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and
Fort Stewart Directorate of Public Works
Under Contract Number W91ZLK-05-D-0015 D.O. 0003

Revised Corrective Action Plan – Part B Addendum #1
Former Pumphouse #1 (Release #1)
Former Building 8060
Hunter Army Airfield
Savannah, GA
Facility ID No. 9-025085*1

October 1, 2009

DOCUMENT 22

ARCADIS

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Senior Engineer

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Senior Project Manager

Revised Corrective Action Plan – Part B Addendum #1

Hunter Army Airfield

Prepared for:
U.S. Army Environmental Command

Prepared by:
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Our Ref.:
GP08HAFS.H13B.EH1R1

Date:
October 1, 2009

Appendices

Appendix C: Laboratory Data – June 2009

Appendix D: Calcium Peroxide Dosing Calculations

Acronyms

ACLs	alternate concentration limits
BTEX	benzene, toluene, ethyl benzene and xylenes
CaO2	calcium peroxide
CAP	Corrective Action Plan
COD	chemical oxygen demand
COPCs	constituents of potential concern
DAACG	Departure/Arrival Air Control Group
DO	dissolved oxygen
DOC	dissolved organic carbon
GA EPD	Georgia Environmental Protection Division
g/L	grams per liter
HAAF	Hunter Army Airfield
H2O2	hydrogen peroxide
IWQS	in-stream water quality standard
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
n_m	mobile porosity
MNA	monitored natural attenuation
NOM	natural organic matter
ROI	radius of injection
SAIC	Science Application International Corporation
TPH	total petroleum hydrocarbons
TSS	total suspended solids
UIC	underground injection control
USEPA	United States Environmental Protection Agency
VOCs	volatile organic compounds

CORRECTIVE ACTION PLAN-PART B

Facility Name:	Former Pumphouse #1 (Release #1)			Street Address:	Former Building 8060, near Taxiway 3		
Facility ID:	9-025085*1	City:	Hunter Army Airfield	County:	Chatham	Zip Code:	31409
Latitude:	32° 00′ 54″	Longitude:	81° 08′ 26″				

Submitted by UST Owner/Operator:				Prepared by Consultant/Contractor:			
Name:	Tom Fry/ Environmental Branch			Name:	Charles Bertz		
Company:	U. S. Army/HQ 3d, Inf. Div. (Mech)			Company:	ARCADIS		
Address:	DPW ENRD ENV. Br.			Address:	801 Corporate Center Dr.		
	1550 Frank Cochran Drive, Bldg. 1137				Suite 300		
City:	Fort Stewart	State:	GA	City:	Raleigh	State:	NC
Zip Code:	31314-4927			Zip Code:	27607		
Telephone:	(912) 767-2010			Telephone:	(919) 854-1282		

I. PLAN CERTIFICATION:

A. UST OWNER/OPERATOR

I hereby certify that the information contained in this plan and in all the attachments is true, accurate, and the plan satisfies all criteria and requirements of rule 391-3-15-09 of the Georgia Rules for Underground Storage tank Management.

Name: Tom Fry

Signature: _____ Date: _____

B. REGISTERED PROFESSIONAL ENGINEER OR PROFESSIONAL GEOLOGIST CERTIFICATION

I hereby certify that I have directed and supervised the fieldwork and preparation of this plan in accordance with State Rules and Regulations. As a registered professional geologist and/or professional engineer, I certify that I am a qualified groundwater professional, as defined by the Georgia State Board of Professional Geologists, and that all of the information and laboratory data in this plan and in all of the attachments are true, accurate, complete, and in accordance with applicable State Rules and Regulations.

Name: Scott Bostian, PE

Signature: Scott Bostian

Date: 10/1/09

GEORGIA REGISTERED 23036 PROFESSIONAL 10/1/09 CURTIS SCOTT BOSTIAN Georgia Stamp or Seal

Check all boxes that apply. Attach supporting documentation, i.e. narrative, figures, tables, maps, boring/well logs, etc., for all items checked. Supporting documentation should be three-hole punched and prepared in conformity with the guidance document "Underground Storage Tank (UST) Release: Corrective Action Plan-Part B (CAP-B) Content", GUST 7B.

II. SITE INVESTIGATION REPORT

☒ **Not Applicable** **The extent of contamination, and the local & site hydrogeology requirements have been fulfilled under the CAP Part A, therefore additional SIR reporting is not necessary.**

☐ **Extent of Contamination:**

☐ Soil ☐ Groundwater ☐ Free Product ☐ Surface water

☐ **Local and Site Hydrogeology:**

☐ Documentation of Local Groundwater Conditions

☐ Stratigraphic Boring Logs

☐ Stratigraphic Cross Sections

☐ Referenced or Documented Calculations of Relevant Aquifer Parameters

☐ Direction of Groundwater Flow

☐ Table of Monitoring Well Data

☐ Potentiometric Map

☐ Flow Net Superimposed on a Base Map

III. REMEDIAL ACTION PLAN

A. Corrective Action Completed or In-Progress:

☐ Not Applicable

☒ Recovery/Removal of Free Product (Non-Aqueous Phase Hydrocarbons)

☐ Remediation/Treatment of Contaminated Soils

☐ Other (specify)

_____

_____

B. Objectives of Corrective Action:

☐ No Further Action

☒ Remove Free Product That Exceeds One-Eighth Inch

☐ Remediate Groundwater Contamination That Exceeds:

☐ Maximum Contaminant Levels (MCLs)

OR

☐ In-stream Water Quality Standards

B. Objectives of Corrective Action (CONTINUED):

☐ Remediate Soil Contamination That Exceeds:

☐ Threshold Values Listed In Table A

OR

☐ Threshold Values Listed In Table B

OR

☐ Alternate Threshold Levels (ATLs) (Reference CAP A App. I)

☒ Provide Risk-Based Corrective Action (Reference CAP B App. I):

☒ Remediate Soil and/or Groundwater Contamination That Exceeds Alternate Concentration Limits (ACLs) and Monitor Residual Contaminants

OR

☐ Monitor Soil and/or Groundwater Contamination That Exceeds Levels In Rule – 391-3-15-.09(3).

C. Design and Operation of Corrective Action Systems:

☒ Soil ☒ Groundwater ☒ Free Product ☐ Surface water ☐ Not Applicable

D. Implementation (MUST INCLUDE THE FOLLOWING):

NOTE: If No Further Action is proposed and none of the following apply, a brief explanation must be provided with the signed Certificate of Completion.

- Milestone schedule for proposed site activities

- Inspection and preventive maintenance schedule for all specialized remediation equipment

AND / OR

Monitoring/sampling and reporting plan for measuring interim progress and project completion

- Plan to decommission equipment/wells and close site

IV. **PUBLIC NOTICE:**

☐ Not Applicable **The Corrective Action Objectives submitted and approved under the CAP-Part A have not changed.**

☐ Certified Letters to Adjacent, Potentially Affected Property Owners and Local Officials

☒ Legal Notice in Newspaper, as approved by EPD

☐ Other EPD-approved Method (specify) _____

V. **CLAIM FOR REIMBURSEMENT** (For GUST Trust Fund sites only)

☒ Not Applicable (specify) _____

_____

☐ GUST Trust Fund Application - (attach if applicable)

☐ Cost Proposal:

☐ A Total of All Costs Incurred To Date (MUST INCLUDE THE FOLLOWING):

- ▶ Invoices and Proofs-of-Payment For All Costs Incurred To Date
- ▶ Invoices itemized on the GUST-4D
- ▶ All Non-Eligible Costs Clearly Identified as such
- ▶ Incurred Costs Itemized per GUST-92 form or EPD provided form/specifications

☐ A Total of Estimated Costs To Complete Corrective Action

- ▶ Estimated Costs Itemized per GUST-92 form or EPD provided form or specifications

☐ Total Project Costs

☐ Proposed Schedule For Reimbursement

☐ Lump Sum Payment Upon Completion Of Corrective Action

OR

☐ Interim Payments With Final Payment Upon Completion

OR

☐ EPD Established Payment Schedule

2. Introduction

Addendum #1 to the Revised Corrective Action Plan – Part B (Revised CAP – Part B Addendum) for Pumphouse #1 Release #1 has been prepared to provide additional detail to the proposed corrective action for groundwater. The proposed groundwater corrective action is explained in the Revised Corrective Action Plan – Part B with 2008 Annual Report (Revised CAP – Part B) (ARCADIS 2009). The former Pumphouse #1, Facility ID #9-025085 was located near former Building 8060 at Hunter Army Airfield (HAAF), in Savannah, Georgia (Figure 2-1).

The horizontal and vertical extent of petroleum-related impacts in soil and groundwater was delineated by activities performed during the previous investigations at the former Pumphouse #1 site and the Departure/Arrival Air Control Group (DAACG) facility. The investigations are documented in the CAP–Part B Report (SAIC 2000), the CAP–Part B Addendum #1 Report (SAIC 2002), and the CAP–Part B Addendum #2 Report (SAIC 2006). Benzene, ethylbenzene, toluene, benzo(*a*)pyrene, chrysene, and naphthalene were identified as chemicals of potential concern (COPCs) for groundwater.

The recommended remedial strategy for groundwater in the previous corrective action plans (CAPs) was free product removal followed by monitored natural attenuation (MNA). The first phase of the corrective action has been completed as free product is no longer present at recoverable quantities and has been consistently less than 1/8 inch in thickness in monitor wells. The second phase of the corrective action is remediation of groundwater to below approved alternate concentration limits (ACLs). To reduce the estimated timeframe for groundwater to reach ACLs, an active corrective action addressing the remaining smear zone and groundwater contamination is recommended. The proposed remedial action, the basis for selection, conceptual design of the remedy, and implementation logistics are presented in the following sections.

3. Pre-design Field Data Collection

Pumphouse #1 Release #1 is located adjacent to an active runway. Consequently, it is important that the remedial strategy selected minimizes impacts to military operations as much as possible. The proposed remedial strategy is enhanced bioremediation via electron acceptor amendment. Enhanced bioremediation will result in less impact to the military flight operations at the site relative to more intrusive technologies such as six-phase heating, air sparge/soil vapor extraction, and chemical oxidation. To better characterize the biogeochemical conditions of the groundwater and to select the most appropriate electron acceptor, a round of groundwater sampling from selected monitor wells was performed in June 2009. Groundwater samples were collected from monitor wells D-MW-1, D-MW-2, D-MW-11, D-MW-19, D-MW-34, D-MW-35, D-MW-37, D-MW-41 and D-MW-42. The samples were analyzed and measured for the following:

- Dissolved Organic Carbon (DOC)
- Alkalinity
- Total Phosphorus (from D-MW-34 and D-MW-41 only)
- Total Kjeldahl Nitrogen (from D-MW-34 and D-MW-41 only)
- Nitrogen as Nitrate
- Total and Dissolved Iron
- Sulfate
- Sulfide
- Methane
- Benzene, Toluene, Ethylbenzene and Xylenes (BTEX)
- Total Petroleum Hydrocarbons (TPH)
- Total/dissolved lead
- Lead speciation (organic and inorganic forms in D-MW-34 and D-MW-41 only)
- pH (field measured)
- Dissolved Oxygen (DO) (field measured)

The sample results are summarized in Tables 3-1 through 3-3 in Appendix B and are presented in Figures 3-1 through 3-3 in Appendix A. The laboratory results are included in Appendix C. In general, the average concentrations of electron acceptors (dissolved oxygen and sulfate) are lower in monitor wells within the petroleum hydrocarbon impacted areas (i.e., D-MW-1, D-MW-2, D-MW-34, D-MW-35, D-MW-37) relative to the background (i.e., D-MW-41 and D-MW-42). Similarly, the average concentrations of metabolic by-products (ferrous [dissolved] iron and methane) are higher within the impacted areas. These observations indicate that intrinsic bioremediation of petroleum hydrocarbons coupled with reduction of electron acceptors is ongoing at the site. However, the relatively low background concentrations of oxygen, nitrate, ferric iron (the difference of total iron and dissolved iron), and sulfate have likely limited biodegradation of the

petroleum hydrocarbons, as evidenced by the relatively stable concentrations of BTEX between 2001 and 2009 (Table 3-3).

In addition to electron acceptors, nutrients such as nitrogen and phosphorus were also analyzed. Nitrogen and phosphorus are essential for biodegradation of organic contaminants by bacteria. The results indicate that nutrient levels are generally low within the groundwater unit. It is not clear whether the low nutrient levels have limited the intrinsic biodegradation since the biogeochemical data strongly indicate that electron acceptor availability is a limiting factor.

Lead was previously detected in groundwater samples collected from DPT borings in January 2008 at levels above the in-stream water quality standard (IWQS) of 30 µg/L. However, the high turbidity of the DPT water samples may have contributed to the elevated concentration of lead. For example, lead concentrations exceeding the IWQS were detected in approximately 10 to 15 percent of the low-flow groundwater samples (3 of the 30 samples from the December 2007 sampling event, and 4 of 27 samples from the December 2008 event), whereas lead concentrations exceeding the IWQS were detected in more than 30 percent of the DPT water samples (15 of 44 samples) during the January 2008 supplemental investigation (ARCADIS 2009).

Lead in groundwater was also evaluated during the June 2009 sampling event to better understand its speciation. The results indicate that inorganic lead exists in both dissolved phase and solid phase as suspended solids in the groundwater. In addition, it appears that lead exists predominantly in the organic form, especially in the BTEX source area (D-MW-34). This may have been a result of microbial alkylation of inorganic lead in anaerobic environments (USEPA 2007).

4. Basis for Selection of Corrective Action

As mentioned in the Revised CAP – Part B report, either oxygen or sulfate will be selected as the electron acceptor to be amended into the impacted groundwater. The qualitative assessment in Section 3 suggests that neither electron acceptor is present at a background level high enough to provide sufficient biodegradation capacity for cleanup within a reasonable timeframe. As a result, the selection of electron acceptor will be based on the inherent characteristics of the electron acceptor processes and of the microbial populations.

As described by Wiedemeier *et. al*. (1999), biodegradation of BTEX occurs more rapidly under aerobic conditions than under sulfate-reducing process. The production of hydrogen sulfide and metal sulfide precipitates (e.g., iron sulfide) from sulfate-reducing processes may result in reduction of permeability and hence injection capacity of the soil matrix. Additionally, sulfate-reducing microorganisms are typically sensitive to environmental conditions, including temperature, inorganic nutrients, and pH (Wiedemeier *et. al*. 1999). An imbalance in suitable environmental conditions could limit BTEX degradation via sulfate reduction.

The background sulfate concentrations indicate the sulfate reducer population may not be adequate to respond to sulfate amendments. Consequently, biodegradation through sulfate reduction may lag significantly or stall entirely. Conversely, many bacteria can rapidly adapt to perform biodegradation under aerobic conditions. Based on these comparisons, oxygen amendment is preferred over sulfate additions. Aerobic conditions can be engineered via different methods, such as oxygen/air sparging coupled with soil vapor extraction, injection and extraction of oxygen-saturated water for a recirculation system, and injection of chemicals that slowly release oxygen (e.g., magnesium peroxide, calcium peroxide, sodium percarbonate). The first two methods are more intrusive and would require trenching for the construction of underground conveyance piping for substrate or air delivery and groundwater or vapor extraction. Due to the significant disruption the construction would have on military flight operations, the first two methods were not selected as part of the remedial strategy. The injection of oxygen releasing substrates involves less intrusive site activities such as well installation and periodic injection events with mobile equipment.

The most important physico-chemical properties of three possible oxygen release chemicals are listed in Table 4-1. The comparison shows that calcium peroxide releases the most oxygen. Calcium peroxide has a low solubility (in comparison with sodium percarbonate). As a result, calcium peroxide is less reactive and provides a slower release of oxygen occurring over the course of several months. Sodium percarbonate releases oxygen more rapidly because of its higher solubility. Consequently, there is a less efficient use of the released oxygen. Because of the higher oxygen content and slow release characteristics, calcium peroxide is chosen to stimulate the biodegradation.

Calcium peroxide (CaO_2) slowly releases oxygen when in contact with water according to the following reaction:

$$2\ CaO_2 + 2\ H_2O \bullet \quad 2\ Ca(OH)_2 + O_2$$

The speed at which oxygen is released is determined by physical and chemical properties of the aquifer (e.g., pH and temperature). When CaO_2 is exposed to a lower pH, hydrogen peroxide (H_2O_2) can be generated according to the following reaction:

$$CaO_2 + 2\ H^+ \bullet \quad Ca^{2+} + H_2O_2$$

H_2O_2 releases oxygen according to the following reaction:

$$2\ H_2O_2 \bullet \quad 2\ H_2O + O_2$$

Hydrogen peroxide is not expected to be generated directly around the injection wells because of the higher pH associated with calcium hydroxide and calcium peroxide. This ensures an efficient release of oxygen. As a consequence of the low solubility of calcium peroxide in water (<0.1 gram per liter [g/L] @ 20 °C), an oxygen release period of more than 6 months is typical.

As mentioned previously, it is not clear whether the low nutrient levels in the groundwater have contributed to the slow biodegradation of BTEX. Therefore, nutrient amendment as a remedial strategy will not be considered at this point. However, this option will be re-evaluated if oxygen amendment appears to be inadequate for simulating an increase in biodegradation rates.

