6.5				
25							NA	-25	Wet, gray, loose, FINE AND MEDIUM SAND, some silt. Refusal @ 26 feet		25

Materials Description
Soils: moisture, density[1], color, size, major and minor constituents[2]
Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 1340, ended at 1445
Samples SB-NW-3(10'-11'),SB-NW-3(20.5'-21.5')
Samples Collected for VOC's
Bedrock @ 26'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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02915

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 7, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Hershberger

Boring/Well No: **NW-4**
Depth to Water (ft): ~9.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 412.799

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				4.5/5.0				0	Wet, dark brown, loose, LOAM		0
							0.4		Dry, brown, loose, MEDIUM SAND, little coarse sand, trace fine sand, little fine rounded gravel		
							0.3		Dry, loose, tan, FINE SAND, little medium sand, little fine sub-round gravel, trace coarse sub-round gravel		
5				1.5/5.0			1.0	-5	Dry, loose, tan, FINE SAND, little medium sand, little fine sub-round gravel, trace coarse sub-round gravel. Moist at bottom.		5
							0.7				
10				2.3/5.0			13.0	-10	Wet, tan, loose, FINE SAND, some medium sand, trace fine sub-round gravel		10
									Wet, tan/gray, loose, COBBLES AND COARSE SUB-ABGULAR GRAVEL, trace fine and coarse gravel		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 1130, ended at 1245
Samples SB-NW-4(14'-15'),SB-NW-4(22'-22.5')
Samples Collected for VOC's
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 7, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Hershberger

Boring/Well No: **NW-4**
Depth to Water (ft): ~9.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 412.799

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
									Wet, dark gray, medium dense, COBBLES, little fine sand, trace coarse sand, trace coarse round gravel		
	SB-NW-4 (14'-15')						203.6				
15				1.0/5.0			126.3	-15	Wet, dark gray, very loose, COBBLES AND COARSE SAND, trace fine sand, trace silt		15
20				3.0/3.0			24.0	-20	Wet, dark gray, very loose, COARSE SAND, trace fine sub-rounded gravel		20
							6.0		Wet, olive gray, dense, FINE SAND, little silt, trace coarse sand, little fine rounded gravel		
	SB-NW-4 (22'-22.5')						10.5		Wet, dark gray, loose, COARSE SAND, some fine sub-angular gravel, trace cobble		
									Refusal @ 25 feet		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Started at 1130, ended at 1245
Samples SB-NW-4(14'-15'),SB-NW-4(22'-22.5')
Samples Collected for VOC's
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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401 Wampanoag Trail
Suite 400
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Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 8, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: NW-5

Depth to Water (ft): ~5.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 410.753

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.2/5.0			1.0	0	Dry, dark brown, loose, LOAM		0
							0.3				
							0.3		Dry, tan, loose, FINE AND MEDIUM SAND, little coarse sand, little fine sub-rounded gravel, trace coarse angular gravel		
							0.4				
							0.4				
5				1.6/5.0			6.9	-5	Wet, tan, medium dense, FINE SAND, trace medium sand		5
							6.7		Wet, light brown, medium dense, FINE SAND AND COBBLES, some fine and coarse angular gravel		
10								-10	Cobble		10

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Started at 0910, ended at 0945
Samples SB-NW-5(13'-13.5'),SB-NW-5(19'-19.5')
Samples Collected for VOC's
Bedrock @ 19.5'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

401 Wampanoag Trail
Suite 400
East Providence
Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 8, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: NW-5

Depth to Water (ft): ~5.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 410.753

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10				4.3/5.0			7.3	-10	Wet, light brown, medium dense, FINE AND MEDIUM SAND, trace fine sub-angular gravel		10
							4.5		Wet, tan/gray, COBBLES, some fine and coarse sub-rounded gravel, little medium to coarse sand		
							64.4		Wet, dark gray, medium dense, FINE AND MEDIUM SAND, some cobbles, some fine and coarse sub-rounded gravel, trace silt		
	SB-NW-5 (13'-13.5')						73.4				
							12.0				
15				2.7/5.0			2.1	-15	Wet, gray, very loose, COARSE SAND AND COBBLES, some fine and coarse sub-rounded gravel, trace fine sand		15
							2.0				
							0.8				
							3.6				
	SB-NW-5 (19'-19.5')								Wet, light gray, dense, FINE SAND AND SILT, little coarse sand, trace coarse round gravel (TILL)		
20								-20	Grey, gneissic, BEDROCK		20

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 0910, ended at 0945
Samples SB-NW-5(13'-13.5'),SB-NW-5(19'-19.5')
Samples Collected for VOC's
Bedrock @ 19.5'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 8, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: **NW-6/OW-304**
Depth to Water (ft): ~6.15
Well Diameter (inches): 2"
Well Screen Slot Size: 10
Measuring Point: PVC
Measuring Point Elevation: 413.218
Ground Surface Elevation: 410.854

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				2.0/5.0			0.0	0	Dry, dark brown, loose, LOAM		
							0.0		Dry, tan, loose, FINE AND MEDIUM SAND, little coarse sand, little fine and coarse sub-angular gravel, trace cobbles		Sand
5				1.3/5.0			6.7	-5	Moist, light brown, FINE AND MEDIUM SAND, some cobbles, little fine rounded gravel, little coarse sub-angular gravel		Bentonite
							30.1		Wet, light brown, loose, COBBLES AND FINE TO		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Started at 1100, ended at 1130
Samples SB-NW-6(14'-15'),SB-NW-6(18'-18.5')
Samples Collected for VOC's,SB-NW-6(14'-15') for TOC also
Bedrock @ 18.5'. Cored 1' into rock and sample fell out of barrel.
Well installed with PVC.
Photovac Micro FID calibrated to 100ppm methane gas

BORING AND WELL CONSTRUCTION LOG

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 8, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

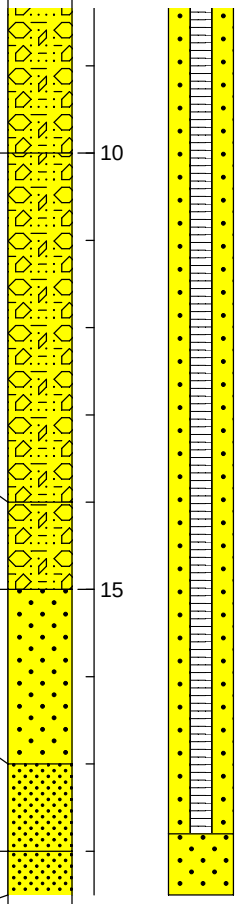
Boring/Well No: NW-6/OW-304

Depth to Water (ft): ~6.15
Well Diameter (inches): 2"
Well Screen Slot Size: 10
Measuring Point: PVC
Measuring Point Elevation: 413.218
Ground Surface Elevation: 410.854

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
									COARSE SUB-ROUNDED GRAVEL, little fine sand, little medium sand, trace silt
10				1.9/5.0			28.9	-10	Wet, light brown, loose, COBBLES, and coarse angular gravel, little fine sand, little medium sand, trace silt
							30.7		
	SB-NW-6 (14'-15')						48.0		Wet, light brown, loose, COARSE SAND AND FINE TO COARSE GRAVEL, trace fine sand and silt
15				4.5/4.5			4.2	-15	Wet, gray, loose, MEDIUM AND COARSE SAND, little fine sand, little sub-angular fine gravel, little coarse sub-rounded gravel. Cobble at bottom.
							1.4		
							6.8		
							2.4		Wet, olive-gray, medium dense, FINE SAND, some medium sand, little fine gravel, trace coarse sub-rounded gravel
	SB-NW-6 (18'-18.5')						10.8		Wet, dense, gray, FINE SAND AND SILT, (TILL)

Graphical Log

Well Construction



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Started at 1100, ended at 1130
Samples SB-NW-6(14'-15'),SB-NW-6(18'-18.5')
Samples Collected for VOC's,SB-NW-6(14'-15') for TOC also
Bedrock @ 18.5'. Cored 1' into rock and sample fell out of barrel.
Well installed with PVC.
Photovac Micro FID calibrated to 100ppm methane gas

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

401 Wampanoag Trail
Suite 400
East Providence
Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 8, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Grab
ESS Observer: McLevy, Purdy

Boring/Well No: NW-7

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 413.374

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				4.5/5.0			0.0	0	Dry, dark brown, loose, LOAM		0
							0.0		Dry, brown, loose, FINE AND MEDIUM SAND, little coarse sand, little fine sub-rounded gravel		
							0.0				
							0.0		Dry, tan, loose, FINE SAND, little medium sand, trace coarse sand, little coarse and fine angular gravel		
							0.0				
5				1.4/5.0			1.0	-5	Moist, tan, loose, FINE SAND, little medium sand, trace coarse sand, little coarse and fine angular gravel		5
									Cobbles (Poor Recovery)		
							0.0				
10				2.2/5.0			9.8	-10	Wet, loose, tan/gray, COBBLES AND FINE TO COARSE ANGULAR GRAVEL, trace fine and coarse sand		10

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Started at 0745, ended at 0820
Samples SB-NW-7(15'-16'),SB-NW-7(20'-20.5')
Samples Collected for VOC's
Bedrock @ 22'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 8, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Grab
ESS Observer: McLevy, Purdy

Boring/Well No: NW-7

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 413.374

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
							9.0		Wet, brown, medium dense, FINE SAND, little medium sand, some cobbles, little fine angular gravel		
							2.2		Wet, gray, medium dense, MEDIUM TO COARSE SAND AND FINE AND COARSE SUB-ANGULAR GRAVEL		
15	SB-NW-7 (15'-16')			2.3/5.0			8.3	-15	Wet, gray, loose, FINE AND MEDIUM SAND, trace silt		15
							8.6		Wet, gray, very loose, COARSE SAND, trace silt		
							5.8		Wet, gray, very loose, COARSE SAND, trace fine sand and silt, some fine and coarse sub-round gravel, trace cobbles		
							1.6				
							1.1		Cobble		
20	SB-NW-7 (20'-20.5')			2.0/2.0			4.4	-20	Wet, gray, very loose, COARSE SAND, trace fine round gravel		20
							0.5				
							0.5		Wet, light gray, very loose,FINE SAND AND SILT.		
							1.9		Refusal @ 22 feet		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 0745, ended at 0820
Samples SB-NW-7(15'-16'),SB-NW-7(20'-20.5')
Samples Collected for VOC's
Bedrock @ 22'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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02915

p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 8, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: **NW-8**
Depth to Water (ft): ~6.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 412.906