As mentioned in the Revised CAP – Part B (ARCADIS 2009), the mitigation of lead in groundwater was considered during the remedy evaluation for dissolved petroleum hydrocarbons. The engineering of an aerobic environment is not expected to affect the mobility of lead as the geochemical transport processes of lead are not directly affected by redox conditions (USEPA 2007). The aerobic environment resulting from calcium peroxide injection may limit the microbial alkylation of inorganic lead to organic lead, which is a more soluble form of lead.

5. Design and Operation of Corrective Action

5.1 Well Layout and Design

Calcium peroxide will be delivered to the target treatment zone via an array of injection wells. Two lines of injection wells will be installed perpendicular to the general direction of groundwater flow in the most impacted areas near monitoring wells D-MW-34 and D-MW-2 (Figure 5-1). The injection wells will be installed 20 feet apart, with a target radius of injection (ROI) of 10 feet. The wells will be constructed with 15-foot screens that extend approximately 5 feet into the vadose zone to address the smear zone.

5.2 Calcium Peroxide Dosing and Injection Volume Design

The dosing of calcium peroxide was calculated by considering three sources of oxygen demand in the subsurface:

- Oxygen required by aerobic bacteria to degrade BTEX compounds;
- Oxygen demand by natural organic matter (NOM) in the groundwater; and
- Oxygen demand by NOM in the soil.

The amount of oxygen required to aerobically biodegrade BTEX was calculated using the total BTEX concentration observed in D-MW-34 during the June 2009 semiannual sampling event and an oxygen utilization factor for BTEX as described in Wiedemeier, *et. al*. (1999). The stoichiometry of the oxidation reaction of individual BTEX compounds by oxygen was considered when calculating the oxygen utilization factor, which is 3 g oxygen/g BTEX. The oxygen demand by NOM in soil and groundwater was calculated based on a typical soil NOM content of 200 milligrams per kilogram (mg/kg) of soil and an average chemical oxygen demand (COD) in groundwater of 104 milligrams per liter (mg/L) from the Pumphouse 1 Release 2 area. In addition, the mass flux of BTEX and NOM in groundwater through the calcium peroxide barrier within the 6-month longevity of calcium peroxide was determined based on a groundwater seepage velocity of 0.52 foot/day and a barrier cross section of 15 feet (thickness) x 100 feet (length perpendicular to groundwater flow). The total oxygen demand was converted to calcium peroxide dosing using an oxygen content of 17 percent by weight and a safety factor of 1.5 to account for losses of oxygen. The estimated calcium peroxide dosing is approximately 34 g calcium peroxide/L of water. The calcium peroxide dosing calculations are included as Appendix D.

The injection volume of calcium peroxide solution was calculated using the following equation:

$$V_{inj} = ROI^2 \times \pi \times h \times n_m \times \left(\frac{7.481\, gal}{ft^3} \right)$$

where:

V_{inj} = volume of injection (gal)

ROI = radius of injection (e.g., 10 feet)

h = height of injected fluid column (15 feet)

n_m = mobile porosity

The estimated injection volumes per injection well and the corresponding amounts of calcium peroxide with different mobile porosity (n_m) values are shown in the following table:

	n_m = 0.05	**n_m = 0.1**	**n_m = 0.15**	**n_m = 0.20**
Injection volume (gallons)	1,763	3,525	5,288	7,050
Mass of calcium peroxide (lb)	497	995	1,492	1,989

5.3 Injection Implementation

After the injection wells have been installed, a startup injection event utilizing all injection wells will be implemented. The purpose of the startup injection is to quantify the injection volume required to reach the design ROI. The arrival of calcium peroxide at a dose-response well located at the design ROI from an injection well (e.g., D-MW-2) will be monitored through measurement of total suspended solids (TSS), dissolved oxygen and conductivity. The likely calcium peroxide injection frequency is expected to be semi-annual but will be adjusted and optimized based on DO and BTEX concentrations in performance monitor wells (described in the following section). Based on estimates from the current data set, the need for a minimum of two injection events is anticipated.

5.4 Performance Monitoring Plan

Quarterly monitoring of designated performance monitor wells is proposed to evaluate remediation progress. Performance monitoring will consist of sampling up to 20 wells. These wells may include, but are not limited to, D-MW-1, D-MW-2, D-MW-11, D-MW-18, D-MW-34, D-MW-35, D-MW-37, D-MW-19, D-MW-33, D-MW-38, D-MW-43, and P1-MW-42. Sufficient downgradient wells will be included in the monitoring plan to evaluate contaminant migration. The quarterly monitoring schedule will include analysis of water quality parameters including dissolved oxygen, TSS and VOCs.

Total and dissolved inorganic lead and organic lead will also be analyzed in monitor well samples within the source area (e.g., D-MW-34, D-MW-1, D-MW-35, and D-MW-2) to evaluate the effect of calcium peroxide injection on lead concentrations in the groundwater.

6. Underground Injection Permit Application

Upon approval of the Revised CAP-Part B and this addendum, a permit application will be submitted to the Underground Injection Control (UIC) Division of Georgia Environmental Protection Division (GA EPD). The permit will be obtained before the initial injection event is conducted.

7. Project Schedule

A project schedule for the proposed corrective action was provided in the Revised CAP (ARCADIS 2009). Fort Stewart will notify GA EPD of any significant changes to the schedule and will provide GA EPD with an updated Gantt chart, as necessary.

8. References

ARCADIS. 2009. Final Revised Corrective Action Plan – Part B with 2008 Annual Report for Former Pumphouse #1 (Release #1), Former Building 8060, Facility ID #9-025085*1, Hunter Army Airfield, Georgia. June.

U.S. Environmental Protection Agency (USEPA). 2007. Monitored Natural Attenuation of Inorganic Contaminants in Ground Water. Vol. 2. Assessment for Non-Radionuclides including Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Nitrate, Perchlorate, and Selenium. October.

Science Applications International Corporation. 2006. Corrective Action Plan–Part B Addendum #2 for Former Pumphouse #1, Facility ID #9-025085, Building 8060, Hunter Army Airfield, Georgia. July.

Science Applications International Corporation. 2002. Corrective Action Plan–Part B Addendum #1 for Former Pumphouse #1, Facility ID #9-025085, Building 8060, Hunter Army Airfield, Georgia. July.

Science Applications International Corporation. 2000. Corrective Action Plan–Part B for Former Pumphouse #1, Facility ID #9-025085, Building 8060, Hunter Army Airfield, Georgia. August.

Wiedemeier, T.H., H.S. Rifai, J.T. Wilson, and C. Newell. 1999. Natural Attenuation of Fuels and Chlorinated Solvents in the Subsurface. John Wiley and Sons.

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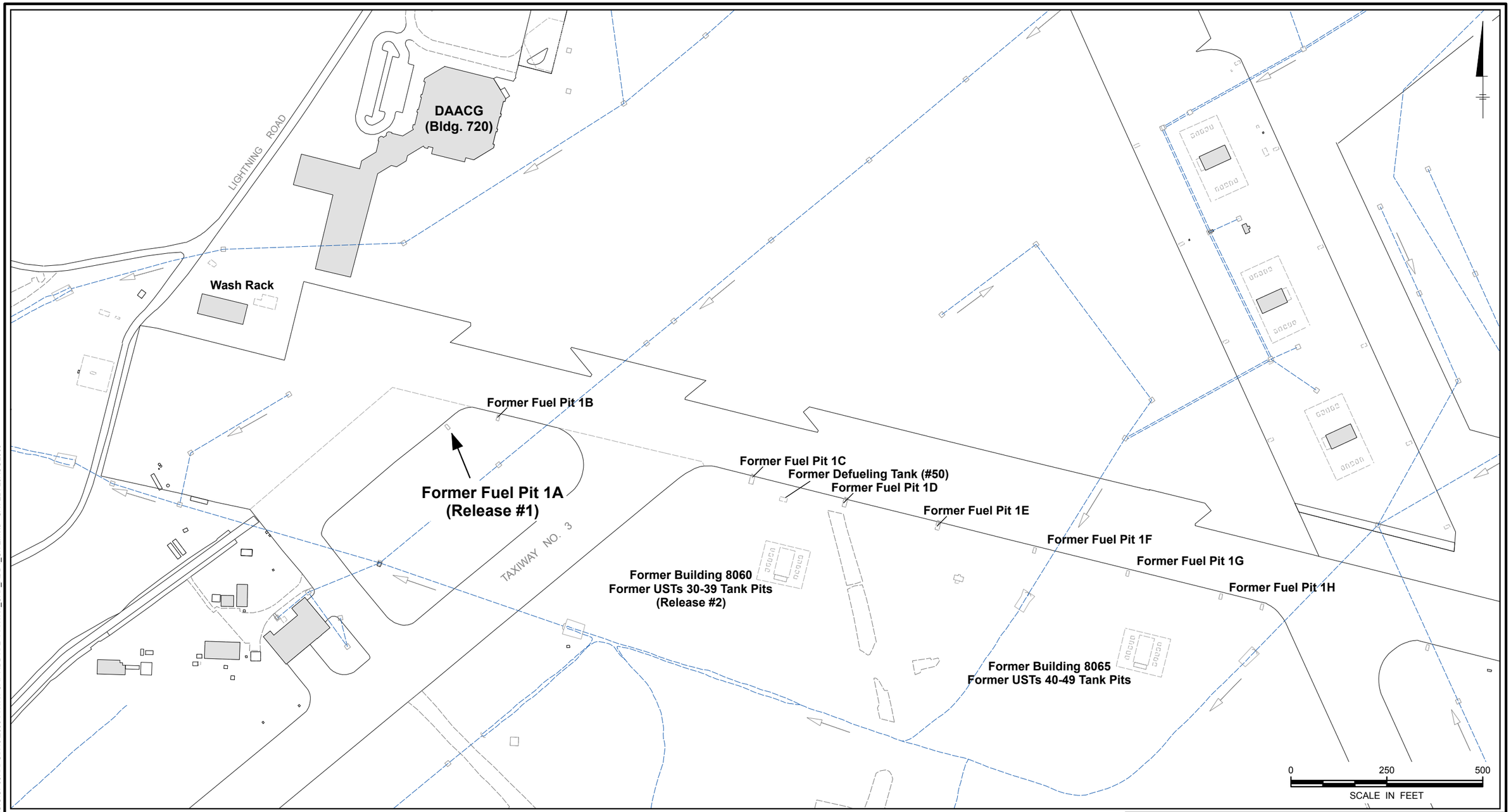
Appendix A

Figures



LEGEND

- Surface Water Drainage Canal
- Surface Water Flow Direction

HUNTER ARMY AIRFIELD, GEORGIA
FORMER PUMPHOUSE #1 (RELEASE #1)
FORMER BUILDING 8060, FACILITY ID #9-025085
REVISED CORRECTIVE ACTION PLAN – PART B ADDENDUM #1

Site Location

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FIGURE
2-1

CITY:(KNOXVILLE) DIV/GROUP:(ENV) DB:(B.ALTOM) LD:(B.ALTOM) PIC:(E.WERTH) PM:(C.BERTZ) TM:(S.GIBBENS/H.ENGLISH)
PROJECT: GP08HAFS.F13B.EH1R2 PATH: G:\GIS\GP08HAFS\H13\2009 PH1R1 CAP ADD1\F2-1 PH1R1_CAP_ADD1_SITE.mxd SAVED: 25AUG2009

D-MW-11	
Sample Date	6/8/2009
B	**62**
T	340
E	270
X	1,500

D-MW-19	
Sample Date	6/5/2009
B	**65**
T	2,000
E	430
X	1,600

D-MW-41	
Sample Date	6/5/2009
No Detects	

D-MW-34	
Sample Date	6/5/2009
B	**730**
T	**9,200**
E	910
X	4,800

D-MW-01	
Sample Date	6/5/2009
B	**120**
T	120
E	780
X	3,700

D-MW-35	
Sample Date	6/5/2009
B	**260**
T	1,700
E	72
X	720

D-MW-42	
Sample Date	6/5/2009
B	ND
T	ND
E	8.2
X	25

D-MW-02	
Sample Date	6/5/2009
B	**440**
T	3,700
E	260
X	2,000

D-MW-37	
Sample Date	6/8/2009
B	**260**
T	1,200
E	230
X	850

DAACG (Bldg. 720)

LIGHTNING

Wash Rack

D-MW-18 D-MW-19 D-MW-22 D-MW-40 D-MW-39 D-MW-44 D-MW-33 D-MW-11 D-MW-17 D-MW-20 D-MW-41 D-MW-38 D-MW-13 D-MW-12 D-MW-14 D-MW-16 D-MW-15 D-MW-42 D-MW-08 D-MW-09 D-MW-10 D-MW-43 D-MW-35 D-MW-37 D-MW-02 D-MW-03 D-MW-04 D-MW-36 P1-MW-42 P1-MW-13 P1-MW-11 P1-MW-12 P1-MW-14 P1-MW-16 P1-MW-15 D-MW-34 D-MW-01

285 51 51 51

Former Fuel Pit 1A (Release #1)

0 150 300
SCALE IN FEET

LEGEND

- Monitor Well (Pumphouse #1 CAP-A)
- Monitor Well (Pumphouse #1 CAP-B)
- Monitor Well (DAACG - shallow)
- Monitor Well (DAACG - 4-inch shallow)
- Surface Water Drainage Canal
- Surface Water Flow Direction
- Benzene Concentrations Exceed IWQS (51 µg/L)
- Benzene Concentrations Exceed ACL (285 µg/L)
- ND Not Detected

ACRONYMS		IWQS	ACL
B	Benzene	51	285
T	Toluene	5,980	800,000
E	Ethylbenzene	2,100	114,800
X	Xylenes (total)	---	---

NOTES:
1) Samples collected on June 5-8, 2009.
2) All concentrations reported in micrograms per liter (µg/L).
3) BTEX was analyzed by Method 8260B.
4) Shaded values exceed the In-Stream Water Quality Standard (IWQS) or Alternate Concentration Limit (ACL).
5) **BOLD** - Concentration exceeds IWQS.

HUNTER ARMY AIRFIELD, GEORGIA
FORMER PUMPHOUSE #1 (RELEASE #1)
FORMER BUILDING 8060, FACILITY ID #9-025085
REVISED CORRECTIVE ACTION PLAN – PART B ADDENDUM #1

BTEX Concentrations in Groundwater Monitor Wells (June 2009)

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FIGURE
3-1

CITY:(KNOXVILLE) DIV/GROUP:(ENV) DB:(B.ALTOM) LD:(B.ALTOM) PIC:(E.WERTH) PM:(C.BERTZ) TM:(S.BOSTIAN/A.AUFFERMAN/E.MADDOX)
PROJECT: GP08HAFS.H13B.EH1R1 PATH: G:\GIS\GP08HAFS\H13\2009 PH1R1 CAP ADD1\F5-1 PH1R1_CAP_ADD1_200906_BTEX.mxd SAVED: 25AUG2009

D-MW-11	
Sample Date	6/8/2009
Methane	920
Alkalinity	7.1 J
DOC	14
Nitrate-N	ND
Sulfate	1.2
Sulfide	ND
TPH-DRO	14,000
TPH-GRO	5,000

D-MW-19	
Sample Date	6/5/2009
Methane	1,100
Alkalinity	29
DOC	14
Nitrate-N	ND
Sulfate	5.2 J
Sulfide	5.2
TPH-DRO	10,000 J
TPH-GRO	540,000

D-MW-34	
Sample Date	6/5/2009
Methane	2,900
Alkalinity	8.5 J
DOC	ND
Nitrate-N	ND
Phosphorous	ND
Sulfate	1.7 J
Sulfide	2.0
TKN	0.71
TPH-DRO	5,000 J
TPH-GRO	830,000

D-MW-41	
Sample Date	6/5/2009
Methane	76
Alkalinity	5.3 J
DOC	4.7
Nitrate-N	ND
Phosphorous	ND
Sulfate	6.4 J
Sulfide	1.5
TKN	ND
TPH-DRO	ND
TPH-GRO	1,900

D-MW-01	
Sample Date	6/5/2009
Methane	1,200
Alkalinity	7.9 J
DOC	7.0
Nitrate-N	0.056
Sulfate	4.6
Sulfide	0.99 J
TPH-DRO	3,600 J
TPH-GRO	200,000

D-MW-35	
Sample Date	6/5/2009
Methane	890
Alkalinity	42
DOC	14
Nitrate-N	0.23
Sulfate	1.4 J
Sulfide	1.2
TPH-DRO	3,800 J
TPH-GRO	250,000

D-MW-42	
Sample Date	6/5/2009
Methane	200
Alkalinity	8.0 J
DOC	7.0
Nitrate-N	ND
Sulfate	4.0 J
Sulfide	0.99 J
TPH-DRO	1,900 J
TPH-GRO	25,000

D-MW-02	
Sample Date	6/5/2009
Methane	1,200
Alkalinity	ND
DOC	22
Nitrate-N	ND
Sulfate	1.8
Sulfide	2.8
TPH-DRO	15,000 J
TPH-GRO	470,000

D-MW-37	
Sample Date	6/8/2009
Methane	2,900
Alkalinity	8.9 J
DOC	16
Nitrate-N	ND
Sulfate	0.45 J
Sulfide	ND
TPH-DRO	8,900
TPH-GRO	5,600

DAACG (Bldg. 720)

Wash Rack

Former Fuel Pit 1A (Release #1)

D-MW-18, D-MW-19, D-MW-22, D-MW-40, D-MW-44, D-MW-39, D-MW-20, D-MW-33, D-MW-17, P1-MW-42, D-MW-11, D-MW-41, D-MW-38, D-MW-13, D-MW-12, D-MW-14, D-MW-34, D-MW-16, D-MW-01, D-MW-42, D-MW-15, D-MW-08, D-MW-43, D-MW-35, D-MW-37, D-MW-09, D-MW-02, D-MW-10, P1-MW-13, D-MW-36, P1-MW-11, D-MW-03, D-MW-04, P1-MW-12, P1-MW-14, P1-MW-16, P1-MW-15

0 150 300
SCALE IN FEET

LEGEND

- Monitor Well (Pumphouse #1 CAP-A)
- Monitor Well (Pumphouse #1 CAP-B)
- Monitor Well (DAACG - shallow)
- Monitor Well (DAACG - 4-inch shallow)
- Surface Water Drainage Canal
- Surface Water Flow Direction

ND Not Detected
J Estimated Value
DOC Dissolved Organic Carbon
TKN Total Kjedahl Nitrogen
TPH Total Petroleum Hydrocarbons

NOTES:
1) Samples collected on June 5-8, 2009.
2) All concentrations reported in milligrams per liter (mg/L).
3) TPH and Methane concentrations reported in micrograms per liter (µg/L).

HUNTER ARMY AIRFIELD, GEORGIA
FORMER PUMPHOUSE #1 (RELEASE #1)
FORMER BUILDING 8060, FACILITY ID #9-025085
REVISED CORRECTIVE ACTION PLAN – PART B ADDENDUM #1

Biogeochemical Concentrations in Groundwater Monitor Wells (June 2009)

ARCADIS

FIGURE
3-2

D-MW-11	
Sample Date	6/8/2009
Lead (dissolved)	0.0081 J
Lead (total)	0.0086 J
Iron (dissolved)	0.37
Iron (total)	0.38

D-MW-19	
Sample Date	6/5/2009
Lead (dissolved)	0.0053 J
Lead (total)	ND
Iron (dissolved)	0.056 J
Iron (total)	0.059 J

D-MW-34	
Sample Date	6/5/2009
Lead (dissolved)	**0.086**
Lead (total)	**0.10**
Iron (dissolved)	1.2
Iron (total)	1.2
Organic Lead	341

D-MW-41	
Sample Date	6/5/2009
Lead (dissolved)	0.0020 J
Lead (total)	ND
Iron (dissolved)	0.35
Iron (total)	0.35

D-MW-01	
Sample Date	6/5/2009
Lead (dissolved)	0.0033 J
Lead (total)	ND
Iron (dissolved)	1.4
Iron (total)	1.5

D-MW-42	
Sample Date	6/5/2009
Lead (dissolved)	ND
Lead (total)	ND
Iron (dissolved)	0.9
Iron (total)	1.2

D-MW-35	
Sample Date	6/5/2009
Lead (dissolved)	0.027
Lead (total)	**0.076**
Iron (dissolved)	0.78
Iron (total)	0.95
Organic Lead	ND

D-MW-02	
Sample Date	6/5/2009
Lead (dissolved)	0.0069 J
Lead (total)	ND
Iron (dissolved)	1.1
Iron (total)	1.2

D-MW-37	
Sample Date	6/8/2009
Lead (dissolved)	0.0047 J
Lead (total)	0.0048 J
Iron (dissolved)	0.7
Iron (total)	1.6

DAACG (Bldg. 720)

LIGHTNIN

Wash Rack

D-MW-18
D-MW-19
D-MW-22
D-MW-40
D-MW-44
D-MW-39
D-MW-20
D-MW-33
D-MW-17
P1-MW-42
D-MW-11
D-MW-41
D-MW-38
D-MW-13
D-MW-34
D-MW-12
D-MW-14
D-MW-16
D-MW-01
D-MW-42
D-MW-15
D-MW-08
D-MW-43
D-MW-35
D-MW-37
D-MW-09
D-MW-02
D-MW-10
P1-MW-13
D-MW-36
P1-MW-11
D-MW-03
P1-MW-12
D-MW-04
P1-MW-14
P1-MW-16
P1-MW-15
Former Fuel Pit 1A (Release #1)

0 150 300
SCALE IN FEET

LEGEND

- Monitor Well (Pumphouse #1 CAP-A)
- Monitor Well (Pumphouse #1 CAP-B)
- Monitor Well (DAACG - shallow)
- Monitor Well (DAACG - 4-inch shallow)
- Surface Water Drainage Canal
- Surface Water Flow Direction
- Lead Concentrations Exceed IWQS (0.03 mg/L)
- ND Not Detected
- J Estimated Value

NOTES:
1) Samples collected on June 5-8, 2009.
2) Lead and iron were the only metals analyzed.
3) Lead and iron values are reported in milligrams per liter (mg/L)
4) Organic lead values are reported in micrograms per liter (µg/L).
5) Shaded values exceed the In-Stream Water Quality Standard (IWQS).

HUNTER ARMY AIRFIELD, GEORGIA
FORMER PUMPHOUSE #1 (RELEASE #1)
FORMER BUILDING 8060, FACILITY ID #9-025085
REVISED CORRECTIVE ACTION PLAN – PART B ADDENDUM #1

Metal Concentrations in Groundwater Monitor Wells (June 2009)

ARCADIS

FIGURE
3-3

CITY:(KNOXVILLE) DIV/GROUP:(ENV) DB:(B.ALTOM) LD:(B.ALTOM) PIC:(E.WERTH) PM:(C.BERTZ) TM:(S.BOSTIANVE.MADDOX)
PROJECT: GP08HAFS.H1S8.EH1R1 PATH: G:\GIS\GP08HAFS\H1S2009 PH1R1 CAP ADD1\F3-3 PH1R1_CAP_ADD1_20090608_MET.mxd SAVED: 25AUG2009

D-MW-11	
Sample Date	6/8/2009
B	**62**
T	340
E	270
X	1,500

D-MW-19	
Sample Date	6/5/2009
B	**65**
T	2,000
E	430
X	1,600

D-MW-41	
Sample Date	6/5/2009
No Detects	

D-MW-34	
Sample Date	6/5/2009
B	**730**
T	**9,200**
E	910
X	4,800

D-MW-01	
Sample Date	6/5/2009
B	**120**
T	120
E	780
X	3,700

D-MW-35	
Sample Date	6/5/2009
B	**260**
T	1,700
E	72
X	720

D-MW-42	
Sample Date	6/5/2009
B	ND
T	ND
E	8.2
X	25

D-MW-02	
Sample Date	6/5/2009
B	**440**
T	3,700
E	260
X	2,000

D-MW-37	
Sample Date	6/8/2009
B	**260**
T	1,200
E	230
X	850

DAACG (Bldg. 720)

LIGHTNING

Wash Rack

D-MW-18 D-MW-19 D-MW-22 D-MW-40 D-MW-39 D-MW-44 D-MW-33 D-MW-11 D-MW-20 D-MW-17 D-MW-41 P1-MW-42 D-MW-38 D-MW-13 D-MW-12 D-MW-14 D-MW-16 D-MW-15 D-MW-34 D-MW-01 D-MW-42 D-MW-43 D-MW-35 D-MW-37 D-MW-08 D-MW-09 D-MW-02 D-MW-10 P1-MW-13 D-MW-36 P1-MW-11 D-MW-03 D-MW-04 P1-MW-12 P1-MW-14 P1-MW-16 P1-MW-15

285 51 51

Former Fuel Pit 1A (Release #1)

0 150 300

SCALE IN FEET

LEGEND

- Monitor Well (Pumphouse #1 CAP-A)
- Monitor Well (Pumphouse #1 CAP-B)
- Monitor Well (DAACG - shallow)
- Monitor Well (DAACG - 4-inch shallow)
- Proposed Injection Well/Radius of Influence (10 ft)
- Surface Water Drainage Canal
- Surface Water Flow Direction
- Benzene Concentrations Exceed IWQS (51 µg/L)
- Benzene Concentrations Exceed ACL (285 µg/L)
- ND Not Detected

ACRONYMS		IWQS	ACL
B	Benzene	51	285
T	Toluene	5,980	800,000
E	Ethylbenzene	2,100	114,800
X	Xylenes (total)	---	---

NOTES:
1) Samples collected on June 5-8, 2009.
2) All concentrations reported in micrograms per liter (µg/L).
3) BTEX was analyzed by Method 8260B.
4) Shaded values exceed the In-Stream Water Quality Standard (IWQS) or Alternate Concentration Limit (ACL).
5) **BOLD** - Concentration exceeds IWQS.

HUNTER ARMY AIRFIELD, GEORGIA
FORMER PUMPHOUSE #1 (RELEASE #1)
FORMER BUILDING 8060, FACILITY ID #9-025085
REVISED CORRECTIVE ACTION PLAN – PART B ADDENDUM #1

Remedial Design for Calcium Peroxide Injection Wells

ARCADIS

FIGURE
5-1

ARCADIS

Appendix B

Tables

Table 3-1
Biogeochemical Parameter Concentrations in Groundwater Monitor Wells - June 2009
Revised Corrective Action Plan - Part B Addendum #1
Former Pumphouse #1 (Release #1)
Former Building 8060
Hunter Army Airfield, Georgia

	Location ID	D-MW-01	D-MW-02	D-MW-11	D-MW-19	D-MW-34	D-MW-35	D-MW-37	D-MW-41	D-MW-42
	Sample ID	D-MW1 (060509)	D-MW2 (060509)	D-MW11(060809)	D-MW19(060509)	D-MW34 (060509)	D-MW35 (060509)	D-MW37(060809)	D-MW 41 (060509)	D-MW 42 (060509)
	Sample Date	6/5/2009	6/5/2009	6/8/2009	6/5/2009	6/5/2009	6/5/2009	6/8/2009	6/5/2009	6/5/2009
Chemical Name	Unit									
VOCs										
Methyl tert-butyl ether	ug/l	< 20	< 25	< 2.5	<5	< 25	< 20	< 10	< 0.5	< 0.5
Metals										
Iron (dissolved)	mg/l	1.4	1.1	0.37	0.056 J	1.2	0.78	0.7	0.35	0.9
Iron (total)	mg/l	1.5	1.2	0.38	0.059 J	1.2	0.95	1.6	0.35	1.2
Lead (dissolved)	mg/l	0.0033 J	0.0069 J	0.0081 J	0.0053 J	0.086	0.027	0.0047 J	0.002 J	< 0.01
Lead (total)	mg/l	0.0064 UB	0.026 UB	0.0086 J	0.0068 UB	0.1	0.076	0.0048 J	0.0035 UB	0.0023 UB
Organic Lead	ug/l	--	--	--	--	341	<23	--	--	--
Biogeo										
Methane	ug/l	1,200	1,200	920	1,100	2,900	890	2,900	76	200
TPH-GRO	ug/l	200,000	470,000	5,000	540,000	830,000	250,000	5,600	1,900	25,000
TPH-DRO	ug/l	3,600 J	15,000 J	14,000	10,000 J	5,000 J	3,800 J	8,900	200 UB	1,900 J
Sulfate	mg/l	4.6	1.8	1.2	5.2 J	1.7 J	1.4 J	0.45 J	6.4 J	4.0 J
TKN	mg/l	--	--	--	--	0.71	--	--	< 0.5	--
Nitrate	mg/l	0.056	0.045 UB	< 0.02	0.011 UB	< 0.02	0.23	< 0.02	0.0044 UB	0.0038 UB
Phosphorus	mg/l	--	--	--	--	< 0.01	--	--	< 0.01	--
Alkalinity	mg/l	7.9 J	< 10	7.1 J	29	8.5 J	42	8.9 J	5.3 J	8 J
Sulfide	mg/l	0.99 J	2.8	2.9 UB	5.2	2	1.2	2 UB	1.5	0.99 J
Dissoved Organic Carbon	mg/l	7	22	14	14	10 UB	14	16	4.7	7

Notes:
mg/L - miligram per Liter
ug/L - microgram per Liter
J - estimated result
UB - result reported as non-detect due to blank contamination
TKN - Total Kjedahl Nitrogen
TPH - Total Petroleum Hydrocarbons
DRO - Diesel Range Organics
GRO - Gasoline Range Organics

Table 3-2
Field Parameters in Groundwater Monitor Wells - June 2009
Revised Corrective Action Plan-Part B Addendum #1
Former Pumphouse #1 (Release #1)
Former Building 8060
Hunter Army Airfield, Georgia

Sample ID	Turbidity (NTUs)	pH (SU)	Conductivity (uS/cm)	Temp. (^{o}C)	DO (mg/L)
D-MW-01	0.0	4.66	40	26.18	0.22
D-MW-02	0.0	4.28	37	26.09	0.19
D-MW-11	2.74	4.55	32	27.18	0.64
D-MW-19	0.03	5.07	93	26.24	0.57
D-MW-34	0.0	4.64	38	25.22	0.46
D-MW-35	0.0	5.55	143	26.91	0.28
D-MW-37	3.98	4.68	50	25.73	0.26
D-MW-41	0.0	4.69	40	27.96	0.49
D-MW-42	4.5	4.99	37	26.69	0.55

Notes:
NTU - Nephelometric Turbidity Units
SU - Standard Unit
mg/L - milligram per Liter
uS/cm - microsiemens per centimeter
^{o}C - degrees Celsius

Table 3-3
Historical BTEX Concentrations in Monitor Wells
Revised Corrective Action Plan - Part B Addendum #1
Former Pumphouse #1 (Release #1)
Former Building 8060
Hunter army Airfield, Georgia

Sample Location	Sample ID	Date Sampled	Benzene (• g/L)	Toluene (• g/L)	Ethylbenzene (• g/L)	Xylenes (• g/L)
Supplemental Corrective Action Plan–Part B Investigation – 2001 (Release #1)						
D-MW-01	AK0122	3/10/2001	**99.8 =**	17.3 =	119 =	776 =
D-MW-02	AK0222	3/11/2001	***400* =**	**11,200 =**	1,050 =	4,940 =
D-MW-03	AK0322	3/11/2001	1 U	1 U	0.21 J	0.74 J
D-MW-08	AK0822	3/11/2001	**156 =**	31.4 =	389 =	1,930 =
D-MW-09	AK0922	3/9/2001	1 U	1 U	1 U	0.54 J
D-MW-11	AK1122	3/10/2001	**179 =**	398 =	187 =	1,490 =
D-MW-12	AK1222	3/11/2001	**58.1 =**	123 =	222 =	2,020 =
D-MW-13	AK1322	3/9/2001	25.0 U	36.2 U	861 =	3,200 =
D-MW-14	AK1422	3/9/2001	1 U	1 U	0.2 J	1.4 J
D-MW-17	AK1722	3/11/2001	**159 =**	3,550 =	364 =	3,250 =
D-MW-18	AK1822	3/10/2001	0.32 J	1.4 =	0.61 J	4.3 =
D-MW-19	AK1922	3/9/2001	**64.2 =**	1,510 =	365 =	1,450 =
D-MW-20	AK2022	3/9/2001	1 U	1 U	1 U	3 U
D-MW-22	AK2222	3/9/2001	1 U	0.33 J	1 U	3 U
D-MW-33	AK3322	3/9/2001	**77.9 =**	774 =	470 =	2,060 =
D-MW-34	AK3422	3/11/2001	***388* =**	**8,180 =**	1,060 =	4,740 =
D-MW-35	AK3522	3/11/2001	***765* =**	**29,600 =**	1,280 =	6,370 =
D-MW-36	AK3622	3/9/2001	**197 =**	2,050 =	586 =	2,120 =
D-MW-37	AK3722	3/10/2001	***601* =**	5,340 =	423 =	1,860 =
D-MW-38	AK3822	3/9/2001	**123 =**	2,410 =	738 =	3,730 =
D-MW-39	AK3922	3/9/2001	29.7 =	98.4 =	340 =	2,010 =
D-MW-40	AK4022	3/9/2001	***313* =**	75.3 =	959 =	4,230 =
D-MW-41	AK4122	3/9/2001	1 U	1 U	1 U	0.43 J
D-MW-42	AK4222	3/9/2001	1 U	112 =	192 =	962 =
D-MW-43	AK4322	3/9/2001	10 =	157 =	36.8 =	161 =
P1-MW-12	AN1222	3/11/2001	1.7 =	2.1 =	138 =	440 =
P1-MW-13	AN1322	3/9/2001	19.5 =	493 =	182 =	788 =
P1-MW-14	AN1422	3/10/2001	0.2 J	1.5 =	1.2 =	6 =
P1-MW-15	AN1522	3/10/2001	1 U	0.29 J	0.24 J	1.3 J
P1-MW-16	AN1622	3/10/2001	1 U	0.27 J	1 U	0.4 U
P1-MW-42	AN4222	3/9/2001	1 U	1 U	1 U	0.48 J
Instream Water Quality Standard (IWQS)			51	5,980	2,100	NRC
Alternate Concentration Limit			285	800,000	114,800	--