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.5/5.0			0.0	0	Dry, dark brown, loose, LOAM		0
							0.0		Dry, tan, loose, FINE AND MEDIUM SAND, liitle coarse sand, little fine and coarse sub-angular gravel		
							0.0				
							0.0				
5	SB-NW-8 (5'-6')			2.4/5.0			117.7	-5	Moist, dark brown, dense, PEAT. Mixed with tan, fine to medium sand, trace coarse round gravel		5
							5.1		Wet, tan, loose, FINE SAND, some cobbles, little fine and coarse angular gravel, trace medium sand		
							10.0				
10				4.7/5.0			3.6	-10	Wet, light brown, very loose, COARSE SAND AND COBBLES, some fine angular gravel, trace silt		10
							0.9		Wet, light brown, loose, MEDIUM SAND, some cobbles, little fine sub-angular gravel		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 1220, ended at 1345
Samples SB-NW-8(5'-6'),SB-NW-8(24'-25')
Samples Collected for VOC's
Bedrock @ 30'. Peat from 5-6' does not appear to be aged.
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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02915

p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 8, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: NW-8

Depth to Water (ft): ~6.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 412.906

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
							1.2				
							0.0		Wet, tan, medium dense, FINE SAND, little silt		
							0.0		Wet, light brown, MEDIUM SAND AND COBBLES, little fine sub-round gravel		
15				0.8/5.0			0.0	-15			15
									Wet, light brown, MEDIUM SAND, trace silt, trace coarse sand. (Poor recovery)		
20				4.0/5.0			0.0	-20	Wet, gray, loose, COARSE SAND, little fine sub-angular gravel		20
							NA		Wet, gray, COARSE SAND AND FINE AND COARSE SUB-ROUND GRAVEL		
							0.0		Wet, gray, very loose, COARSE SUB-ROUNDED GRAVEL		
							0.0		Wet, gray, very loose, COARSE SAND, some fine sub-rounded gravel		
	SB-NW-8 (24'-25')						2.4		Wet, gray, loose, MEDIUM AND COARSE SAND, little fine and coarse sub-rounded gravel, trace silt		
25				1.8/5.0				-25	Wet, olive-gray, dense, FINE SAND, little medium to coarse sand, cobble in middle.		25

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 1220, ended at 1345
Samples SB-NW-8(5'-6'),SB-NW-8(24'-25')
Samples Collected for VOC's
Bedrock @ 30'. Peat from 5-6' does not appear to be aged.
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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02915

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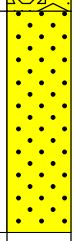
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 8, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: **NW-8**
Depth to Water (ft): ~6.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 412.906

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description Soils: moisture, density[1], color, size, major and minor constituents[2] Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing	Graphical Log	Well Construction
									Wet, very loose, COARSE SUB-ROUNDED GRAVEL		
							0.0		Wet, gray, loose, MEDIUM AND COARSE SAND, trace fine sub-angular gravel Refusal @ 30 feet		
30								-30			30

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Started at 1220, ended at 1345
Samples SB-NW-8(5'-6'),SB-NW-8(24'-25')
Samples Collected for VOC's
Bedrock @ 30'. Peat from 5-6' does not appear to be aged.
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
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Scientists
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401 Wampanoag Trail
Suite 400
East Providence
Rhode Island
02915

p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 29, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: **SE-1**
Depth to Water (ft): ~11.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 418.088

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				4.4/5.0			0.0	0	Moist, brown, loose, LOAM		0
							0.0		Moist, brown, loose, MEDIUM SAND, little fine sand, trace coarse sand, trace fine sub-rounded gravel		
							0.0				
5				3.5/5.0			0.0	-5	Moist, brown, loose, MEDIUM SAND, little fine sand, trace coarse sand, trace fine sub-rounded gravel		5
							0.0				
							0.0				
							0.0		Dry, gray, loose, MEDIUM SAND, little coarse sub-rounded gravel and cobbles		
10				1.0/1.0			NA	-10	Cobble		10
				1.0/1.2					Wet, tan, COBBLES, loose, coarse sand, trace fine sand		
				2.6/5.0					Boulder		
15								-15			15
				3.2/9.0			0.0		Wet, dark gray, loose, COARSE SAND, trace fine sand, trace fine gravel, cobbles		
20							0.0	-20			20
							0.0				
							0.0		Wet, dark gray, dense, FINE SAND, trace silt, some coarse gravel, cobbles. (TILL)		
25	SB-SE-1 (25'-25.5')						0.0	-25	Refusal @ 26 feet		25

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Start drilling @ 0915, ended @ 1100
Sample SB-SE-1(25'-25.5')
Sample collected for VOC's
Hitting boulder @ 10'-17', appeared to penetrate @ ~16'-17'
Bedrock @ 26'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 29, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: **SE-2**
Depth to Water (ft): ~11.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 417.958

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				4.8/5.0			0.0	0	Moist, brown, medium dense, LOAM		0
									Moist, brown, medium dense, MEDIUM SAND, trace fine sand, trace coarse sand, trace fine round gravel		
							0.0				
							0.0		Moist, brown, loose, MEDIUM SAND, little coarse sand, some fine and coarse sub-rounded gravel		
							0.0				
5				5.0/5.0			0.0	-5	Moist, brown, dense, MEDIUM SAND, trace coarse sand, some fine rounded gravel		5
							0.0		Dry, brown, loose, MEDIUM SAND, trace fine sand, trace coarse sand, some fine and coarse gravel		
							0.0		Dry, tan, loose, FINE SAND, little coarse sand, litle fine and coarse sub-angular gravel		
							114.3				
							14.6		Dry, brown, dense, FINE SAND, little coarse sand, little fine sand and coarse sub-angular gravel. Cobbles @ 9'. Rock @ 10'		
10				2.2/3.0			550.1	-10	BOULDER,brown, fine sllty sand @ bottom (has a sheen on it)		10

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Start drilling @ 1200
Samples SB-SE-2(15'-15.5'),SB-SE-2(21'-21.5')
Samples collected for VOC's and SB-SE-2(15'-15.5') for TOC
Bedrock @ 22'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 29, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: SE-2

Depth to Water (ft): ~11.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 417.958

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
				4.4/5.0			0.0		Wet, tan, very loose, COARSE SAND, trace fine sand, little fine rounded gravel		
							152.4				
15	SB-SE-2 (15-15.5)						490.0	-15	Wet, gray, loose, MEDIUM TO COARSE SAND, little fine sand, some fine and coarse sub-rounded gravel		15
							42.6				
							0.0		Wet, gray, loose, FINE AND MEDIUM SAND, trace coarse sand, some fine and coarse sub-rounded gravel. Cobbles throughout		
				1.3/4.0			22.2		Wet, gray, loose, COARSE SAND AND FINE SUB-ROUNDED AND SUB-ANGULAR GRAVEL		
20							68.4	-20			20
	SB-SE-2 (21'-21.5')										
									Grey, gneissic, BEDROCK		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Start drilling @ 1200
Samples SB-SE-2(15'-15.5'),SB-SE-2(21'-21.5')
Samples collected for VOC's and SB-SE-2(15'-15.5') for TOC
Bedrock @ 22'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

401 Wampanoag Trail
Suite 400
East Providence
Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 29, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: SE-4

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 416.279

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.6/5.0			0.0	0	Wet, loose, brown, LOAM		0
							0.0		Moist, brown, loose, MEDIUM SAND, little fine sand, rounded gravel, trace coarse sand		
							0.0				
							0.0				
							0.0				
5				2.8/5.0			0.0	-5	Moist, brown, loose, MEDIUM SAND, little fine sand, rounded gravel, trace coarse sand		5
							0.0		Wet, light brown, medium dense, FINE AND MEDIUM SAND, little coarse sand, trace fine sub-rounded gravel		
							0.0				
							31.0		Dry, light gray, loose, FINE SAND, little coarse sand, little fine and coarse sub-angular gravel, trace cobbles.		
							86.1				
10								-10			10

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Started at 1430
Samples SB-SE-4(14.5'-15'),SB-SE-4(16'-16.5'),SB-SE-4(27'-27.5')
Samples Collected for VOC's, SB-SE-4(14.5'-15') for TOC also
Bedrock @ 38.0'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

401 Wampanoag Trail
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Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 29, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: SE-4

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 416.279

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10				1.5/5.0			182.5	-10	Wet, light brown, medium dense, FINE AND MEDIUM SAND, little coarse sand, trace fine sub-rounded gravel		10
							175.3				
									Wet, gray, medium dense, FINE SAND		
							431.5				
							1567				
	SB-SE-4 (14.5'-15')								Wet, dense, black, PEAT		
15				4.0/5.0			551.0	-15	Wet, dark gray, medium dense, FINE SAND, little medium sand, little silt		15
	SB-SE-4 (16'-16.5')						434.7		Wet, light gray, loose, MEDIUM AND FINE SAND		
							134.5		Wet, tan and gray bands medium dense, SILT, trace clay, cobble @ 17.5'.		
							42.6		Wet, light gray, medium dense, FINE AND MEDIUM SAND, some cobbles from 19-20'.		
							5.6				

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 1430
Samples SB-SE-4(14.5'-15'),SB-SE-4(16'-16.5'),SB-SE-4(27'-27.5')
Samples Collected for VOC's, SB-SE-4(14.5'-15') for TOC also
Bedrock @ 38.0'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