Source: 2007 Free Product Removal and Monitoring only Report (SAIC 2008)

Notes:

a - Groundwater sample inadvertently not collected in December 2006; therefore, the sample was collected in January

Bold values exceed In-Stream Water Quality Standard

Italic values exceed Alternate Concentration Limits

BTEX - benzene, toluene, ethylbenzene, and xylenes

ND - Not Detected

NRC - No Regulatory Criteria

Laboratory Qualifiers:

J - Indicates that the value for the compound is estimated

U - Indicates that the compound was not detected at the concentration reported

= - Indicates that the compound was detected at the concentration reported

Table 3-3
Historical BTEX Concentrations in Monitor Wells
Revised Corrective Action Plan - Part B Addendum #1
Former Pumphouse #1 (Release #1)
Former Building 8060
Hunter army Airfield, Georgia

Sample Location	Sample ID	Date Sampled	Benzene (• g/L)	Toluene (• g/L)	Ethylbenzene (• g/L)	Xylenes (• g/L)
First Annual Sampling Event – December 2006						
D-MW-01	AK0132	12/14/2006	**95.9 =**	43.9 =	605 =	1,930 =
D-MW-02	AK0232	12/14/2006	***399* =**	2,430 =	659 =	1,940 =
D-MW-03	AK0332	12/14/2006	1 U	0.563 J	0.518 J	2.2 =
D-MW-08	AK0832	12/14/2006	**113 =**	51.2 =	258 =	1,390 =
D-MW-09	AK0932	12/13/2006	1 U	1 U	1 U	1 U
D-MW-11	AK1132	12/14/2006	**78 =**	312 =	352 =	1,750 =
D-MW-12	AK1232	12/14/2006	15.2 =	63 =	337 =	1,940 =
D-MW-13	AK1332	12/15/2006	1 U	3.27 J	332 =	721 =
D-MW-14	AK1432	12/13/2006	1 U	1 U	1 U	1 U
D-MW-17	AK1732	12/15/2006	45.6 **=**	1,280 =	264 =	1,810 =
D-MW-18	AK1832	12/15/2006	1 U	1 U	1 U	1 U
D-MW-19	AK1932	12/15/2006	**98.6 =**	2,270 =	705 =	2,170 =
D-MW-20	AK2032	12/15/2006	1 U	0.436 J	1 U	0.458 J
D-MW-22	AK2232	12/15/2006	1 U	1 U	1 U	1 U
D-MW-33	AK3332	12/14/2006	**115 =**	1,130 =	287 =	1,140 =
D-MW-34	AK3432	12/14/2006	**254 =**	2,220 =	175 =	1,490 =
D-MW-35	AK3532	12/14/2006	**143 =**	922 =	126 =	1,400 =
D-MW-36	AK3632	12/13/2006	**131 =**	18 =	234 =	379 =
D-MW-37	AK3732	12/13/2006	18.5 **=**	130 =	14.5 =	79.3 =
D-MW-38	AK3832	12/14/2006	18.8 **=**	116 =	291 =	1300 =
D-MW-39	AK3932	12/15/2006	1 U	0.273 J	18.6 =	9.74 =
D-MW-40	AK4032	12/15/2006	8.09 **=**	4.95 =	46.4 =	181 =
D-MW-41	AK4132	12/13/2006	1 U	0.266 J	1 U	0.474 J
D-MW-42	AK4232	12/13/2006	1 U	0.392 J	2.59 =	10.2 =
D-MW-43	AK4332	12/15/2006	28.4 =	119 =	200 =	562 =
D-MW-44	AK4432	01/17/07*a*	23.2 =	85 =	225 =	496 =
P1-MW-12	AN1232	12/13/2006	1.42 =	0.452 J	234 =	247 =
P1-MW-13	AN1332	12/15/2006	6.82 =	50.6 =	252 =	899 =
P1-MW-14	AN1432	12/13/2006	1 U	1 U	1 U	1 U
P1-MW-15	AN1532	12/13/2006	1 U	1 U	1 U	1 U
Instream Water Quality Standard (IWQS)			51	5,980	2,100	NRC
Alternate Concentration Limit			285	800,000	114,800	--

Source: 2007 Free Product Removal and Monitoring only Report (SAIC 2008)

Notes:
a - Groundwater sample inadvertently not collected in December 2006; therefore, the sample was collected in January
Bold values exceed In-Stream Water Quality Standard
Italic values exceed Alternate Concentration Limits
ND - Not Detected
NRC - No Regulatory Criteria
Laboratory Qualifiers:
J - Indicates that the value for the compound is estimated
U - Indicates that the compound was not detected at the concentration reported
= - Indicates that the compound was detected at the concentration reported

Table 3-3
Historical BTEX Concentrations in Monitor Wells
Revised Corrective Action Plan - Part B Addendum #1
Former Pumphouse #1 (Release #1)
Former Building 8060
Hunter army Airfield, Georgia

Sample Location	Sample ID	Date Sampled	Benzene (• g/L)	Toluene (• g/L)	Ethylbenzene (• g/L)	Xylenes (• g/L)
Second Annual Sampling Event – December 2007						
D-MW-01	AK0152	12/6/2007	17.9 =	5.1 =	228 =	512 =
D-MW-02	AK0252	12/6/2007	**204 =**	2,550 =	324 =	1,650 =
D-MW-03	AK0352	12/5/2007	1 U	1 U	1 U	1 U
D-MW-08	AK0852	12/5/2007	**118 =**	26.4 =	312 =	1,610 =
D-MW-09	AK0952	12/5/2007	1 U	1 U	1 U	1 U
D-MW-11	AK1152	12/6/2007	**90.3 =**	277 =	247 =	1,580 =
D-MW-12	AK1252	12/5/2007	8.77 =	69.1 =	174 =	605 =
D-MW-13	AK1352	12/5/2007	1 U	2.13 =	334 =	633 =
D-MW-14	AK1452	12/5/2007	1 U	1 U	1 U	1 U
D-MW-17	AK1752	12/7/2007	51.5 =	2,680 =	297 =	1,420 =
D-MW-18	AK1852	12/6/2007	1 U	1 U	1 U	1 U
D-MW-19	AK1952	12/6/2007	**96.3 =**	2,280 =	692 =	811 =
D-MW-20	AK2052	12/6/2007	1 U	1 U	1 U	0.281 J
D-MW-22	AK2252	12/7/2007	1 U	1 U	1 U	1 U
D-MW-33	AK3352	12/6/2007	**240 =**	1,180 =	557 =	2,240 =
D-MW-34	AK3452	12/6/2007	***935 =***	**8,270 =**	1,000 =	4,680 =
D-MW-35	AK3552	12/6/2007	***330 =***	3,180 =	130 =	1,010 =
D-MW-36	AK3652	12/6/2007	**116 =**	10.5 =	165 =	369 =
D-MW-37	AK3752	12/7/2007	**212 =**	407 =	77.1 =	384 =
D-MW-38	AK3852	12/7/2007	3.97 =	3.65 =	80 =	283 =
D-MW-39	AK3952	12/7/2007	1.7 =	0.259 J	64.8 =	32.6 =
D-MW-40	AK4052	12/7/2007	5.94 =	2.25 =	44.1 =	170 =
D-MW-41	AK4152	12/7/2007	1 U	0.492 J	1 U	0.464 J
D-MW-42	AK4252	12/7/2007	1 U	1 U	1.63 =	2.07 =
D-MW-43	AK4352	12/8/2007	9.99 =	158 =	82.8 =	269 =
D-MW-44	AK4452	12/7/2007	13.1 =	78.9 =	54.2 =	206 =
P1-MW-12	AN1252	12/7/2007	1.02 =	0.307 J	265 =	211 =
P1-MW-13	AN1352	12/8/2007	7.43 =	194 =	195 =	536 =
P1-MW-14	AN1452	12/8/2007	1 U	0.263 J	1 U	0.317 J
P1-MW-15	AN1552	12/7/2007	1 U	1 U	1 U	1 U
Instream Water Quality Standard (IWQS)			51	5,980	2,100	NRC
Alternate Concentration Limit			285	800,000	114,800	--

Source: 2007 Free Product Removal and Monitoring only Report (SAIC 2008)

Notes:
a - Groundwater sample not collected in December 2006; sample was collected in January 2007.
Bold values exceed In-Stream Water Quality Standard
Italic values exceed Alternate Concentration Limits
ND - Not Detected
NRC - No Regulatory Criteria
Laboratory Qualifiers:
J - Indicates that the value for the compound is estimated
U - Indicates that the compound was not detected at the concentration reported
= - Indicates that the compound was detected at the concentration reported

Table 3-3
Historical BTEX Concentrations in Monitor Wells
Revised Corrective Action Plan - Part B Addendum #1
Former Pumphouse #1 (Release #1)
Former Building 8060
Hunter army Airfield, Georgia

Sample Location	Sample ID	Date Sampled	Benzene (• g/L)	Toluene (• g/L)	Ethylbenzene (• g/L)	Xylenes (• g/L)
Groundwater DPT Samples - January 2008						
D-DB-01	AK0118(011508)	1/15/2008	1 U	1.63 =	0.754 J	3.35 =
D-DB-02	AK0214(011508)	1/15/2008	0.999 J	122 =	150 =	496 =
D-DB-02	AK0218(011508)	1/15/2008	0.959 J	141 =	159 =	535 =
D-DB-03	AK0318(011508)	1/15/2008	1 U	0.276 J	0.257 J	0.904 J
D-DB-04	AK0418(011508)	1/15/2008	**216 =**	2360 =	1010 =	3890 =
D-DB-05	AK0518(011608)	1/16/2008	**137 =**	3730 =	542 =	1890 =
D-DB-06	AK0618(011608)	1/16/2008	**106 =**	**10100 =**	1030 =	3900 =
D-DB-07	AK0714(011608)	1/16/2008	1 U	0.553 J	0.357 J	1.65 =
D-DB-07	AK0718(011608)	1/16/2008	1 U	0.622 J	0.367 J	1.56 =
D-DB-08	AK0818(012308)	1/23/2008	**131 =**	917 =	827 =	3740 =
D-DB-09	AK0918(012308)	1/23/2008	0.815 J	7.36 =	641 =	2080 =
D-DB-10	AK1018(012408)	1/24/2008	**171 =**	5830 =	577 =	3610 =
D-DB-11	AK1118(012408)	1/24/2008	**133 =**	**6680 =**	1070 =	5670 =
D-DB-12	AK1218(012408)	1/24/2008	1 U	4.46 =	83.9 =	192 =
D-DB-12	AK1214(012408)	1/24/2008	1 U	4.12 =	80.1 =	183 =
D-DB-13	AK1318(012408)	1/24/2008	0.538 J	0.476 J	1 U	1 U
D-DB-14	AK1418(012308)	1/23/2008	***738 =***	**6130 =**	808 =	3680 =
D-DB-15	AK1518(012308)	1/23/2008	**156 =**	1140 =	384 =	1800 =
D-DB-16	AK1618(012408)	1/24/2008	35.5 =	333 =	810 =	3570 =
D-DB-17	AK1714(012408)	1/24/2008	6.51 =	2250 =	415 =	1910 =
D-DB-17	AK1718(012408)	1/24/2008	5.97 =	2350 =	440 =	2070 =
D-DB-18	AK1818(012408)	1/24/2008	1.56 =	246 =	1500 =	5190 =
D-DB-19	AK1918(012508)	1/25/2008	1 U	0.329 J	0.266 J	1 U
D-DB-20	AK2018(012308)	1/23/2008	***448 =***	1370 =	653 =	3280 =
D-DB-21	AK2118(012308)	1/23/2008	***599 =***	5460 =	786 =	3570 =
D-DB-22	AK2218(012508)	1/25/2008	***497 =***	250 =	548 =	2160 =
D-DB-23	AK2318(012508)	1/25/2008	**93.4 =**	21.4 =	871 =	2550 =
D-DB-24	AK2418(012508)	1/25/2008	0.399 J	6.55 =	50.3 =	143 =
D-DB-25	AK2518(012508)	1/25/2008	1 U	1 U	0.252 J	1U
D-DB-26	AK2618(012508)	1/25/2008	***382 =***	3280 =	620 =	2580 =
D-DB-27	AK2714(012608)	1/26/2008	**208 =**	5210 =	543 =	2160 =
D-DB-27	AK2718(012608)	1/26/2008	**271 =**	**6570 =**	680 =	2720 =
D-DB-28	AK2818(012608)	1/26/2008	***1,360 =***	555 =	715 =	2650 =
D-DB-29	AK2918(012608)	1/26/2008	***709 =***	292 =	919 =	3490 =
D-DB-30	AK3018(012608)	1/26/2008	10.4 =	2.04 J	70.3 =	330 =
D-DB-31	AK3118(012608)	1/26/2008	1 U	0.27 J	0.579 J	1.74 =
D-DB-32	AK3218(012708)	1/27/2008	37 =	2300 =	472 =	1810 =
D-DB-32	AK3214(012708)	1/27/2008	32.5 =	2240 =	439 =	1620 =
D-DB-33	AK3318(012708)	1/27/2008	**153 =**	3700 =	424 =	1790 =
D-DB-34	AK3418(012708)	1/27/2008	***434 =***	4030 =	673 =	1380 =
D-DB-35	AK3518(012708)	1/27/2008	**157 =**	276 =	952 =	4490 =
D-DB-36	AK3618(012608)	1/26/2008	9.47 =	8.85 =	447 =	1720 =
D-DB-37	AK3718(012608)	1/26/2008	1 U	1 U	1 U	0.301 J
D-DB-38	AK3818(011608)	1/16/2008	1.28 =	385 =	338 =	1220 =
D-DB-39	AK3918(011608)	1/16/2008	2.04 =	555 =	120 =	475 =
D-DB-40	AK4018(012308)	1/23/2008	1.97 =	1.62 =	12.9 =	67.3 =
D-DB-41	AK4118(012708)	1/27/2008	12.4 =	119 =	302 =	1180 =
D-DB-42	AK4218(012708)	1/27/2008	1 U	59.9 =	480 =	3080 =
D-DB-43	AK4318(012808)	1/28/2008	1 U	1 U	1 U	0.728 J
D-DB-44	AK4418(012808)	1/28/2008	1 U	1 U	1 U	0.264 J
D-DB-45	AK4518(012808)	1/28/2008	1 U	1 U	1 U	1 U
Instream Water Quality Standard (IWQS)			51	5,980	2,100	NRC
Alternate Concentration Limit			285	800,000	114,800	--

Source:2008 Supplemental Site Investigation Data Package Former Pumphouse #1, Release #1 (SAIC, 2008)

Notes:
Bold values exceed IWQS
Italics values exceed alternate threshold limits
ug/L - microgram per Liter
NRC - No regulatory Criteria
DPT - Direct Push Tecnology
Laboratory Qualifiers:
U - Indicates the compound was not detected at the concentration reported
J - Indicates the value of the compound is an estimated value
= - Indicates the compound was detected at the concentration reported

Table 3-3
Historical BTEX Concentrations in Monitor Wells
Revised Corrective Action Plan - Part B Addendum #1
Former Pumphouse #1 (Release #1)
Former Building 8060
Hunter army Airfield, Georgia