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p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 29, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: SE-4

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 416.279

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
20				4.5/5.0			0.0	-20	Wet, gray, very loose, COARSE SAND, trace fine sand, trace coarse rounded gravel, trace cobbles		20
							0.0				
							0.0		Wet, light gray, loose, FINE SAND		
							0.0				
							0.0				
25				4.7/5.0			0.0	-25	Wet, light gray, loose, MEDIUM AND COARSE SAND		25
							0.0		Wet, light gray, loose, FINE SAND		
	SB-SE-4 (27'-27.5')						0.0				
							0.0		Wet, dark gray, loose, FINE AND MEDIUM SAND, coarse sub-rounded gravel, trace coarse sand		
							0.0				

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 1430
Samples SB-SE-4(14.5'-15'),SB-SE-4(16'-16.5'),SB-SE-4(27'-27.5')
Samples Collected for VOC's, SB-SE-4(14.5'-15') for TOC also
Bedrock @ 38.0'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

401 Wampanoag Trail
Suite 400
East Providence
Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 29, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: SE-4

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 416.279

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
30				4.8/8.0			0.0	-30	Wet, gray, loose, FINE TO MEDIUM SAND, trace fine gravel		30
							0.0				
							0.0		Wet, loose, gray, FINE SAND, some fine and coarse sub-angular gravel		
							0.0				
									Wet, dark gray, medium dense, FINE SAND, little coarse sand, trace silt, little sub-angular gravel		
							0.0				
35							0.0	-35			35
							0.0				
									Dry, light gray, loose, FINE AND COARSE SAND, some fine angular gravel.		
							0.0		Refusal @ 38 feet		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Started at 1430
Samples SB-SE-4(14.5'-15'),SB-SE-4(16'-16.5'),SB-SE-4(27'-27.5')
Samples Collected for VOC's, SB-SE-4(14.5'-15') for TOC also
Bedrock @ 38.0'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

401 Wampanoag Trail
Suite 400
East Providence
Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 29, 2008
Drilling Company: Boart Longyear
Drilling Method: Sonic
Sampling Method: Grab
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: **SE-5**
Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 418.809

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				4.4/5.0			0.0	0	Wet, dark brown, loose, LOAM		0
							0.0		Moist, brown, loose, MEDIUM SAND, little fine rounded gravel, trace coarse gravel		
							0.0				
							0.0				
							0.0				
5				4.0/5.0			2.5	-5	Moist, brown, loose, MEDIUM SAND, little fine rounded gravel, trace coarse gravel		5
							0.0				
							0.0				
							0.0		Dry, tan, loose, MEDIUM SAND, some coarse sand, some fine sub-rounded gravel, trace coarse sub-rounded gravel. Cobble @ 8.5'		
							0.0				
10				3.5/5.0			0.0	-10	Wet, tan, loose, COARSE GRAVEL, some fine sand		10

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Samples SB-SE-5(16'-16.5'), SB-SE-5(20'-20.5')
Samples Collected for VOC's
Bedrock @ 21.5'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

401 Wampanoag Trail
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02915

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f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 29, 2008
Drilling Company: Boart Longyear
Drilling Method: Sonic
Sampling Method: Grab
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: SE-5

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 418.809

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
							0.0		Wet, tan, medium dense, MEDIUM SAND, some fine sand, trace coarse sand, trace fine gravel. Cobble @ 12'		
							0.0				
							0.0		Wet, brown/gray, medium dense, FINE SAND, some medium sand, trace coarse sand, trace fine sub-angular gravel. Cobble @ 14.2'		
							0.0		Wet, tan, medium dense, MEDIUM SAND, some fine sand, trace fine sub-angular gravel		
15				4.2/6.5			0.0	-15	Wet, tan, loose, MEDIUM TO COARSE SAND, little fine sand		15
	SB-SE-5 (16'-16.5')						0.0				
							0.0		Wet, loose, gray/brown, COARSE SAND, little fine sand, little angular gravel		
							0.0		Wet, gray/brown, medium dense, FINE SAND, trace fine sub-angular gravel		
							0.0				
							0.0		Wet, gray/brown, FINE SAND, some coarse sand, little fine gravel. Cobble @ 19.5'		
20	SB-SE-5 (20'-20.5')						0.0	-20	Wet, very dense, gray, FINE SILTY SAND AND COBBLES. (TILL)		20
									Refusal @ 21.5 feet		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Samples SB-SE-5(16'-16.5'), SB-SE-5(20'-20.5')
Samples Collected for VOC's
Bedrock @ 21.5'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

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02915

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 3, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Grab
ESS Observer: McLevy, Purdy

Boring/Well No: **SE-6**
Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 416.941

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				4.0/5.0			0.0	0	Wet, dark brown, loose, LOAM		0
							0.0		Dry, brown, loose, MEDIUM SAND, trace coarse sand, little fine rounded gravel		
							0.0				
							0.0				
							0.0				
5				3.8/5.0			3.1	-5	Dry, brown, loose, MEDIUM SAND, trace coarse sand, little fine rounded gravel		5
							0.0		Wet, brown, loose, MEDIUM AND COARSE SAND, little rounded gravel, trace coarse rounded gravel		
							0.0		COBBLE, dry, gray		
							0.0		Dry, light brown, loose, FINE AND MEDIUM SAND, trace coarse sand, trace coarse angular gravel		
							3.8				
10				2.7/5.0			16.6	-10	Wet, brown, medium dense, FINE SAND, trace medium sand, trace coarse sand, trace fine rounded gravel, trace cobbles		10
							15.1				
							13.5				

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Started at 0730, Stopped at 0845
Samples SB-SE-6(14'-14.5'),SB-SE-6(29'-29.5')
Samples collected for VOC's
Bedrock @ 29.5'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

401 Wampanoag Trail
Suite 400
East Providence
Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 3, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Grab
ESS Observer: McLevy, Purdy

Boring/Well No: SE-6

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 416.941

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
							107.8				
	SB-SE-6 (14'-15')						497.7		Wet, gray/brown, dense, FINE SAND, little silt and cobble, traces of organic material, brick fragments		
15				5.0/530			116.1	-15	Wet, gray, loose, MEDIUM AND COARSE SAND, trace fine sand		15
							59.0		Wet, gray/tan, FINE AND MEDIUM SAND, trace fine angular gravel		
							46.9		Wet, tan to gray, dense, FINE SAND AND SILT, iron stained		
							22.7		Wet, gray, dense, FINE SAND AND SILT, little clay. Cobble @ 19'.		
							12.5				
20				3.1/5.0			6.8	-20	Wet, tan, dense, SILT, trace fine sand, little clay		20
							1.4		Wet, gray, very loose, MEDIUM AND COARSE SAND, little fine sand		
							0.0		Wet, gray, very loose, COARSE SAND, some fine and coarse rounded gravel		
							0.0				
							0.0				

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Started at 0730, Stopped at 0845
Samples SB-SE-6(14'-14.5'),SB-SE-6(29'-29.5')
Samples collected for VOC's
Bedrock @ 29.5'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 3, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Grab
ESS Observer: McLevy, Purdy

Boring/Well No: SE-6

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 416.941

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
25				4.3/4.5			0.0	-25	Wet, gray, very loose, COARSE SAND, little fine rounded gravel		25
							0.0				
							0.0		Wet, gray, MEDIUM AND COARSE SAND, some coasrse rounded gravel, trace fine rounded gravel		
							0.0				
	SB-SE-6 (29'-29.5')						0.3		Wet, gray, dense, FINE SAND AND SILT,some angular cobbles		
30								-30	Grey, gneissic, BEDROCK		30

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Started at 0730, Stopped at 0845
Samples SB-SE-6(14'-14.5'),SB-SE-6(29'-29.5')
Samples collected for VOC's
Bedrock @ 29.5'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

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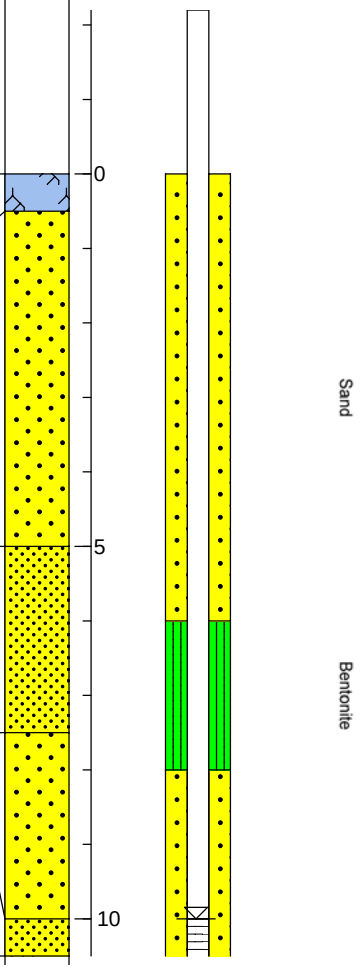
Site:	Davis Superfund Site
Client Name:	Ashland
Date(s):	October 2, 2008
Drilling Company:	Boart Longyear
Drilling Method:	Rotasonic
Sampling Method:	Sonic Core
ESS Observer:	McLevy, Purdy

Boring/Well No:	**SE-7/OW-301**
Depth to Water (ft):	~10.0
Well Diameter (inches):	2"
Well Screen Slot Size:	10
Measuring Point:	PVC
Measuring Point Elevation:	417.645
Ground Surface Elevation:	415.474

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
0				5.0/5.0			0.0	0	Wet, dark brown, loose, LOAM
							0.7		Dry, brown, loose, MEDIUM SAND, trace fine sand, trace coarse sand, little fine rounded gravel. Cobble at bottom
							0.9		
							2.1		
							3.1		
5				3.0/5.0			2.2	-5	Moist, brown, medium dense, FINE SAND, little coarse sand, trace fine sub-angular gravel
							8.1		
							5.4		Dry, light brown, loose, FINE AND MEDIUM SAND AND COBBLES, little fine and coarse sub-rounded gravel
							0.6		
							1.7		Wet, brown, medium dense, FINE SAND, trace medium sand, trace coarse sand, trace fine rounded gravel
10				4.6/5.0			24.1	-10	

Graphical Log

Well Construction



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
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ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
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30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 1200, ended at 1440
Samples SB-SE-7(12'-12.5'),SB-SE-7(14.5'-15')
Samples Collected for VOC's,SB-SE-7(12'-12.5') for TOC also
Bedrock @34.0'
Well installed with PVC, stickup with no protective casing. Concrete at ground surface.
Photovac Micro FID calibrated to 100ppm methane gas

BORING AND WELL CONSTRUCTION LOG

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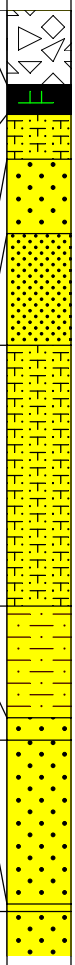
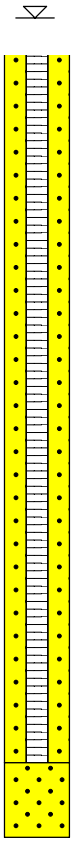
Site:	Davis Superfund Site	Boring/Well No:	**SE-7/OW-301**
Client Name:	Ashland	Depth to Water (ft):	~10.0
Date(s):	October 2, 2008	Well Diameter (inches):	2"
Drilling Company:	Boart Longyear	Well Screen Slot Size:	10
Drilling Method:	Rotasonic	Measuring Point:	PVC
Sampling Method:	Sonic Core	Measuring Point Elevation:	417.645
ESS Observer:	McLevy, Purdy	Ground Surface Elevation:	415.474

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
							NA		Cobble
							268.4		Wet, black and brown, loose, PEAT AND FINE SILTY SAND AND COBBLES
	SB-SE-7 (12'-12.5')						1635		
							255.4		Wet, dense, INTERBEDDED FINE ORGANIC MATERIAL AND FINE SILTY SAND, little clay and bits of plastic and glass
							111.3		Wet, gray, loose, FINE AND MEDIUM SAND, trace silt, trace fine rounded gravel
	SB-SE-7 (14.5'-15')								Wet, gray, medium dense, FINE SAND, some silt
15				5.0/5.0			68.5	-15	Wet gray, dense, FINE SAND AND SILT, trace clay, thin bands of reddish organic material at 16.5'. 2" layer of medium sand, trace coarse sand at 15.7'.
							12.5		
							3.7		
							3.8		Wet, tan, dense, SILT BANDS WITH STAINING. Bands of gray clay and silt at 18.5'-18.9'.
							7.9		
20				2.8/5.0			1.3	-20	Wet, gray, very loose, COARSE SAND
							0.0		Wet, gray, very loose, COARSE SAND, little fine rounded gravel
							0.8		Wet, tan/gray, medium dense, SILT WITH TRACE CLAY
									Wet, gray, very loose, COARSE SAND, some fine

Graphical Log



Well Construction



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Started at 1200, ended at 1440
Samples SB-SE-7(12'-12.5'),SB-SE-7(14.5'-15')
Samples Collected for VOC's,SB-SE-7(12'-12.5') for TOC also
Bedrock @34.0'
Well installed with PVC, stickup with no protective casing. Concrete at ground surface.
Photovac Micro FID calibrated to 100ppm methane gas

BORING AND WELL CONSTRUCTION LOG

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Suite 400
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Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 2, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: **SE-7/OW-301**
Depth to Water (ft): ~10.0
Well Diameter (inches): 2"
Well Screen Slot Size: 10
Measuring Point: PVC
Measuring Point Elevation: 417.645
Ground Surface Elevation: 415.474

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
							0.0		and coarse rounded gravel		
							0.0				
25				3.7/5.0			0.0	-25	wet, gray, very loose, COARSE SAND, some fine rounded gravel, trace coarse rounded gravel. Cobble at bottom		25
							0.0				
							0.0				
							0.0				
	SB-SE-7 (29.5'-30')						0.0				
30				4.5/4.0			0.0	-30	Wet, gray, very loose, MEDIUM AND COARSE SAND, some fine rounded gravel		30
							1.0				
							2.2		Wet, gray, loose, FINE AND MEDIUM SAND, trace silt and coarse sub-rounded gravel and cobbles		
							3.1		Wet, gray, dense, SILT AND WEATHERED ROCK. (TILL)		
									Refusal @ 34 feet		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 1200, ended at 1440
Samples SB-SE-7(12'-12.5'),SB-SE-7(14.5'-15')
Samples Collected for VOC's,SB-SE-7(12'-12.5') for TOC also
Bedrock @34.0'
Well installed with PVC, stickup with no protective casing. Concrete at ground surface.
Photovac Micro FID calibrated to 100ppm methane gas

BORING AND WELL CONSTRUCTION LOG

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 2, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: SE-8

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 415.532

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				4.5/5.0			0.0	0	Wet, brown, medium dense, LOAM		0
							0.0		Moist, loose, MEDIUM AND FINE SAND, little fine and coarse rounded gravel, trace cobbles		
							0.0				
							0.4				
							0.6				
5				3.2/5.0			19.7	-5	Wet, brown, dense, FINE TO MEDIUM SAND, trace fine gravel		5
							9.8				
							21.5				
							24.0		Dry, gray, COBBLES, trace fine sand, pieces of poly sheeting		
							NA		Wet, brown, loose, FINE SAND, trace medium sand, trace coarse sand, trace fine sub-rounded gravel		
10				4.0/5.0			12.2	-10			10
							3.9		Wet, organic brown, loose, FINE SAND, some coarse sand, little fine rounded gravel		
							11.8				
	SB-SE-8 (11'-11.5')						35.3		Wet, dark brown, PEAT		
							56.8		Wet, light brown, PEAT AND FINE SAND, trace silt, trace fine and coarse rounded gravel		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
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ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
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MOISTURE:
dry
damp
moist
wet

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Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

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30-49: dense
50+: very dense

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0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 0930, Stopped at 1050
Samples SB-SE-8(11'-11.5'),SB-SE-8(15'-16'),SB-SE-8(25'-25.5'),SB-SE-8(37.5'-38')
Samples collected for VOC's, SB-SE-8(15'-16') collected for TOC also
Bedrock @ 38'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 2, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: SE-8

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 415.532

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
							156.6		Wet, gray, loose, MEDIUM SAND, little fine sand, cobble @ top		
							69.4		Wet, gray, dense, FINE SAND		
15	SB-SE-8 (15'-16')			5.0/5.0			165.4	-15	Wet, gray, loose, MEDIUM SAND, littLe fine sand		15
									Wet, gray, medium dense, FINE SAND		
							104.8		Wet, gray, medium dense, FINE AND MEDIUM SAND		
							26.4		Wet, gray, dense, FINE SAND AND SILT, trace clay, thin bands of reddish organic material from 16.2-18.2'		
							10.5				
							4.1				
20				2.3/5.0			4.1	-20	Wet, gray, very dense, SILT, some clay, iron staining		20
							3.1				
							1.4				
									Wet, tan, loose, COARSE SAND, trace fine sand, trace fine sub-angualr gravel		
							0.7				
							1.2				
25	SB-SE-8 (25'-25.5')			4.0/5.0			1.5	-25	Wet, gray, loose, COARSE AND MEDIUM SAND, trace coarse rounded gravel, trace fine rounded gravel		25

LEGEND:
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bgs: below ground surface
NM: not measured

SAMPLE TYPES:
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wet

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Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
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5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 0930, Stopped at 1050
Samples SB-SE-8(11'-11.5'),SB-SE-8(15'-16'),SB-SE-8(25'-25.5'),SB-SE-8(37.5'-38')
Samples collected for VOC's, SB-SE-8(15'-16') collected for TOC also
Bedrock @ 38'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

401 Wampanoag Trail
Suite 400
East Providence
Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 2, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: SE-8

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 415.532

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
							0.5				
							0.0				
							0.0				
							0.0		Wet, gray, FINE AND MEDIUM SAND, little fine rounded gravel, cobble in middle		
30				4.8/5.0			0.0	-30	Wet, gray, loose, MEDIUM TO COARSE SAND, little fine and coarse rounded gravel		30
							0.5				
							0.5				
							0.6				
							1.2		Wet, dark gray, loose, FINE SAND AND FINE ROUNDED GRAVEL, little coarse round gravel		
35				2.4/3.0			1.8	-35	Wet, dark gray, loose, FINE AND MEDIUM SAND, trace coarse sand, trace coarse gravel		35
							0.7		Wet, brown/gray, very dense, WEATHERED ROCK, fine silt, sand		
	SB-SE-8 (37.5'-38')						1.1		Refusal @ 38 feet		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 0930, Stopped at 1050
Samples SB-SE-8(11'-11.5'),SB-SE-8(15'-16'),SB-SE-8(25'-25.5'),SB-SE-8(37.5'-38')
Samples collected for VOC's, SB-SE-8(15'-16') collected for TOC also
Bedrock @ 38'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
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401 Wampanoag Trail
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p 401.434.5560
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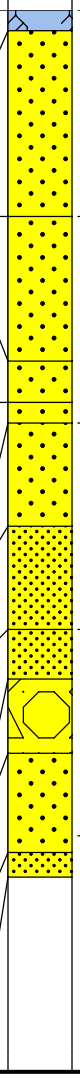
Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 26, 2008
Drilling Company: Boart Longyear
Drilling Method: Sonic
Sampling Method: Grab
ESS Observer: A. Mclevy,K. Purdy