Sample Location	Sample ID	Date Sampled	Benzene (• g/L)	Toluene (• g/L)	Ethylbenzene (• g/L)	Xylenes (• g/L)
Third Annual Sampling Event – December 2008						
D-MW-01	D-MW1 (121608)	12/16/2008	***300***	220	2,500	8,800
D-MW-02	D-MW2 (121708)	12/17/2008	**260**	2,200	230	1,200
D-MW-08	D-MW8 (121708)	12/17/2008	**120**	20	260	1,400
D-MW-11	D-MW11 (121708)	12/17/2008	**74**	280	270	1,600
D-MW-12	D-MW12 (121708)	12/17/2008	15	140	270	1,700
D-MW-13	D-MW13 (121708)	12/17/2008	2.5 U	2.5 U	220	800
D-MW-17	D-MW17 (121708)	12/17/2008	40	1,600	210	1,500
D-MW-18	D-MW18 (121708)	12/17/2008	0.5 U	0.5 U	0.5 U	0.5 U
D-MW-19	D-MW19 (121708)	12/17/2008	**120**	2,900	690	2,400
D-MW-22	D-MW22 (121708)	12/17/2008	0.5 U	0.5 U	0.5 U	0.5 U
D-MW-33	D-MW33 (11708)	12/17/2008	**250**	1,400	530	2,200
D-MW-34	D-MW34 (121608)	12/16/2008	***490 J***	4,900 J	510 J	2,700 J
D-MW-34	DUP-HAA13RI-1 (121608)	12/16/2008	**240 J**	2,400 J	220 J	1,300 J
D-MW-35	D-MW35 (121708)	12/17/2008	**140**	1,100	110	840
D-MW-35	DUP-HAA13R1-2 (121708)	12/17/2008	**140**	1,000	98	740
D-MW-36	D-MW36 (121608)	12/16/2008	**57**	1.7	200	350
D-MW-37	D-MW37 (121708)	12/17/2008	**64**	100	160	720
D-MW-38	D-MW38 (121708)	12/17/2008	3.1	4.3	43	160
D-MW-39	D-MW39 (121708)	12/17/2008	2.7	1.9	40	180
D-MW-40	D-MW40 (121708)	12/17/2008	16	11	94	420
D-MW-41	D-MW41 (121708)	12/17/2008	0.5 U	0.5 U	0.5 U	0.5 U
D-MW-42	D-MW42 (121708)	12/17/2008	0.5 U	0.5 U	1.4	1.9
D-MW-43	D-MW43 (121808)	12/18/2008	22	57	180	620
P1-MW-11	P1-MW11 (121608)	12/16/2008	29	91	680	1,900
P1-MW-12	P1-MW12 (121608)	12/16/2008	0.5 U	0.5 U	17	64
P1-MW-13	P1-MW13 (121608)	12/16/2008	4.8	130	160	480
P1-MW-42	P1-MW42 (121708)	12/17/2008	0.5 U	0.5 U	0.5 U	0.5 U
In-Stream Water Quality Standard (IWQS)			51	5,980	2,100	NRC
Alternate Concentration Limit (ACL)			285	800,000	114,800	--
Sample Location	**Sample ID**	**Date Sampled**	**Benzene (• g/L)**	**Toluene (• g/L)**	**Ethylbenzene (• g/L)**	**Xylenes (• g/L)**
Semi-Annual Sampling Event – June 2009						
D-MW-01	D-MW1 (060509)	6/5/2009	**120**	120	780	3,700
D-MW-02	D-MW2 (060509)	6/5/2009	***440***	3,700	260	2,000
D-MW-11	D-MW11(060809)	6/8/2009	**62**	340	270	1,500
D-MW-19	D-MW19(060509)	6/5/2009	**65**	2,000	430	1,600
D-MW-34	D-MW34 (060509)	6/5/2009	***730***	**9,200**	910	4,800
D-MW-35	D-MW35 (060509)	6/5/2009	**260**	1,700	72	720
D-MW-37	D-MW37(060809)	6/8/2009	**260**	1,200	230	850
D-MW-41	D-MW 41 (060509)	6/5/2009	< 0.5	< 0.5	< 0.5	< 0.5
D-MW-42	D-MW 42 (060509)	6/5/2009	< 0.5	< 0.5	8.2	25
In-Stream Water Quality Standard (IWQS) **(Revised 2009)**			51	5,980	2,100	--
Alternate Concentration Limit (ACL)			285	114,800	800,000	--

Notes:
Bold values exceed IWQS or ACLs
Italics values exceed alternate threshold limits
ug/L - microgram per Liter
NRC - No regulatory Criteria
DPT - Direct Push Tecnology

Laboratory Qualifiers:
U - Indicates the compound was not detected at the concentration reported
J - Indicates the value of the compound is an estimated value
= - Indicates the compound was detected at the concentration reported

Table 4-1
Properties of Oxygen Release Chemicals
Revised Corrective Action Plan-Part B Addendum #1
Former Pumphouse #1 (Release #1)
Former Building 8060
Hunter Army Airfield, Georgia

Properties	**Magnesium-Peroxide**	**Calcium-Peroxide**	**Sodium-Percarbonate**
Formula	MgO_2	CaO_2	$2\ Na_2CO_3\ \ 3\ H_2O_2$
Molecular weight (g/mol)	56	72	314
Purity (%)	35	>75	>88
Additions	Mg (60%)	$Ca(OH)_2$, $CaCO_3$	
pH (con = 10 g/L; T = 20°C)	10.3	11.9	10.4-10.6
Density (kg/m^3)	500	670	900-1200
Solubility in water (g/L)	<0.1	<0.1	150
formed in solution	$Mg(OH)_2$, O_2	$Ca(OH)_2$, O_2	Na_2CO_3, H_2O_2 and O_2
Clogging Potential	Yes: $Mg(OH)_2$	Yes: $Ca(OH)_2$	No
$\%O_2$ generated	28	22	15
$\%O_2$ in relation to its purity	10	17	13

ARCADIS

Appendix C

Laboratory Analytical Results

Chain of Custody Record

SHEALY ENVIRONMENTAL SERVICES, INC.
106 Va Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111

JUN 12 2009
URS & M
Corporation, Inc.

Number 2134

Client: ARCADIS	Report to Contact: Scott Bostian	Telephone No. / Fax No. / E-mail: 770-431-8666 / 770-435-2666
Address: 2849 Paces Ferry Rd	Sampler's Signature: X [signature]	Quote No.
City: Atlanta / State: GA / Zip Code: 30339	Printed Name: Erica Maddox	Waybill No.
Project Name: HAA-13 Pumphouse 1 Release 1		Page 1 of 1
Project No.: GP08HAFS. H13A. NAIR2	P.O. No.	Analysis (Attach list if more space is needed.)

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Solid	Non-Aqueous	No. of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	BTEX/MTBE	SVOCs	Dissolved Iron & Lead	Total Iron & Lead	TPH	DOC, Alk, Nitrate, Sulfate	TCL PVOCs	TCL SVOCs	Hydrocarbon Screening
D-MW37 (060809)	6/8/09	1350	G	X			2		1	5	1		✓	✓	✓	✓	✓	✓			
D-MW11 (060809)		1345	G	X			2		1	5	1		✓	✓	✓	✓	✓	✓			
IB-01 (060809)		1200	G	X						2			✓								
HA13R1IDW-1 (060809)	↓	1430	G	X			3			3			SEND LAST				SEND LAST		✓	✓	✓

Lot No. KF09013

Remarks / Cooler I.D.

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

Sample Disposal
☐ Return to Client ☐ Disposal by Lab

Note: All samples are retained for six weeks from receipt unless other arrangements are made.

Turn Around Time Required (Prior lab approval required for expedited TAT.)
☐ Standard ☐ Rush (Specify)

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished by: [signature]	6-8-09	1500	1. Received by		
2. Relinquished by			2. Received by		
3. Relinquished by: [signature]	6/9/09	0915	3. Laboratory received by: [signature]	6/9/09	0915

Comments

LAB USE ONLY
Received on ice (Circle) (Yes) No Ice Pack

Receipt Temp. 3.5 °C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number F-AD-013 Effective Da

SHEALY ENVIRONMENTAL SERVICES, INC.

106 Var Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111

Chain of Custody Record

Number 1-2191

Client: ARCADIS	Report to Contact: Scott Bostian	Telephone No. / Fax No. / E-mail: 770-435-2666	Quote No.
Address: 2849 Paces Ferry Rd	Sampler's Signature: x Erica Maddox	Waybill No.	Page 1 of 1
City: Atlanta / State: GA / Zip Code: 30339	Printed Name: Erica Maddox	Analysis (Attach list if more space is needed.)	
Project Name: HAA13 Pumphouse 1, Release 1			
Project No.: GP08HAFS.H13A.NIR1	P.O. No.		Lot No.: KF06033

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Solid	Non-Aqueous	No. of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	BTEX/MTBE	Total Lead & Iron	D 45. Lead & Iron	Nit. N, Sulfate, DOC	TPH	Remarks / Cooler I.D.
D-MW1 (060509)	6/5/09	1115		X			3		1	5			✓	✓	✓	✓	✓	
D-MW2 (060509)		1300		X			3		1	5			✓	✓	✓	✓	✓	
TB-03 (060509)		1230		X						3			✓					

6/6/09

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

Sample Disposal: ☐ Return to Client ☐ Disposal by Lab

Note: All samples are retained for six weeks from receipt unless other arrangements are made.

Turn Around Time Required (Prior lab approval required for expedited TAT.): ☑ Standard ☐ Rush (Specify)

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished by: Erica Maddox	6/5/09	1700	1. Received by		
2. Relinquished by	Date	Time	2. Received by	6/6/09	0930
3. Relinquished by: FedEx	6/6/09	930	3. Laboratory received by: Scott Moffitt	~~6/5/09~~	~~1700~~ SAM 6/6/09

Comments

LAB USE ONLY
Received on ice (Circle) (Yes) No Ice Pack

Receipt Temp. 2.8 °C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

SHEALY **Chain of Custody Record**

SHEALY ENVIRONMENTAL SERVICES, INC.
106 Vantage Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111

Number 102226

Client: ARCADIS
Address: 2849 Paces Ferry Rd
City: Atlanta | State: GA | Zip Code: 30339
Project Name: HAA-13 Pumphouse 1, Release 1
Project No.: GP08HAFS, H13A, NM12

Report to Contact: Scott Bostian
Sampler's Signature: X Erica Maddox
Printed Name: Erica Maddox

Telephone No. / Fax No. / E-mail: 770-431-8666 / 770-435-2666
Waybill No.:
Quote No.:
Page 1 of 1

Analysis (Attach list if more space is needed.)

P.O. No.:

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Solid	Non-Aqueous	No. of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	BTEX/MTBE	Sulfide	Lead Speciation	Total Lead + Iron	Diss. Lead + Iron	TPH	Alkalinity, Nitrate, Sulfate	Total Phosphorous	TKN
D-MW34 (060509)	6/5/09	0910		X			2		3	3			✓	✓	✓	✓	✓	✓	✓	✓	✓
D-MW35 (060509)		1425		X			2		3	3			✓	✓	✓	✓	✓	✓	✓		✓
TB-02 (060509)		0900		X						2											

Lot No.: KF06034
Remarks / Cooler I.D.:

Added Sulfide as per client request NMS 06/12/09

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

Sample Disposal
☐ Return to Client ☐ Disposal by Lab

Note: All samples are retained for six weeks from receipt unless other arrangements are made.

Turn Around Time Required (Prior lab approval required for expedited TAT.)
☒ Standard ☐ Rush (Specify)

QC Requirements (Specify)

	Date	Time
1. Relinquished by: Erica Maddox	6/5/09	1700
2. Relinquished by:		
3. Relinquished by: FedEx	6/6/09	930

	Date	Time
1. Received by		
2. Received by	6/6/09	0930
3. Laboratory received by: Scott Mallett	6/5/09	1700 SAM 6/6/09

Comments:
LAB USE ONLY
Received on ice (Circle) Yes No Ice Pack
SAM 6/6/09
Receipt Temp. X °C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

SHEALY *Chain of Custody Record*

SHEALY ENVIRONMENTAL SERVICES, INC.
106 Vantage Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111

Number 102281

Client: Arcadis	Report to Contact: Scott Bostian	Telephone No. / Fax No. / E-mail: 770-431-8666 / 770-435-2666	Quote No.
Address: 2849 Paces Ferry Rd Ste400	Sampler's Signature: X Cecil Bell	Waybill No.	Page 1 of 1
City: Atlanta / State: GA / Zip Code: 30339	Printed Name: Cecilia Bell		
Project Name: HAA13 Pumphouse 1 Release1			
Project No.: GP08HAFS. H13A, N1R1	P.O. No.		

Analysis (Attach list if more space is needed.)

Lot No.: KF06024

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Solid	Non-Aqueous	No. of Containers by Preservative Type: Unpres.	H_2SO_4	HNO_3	HCl	NaOH	5035 Kit	AIK, Sulfate, COD	Sulfide	Dissolved Lead Dissolved Iron	BTEX / MTBE	TPH	Total Iron, Total Lead	NO_3	TKN	Remarks / Cooler I.D.
D-MW 42 (060509)	6/5/09	1115	G	X			2		1	5	1		1	1	1	3	2	1			
D-MW 41 (060509)	6/5/09	1230	G	X			2	2	1	5	1		1	1	1	3	2	1	1	1	
D-MW 19 (060509)	6/5/09	1350	G	X			2		1	5	1		1	1	1	3	2	1			
Trip blank	6/5/09																				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

Sample Disposal
☐ Return to Client ☐ Disposal by Lab

Note: All samples are retained for six weeks from receipt unless other arrangements are made.

Turn Around Time Required (Prior lab approval required for expedited TAT.)
☒ Standard ☐ Rush (Specify)

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished by: Cecil Bell	6/5/09		1. Received by		
2. Relinquished by			2. Received by		
3. Relinquished by: FedEx	6/6/09	0930	3. Laboratory received by: Scott Moffett	6/6/09	0930

Comments

LAB USE ONLY
Received on ice (Circle) (Yes) No Ice Pack
Receipt Temp. 5.4 °C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

ARCADIS U.S., Inc.
30 Patewood Drive
Suite 155
Greenville, SC 29615
Attention: Janet Christy

Project Name: **HAA13 Pumphouse 1, Release 1**

Project Number: **GP08HAFS.H13A.N1R1**

Lot Number: **KF06033**

Date Completed: **06/18/2009**

Nisreen Saikaly
Project Manager

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.

* K F 0 6 0 3 3 *

Case Narrative
ARCADIS U.S., Inc.
Lot Number: KF06033

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

DRO

Samples -001 and -002 have an unknown pattern associated with the DRO analysis.

Nitrate - N

The MS/MSD recoveries in batch 11983 were outside acceptance criteria. All other QA/QC criteria for the batch were within acceptance criteria and method control limits. The MS/MSD recovery results are attributed to matrix interference. The associated sample results were reported and no corrective action was required.

Sample Summary
ARCADIS U.S., Inc.
Lot Number: KF06033

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	D-MW1 (060509)	Aqueous	06/05/2009 1115	06/06/2009
002	D-MW2 (060509)	Aqueous	06/05/2009 1300	06/06/2009
003	TB-03 (060509)	Aqueous	06/05/2009 1230	06/06/2009

(3 samples)

Executive Summary
ARCADIS U.S., Inc.
Lot Number: KF06033

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	D-MW1 (060509)	Aqueous	Alkalinity	SM 2320B	7.9	J	mg/L	5
001	D-MW1 (060509)	Aqueous	DOC	SM 5310D	7.0	B	mg/L	5
001	D-MW1 (060509)	Aqueous	Nitrate - N	353.2	0.056	B	mg/L	5
001	D-MW1 (060509)	Aqueous	Sulfate	300.0	4.6		mg/L	5
001	D-MW1 (060509)	Aqueous	Sulfide	SM 4500-S2 F	0.99	J	mg/L	5
001	D-MW1 (060509)	Aqueous	Benzene	8260B	120		ug/L	6
001	D-MW1 (060509)	Aqueous	Ethylbenzene	8260B	780		ug/L	6
001	D-MW1 (060509)	Aqueous	Toluene	8260B	120	B	ug/L	6
001	D-MW1 (060509)	Aqueous	Xylenes (total)	8260B	3700	B	ug/L	6
001	D-MW1 (060509)	Aqueous	TPH-DRO	8015C	3600	BI1	ug/L	7
001	D-MW1 (060509)	Aqueous	TPH-GRO	8015B	200000		ug/L	8
001	D-MW1 (060509)	Aqueous	Dissolved Iron	6010B	1.4		mg/L	9
001	D-MW1 (060509)	Aqueous	Dissolved Lead	6010B	0.0033	J	mg/L	9
001	D-MW1 (060509)	Aqueous	Iron	6010B	1.5		mg/L	10
001	D-MW1 (060509)	Aqueous	Lead	6010B	0.0064	BJ	mg/L	10
002	D-MW2 (060509)	Aqueous	DOC	SM 5310D	22	B	mg/L	11
002	D-MW2 (060509)	Aqueous	Nitrate - N	353.2	0.045	B	mg/L	11
002	D-MW2 (060509)	Aqueous	Sulfate	300.0	1.8		mg/L	11
002	D-MW2 (060509)	Aqueous	Sulfide	SM 4500-S2 F	2.8		mg/L	11
002	D-MW2 (060509)	Aqueous	Benzene	8260B	440		ug/L	12
002	D-MW2 (060509)	Aqueous	Ethylbenzene	8260B	260		ug/L	12
002	D-MW2 (060509)	Aqueous	Toluene	8260B	3700	B	ug/L	12
002	D-MW2 (060509)	Aqueous	Xylenes (total)	8260B	2000	B	ug/L	12
002	D-MW2 (060509)	Aqueous	TPH-DRO	8015C	15000	BI1	ug/L	13
002	D-MW2 (060509)	Aqueous	TPH-GRO	8015B	470000		ug/L	14
002	D-MW2 (060509)	Aqueous	Dissolved Iron	6010B	1.1		mg/L	15
002	D-MW2 (060509)	Aqueous	Dissolved Lead	6010B	0.0069	J	mg/L	15
002	D-MW2 (060509)	Aqueous	Iron	6010B	1.2		mg/L	16
002	D-MW2 (060509)	Aqueous	Lead	6010B	0.026	B	mg/L	16

(29 detections)

Inorganic non-metals

Client: **ARCADIS U.S., Inc.**
Laboratory ID: **KF06033-001**
Description: **D-MW1 (060509)**
Matrix: **Aqueous**
Date Sampled: **06/05/2009 1115**
Date Received: **06/06/2009**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(Alkalinity) SM 2320B	1	06/10/2009 0905	PMM		12132
1		(DOC) SM 5310D	1	06/09/2009 0540	PMM		11962
1		(Nitrate - N) 353.2	1	06/06/2009 1724	MML		11983
1		(Sulfate) 300.0	1	06/18/2009 0308	DAS		12681
1		(Sulfide) SM 4500-S2 F	1	06/08/2009 1510	BM		12103