Boring/Well No: SE-9

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 418.466

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
0				4.3/5.0			0.0	0	Moist, loose, dark brown, loam
							0.0		Dry, brown, loose medium sand, little coarse sand, little fine sub-rounded gravel
							0.0		
							0.0		
							0.0		
5				3.8/5.0			0.0	-5	Dry, brown, loose medium sand, little coarse sand, little fine sub-rounded gravel
							0.0		
							0.0		
							0.0		Dry, light gray, loose, medium sand, little coarse sand, trace fine sub-rounded gravel
							0.0		
10				3.0/5			0.0	-10	Dry, tan, loose, medium sand, some coarse sand, trace fine gravel.Cobble @ 9.5'
							0.0		Wet, tan, loose, coarse sand, trace fine sand, trace fine gravel, trace cobbles
							0.0		
							0.0		Wet, olive gray, medium dense, fine sand, trace medium and coarse sand, trace fine rounded gravel, trace cobbles
15	SB-SE-9 (14'-14.5')			3.5/6.0			0.0	-15	Wet, olive gray, medium dense, fine sand, trace medium and coarse sand, trace fine rounded gravel, trace cobbles
									Cobble
20	SB-SE-9 (20'-20.5')							-20	Wet, dark gray, loose, medium to coarse sand, some fine and coarse gravel, trace silt, cobbles throughout
									Wet, gray, medium dense, fine sand, trace coarse sand, rock @ bottom

Graphical Log



Well Construction

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Start drilling @ 0825, finished boring @0935
Samples SB-SE-9(14-14.5'),SB-SE-9(20'-20.5')
Samples collected for VOC's
Bedrock @ 21', bedrock cored for 2', competent @ 22'
Photovac Micro FID calibrated to 100ppm methane gas

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 1, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Hershberger

Boring/Well No: **SE-10**
Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 417.099

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				4.3/5.0				0	Wet, dark brown, medium dense, LOAM		0
							0.6		Dry, brown, loose, MEDIUM SAND, some sub-angular fine gravel, trace coarse sand		
							0.7				
5				2.0/5.0			4.1	-5	Dry, brown, loose, MEDIUM SAND, some sub-angular fine gravel, trace coarse sand		5
									Dry, tan, loose, FINE TO MEDIUM SAND, some coarse sand and angular cobbles. Cobble @ bottom.		
							2.5				
									Dry, brown, PEAT		
10				1.3/2.5			2.7	-10	Moist, brown, PEAT		10
							1.9		Moist, gray/tan, FINE AND MEDIUM SAND, trace coarse sand, trace fine sub-angular gravel and cobbles. Cobble @ bottom.		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 1400, Stopped at 1550
Bedrock @ 20.0'
Grouted Bedrock with 3' of bentonite
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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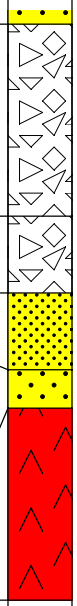
Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 1, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Hershberger

Boring/Well No: **SE-10**
Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 417.099

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
				1.6/2.5			NA		Boulder		
15				2.0/2.5			1.1	-15	Boulder		15
							1.5		Wet, gray, very dense, FINE SAND, coarse sand, angular rock fragments		
							1.5		Moist, brown, loose, MEDIUM SAND, little fine sand, little coarse sand, trace fine gravel		
				2.5/2.5			NA		Grey, gneissic, BEDROCK		
20								-20			20



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 1400, Stopped at 1550
Bedrock @ 20.0'
Grouted Bedrock with 3' of bentonite
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

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02915

p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 1, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Hershberger

Boring/Well No: SE-11

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 414.837

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				4.5/5.0				0	Wet, dark brown, medium dense, LOAM		0
							0.0		Dry, brown, loose, MEDIUM SAND, trace fine rounded gravel, trace coarse sand		
									Dry, tan, loose, FINE SAND, trace coarse sand, trace fine rounded gravel, some cobbles		
							0.0				
5				3.8/5.0			2.4	-5	Dry, tan, loose, FINE SAND, trace coarse sand, trace fine rounded gravel, some cobbles		5
									Dry, medium dense, tan, FINE SAND, trace coarse sand, trace fine sub-rounded gravel		
							0.0				
							NA		Wet, tan, medium dense, FINE SAND AND COBBLES, trace coarse sand, trace fine sub-round gravel		
10				5.0/5.0			6.8	-10	Wet, tan, dense, FINE SAND, trace coarse sand, trace fine angular gravel. Cobble @ 16.4. Iron staining @ 16.4		10
							16.7				
	SB-SE-11 (12'-13')						18.2		Wet, light gray, FINE TO MEDIUM SAND		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 1230, Stopped at 1330
Samples SB-SE-11(12'-13'),SB-SE-11(15'-16'),SB-SE-11(20'-21')
Samples collected for VOC's, SB-SE-11(15'-16') for TOC also
Bedrock @ 25'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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02915

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 1, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Hershberger

Boring/Well No: SE-11

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 414.837

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
							12.2				
							6.4		Wet, dark gray, loose, COARSE SAND, trace fine sand, trace fine rounded gravel		
15	SB-SE-11 (15'-16')			4.6/5.0			9.8	-15	Wet, dark gray, loose, COARSE SAND, trace fine sand, trace fine rounded gravel with some cobbles		15
							3.3		Wet, light gray, loose, FINE SAND, trace medium sand, trace fine rounded gravel		
							0.0		Wet, black, loose, COARSE SAND, trace fine sand, trace fine rounded gravel		
							0.3		Wet, gray, loose, FINE AND MEDIUM SAND		
									Wet, dark gray, loose, COARSE SAND, trace fine sandtrace fine rounded gravel		
20	SB-SE-11 (20'-21')			4.0/5.0			0.4	-20	Wet, olive gray, dense, FINE SAND		20
							0.2		Wet, gray, loose, MEDIUM SAND, trace very fine gravel. Cobble @21.5'		
							0.4		Wet, orange-brown, medium dense, MEDIUM SAND, little coarse sand, little coarse angular gravel. Very dense @ bottom (weathered rock)		
							0.4		Wet, gray, medium dense, FINE SAND, trace fine angular gravel.		
25								-25	Refusal @ 25 feet		25

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Started at 1230, Stopped at 1330
Samples SB-SE-11(12'-13'),SB-SE-11(15'-16'),SB-SE-11(20'-21')
Samples collected for VOC's, SB-SE-11(15'-16') for TOC also
Bedrock @ 25'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 1, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Hershberger

Boring/Well No: **SE-12**
Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 415.561

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.6/5.0				0	Wet, dark brown, medium dense, LOAM		0
							0.0		Dry, brown, loose, MEDIUM SAND, trace fine rounded gravel, trace coarse sand		
							0.0		Dry, light brown, loose, FINE SAND, little medium sand, trace coarse sand, trace fine rounded gravel		
5				NA			0.0	-5	No Recovery		5
10				4.6/5.0			0.8	-10	Wet, tan/olive gray, loose, FINE SAND, little silt. Cobbles from 12'-13'.		10
							0.4				
	SB-SE-12 (12'-13')						2.3				
							1.0		Wet, dark gray, loose, FINE SAND AND COBBLES, little medium sand, trace coarse sand, trace fine angular gravel		
15				3.4/5.0			1.4	-15	Wet, gray, medium dense, FINE SAND, little medium sand, trace silt		15
							1.1		Wet, gray, loose, COBBLES, some fine sand, trace silt.		
							1.0		Refusal @ 20 feet		
20								-20			20

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 1000, Stopped at 1550
Sample SB-SE-12(12'-13') for VOC's
No recovery from 5'-10'
Bedrock @ 20.0'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
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p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 2, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: SE-13

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 416.063

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.3/5.0				0	Wet, dark brown, medium dense, LOAM		0
							0.0		Dry, brown, loose, MEDIUM SAND, some coarse angular gravel, trace coarse sand. Cobble @ 2'		
							0.0				
							0.0				
							0.0				
5				3.4/5.0			0.0	-5	Dry, brown, loose, MEDIUM SAND, some coarse angular gravel, trace coarse sand.		5
							0.0		Dry, tan, FINE SAND, some medium sand, trace coarse sand, little fine and coarse rounded gravel. Cobble @ bottom.		
							0.0				
							0.0		Moist, tan, medium dense, TRACE COARSE SUB-ROUNDED GRAVEL, organic material mixed in (not homogenous)		
10	SB-SE-13 (9.5'-10')			3.0/5.0			2.7	-10			10
							1.3		Wet, tan, medium dense, FINE SAND, trace fine sub-rounded gravel		
							0.1				
							0.0		Wet, brown, very dense, FINE SAND, trace medium sand, little coarse angular gravel. Cobble @ top.		
							0.0				
							0.3		Wet, olive gray, medium dense, FINE SAND, trace coarse sand, trace fine subangular gravel. Cobble @ top.		
15				4.5/7.0			0.1	-15			15
							0.1		Wet, tan/gray, loose, COARSE SAND, little fine sand, little fine angular gravel		
							0.0				
	SB-SE-13 (18'-19')						2.5		Wet, gray/brown, loose, FINE AND MEDIUM SAND, little fine and coarse angular gravel and cobbles.		
							0.0				
20							0.0	-20	Refusal @ 22 feet		20
							0.0				

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Started at 0810, Stopped at 0900
Samples SB-SE-13(9.5'-10'),SB-SE-13(18'-19')
Samples collected for VOC's
Bedrock @ 22'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

401 Wampanoag Trail
Suite 400
East Providence
Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): October 9, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: SE-14

Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 416.331

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				5.0/5.0			0.0	0	Dry, brown, loose, LOAM		0
							0.0		Dry, brown, loose, FINE AND MEDIUM SAND, little coarse sand, little fine sub-angular gravel		
							0.0				
							0.0		Dry, brown, medium dense, FINE AND MEDIUM SAND, little coarse sand, little fine sub-angular gravel, trace cobble		
							1.7				
5				4.2/5.0			6.8	-5			5
							4.9		Dry, tan, loose, FINE SAND, trace coarse sand, trace fine and coarse sub-rounded gravel		
							0.8				
							1.9		Wet, light brown, loose, COARSE SAND, some fine angular gravel, little fine sand		
							1.4				
10	SB-SE-14 (10'-11')			4.1/5.0			58.2	-10	Wet, tan/gray bands, dense, FINE SAND, trace fine sub-angular gravel, trace cobble. Several thin layers of silt and clay.		10
							14.6				
							23.0		Wet, dark brown, medium dense, SILT AND CLAY, trace organics		
							9.1				
							4.6		Wet, dark gray, loose, COARSE SAND, trace fine sub-rounded gravel		
15				4.8/5.0			2.4	-15			15
							1.9		Wet, dark gray, loose, COARSE SAND, trace fine gravel, little coarse rounded gravel		
							1.1				
							1.2		Wet, dark gray, medium dense, FINE SAND, some silt, trace fine sub-rounded gravel.		
	SB-SE-14 (19'-20')						1.6				
20				1.7/5.0			1.3	-20	Refusal @ 25 feet		20
							0.8				
							1.1				

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Started at 1130, Stopped at 1215
Samples SB-SE-14(10'-11'),SB-SE-14(19'-20')
Samples collected for VOC's
Bedrock @ 23'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 23, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: K. Purdy

Boring/Well No: SW-1

Depth to Water (ft): ~5.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 412.458

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				2.0/5.0			ND	0	Dry, medium dense, dark brown, COARSE TO FINE SAND, little fine and coarse gravel		0
							ND				
							ND		Dry, medium dense, light gray, COARSE TO FINE SAND, trace fine gravel		
5				2.8/5.0				-5	Wet, loose, dark brown, COARSE SAND, little fine gravel		5
									Wet, medium dense, light grey, FINE SAND AND SILT, trace fine gravel		
									Wet, loose, dark brown, COARSE TO MEDIUM SAND AND COARSE AND FINE GRAVEL		
10				3.5/5.0			1.7	-10	Wet, medium dense, light grey, FINE SAND, trace fine gravel		10
							2.0		Wet. medium dense, dark brown, MEDIUM SAND, little fine gravel, trace cobbles		
							2.8		Wet, medium dense, dark brown, COARSE SAND, little fine gravel, trace cobble		
15				1.6/5.0			4.5	-15	Wet, dense, dark gray, SILT, some cobbles, little clay, trace fine gravel (TILL)		15
	SB-SW-1 (16'-17')								Refusal @ 20 feet		
							3.9				
							2.7				
20								-20			20

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Laborarory Sample Collected for VOC's
Sample SB-SW-1 (16'-17')
Bedrock @ 20'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 25, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: **SW-2**
Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 415.802

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				3.8/5.0				0	Moist, dark brown, loose, LOAM		0
							0.0		Dry, brown, loose, FINE AND MEDIUM SAND, little fine subrounded gravel, trace coarse sand		
							0.0				
							0.0				
							0.0				
5				2.7/5.0			0.0	-5	Wet, tan, loose, COARSE SAND, little fine sand		5
							0.0		Dry, brown, loose, FINE AND MEDIUM SAND, little fine sub-rounded gravel, trace coarse sand		
							0.0		Dry, tan, loose, MEDIUM SAND, trace coarse sand, trace fine sand, trace sub-rounded fine gravel		
							0.0				
							0.0				
10				1.0/5.0			NA	-10	Wet, tan, dense, COARSE SAND, some fine sand, little, fine angular gravel, rock @ bottom		10
							NA				
							NA				

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Start drilling @ 0830, finished @ 0930
Samples SB-SW-2(17'-17.5'), SB-SW-2(28'-28.5')
Samples collected for VOC's and SW-2(17'-17.5') for TOC
Appeared to hit rubble @ 13' - little recovery 10'-15'
Bedrock @ 29'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 25, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: **SW-2**
Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 415.802

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
							NA				
							NA				
15				4.2/5.0			NA	-15	Wet, tan, dense, COARSE SAND, some fine sand, little, fine angular gravel, rock @ bottom		15
							0.0		Wet, dark gray, dense, FINE SAND, trace medium sand, trace coarse sand		
	SB-SW-2 (17'-17.5')						26.7		Wet, dark gray, very dense, FINE SAND, trace medium sand		
							0.0				
							0.0		Wet, gray, loose, COARSE SAND, trace fine sand, some sub-rounded coarse gravel, trace cobbles		
20				5.2/9			0.0	-20	Wet, gray, loose, COARSE SAND, little fine sand, trace sub-rounded and sub-angular fine gravel		20
									Wet, gray, medium dense, FINE SAND AND COARSE SUB-ANGULAR GRAVEL		
									Wet, gray, loose, COARSE SAND, little fine sand, some fine sub-rounded gravel		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Start drilling @ 0830, finished @ 0930
Samples SB-SW-2(17'-17.5'), SB-SW-2(28'-28.5')
Samples collected for VOC's and SW-2(17'-17.5') for TOC
Appeared to hit rubble @ 13' - little recovery 10'-15'
Bedrock @ 29'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 25, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: **SW-2**
Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 415.802

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
25							0.0	-25			25
							0.0		Wet, gray, loose, MEDIUM SAND, trace fine rounded gravel, cobble @ 28'		
							0.0		Wet, olive gray, very dense, FINE SAND AND SILT, rock fragments @ 29'. (TILL)		
	SB-SW-2 (28'-28.5')						0.0		Refusal @ 29 feet		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Start drilling @ 0830, finished @ 0930
Samples SB-SW-2(17'-17.5'), SB-SW-2(28'-28.5')
Samples collected for VOC's and SW-2(17'-17.5') for TOC
Appeared to hit rubble @ 13' - little recovery 10'-15'
Bedrock @ 29'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 24, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: **SW-3**
Depth to Water (ft): ~5.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 411.757

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				1.9/5.0				0	Moist, brown, LOAM		0
							0.0		Moist, brown, loose, FINE SAND, trace coarse sand, some fine gravel		
							0.0				
							0.0				
5				4.6/5.0			0.0	-5	Wet, light gray, medium dense, FINE SAND, trace fine gravel		5
							0.0				
									Wet, light brown, loose, MEDIUM TO COARSE SAND, some well rounded fine gravel		
							0.0				
10				3.9/5.0			0.0	-10	Wet, light brown, loose, MEDIUM TO COARSE SAND, some fine well rounded fine and coarse gravel		10
							0.0		Wet, light gray, loose, COARSE SAND, little silt, some fine and coarse well rounded gravel		
							0.0				

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Start drilling @ 0830, finish drilling @ 0930
Laborarory Sample Collected for VOC's
Samples SB-SW-3 (18'-18.5'), SB-SW-3(21'-21.5')
Bedrock @ 23'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 24, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: **SW-3**
Depth to Water (ft): ~5.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 411.757

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
							0.0				
							0.0				
15				2.1/5.0			0.0	-15	Wet, light gray, loose, COARSE SAND, little silt, some fine and coarse well rounded gravel		15
							0.0				
							0.0		Dry, brown, very dense, FINE SAND, trace fine and coarse rounded gravel		
	SB-SW-3 (18'-18.5')						0.0				
							0.0				
20				1.7/5.0			0.0	-20	Wet, SUB-ROUND COARSE COBBLES, trace cobbles, broken rock (possible weathered bedrock)		20
	SB-SW-3 (21'-21.5')						0.0		Refusal @ 25'		
							0.0				

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Start drilling @ 0830, finish drilling @ 0930
Laborarory Sample Collected for VOC's
Samples SB-SW-3 (18'-18.5'), SB-SW-3(21'-21.5')
Bedrock @ 23'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

401 Wampanoag Trail
Suite 400
East Providence
Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 24, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: **SW-4**
Depth to Water (ft): ~5.5
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 414.403

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description: Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing	Graphical Log	Well Construction
0				3.5/5.0			0.0	0	Dry, brown, loose, LOAM		0
							0.0		Dry, brown, loose, FINE TO MEDIUM SAND, trace silt, trace fine rounded gravel		
							0.0				
							0.0				
							0.0				
5				4.1/5.0				-5	Wet, tan, loose, COARSE SAND, little fine gravel		5
							0.0		Moist, brown, loose, FINE TO MEDIUM SAND, trace silt, trace fine rounded gravel		
							0.0				
									Moist, light gray, loose, FINE SAND, trace coarse sand, trace sub-rounded fine gravel, several sub-angular cobbles		
							0.0		Moist to Wet, brown, dense, FINE AND MEDIUM SAND, trace fine gravel		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Start drilling @ 1500, finished @ 1600
Samples SB-SW4-(12'-12.5'), SB-SW4-(21'-21.5')
Samples collected for VOC's and SW-4-(12'-12.5') for TOC
Bedrock @ 25'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 24, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: SW-4

Depth to Water (ft): ~5.5
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 414.403

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description	Graphical Log	Well Construction
10				2.9/5.0			2.3	-10	Wet, tan, loose, COARSE SAND, little fine sub-rounded gravel		10
							123				
	SB-SW-4 (12'-12.5')						188.9		Wet, gray, medium dense, FINE SAND, little medium sand		
							39				
							0.0		Wet, dark gray, MEDIUM SAND, trace coarse sand, trace fine sand, little coarse gravel		
15				4.2/5.0			0.0	-15	Wet, tan/gray, loose, COARSE SAND, trace silt, some fine sub-angular and rounded gravel, several cobbles @ bottom		15
							0.0				
							0.0				
							0.0				
							0.0				

Materials Description
Soils: moisture, density[1], color, size, major and minor constituents[2]
Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Start drilling @ 1500, finished @ 1600
Samples SB-SW4-(12'-12.5'), SB-SW4-(21'-21.5')
Samples collected for VOC's and SW-4-(12'-12.5') for TOC
Bedrock @ 25'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
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02915

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 24, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: **SW-4**
Depth to Water (ft): ~5.5
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 414.403