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Alkalinity		**SM 2320B**	**7.9**	**J**	**10**	**3.9**	**mg/L**	**1**
DOC		**SM 5310D**	**7.0**	**B**	**1.0**	**0.063**	**mg/L**	**1**
Nitrate - N		**353.2**	**0.056**	**B**	**0.020**	**0.0013**	**mg/L**	**1**
Sulfate		**300.0**	**4.6**		**1.0**	**0.13**	**mg/L**	**1**
Sulfide	**18496-25-8**	**SM 4500-S2 F**	**0.99**	**J**	**1.0**	**0.62**	**mg/L**	**1**

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

Volatile Organic Compounds by GC/MS

Client: **ARCADIS U.S., Inc.**
Laboratory ID: **KF06033-001**
Description: **D-MW1 (060509)**
Matrix: **Aqueous**
Date Sampled: **06/05/2009 1115**
Date Received: **06/06/2009**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	40	06/09/2009 0742	DLB		12076

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Benzene	**71-43-2**	**8260B**	**120**		**20**	**1.1**	**ug/L**	**1**
Ethylbenzene	**100-41-4**	**8260B**	**780**		**20**	**6.8**	**ug/L**	**1**
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		20	0.76	ug/L	1
Toluene	**108-88-3**	**8260B**	**120**	**B**	**20**	**6.8**	**ug/L**	**1**
Xylenes (total)	**1330-20-7**	**8260B**	**3700**	**B**	**20**	**6.8**	**ug/L**	**1**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		94	52-138
Bromofluorobenzene		102	70-147
Toluene-d8		96	76-125

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P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

TPH - DRO

Client: **ARCADIS U.S., Inc.**
Laboratory ID: **KF06033-001**
Description: **D-MW1 (060509)**
Matrix: **Aqueous**
Date Sampled: **06/05/2009 1115**
Date Received: **06/06/2009**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8015C	1	06/13/2009 1203	ASB	06/09/2009 2234	12123

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
TPH-DRO		**8015C**	**3600**	**BI1**	**200**	**23**	**ug/L**	**1**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
o - Terphenyl		88	53-118

PQL = Practical quantitation limit
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P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

TPH - GRO

Client: **ARCADIS U.S., Inc.**
Laboratory ID: **KF06033-001**
Description: **D-MW1 (060509)**
Matrix: **Aqueous**
Date Sampled: **06/05/2009 1115**
Date Received: **06/06/2009**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8015B	2	06/17/2009 1408	IVC		12676

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
TPH-GRO		**8015B**	**200000**		**200**	**40**	**ug/L**	**1**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
Bromofluorobenzene		108	70-130

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
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J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

ICP-AES

Client: **ARCADIS U.S., Inc.**
Laboratory ID: **KF06033-001**
Description: **D-MW1 (060509)**
Matrix: **Aqueous**
Date Sampled: **06/05/2009 1115**
Date Received: **06/06/2009**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3005A	6010B	1	06/16/2009 0631	CDF	06/12/2009 2200	12368

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Dissolved Iron	**7439-89-6**	**6010B**	**1.4**		**0.10**	**0.023**	**mg/L**	**1**
Dissolved Lead	**7439-92-1**	**6010B**	**0.0033**	**J**	**0.010**	**0.0019**	**mg/L**	**1**

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
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J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
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H = Out of holding time

ICP-AES

Client: **ARCADIS U.S., Inc.**
Laboratory ID: **KF06033-001**
Description: **D-MW1 (060509)**
Matrix: **Aqueous**
Date Sampled: **06/05/2009 1115**
Date Received: **06/06/2009**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3005A	6010B	1	06/12/2009 0042	CDF	06/11/2009 1203	12240

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Iron	**7439-89-6**	**6010B**	**1.5**		**0.10**	**0.023**	**mg/L**	**1**
Lead	**7439-92-1**	**6010B**	**0.0064**	**BJ**	**0.010**	**0.0019**	**mg/L**	**1**

PQL = Practical quantitation limit
B = Detected in the method blank
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ND = Not detected at or above the MDL
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P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

Inorganic non-metals

Client: **ARCADIS U.S., Inc.**
Laboratory ID: **KF06033-002**
Description: **D-MW2 (060509)**
Matrix: **Aqueous**
Date Sampled: **06/05/2009 1300**
Date Received: **06/06/2009**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(Alkalinity) SM 2320B	1	06/10/2009 0914	PMM		12132
1		(DOC) SM 5310D	1	06/09/2009 0600	PMM		11962
1		(Nitrate - N) 353.2	1	06/06/2009 1813	MML		11983
1		(Sulfate) 300.0	1	06/18/2009 0415	DAS		12681
1		(Sulfide) SM 4500-S2 F	1	06/08/2009 1510	BM		12103

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Alkalinity		SM 2320B	ND		10	3.9	mg/L	1
DOC		**SM 5310D**	**22**	**B**	**1.0**	**0.063**	**mg/L**	**1**
Nitrate - N		**353.2**	**0.045**	**B**	**0.020**	**0.0013**	**mg/L**	**1**
Sulfate		**300.0**	**1.8**		**1.0**	**0.13**	**mg/L**	**1**
Sulfide	**18496-25-8**	**SM 4500-S2 F**	**2.8**		**1.0**	**0.62**	**mg/L**	**1**

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

Volatile Organic Compounds by GC/MS

Client: **ARCADIS U.S., Inc.**
Laboratory ID: **KF06033-002**
Description: **D-MW2 (060509)**
Matrix: **Aqueous**
Date Sampled: **06/05/2009 1300**
Date Received: **06/06/2009**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	50	06/09/2009 0808	DLB		12076

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Benzene	**71-43-2**	**8260B**	**440**		**25**	**1.4**	**ug/L**	**1**
Ethylbenzene	**100-41-4**	**8260B**	**260**		**25**	**8.5**	**ug/L**	**1**
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		25	0.94	ug/L	1
Toluene	**108-88-3**	**8260B**	**3700**	**B**	**25**	**8.5**	**ug/L**	**1**
Xylenes (total)	**1330-20-7**	**8260B**	**2000**	**B**	**25**	**8.5**	**ug/L**	**1**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		94	52-138
Bromofluorobenzene		99	70-147
Toluene-d8		93	76-125

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

TPH - DRO

Client: **ARCADIS U.S., Inc.**
Laboratory ID: **KF06033-002**
Description: **D-MW2 (060509)**
Matrix: **Aqueous**
Date Sampled: **06/05/2009 1300**
Date Received: **06/06/2009**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8015C	1	06/13/2009 1222	ASB	06/09/2009 2234	12123

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
TPH-DRO		**8015C**	**15000**	**BI1**	**200**	**23**	**ug/L**	**1**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
o - Terphenyl		75	53-118

PQL = Practical quantitation limit
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P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

TPH - GRO

Client: **ARCADIS U.S., Inc.**
Laboratory ID: **KF06033-002**
Description: **D-MW2 (060509)**
Matrix: **Aqueous**
Date Sampled: **06/05/2009 1300**
Date Received: **06/06/2009**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8015B	5	06/17/2009 1433	IVC		12676

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
TPH-GRO		**8015B**	**470000**		**500**	**100**	**ug/L**	**1**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
Bromofluorobenzene		81	70-130

PQL = Practical quantitation limit
B = Detected in the method blank
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J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

ICP-AES

Client: **ARCADIS U.S., Inc.**
Laboratory ID: **KF06033-002**
Description: **D-MW2 (060509)**
Matrix: **Aqueous**
Date Sampled: **06/05/2009 1300**
Date Received: **06/06/2009**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3005A	6010B	1	06/16/2009 0657	CDF	06/12/2009 2200	12368

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Dissolved Iron	**7439-89-6**	**6010B**	**1.1**		**0.10**	**0.023**	**mg/L**	**1**
Dissolved Lead	**7439-92-1**	**6010B**	**0.0069**	**J**	**0.010**	**0.0019**	**mg/L**	**1**

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

ICP-AES

Client: **ARCADIS U.S., Inc.**
Laboratory ID: **KF06033-002**
Description: **D-MW2 (060509)**
Matrix: **Aqueous**
Date Sampled: **06/05/2009 1300**
Date Received: **06/06/2009**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3005A	6010B	1	06/12/2009 0047	CDF	06/11/2009 1203	12240

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Iron	**7439-89-6**	**6010B**	**1.2**		**0.10**	**0.023**	**mg/L**	**1**
Lead	**7439-92-1**	**6010B**	**0.026**	**B**	**0.010**	**0.0019**	**mg/L**	**1**

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

Volatile Organic Compounds by GC/MS

Client: **ARCADIS U.S., Inc.**
Laboratory ID: **KF06033-003**
Description: **TB-03 (060509)**
Matrix: **Aqueous**
Date Sampled: **06/05/2009 1230**
Date Received: **06/06/2009**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/09/2009 0425	DLB		12069

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Benzene	71-43-2	8260B	ND		0.50	0.027	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.17	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.019	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.17	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		0.50	0.17	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		106	52-138
Bromofluorobenzene		94	70-147
Toluene-d8		105	76-125

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

QC Summary

Inorganic non-metals - MB

Sample ID: KQ11962-001
Batch: 11962
Analytical Method: SM 5310D
Matrix: Aqueous

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
DOC	**0.26**	**J**	**1**	**1.0**	**0.063**	**mg/L**	**06/09/2009 0009**

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCS

Sample ID: KQ11962-002
Batch: 11962
Analytical Method: SM 5310D
Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
DOC	20	21		1	107	90-110	06/09/2009 0030

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCSD

Sample ID: KQ11962-003 **Matrix:** Aqueous
Batch: 11962
Analytical Method: SM 5310D

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
DOC	20	22		1	109	2.0	90-110	20	06/09/2009 0051

PQL = Practical quantitation limit
P = The RPD between two GC columns exceeds 40%
N - Recovery is out of criteria
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
+ - RPD is out of criteria
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MB

Sample ID: KQ11983-001
Batch: 11983
Analytical Method: 353.2
Matrix: Aqueous

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Nitrate - N	**0.011**	**J**	**1**	**0.020**	**0.0013**	**mg/L**	**06/06/2009 1657**

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCS

Sample ID: KQ11983-002
Batch: 11983
Analytical Method: 353.2
Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Nitrate - N	0.80	0.82		1	103	90-110	06/06/2009 1658

PQL = Practical quantitation limit
P = The RPD between two GC columns exceeds 40%
N - Recovery is out of criteria
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
+ - RPD is out of criteria
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCSD

Sample ID: KQ11983-003 **Matrix:** Aqueous
Batch: 11983
Analytical Method: 353.2

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Nitrate - N	0.80	0.83		1	104	0.84	90-110	20	06/06/2009 1700

PQL = Practical quantitation limit
P = The RPD between two GC columns exceeds 40%
N - Recovery is out of criteria
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
+ - RPD is out of criteria
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MS

Sample ID: KF06033-001MS
Batch: 11983
Analytical Method: 353.2
Matrix: Aqueous

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Nitrate - N	0.056	0.80	0.84		1	98	90-110	06/07/2009 1103

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MSD

Sample ID: KF06033-001MD
Batch: 11983
Analytical Method: 353.2
Matrix: Aqueous

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Nitrate - N	0.056	0.80	0.85		1	100	0.94	90-110	20	06/07/2009 1104

PQL = Practical quantitation limit
P = The RPD between two GC columns exceeds 40%
N - Recovery is out of criteria
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
+ - RPD is out of criteria
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MS

Sample ID: KF06033-002MS
Batch: 11983
Analytical Method: 353.2
Matrix: Aqueous

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Nitrate - N	0.045	0.80	0.94	N	1	112	90-110	06/07/2009 1105

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MSD

Sample ID: KF06033-002MD
Batch: 11983
Analytical Method: 353.2
Matrix: Aqueous

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Nitrate - N	0.045	0.80	0.94	N	1	112	0.74	90-110	20	06/07/2009 1106

PQL = Practical quantitation limit
P = The RPD between two GC columns exceeds 40%
N - Recovery is out of criteria
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
+ - RPD is out of criteria
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MB

Sample ID: KQ12103-001
Batch: 12103
Analytical Method: SM 4500-S2 F
Matrix: Aqueous

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Sulfide	ND		1	1.0	0.62	mg/L	06/08/2009 1510

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCS

Sample ID: KQ12103-002
Batch: 12103
Analytical Method: SM 4500-S2 F

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Sulfide	10	9.4		1	94	80-120	06/08/2009 1510

PQL = Practical quantitation limit
P = The RPD between two GC columns exceeds 40%
N - Recovery is out of criteria
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
+ - RPD is out of criteria
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCSD

Sample ID: KQ12103-003 **Matrix:** Aqueous
Batch: 12103
Analytical Method: SM 4500-S2 F

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Sulfide	10	9.3		1	93	1.9	80-120	20	06/08/2009 1510

PQL = Practical quantitation limit
P = The RPD between two GC columns exceeds 40%
N - Recovery is out of criteria
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
+ - RPD is out of criteria
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MB

Sample ID: KQ12132-001
Batch: 12132
Analytical Method: SM 2320B
Matrix: Aqueous

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Alkalinity	ND		1	10	3.9	mg/L	06/10/2009 0713

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCS

Sample ID: KQ12132-002
Batch: 12132
Analytical Method: SM 2320B
Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Alkalinity	100	100		1	100	90-110	06/10/2009 0729

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCSD

Sample ID: KQ12132-003 **Matrix:** Aqueous
Batch: 12132
Analytical Method: SM 2320B

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Alkalinity	100	100		1	102	2.2	90-110	20	06/10/2009 0745

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MB

Sample ID: KQ12681-001
Batch: 12681
Analytical Method: 300.0
Matrix: Aqueous

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Sulfate	ND		1	1.0	0.13	mg/L	06/18/2009 0139

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCS

Sample ID: KQ12681-002
Batch: 12681
Analytical Method: 300.0
Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Sulfate	20	18		1	92	90-110	06/18/2009 0201

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCSD

Sample ID: KQ12681-003 **Matrix:** Aqueous
Batch: 12681
Analytical Method: 300.0

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Sulfate	20	18		1	90	2.2	90-110	20	06/18/2009 0223

PQL = Practical quantitation limit
P = The RPD between two GC columns exceeds 40%
N - Recovery is out of criteria
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
+ - RPD is out of criteria
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MS

Sample ID: KF06033-001MS
Batch: 12681
Analytical Method: 300.0
Matrix: Aqueous

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Sulfate	4.6	20	23		1	93	90-110	06/18/2009 0331

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MSD

Sample ID: KF06033-001MD
Batch: 12681
Analytical Method: 300.0
Matrix: Aqueous

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Sulfate	4.6	20	25		1	101	6.6	90-110	20	06/18/2009 0353

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - MB

Sample ID: KQ12069-001
Batch: 12069
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Benzene	ND		1	0.50	0.027	ug/L	06/08/2009 2302
Ethylbenzene	ND		1	0.50	0.17	ug/L	06/08/2009 2302
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.019	ug/L	06/08/2009 2302
Toluene	ND		1	0.50	0.17	ug/L	06/08/2009 2302
Xylenes (total)	ND		1	0.50	0.17	ug/L	06/08/2009 2302

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		95	70-130
1,2-Dichloroethane-d4		106	70-130
Toluene-d8		107	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCS

Sample ID: KQ12069-002
Batch: 12069
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	50	50		1	101	70-130	06/08/2009 2136
Ethylbenzene	50	50		1	99	70-130	06/08/2009 2136
Methyl tertiary butyl ether (MTBE)	50	50		1	99	70-130	06/08/2009 2136
Toluene	50	50		1	99	70-130	06/08/2009 2136
Xylenes (total)	100	99		1	99	70-130	06/08/2009 2136

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		98	70-130
1,2-Dichloroethane-d4		102	70-130
Toluene-d8		108	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCSD

Sample ID: KQ12069-003
Batch: 12069
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	50	51		1	102	1.4	70-130	20	06/08/2009 2158
Ethylbenzene	50	51		1	103	3.6	70-130	20	06/08/2009 2158
Methyl tertiary butyl ether (MTBE)	50	50		1	100	0.72	70-130	20	06/08/2009 2158
Toluene	50	50		1	100	0.55	70-130	20	06/08/2009 2158
Xylenes (total)	100	100		1	101	1.9	70-130	20	06/08/2009 2158

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		99	70-130
1,2-Dichloroethane-d4		104	70-130
Toluene-d8		107	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - MB

Sample ID: KQ12076-001
Batch: 12076
Analytical Method: 8260B
Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Benzene	ND		1	0.50	0.027	ug/L	06/08/2009 2336
Ethylbenzene	ND		1	0.50	0.17	ug/L	06/08/2009 2336
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.019	ug/L	06/08/2009 2336
Toluene	**0.35**	**J**	**1**	**0.50**	**0.17**	**ug/L**	**06/08/2009 2336**
Xylenes (total)	**0.44**	**J**	**1**	**0.50**	**0.17**	**ug/L**	**06/08/2009 2336**

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		94	70-130
1,2-Dichloroethane-d4		85	70-130
Toluene-d8		93	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCS