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description	Graphical Log	Well Construction
20				3.5/5.0			0.0	-20	Wet, tan/gray, loose, COARSE SAND, trace silt, some fine sub-angular and rounded gravel, several cobbles @ bottom		20
	SB-SW-4 (21'-21.5')						0.0		Wet, gray, loose, MEDIUM SAND, little fine sand, trace coarse sand, trace fine sub-angular gravel		
							0.0				
							0.0		Wet, dark gray, very dense, FINE SILT, trace coarse sand, rock @ bottom. (TILL) Refusal @ 25 feet		
25								-25			25

Materials Description
Soils: moisture, density[1], color, size, major and minor constituents[2]
Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Start drilling @ 1500, finished @ 1600
Samples SB-SW4-(12'-12.5'), SB-SW4-(21'-21.5')
Samples collected for VOC's and SW-4-(12'-12.5') for TOC
Bedrock @ 25'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 25, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: **SW-5**
Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 416.384

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				2.9/5.0				0	Moist, brown, loose, LOAM		0
							0.0		Dry, brown, loose, FINE AND MEDIUM SAND, little fine sub-rounded gravel, trace coarse sand		
							0.0				
							NA				
							0.0				
5				2.4/5.0			0.0	-5	Dry, brown, loose, FINE AND MEDIUM SAND, little fine sub-rounded gravel, trace coarse sand.Cobble @ 7.5'		5
							0.0				
							0.0				
							0.0		Dry, light gray, loose, FINE TO MEDIUM SAND, trace coarse sand, little medium and fine sub-angular gravel		
							0.0				

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Start drilling @ 1235
Samples SB-SW-5(14.5-15'),SB-SW-5(16.5'-17'),SB-SW-5(20.5'-21')
Samples collected for VOC's
Defined line of black to gray soil @ 18'
Possibly black soils @ 20' originate from water above
Bedrock @ 25'
Photovac Micro FID calibrated to 100ppm methane gas

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

401 Wampanoag Trail
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02915

p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 25, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: **SW-5**
Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 416.384

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10				3.0/10			0.0	-10	Wet, tan, loose, COARSE SAND, trace fine sand, trace fine and coarse sub-angular gravel.Cobble @ 13.5		10
							0.0				
							0.0				
							420.0		Wet, black, loose, MEDIUM SAND, trace fine gravel. Odor.		
							762.4				
15	SB-SW-5 (14.5'-15')			4.0/5.0			209.7	-15	Wet, black, loose, FINE TO MEDIUM SAND, trace fine gravel. Odor.		15
							232.0				
	SB-SW-5 (16.5'-17')						24.3				
							0.0		Wet, gray, medium dense, FINE SAND, trace coarse sand, cobble @ 20'		
							0.0		Wet, black, loose, MEDIUM SAND		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Start drilling @ 1235
Samples SB-SW-5(14.5-15'),SB-SW-5(16.5'-17'),SB-SW-5(20.5'-21')
Samples collected for VOC's
Defined line of black to gray soil @ 18'
Possibly black soils @ 20' originate from water above
Bedrock @ 25'
Photovac Micro FID calibrated to 100ppm methane gas

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

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Suite 400
East Providence
Rhode Island
02915

p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 25, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: **SW-5**
Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 416.384

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description	Graphical Log	Well Construction
20								-20			20
				4.0/5.0			36.4		Wet, gray, loose, COARSE SAND, some fine sand		
	SB-SW-5 (20.5'-21')										
							30.2		Wet, gray to dark gray, medium dense, MEDIUM TO COARSE SAND, some fine sand, some sub-angular coarse gravel		
							0.0		Cobbles @ 23.5'		
									Refusal @ 25 feet		
							0.0				
							0.0				
25								-25			25

Materials Description

Soils: moisture, density[1], color, size, major and minor constituents[2]

Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL

[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Start drilling @ 1235
Samples SB-SW-5(14.5-15'),SB-SW-5(16.5'-17'),SB-SW-5(20.5'-21')
Samples collected for VOC's
Defined line of black to gray soil @ 18'
Possibly black soils @ 20' originate from water above
Bedrock @ 25'
Photovac Micro FID calibrated to 100ppm methane gas

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
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p 401.434.5560
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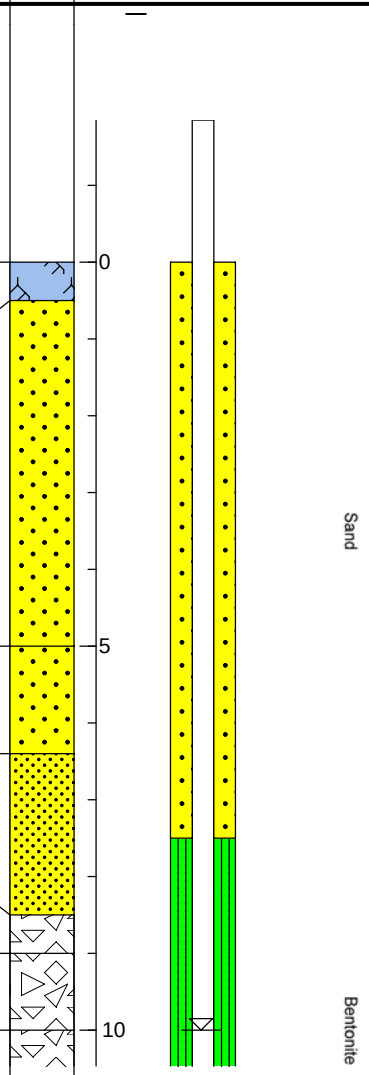
Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 30, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: SW-6/OW-300

Depth to Water (ft): ~10.0
Well Diameter (inches): 2"
Well Screen Slot Size: 10
Measuring Point: PVC
Measuring Point Elevation: 419.553
Ground Surface Elevation: 417.842

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
0				3.7/5.0			0.0	0	Moist, dark brown, loose, LOAM
							0.0		Moist, brown, loose, FINE AND MEDIUM SAND, little fine rounded gravel, trace coarse rounded gravel
							0.0		
							0.0		
							0.0		
5				4.0/4.0			0.0	-5	Moist, brown, loose, FINE AND MEDIUM SAND, little fine rounded gravel, trace coarse rounded gravel
							0.0		Moist, tan, dense, FINE SAND, little coarse sand, and fine and coarse angular gravel, cobbles throughout
							0.0		
							0.0		Boulder
				1.0/1.0			NA		Boulder - Quartz-rich
10				2.4/5.0				-10	Boulder

Graphical Log / Well Construction



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Samples SB-SW-6(19.5'-20'),SB-SW-6(26.5'-27') Samples Collected for VOC's,SB-SW-6(19.5'-20') for TOC also
Bedrock @ 27.0
Well installed with PVC, stickup with no protective casing. Concrete at ground surface.
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

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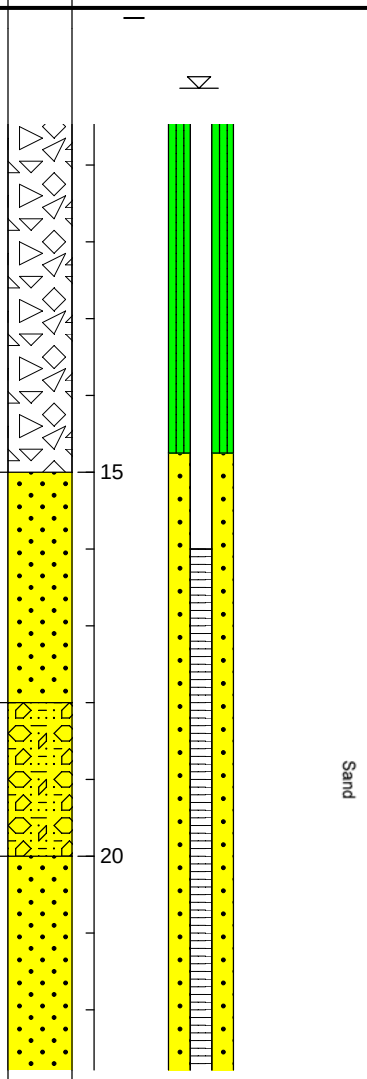
Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 30, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: **SW-6/OW-300**
Depth to Water (ft): ~10.0
Well Diameter (inches): 2"
Well Screen Slot Size: 10
Measuring Point: PVC
Measuring Point Elevation: 419.553
Ground Surface Elevation: 417.842

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)
15				3.5/5.0			7.0	-15	Wet, tan, loose, COARSE SAND. Cobble at bottom
							7.2		
							16.4		
							169.0		Wet, black to gray, COBBLES, little fine sand
							236.6		
20	SB-SW-6 (19.5'-20')			3.5/7.0			127.3	-20	Wet, dark gray, FINE AND MEDIUM SAND, trace coarse sand, trace coarse sub-angular gravel. Cobble @ bottom.
							71.0		

Graphical Log

Well Construction



LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Samples SB-SW-6(19.5'-20'),SB-SW-6(26.5'-27')
Samples Collected for VOC's,SB-SW-6(19.5'-20') for TOC also
Bedrock @ 27.0
Well installed with PVC, stickup with no protective casing. Concrete at ground surface.
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

401 Wampanoag Trail
Suite 400
East Providence
Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 30, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: McLevy, Purdy

Boring/Well No: **SW-6/OW-300**
Depth to Water (ft): ~10.0
Well Diameter (inches): 2"
Well Screen Slot Size: 10
Measuring Point: PVC
Measuring Point Elevation: 419.553
Ground Surface Elevation: 417.842

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
							19.7				
25							44.1	-25			25
							82.8		Wet, gray, medium dense, FINE SAND, cobble @ bottom.		
	SB-SW-6 (26.5'-27')								Refusal @ 27 feet		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Samples SB-SW-6(19.5'-20'),SB-SW-6(26.5'-27')
Samples Collected for VOC's,SB-SW-6(19.5'-20') for TOC also
Bedrock @ 27.0
Well installed with PVC, stickup with no protective casing. Concrete at ground surface.
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 30, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: **SW-7**
Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 414.078

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				4.2/5.0			0.0	0	Moist, dark brown, loose, LOAM		0
							0.0		Moist, brown, loose, FINE AND MEDIUM SAND, little fine rounded gravel, trace coarse rounded gravel		
							0.0				
							0.0				
							0.0				
5				2.2/5.0			0.0	-5	Moist, brown, loose, FINE AND MEDIUM SAND, little fine rounded gravel, trace coarse rounded gravel		5
							0.0				
							0.0		Moist, tan, loose, FINE TO MEDIUM SAND, little coarse sand, little fine and coarse sub-rounded gravel		
							0.0				
							0.0				
10								-10			10

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Start drilling @ 1315, finish drilling @ 1400
Sample SB-SW-7 (15'-15.5')
Laborarory Sample Collected for VOC's
Bedrock @ 20'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
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401 Wampanoag Trail
Suite 400
East Providence
Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 30, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: **SW-7**
Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 414.078

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
10				3.8/5.0			4.7	-10	Wet, gray/tan, loose, FINE SAND, trace medium sand, trace coarse sand, trace fine sub-rounded gravel, metal fragments at bottom		10
							1.2				
							3.4				
							0.8		Wet, gray, loose, FINE SAND, some medium to coarse sand, little coarse angular gravel and cobbles		
							0.5		Wet, gray, loose, FINE SAND, trace coarse sand, trace fine rounded gravel		
15	SB-SW-7 (15'-15.5')			2.8/5.0			3.0	-15	Wet, gray, loose, COARSE SAND AND COBBLES		15
							0.0		Wet, gray, loose, COARSE SAND AND FINE GRAVEL, trace fine sand		
							0.0				
							0.0		Wet, gray, loose, COARSE AND FINE SAND, some fine gravel, cobble @ 19'		
							0.0		Wet, brown, loose, FINE SAND, some coarse sand and broken rock. Refusal @ 20 feet		
20								-20			20

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Start drilling @ 1315, finish drilling @ 1400
Sample SB-SW-7 (15'-15.5')
Laborarory Sample Collected for VOC's
Bedrock @ 20'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
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Suite 400
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02915

p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 25, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: **SW-8**
Depth to Water (ft): ~5.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 412.231

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				4.0/5.0				0	Moist, brown, loose, LOAM		0
							0.0		Dry, light brown, loose, MEDIUM SAND, some fine rounded gravel, little coarse gravel		
							0.0				
							0.0		Dry, tan, loose, FINE AND MEDIUM SAND, trace coarse sand, little fine and coarse sand. Cobble @ 4'		
							0.0				
5				5.0/5.0			0.0	-5	Wet, tan, loose, FINE AND MEDIUM SAND, trace coarse sand, little fine and coarse sand.		5
							0.0				
							94.1		Wet, tan, medium dense, FINE SAND		
							0.0		Wet, tan, loose, MEDIUM SAND. Iron staining @ 9'		
							119.0				
10				3.4/5.0			48.5	-10	Wet, olive gray, dense, FINE SAND, bands of clay		10
	SB-SW-8 (11.5'-12')						212.1		Wet, tan, COARSE SAND, little fine sand, trace fine gravel		
							146.1		Wet, tan, COARSE SAND AND COARSE SUB-ANGULAR GRAVEL, trace fine sand. Cobble at 14'.		
							0.0				
							0.0				
15				3.8/5.0			228.1	-15	Wet, tan, loose, MEDIUM TO COARSE SAND, trace fine sand		15
	SB-SW-8 (16'-16.5')						230.1				
							0.0				
							0.0		Wet, light brown, COARSE SAND AND COARSE SUB-ROUNDED GRAVEL, trace cobbles, trace fine sand.		
							1.4				
20							0.0	-20	Refusal @ 22 feet		20
							0.0				

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

NOTES:
Start drilling @ 1430, finished boring @ 1530
Samples SB-SW-8(11.5-12'),SB-SW-8(16'-16.5')
Samples collected for VOC's
Bedrock @ 22'
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

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East Providence
Rhode Island
02915

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f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 24, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: **SW-9**
Depth to Water (ft): ~5.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 412.013

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				4.0/5.0				0	Moist, dark brown, loose, LOAM, trace fine sub-rounded gravel		0
							0.0				
							0.0				
							0.0		Dry, light brown, loose, MEDIUM SAND, trace coarse sand, trace sub-rounded coarse gravel		
							0.0				
5				1.2/5.0			0.0	-5	Wet, olive gray, medium dense, FINE SAND, trace coarse sand, broken rock at top		5
							0.0		Wet, gray, BROKEN ROCK FRAGMENTS (ANGULAR), some fine sand, some coarse sand		
10				3.1/9.0			NA	-10	Wet, tan, loose, MEDIUM TO COARSE SAND		10
15								-15	Wet, tan, COARSE SAND AND BROKEN ROCK (ANGULAR)		15
							0.0				
	SB-SW-9 (17'-17.5')						0.0		Wet, dark gray, very dense, VERY FINE SILT		
							0.0		Refusal @ 20 feet		

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD): reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Start drilling @ 1045, finish drilling @ 1140
10'-15' Sample fell out of barrel - refusal @ 20'
Sample SB-SW-9 (17'-17.5')
Laborarory Sample Collected for VOC's
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
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Scientists
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401 Wampanoag Trail
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02915

p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 24, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: SW-10

Depth to Water (ft): ~5.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 411.191

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				4.4/5.0				0	Moist, dark brown, LOAM		0
							0.0		Dry, light brown, loose, FINE TO MEDIUM SAND, trace coarse sand, trace fine rounded gravel		
							0.0				
							0.0				
							0.0		Dry, light tan, loose, MEDIUM SAND, trace coarse sand, trace fine sub-rounded gravel		
5				1.9/5.0			0.0	-5	Wet, light brown, loose, MEDIUM TO COARSE SAND		5
									Wet, light brown, medium dense, FINE SILTY SAND, iron stained.		
							0.0				
							0.0		Wet, light brown, loose, MEDIUM TO COARSE SAND		
10				3.0/5.0			0.0	-10	Wet, light brown, med dense, FINE SAND		10
							0.0		Wet, tan, medium dense, MEDIUM SAND		
							0.0				
							0.0		Wet, gray, medium dense, FINE SAND, rock at bottom.		
							0.0		Refusal @ 15 feet		
15								-15			15

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Start drilling @ 1245
Cored ~1' into rock, could not retrieve core - only broken rock fragments
Bedrock @ 15'
No Sample Collected
Photovac Micro FID calibrated to 100ppm methane gas
Density Estimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

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East Providence
Rhode Island
02915

p 401.434.5560
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Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 25, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: **SW-11**
Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 417.213

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data: PID (ppm)	Screening Data: FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
0				4.2/5.0			0.0	0	Dry, brown, loose, FINE AND MEDIUM SAND, little fine sub-rounded gravel, trace coarse sand		0
							0.0				
5				3.1/5.0			0.0	-5	Wet, dense, brown, MEDIUM SAND, trace coarse sand, trace fine gravel		5
							0.0				
							0.0				
							0.0				
							0.0		Dry, light gray, loose, FINE TO MEDIUM SAND, little coarse sand, trace coarse sub-angular gravel, some cobbles		
10				4.5/10			23.2	-10	Wet, gray, loose, FINE AND COARSE SAND, some angular coarse gravel		10

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

[1] GRANULAR SOILS DENSITY:
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

[1] PLASTIC SOILS DENSITY:
0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

NOTES:
Start drilling @ 1020
Samples SB-SW-11(17'-17.5')
Samples collected for VOC's and TOC
Ran double core barrel 10'-20'
Hit bedrock @ 22', cored 3' into it
Photovac Micro FID calibrated to 100ppm methane gas
Density Esitimated

BORING AND WELL CONSTRUCTION LOG

ESS Group, Inc.
Engineers
Scientists
Consultants

401 Wampanoag Trail
Suite 400
East Providence
Rhode Island
02915

p 401.434.5560
f 401.434.8158

Site: Davis Superfund Site
Client Name: Ashland
Date(s): September 25, 2008
Drilling Company: Boart Longyear
Drilling Method: Rotasonic
Sampling Method: Sonic Core
ESS Observer: A. McLevy,K. Purdy

Boring/Well No: **SW-11**
Depth to Water (ft): ~10.0
Well Diameter (inches): NA
Well Screen Slot Size: NA
Measuring Point: NA
Measuring Point Elevation: NA
Ground Surface Elevation: 417.213

Depth bgs (ft.)	Sample or Run Designation	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation	Screening Data PID (ppm)	Screening Data FID (ppm)	Elevation (ft.)	Materials Description (Soils: moisture, density[1], color, size, major and minor constituents[2]; Rock: color, rock type, hardness, major mineral types, weathering, and degree of fracturing)	Graphical Log	Well Construction
15							113.6	-15			15
							123.0		Wet, gray, loose, COARSE SAND, trace fine sub-angular gravel		
	SB-SW-11 (17'-17.5')						250.0		Wet, dark gray, dense, FINE SAND, trace silt, trace coarse sand, trace sub-angular coarse gravel		
							12.2				
							0.0				
20				3/3			NA	-20	Wet, medium dense, dark gray, MEDIUM SAND, trace silt, some fine gravel and cobbles		20
							NA		Grey, gneissic, BEDROCK, high RQD Refusal @ 22 feet		
25								-25			25

LEGEND:
ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

SAMPLE TYPES:
D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored
RC: rotasonic core

ROCK
ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4" and longer/length of run] x 100

SOIL
[1] Density designation based on blow counts for each 12" of penetration using a 140 lb. wt x 30" drop on a 2" O.D. spilt spoon sampler. If blow counts are not taken then density may be estimated

MOISTURE:
dry
damp
moist
wet

[2] PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

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