Sample ID: KQ12076-002
Batch: 12076
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	50	51		1	103	70-130	06/08/2009 2210
Ethylbenzene	50	53		1	105	70-130	06/08/2009 2210
Methyl tertiary butyl ether (MTBE)	50	56		1	112	70-130	06/08/2009 2210
Toluene	50	53		1	106	70-130	06/08/2009 2210
Xylenes (total)	100	110		1	107	70-130	06/08/2009 2210

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		96	70-130
1,2-Dichloroethane-d4		80	70-130
Toluene-d8		93	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCSD

Sample ID: KQ12076-003
Batch: 12076
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	50	50		1	100	2.6	70-130	20	06/08/2009 2231
Ethylbenzene	50	51		1	102	3.8	70-130	20	06/08/2009 2231
Methyl tertiary butyl ether (MTBE)	50	54		1	108	3.1	70-130	20	06/08/2009 2231
Toluene	50	52		1	104	2.0	70-130	20	06/08/2009 2231
Xylenes (total)	100	100		1	102	4.2	70-130	20	06/08/2009 2231

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		96	70-130
1,2-Dichloroethane-d4		81	70-130
Toluene-d8		96	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

TPH - DRO - MB

Sample ID: KQ12123-001
Batch: 12123
Analytical Method: 8015C
Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/09/2009 2234

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
TPH-DRO	**57**	**J**	**1**	**200**	**23**	**ug/L**	**06/13/2009 0909**

Surrogate	Q	% Rec	Acceptance Limit
o - Terphenyl		88	53-118

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

TPH - DRO - LCS

Sample ID: KQ12123-002
Batch: 12123
Analytical Method: 8015C
Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/09/2009 2234

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH-DRO	2500	2200		1	90	70-130	06/13/2009 0928

Surrogate	Q	% Rec	Acceptance Limit
o - Terphenyl		87	53-118

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

TPH - GRO - MB

Sample ID: KQ12676-001
Batch: 12676
Analytical Method: 8015B
Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
TPH-GRO	ND		1	100	20	ug/L	06/17/2009 1229

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		118	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

TPH - GRO - LCS

Sample ID: KQ12676-002
Batch: 12676
Analytical Method: 8015B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH-GRO	1000	980		1	98	70-130	06/17/2009 1139

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		120	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

TPH - GRO - LCSD

Sample ID: KQ12676-003
Batch: 12676
Analytical Method: 8015B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH-GRO	1000	980		1	98	0.0	70-130	20	06/17/2009 1204

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		122	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-AES - MB

Sample ID: KQ12240-001
Batch: 12240
Analytical Method: 6010B
Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/11/2009 1203

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Iron	ND		1	0.10	0.023	mg/L	06/11/2009 2341
Lead	**0.0041**	**J**	**1**	**0.010**	**0.0019**	**mg/L**	**06/11/2009 2341**

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-AES - LCS

Sample ID: KQ12240-002
Batch: 12240
Analytical Method: 6010B
Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/11/2009 1203

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Iron	20	20		1	101	80-120	06/11/2009 2346
Lead	0.40	0.39		1	98	80-120	06/11/2009 2346

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-AES - LCSD

Sample ID: KQ12240-003
Batch: 12240
Analytical Method: 6010B
Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/11/2009 1203

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Iron	20	20		1	103	1.8	80-120	20	06/11/2009 2351
Lead	0.40	0.40		1	100	2.1	80-120	20	06/11/2009 2351

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-AES - MB

Sample ID: KQ12368-001
Batch: 12368
Analytical Method: 6010B
Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/12/2009 2200

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Dissolved Iron	ND		1	0.10	0.023	mg/L	06/16/2009 0402
Dissolved Lead	ND		1	0.010	0.0019	mg/L	06/16/2009 0402

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-AES - LCS

Sample ID: KQ12368-002
Batch: 12368
Analytical Method: 6010B
Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/12/2009 2200

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Dissolved Iron	20	19		1	96	80-120	06/16/2009 0407
Dissolved Lead	0.40	0.37		1	93	80-120	06/16/2009 0407

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-AES - LCSD

Sample ID: KQ12368-003
Batch: 12368
Analytical Method: 6010B
Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/12/2009 2200

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Dissolved Iron	20	20		1	98	2.5	80-120	20	06/16/2009 0413
Dissolved Lead	0.40	0.38		1	95	2.4	80-120	20	06/16/2009 0413

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
Document Number: F-AD-016
Revision Number: 6

Page 1 of 1
Replaces Date: 09/22/06
Effective Date: 05/29/07

Sample Receipt Checklist (SRC)

Client: ARCADIS Cooler Inspected by/date: SAM 1 6/6/04 Lot #: KF06033

Means of receipt: ☐ SESI ☑ Client ☐ UPS ☐ FedEx ☐ Airborne Exp ☐ Other

Yes ☐	No ☑	NA ☐	1. Were custody seals present on the cooler?
Yes ☐	No ☐	NA ☑	2. If custody seals were present, were they intact and unbroken?

Cooler ID/temperature upon receipt 2.8 / °C ___ / ___ °C ___ / ___ °C ___ / ___ °C
___ / ___ °C ___ / ___ °C ___ / ___ °C ___ / ___ °C

Method: ☐ Temperature Blank ☑ Against Bottles
Method of coolant: ☑ Wet Ice ☐ Blue Ice ☐ Dry Ice ☐ None

If response is No (or Yes for 14, 15, 16), an explanation/resolution must be provided.

Yes ☐	No ☐	NA ☑	3. If temperature of any cooler exceeded 6.0°C, was Project Manager notified? PM notified by SRC, phone, note (circle one), other: ___. (For coolers received via commercial courier, PMs are to be notified immediately.
Yes ☐	No ☐	NA ☑	4. Is the commercial courier's packing slip attached to this form?
Yes ☑	No ☐	NA ☐	5. Were proper custody procedures (relinquished/received) followed?
Yes ☑	No ☐	NA ☐	6. Were sample IDs listed?
Yes ☑	No ☐	NA ☐	7. Was collection date & time listed?
Yes ☑	No ☐	NA ☐	8. Were tests to be performed listed on the COC or was quote # provided?
Yes ☑	No ☐	NA ☐	9. Did all samples arrive in the proper containers for each test?
Yes ☑	No ☐	NA ☐	10. Did all container label information (ID, date, time) agree with COC?
Yes ☑	No ☐	NA ☐	11. Did all containers arrive in good condition (unbroken, lids on, etc.)?
Yes ☑	No ☐	NA ☐	12. Was adequate sample volume available?
Yes ☑	No ☐	NA ☐	13. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
Yes ☐	No ☑	NA ☐	14. Were any samples containers missing?
Yes ☐	No ☑	NA ☐	15. Were there any excess samples not listed on COC?
SAM 6/6/04 Yes ☐	No ☑	NA ☒	16. Were bubbles present >"pea-size" (¼"or 6mm in diameter) in any VOA vials?
Yes ☑	No ☐	NA ☐	17. Were all metals/O&G/HEM/nutrient samples received at a pH of <2?
Yes ☑	No ☐	NA ☐	18. Were all cyanide and/or sulfide samples received at a pH >12?
Yes ☐	No ☐	NA ☑	19. Were all applicable NH3/TKN/cyanide/phenol/BNA/pest/PCB/herb (<0.2mg/L) and toxicity (<0.1mg/L) samples free of residual chlorine?
Yes ☐	No ☐	NA ☑	20. Were collection temperatures documented on the COC for NC samples?

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) ___ were received incorrectly preserved and were adjusted accordingly in sample receiving with ___ (H_2SO_4,HNO_3,HCl,NaOH) with the SR # (number)

Sample(s) ___ were received with bubbles >6 mm in diameter.

Sample(s) ___ were received with TRC >0.2 mg/L for NH3/TKN/cyanide/BNA/pest/PCB/herb.

Toxicity sample(s) ___ were received with TRC >0.1 mg/L and were analyzed by method 330.5.

Corrective Action taken, if necessary:

Was client notified: Yes ☐ No ☐ Did client respond: Yes ☐ No ☐
SESI employee: ___ Date of response: ___
Comments: ___

SHEALY ENVIRONMENTAL SERVICES, INC.
106 Vantage Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111

SHEALY Chain of Custody Record

Number 102191

Client: ARCADIS	Report to Contact: Scott Bostian	Telephone No. / Fax No. / E-mail: 770-435-2666	Quote No.
Address: 2849 Paces Ferry Rd	Sampler's Signature: x Erica Maddox	Waybill No.	Page 1 of 1
City: Atlanta / State: GA / Zip Code: 30339	Printed Name: Erica Maddox	Analysis (Attach list if more space is needed.)	
Project Name: HAA13 Pumphouse 1, Release 1			
Project No.: 6P08HAFS.H13A.NIR1	P.O. No.		Lot No. KF06033

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Solid	Non-Aqueous	No. of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnOAc Kit	BTEX/MTBE	Total Lead & Iron	Diss. Lead & Iron	PAH, Nitrate, Sulfate	TPH	Remarks / Cooler I.D.
D-MW1 (060509)	6/5/09	1115	G	X			3		1	5			✓	✓	✓	✓	✓	
D-MW2 (060509)	"	1300	G	X			3		1	5			✓	✓	✓	✓	✓	
TB-03 (060509)	"	1230	G	X						3			✓					

Relinquished by: Erica Maddox 6/5/09

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

Sample Disposal: ☐ Return to Client ☐ Disposal by Lab

Note: All samples are retained for six weeks from receipt unless other arrangements are made.

Turn Around Time Required (Prior lab approval required for expedited TAT.): ☑ Standard ☐ Rush (Specify)

QC Requirements (Specify):

	Date	Time
1. Relinquished by: Erica Maddox	6/5/09	1700
2. Relinquished by	Date	Time
3. Relinquished by: FedEx	6/6/09	930

	Date	Time
1. Received by		
2. Received by	6/6/09	0930
3. Laboratory received by: Scott Moffett	~~6/5/09~~	~~1700~~ SAM 6/6/09

Comments:

LAB USE ONLY: Received on ice (Circle) (Yes) No Ice Pack — Receipt Temp. 2.8 °C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: F-AD-012 Effective Date: 08-04-02

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Level 1 Report v2.1

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

ARCADIS U.S., Inc.
30 Patewood Drive
Suite 155
Greenville, SC 29615
Attention: Janet Christy

Project Name: HAA-13 Pumphouse 1, Release 1

Project Number: GP08HAFS.H13A.N1R1

Lot Number: KF06034

Date Completed: 06/18/2009

Nisreen Saikaly
Project Manager

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.

* K F 0 6 0 3 4 *

Case Narrative
ARCADIS U.S., Inc.
Lot Number: KF06034

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

DRO

Sample -001 and -002 have an unknown pattern associated with the DRO analysis.

Sulfate

The RPD for duplicate -002 exceeded method control limits; however, all other QA/QC criteria for the LCS/LCSD were within acceptance criteria and method control limits. The associated sample results were reported and no corrective action was required.

Sample Summary
ARCADIS U.S., Inc.
Lot Number: KF06034

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	D-MW34 (060509)	Aqueous	06/05/2009 0910	06/06/2009
002	D-MW35 (060509)	Aqueous	06/05/2009 1425	06/06/2009
003	TB-02 (060509)	Aqueous	06/05/2009 0900	06/06/2009

(3 samples)

Executive Summary

ARCADIS U.S., Inc.

Lot Number: KF06034

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	D-MW34 (060509)	Aqueous	Alkalinity	SM 2320B	8.5	J	mg/L	5
001	D-MW34 (060509)	Aqueous	DOC	SM 5310D	10	B	mg/L	5
001	D-MW34 (060509)	Aqueous	Sulfate	300.0	1.7		mg/L	5
001	D-MW34 (060509)	Aqueous	Sulfide	SM 4500-S2 F	2.0		mg/L	5
001	D-MW34 (060509)	Aqueous	TKN	351.2	0.71		mg/L	5
001	D-MW34 (060509)	Aqueous	Benzene	8260B	730		ug/L	6
001	D-MW34 (060509)	Aqueous	Ethylbenzene	8260B	910		ug/L	6
001	D-MW34 (060509)	Aqueous	Toluene	8260B	9200	B	ug/L	6
001	D-MW34 (060509)	Aqueous	Xylenes (total)	8260B	4800	B	ug/L	6
001	D-MW34 (060509)	Aqueous	TPH-DRO	8015C	5000	B	ug/L	7
001	D-MW34 (060509)	Aqueous	TPH-GRO	8015B	830000		ug/L	8
001	D-MW34 (060509)	Aqueous	Dissolved Iron	6010B	1.2		mg/L	9
001	D-MW34 (060509)	Aqueous	Dissolved Lead	6010B	0.086		mg/L	9
001	D-MW34 (060509)	Aqueous	Iron	6010B	1.2		mg/L	10
001	D-MW34 (060509)	Aqueous	Lead	6010B	0.10	B	mg/L	10
002	D-MW35 (060509)	Aqueous	Alkalinity	SM 2320B	42		mg/L	11
002	D-MW35 (060509)	Aqueous	DOC	SM 5310D	14	B	mg/L	11
002	D-MW35 (060509)	Aqueous	Nitrate - N	353.2	0.23	B	mg/L	11
002	D-MW35 (060509)	Aqueous	Sulfate	300.0	1.4		mg/L	11
002	D-MW35 (060509)	Aqueous	Sulfide	SM 4500-S2 F	1.2		mg/L	11
002	D-MW35 (060509)	Aqueous	Benzene	8260B	260		ug/L	12
002	D-MW35 (060509)	Aqueous	Ethylbenzene	8260B	72		ug/L	12
002	D-MW35 (060509)	Aqueous	Toluene	8260B	1700	B	ug/L	12
002	D-MW35 (060509)	Aqueous	Xylenes (total)	8260B	720	B	ug/L	12
002	D-MW35 (060509)	Aqueous	TPH-DRO	8015C	3800	B	ug/L	13
002	D-MW35 (060509)	Aqueous	TPH-GRO	8015B	250000		ug/L	14
002	D-MW35 (060509)	Aqueous	Dissolved Iron	6010B	0.78		mg/L	15
002	D-MW35 (060509)	Aqueous	Dissolved Lead	6010B	0.027		mg/L	15
002	D-MW35 (060509)	Aqueous	Iron	6010B	0.95		mg/L	16
002	D-MW35 (060509)	Aqueous	Lead	6010B	0.076	B	mg/L	16

(30 detections)

Inorganic non-metals

Client: ARCADIS U.S., Inc.
Laboratory ID: KF06034-001
Description: D-MW34 (060509)
Matrix: Aqueous
Date Sampled: 06/05/2009 0910
Date Received: 06/06/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(Alkalinity) SM 2320B	1	06/10/2009 0951	PMM		12132
1		(DOC) SM 5310D	1	06/09/2009 0621	PMM		11962
1		(Nitrate - N) 353.2	1	06/06/2009 1814	MML		11983
1		(Phosphorus) 365.1	1	06/17/2009 2353	SLH	06/16/2009 1239	12522
1		(Sulfate) 300.0	1	06/18/2009 0438	DAS		12681
1		(Sulfide) SM 4500-S2 F	1	06/08/2009 1510	BM		12103
1	351.4	(TKN) 351.2	1	06/17/2009 1828	SLH	06/16/2009 0814	12504

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Alkalinity		SM 2320B	8.5	J	10	3.9	mg/L	1
DOC		SM 5310D	10	B	1.0	0.063	mg/L	1
Nitrate - N		353.2	ND		0.020	0.0013	mg/L	1
Phosphorus	7723-14-0	365.1	ND		0.010	0.0048	mg/L	1
Sulfate		300.0	1.7		1.0	0.13	mg/L	1
Sulfide	18496-25-8	SM 4500-S2 F	2.0		1.0	0.62	mg/L	1
TKN		351.2	0.71		0.50	0.084	mg/L	1

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

Volatile Organic Compounds by GC/MS

Client: ARCADIS U.S., Inc.
Laboratory ID: KF06034-001
Description: D-MW34 (060509)
Matrix: Aqueous
Date Sampled: 06/05/2009 0910
Date Received: 06/06/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	50	06/09/2009 0830	DLB		12076

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Benzene	71-43-2	8260B	730		25	1.4	ug/L	1
Ethylbenzene	100-41-4	8260B	910		25	8.5	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		25	0.94	ug/L	1
Toluene	108-88-3	8260B	9200	B	25	8.5	ug/L	1
Xylenes (total)	1330-20-7	8260B	4800	B	25	8.5	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		96	52-138
Bromofluorobenzene		99	70-147
Toluene-d8		95	76-125

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

TPH - DRO

Client: ARCADIS U.S., Inc.
Laboratory ID: KF06034-001
Description: D-MW34 (060509)
Matrix: Aqueous
Date Sampled: 06/05/2009 0910
Date Received: 06/06/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8015C	1	06/13/2009 1241	ASB	06/09/2009 2234	12123

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
TPH-DRO		8015C	5000	B	200	23	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
o - Terphenyl		84	53-118

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

TPH - GRO

Client: ARCADIS U.S., Inc.
Laboratory ID: KF06034-001
Description: D-MW34 (060509)
Matrix: Aqueous
Date Sampled: 06/05/2009 0910
Date Received: 06/06/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8015B	10	06/17/2009 1458	IVC		12676

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
TPH-GRO		8015B	830000		1000	200	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
Bromofluorobenzene		96	70-130

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

ICP-AES

Client: ARCADIS U.S., Inc.
Laboratory ID: KF06034-001
Description: D-MW34 (060509)
Matrix: Aqueous
Date Sampled: 06/05/2009 0910
Date Received: 06/06/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3005A	6010B	1	06/16/2009 2128	CDF	06/15/2009 1800	12463

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Dissolved Iron	7439-89-6	6010B	1.2		0.10	0.023	mg/L	1
Dissolved Lead	7439-92-1	6010B	0.086		0.010	0.0019	mg/L	1

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

ICP-AES

Client: ARCADIS U.S., Inc.
Description: D-MW34 (060509)
Date Sampled: 06/05/2009 0910
Date Received: 06/06/2009

Laboratory ID: KF06034-001
Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3005A	6010B	1	06/18/2009 0327	KJC	06/16/2009 1800	12573

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Iron	7439-89-6	6010B	1.2		0.10	0.023	mg/L	1
Lead	7439-92-1	6010B	0.10	B	0.010	0.0019	mg/L	1

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

Inorganic non-metals

Client: ARCADIS U.S., Inc.
Laboratory ID: KF06034-002
Description: D-MW35 (060509)
Matrix: Aqueous
Date Sampled: 06/05/2009 1425
Date Received: 06/06/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(Alkalinity) SM 2320B	1	06/10/2009 1003	PMM		12132
1		(DOC) SM 5310D	1	06/09/2009 0642	PMM		11962
1		(Nitrate - N) 353.2	1	06/06/2009 1817	MML		11983
1		(Sulfate) 300.0	1	06/18/2009 0500	DAS		12681
1		(Sulfide) SM 4500-S2 F	1	06/08/2009 1510	BM		12103

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Alkalinity		SM 2320B	42		10	3.9	mg/L	1
DOC		SM 5310D	14	B	1.0	0.063	mg/L	1
Nitrate - N		353.2	0.23	B	0.020	0.0013	mg/L	1
Sulfate		300.0	1.4		1.0	0.13	mg/L	1
Sulfide	18496-25-8	SM 4500-S2 F	1.2		1.0	0.62	mg/L	1

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

Volatile Organic Compounds by GC/MS

Client: ARCADIS U.S., Inc.
Laboratory ID: KF06034-002
Description: D-MW35 (060509)
Matrix: Aqueous
Date Sampled: 06/05/2009 1425
Date Received: 06/06/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	40	06/09/2009 0851	DLB		12076

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Benzene	71-43-2	8260B	260		20	1.1	ug/L	1
Ethylbenzene	100-41-4	8260B	72		20	6.8	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		20	0.76	ug/L	1
Toluene	108-88-3	8260B	1700	B	20	6.8	ug/L	1
Xylenes (total)	1330-20-7	8260B	720	B	20	6.8	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		96	52-138
Bromofluorobenzene		97	70-147
Toluene-d8		96	76-125

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

TPH - DRO

Client: ARCADIS U.S., Inc.
Laboratory ID: KF06034-002
Description: D-MW35 (060509)
Matrix: Aqueous
Date Sampled: 06/05/2009 1425
Date Received: 06/06/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8015C	1	06/13/2009 1301	ASB	06/09/2009 2234	12123

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
TPH-DRO		8015C	3800	B	200	23	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
o - Terphenyl		78	53-118

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

TPH - GRO

Client: ARCADIS U.S., Inc.
Laboratory ID: KF06034-002
Description: D-MW35 (060509)
Matrix: Aqueous
Date Sampled: 06/05/2009 1425
Date Received: 06/06/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8015B	5	06/17/2009 1523	IVC		12676

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
TPH-GRO		8015B	250000		500	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
Bromofluorobenzene		93	70-130

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

ICP-AES

Client: ARCADIS U.S., Inc.
Laboratory ID: KF06034-002
Description: D-MW35 (060509)
Matrix: Aqueous
Date Sampled: 06/05/2009 1425
Date Received: 06/06/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3005A	6010B	1	06/16/2009 2133	CDF	06/15/2009 1800	12463

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Dissolved Iron	7439-89-6	6010B	0.78		0.10	0.023	mg/L	1
Dissolved Lead	7439-92-1	6010B	0.027		0.010	0.0019	mg/L	1

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

ICP-AES

Client: ARCADIS U.S., Inc.
Laboratory ID: KF06034-002
Description: D-MW35 (060509)
Matrix: Aqueous
Date Sampled: 06/05/2009 1425
Date Received: 06/06/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3005A	6010B	1	06/12/2009 0052	CDF	06/11/2009 1203	12240

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Iron	7439-89-6	6010B	0.95		0.10	0.023	mg/L	1
Lead	7439-92-1	6010B	0.076	B	0.010	0.0019	mg/L	1

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

Volatile Organic Compounds by GC/MS

Client: ARCADIS U.S., Inc.
Laboratory ID: KF06034-003
Description: TB-02 (060509)
Matrix: Aqueous
Date Sampled: 06/05/2009 0900
Date Received: 06/06/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/09/2009 0446	DLB		12069

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Benzene	71-43-2	8260B	ND		0.50	0.027	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.17	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.019	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.17	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		0.50	0.17	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		107	52-138
Bromofluorobenzene		92	70-147
Toluene-d8		108	76-125

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

QC Summary

Inorganic non-metals - MB

Sample ID: KQ11962-001
Batch: 11962
Analytical Method: SM 5310D
Matrix: Aqueous

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
DOC	0.26	J	1	1.0	0.063	mg/L	06/09/2009 0009

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCS

Sample ID: KQ11962-002
Batch: 11962
Analytical Method: SM 5310D
Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
DOC	20	21		1	107	90-110	06/09/2009 0030

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCSD

Sample ID: KQ11962-003
Batch: 11962
Analytical Method: SM 5310D

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
DOC	20	22		1	109	2.0	90-110	20	06/09/2009 0051

PQL = Practical quantitation limit
P = The RPD between two GC columns exceeds 40%
N - Recovery is out of criteria
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
+ - RPD is out of criteria
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MB

Sample ID: KQ11983-001
Batch: 11983
Analytical Method: 353.2

Matrix: Aqueous

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Nitrate - N	0.011	J	1	0.020	0.0013	mg/L	06/06/2009 1657

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCS

Sample ID: KQ11983-002
Batch: 11983
Analytical Method: 353.2
Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Nitrate - N	0.80	0.82		1	103	90-110	06/06/2009 1658

PQL = Practical quantitation limit
P = The RPD between two GC columns exceeds 40%
N - Recovery is out of criteria
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
+ - RPD is out of criteria
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCSD

Sample ID: KQ11983-003
Batch: 11983
Analytical Method: 353.2

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Nitrate - N	0.80	0.83		1	104	0.84	90-110	20	06/06/2009 1700

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MB

Sample ID: KQ12103-001
Batch: 12103
Analytical Method: SM 4500-S2 F

Matrix: Aqueous

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Sulfide	ND		1	1.0	0.62	mg/L	06/08/2009 1510

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCS

Sample ID: KQ12103-002
Batch: 12103
Analytical Method: SM 4500-S2 F

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Sulfide	10	9.4		1	94	80-120	06/08/2009 1510

PQL = Practical quantitation limit
P = The RPD between two GC columns exceeds 40%
N - Recovery is out of criteria
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
+ - RPD is out of criteria
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCSD

Sample ID: KQ12103-003
Batch: 12103
Analytical Method: SM 4500-S2 F

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Sulfide	10	9.3		1	93	1.9	80-120	20	06/08/2009 1510

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MB

Sample ID: KQ12132-001
Batch: 12132
Analytical Method: SM 2320B
Matrix: Aqueous

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Alkalinity	ND		1	10	3.9	mg/L	06/10/2009 0713

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCS

Sample ID: KQ12132-002
Batch: 12132
Analytical Method: SM 2320B

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Alkalinity	100	100		1	100	90-110	06/10/2009 0729

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCSD

Sample ID: KQ12132-003
Batch: 12132
Analytical Method: SM 2320B

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Alkalinity	100	100		1	102	2.2	90-110	20	06/10/2009 0745

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MB

Sample ID: KQ12504-001
Batch: 12504
Analytical Method: 351.2
Matrix: Aqueous
Prep Method: 351.4
Prep Date: 06/16/2009 814

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
TKN	ND		1	0.50	0.084	mg/L	06/17/2009 1753

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCS

Sample ID: KQ12504-002
Batch: 12504
Analytical Method: 351.2
Matrix: Aqueous
Prep Method: 351.4
Prep Date: 06/16/2009 814

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TKN	2.0	1.9		10	97	90-110	06/18/2009 1552

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCSD

Sample ID: KQ12504-003
Batch: 12504
Analytical Method: 351.2

Matrix: Aqueous
Prep Method: 351.4
Prep Date: 06/16/2009 814

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TKN	2.0	1.9		1	93	3.9	90-110	20	06/18/2009 1521

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MB

Sample ID: KQ12522-001
Batch: 12522
Analytical Method: 365.1
Matrix: Aqueous
Prep Method: 365.1
Prep Date: 06/16/2009 1239

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Phosphorus	ND		1	0.010	0.0048	mg/L	06/17/2009 2237

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCS

Sample ID: KQ12522-002
Batch: 12522
Analytical Method: 365.1
Matrix: Aqueous
Prep Method: 365.1
Prep Date: 06/16/2009 1239

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Phosphorus	0.25	0.24		1	97	90-110	06/17/2009 2237

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCSD

Sample ID: KQ12522-003
Batch: 12522
Analytical Method: 365.1
Matrix: Aqueous
Prep Method: 365.1
Prep Date: 06/16/2009 1239

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Phosphorus	0.25	0.24		1	98	0.75	90-110	20	06/17/2009 2237

PQL = Practical quantitation limit
P = The RPD between two GC columns exceeds 40%
N - Recovery is out of criteria
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
+ - RPD is out of criteria
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MB

Sample ID: KQ12681-001
Batch: 12681
Analytical Method: 300.0
Matrix: Aqueous

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Sulfate	ND		1	1.0	0.13	mg/L	06/18/2009 0139

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCS

Sample ID: KQ12681-002
Batch: 12681
Analytical Method: 300.0

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Sulfate	20	18		1	92	90-110	06/18/2009 0201

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCSD

Sample ID: KQ12681-003
Batch: 12681
Analytical Method: 300.0

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Sulfate	20	18		1	90	2.2	90-110	20	06/18/2009 0223

PQL = Practical quantitation limit

ND = Not detected at or above the MDL

P = The RPD between two GC columns exceeds 40%

J = Estimated result < PQL and ≥ MDL

N - Recovery is out of criteria

+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - Duplicate

Sample ID: KF06034-002DU
Batch: 12681
Analytical Method: 300.0
Matrix: Aqueous

Parameter	Sample Amount (mg/L)	Result (mg/L)	Q	Dil	% RPD	% RPD Limit	Analysis Date
Sulfate	1.4	2.0	+	1	35	20	06/18/2009 0523

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - MB

Sample ID: KQ12069-001
Batch: 12069
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Benzene	ND		1	0.50	0.027	ug/L	06/08/2009 2302
Ethylbenzene	ND		1	0.50	0.17	ug/L	06/08/2009 2302
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.019	ug/L	06/08/2009 2302
Toluene	ND		1	0.50	0.17	ug/L	06/08/2009 2302
Xylenes (total)	ND		1	0.50	0.17	ug/L	06/08/2009 2302

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		95	70-130
1,2-Dichloroethane-d4		106	70-130
Toluene-d8		107	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCS

Sample ID: KQ12069-002
Batch: 12069
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	50	50		1	101	70-130	06/08/2009 2136
Ethylbenzene	50	50		1	99	70-130	06/08/2009 2136
Methyl tertiary butyl ether (MTBE)	50	50		1	99	70-130	06/08/2009 2136
Toluene	50	50		1	99	70-130	06/08/2009 2136
Xylenes (total)	100	99		1	99	70-130	06/08/2009 2136

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		98	70-130
1,2-Dichloroethane-d4		102	70-130
Toluene-d8		108	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCSD

Sample ID: KQ12069-003
Batch: 12069
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	50	51		1	102	1.4	70-130	20	06/08/2009 2158
Ethylbenzene	50	51		1	103	3.6	70-130	20	06/08/2009 2158
Methyl tertiary butyl ether (MTBE)	50	50		1	100	0.72	70-130	20	06/08/2009 2158
Toluene	50	50		1	100	0.55	70-130	20	06/08/2009 2158
Xylenes (total)	100	100		1	101	1.9	70-130	20	06/08/2009 2158

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		99	70-130
1,2-Dichloroethane-d4		104	70-130
Toluene-d8		107	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - MB

Sample ID: KQ12076-001
Batch: 12076
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Benzene	ND		1	0.50	0.027	ug/L	06/08/2009 2336
Ethylbenzene	ND		1	0.50	0.17	ug/L	06/08/2009 2336
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.019	ug/L	06/08/2009 2336
Toluene	0.35	J	1	0.50	0.17	ug/L	06/08/2009 2336
Xylenes (total)	0.44	J	1	0.50	0.17	ug/L	06/08/2009 2336

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		94	70-130
1,2-Dichloroethane-d4		85	70-130
Toluene-d8		93	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCS

Sample ID: KQ12076-002
Batch: 12076
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	50	51		1	103	70-130	06/08/2009 2210
Ethylbenzene	50	53		1	105	70-130	06/08/2009 2210
Methyl tertiary butyl ether (MTBE)	50	56		1	112	70-130	06/08/2009 2210
Toluene	50	53		1	106	70-130	06/08/2009 2210
Xylenes (total)	100	110		1	107	70-130	06/08/2009 2210

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		96	70-130
1,2-Dichloroethane-d4		80	70-130
Toluene-d8		93	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCSD

Sample ID: KQ12076-003
Batch: 12076
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	50	50		1	100	2.6	70-130	20	06/08/2009 2231
Ethylbenzene	50	51		1	102	3.8	70-130	20	06/08/2009 2231
Methyl tertiary butyl ether (MTBE)	50	54		1	108	3.1	70-130	20	06/08/2009 2231
Toluene	50	52		1	104	2.0	70-130	20	06/08/2009 2231
Xylenes (total)	100	100		1	102	4.2	70-130	20	06/08/2009 2231

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		96	70-130
1,2-Dichloroethane-d4		81	70-130
Toluene-d8		96	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

TPH - DRO - MB

Sample ID: KQ12123-001
Batch: 12123
Analytical Method: 8015C

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/09/2009 2234

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
TPH-DRO	57	J	1	200	23	ug/L	06/13/2009 0909

Surrogate	Q	% Rec	Acceptance Limit
o - Terphenyl		88	53-118

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

TPH - DRO - LCS

Sample ID: KQ12123-002
Batch: 12123
Analytical Method: 8015C

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/09/2009 2234

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH-DRO	2500	2200		1	90	70-130	06/13/2009 0928

Surrogate	Q	% Rec	Acceptance Limit
o - Terphenyl		87	53-118

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

TPH - GRO - MB

Sample ID: KQ12676-001
Batch: 12676
Analytical Method: 8015B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
TPH-GRO	ND		1	100	20	ug/L	06/17/2009 1229

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		118	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

TPH - GRO - LCS

Sample ID: KQ12676-002
Batch: 12676
Analytical Method: 8015B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH-GRO	1000	980		1	98	70-130	06/17/2009 1139

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		120	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

TPH - GRO - LCSD

Sample ID: KQ12676-003
Batch: 12676
Analytical Method: 8015B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH-GRO	1000	980		1	98	0.0	70-130	20	06/17/2009 1204

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		122	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-AES - MB

Sample ID: KQ12240-001
Batch: 12240
Analytical Method: 6010B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/11/2009 1203

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Iron	ND		1	0.10	0.023	mg/L	06/11/2009 2341
Lead	0.0041	J	1	0.010	0.0019	mg/L	06/11/2009 2341

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-AES - LCS

Sample ID: KQ12240-002
Batch: 12240
Analytical Method: 6010B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/11/2009 1203

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Iron	20	20		1	101	80-120	06/11/2009 2346
Lead	0.40	0.39		1	98	80-120	06/11/2009 2346

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-AES - LCSD

Sample ID: KQ12240-003
Batch: 12240
Analytical Method: 6010B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/11/2009 1203

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Iron	20	20		1	103	1.8	80-120	20	06/11/2009 2351
Lead	0.40	0.40		1	100	2.1	80-120	20	06/11/2009 2351

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-AES - MB

Sample ID: KQ12463-001
Batch: 12463
Analytical Method: 6010B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/15/2009 1800

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Dissolved Iron	ND		1	0.10	0.023	mg/L	06/16/2009 2112
Dissolved Lead	ND		1	0.010	0.0019	mg/L	06/16/2009 2112

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-AES - LCS

Sample ID: KQ12463-002
Batch: 12463
Analytical Method: 6010B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/15/2009 1800

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Dissolved Iron	20	20		1	99	80-120	06/16/2009 2117
Dissolved Lead	0.40	0.38		1	95	80-120	06/16/2009 2117

PQL = Practical quantitation limit
P = The RPD between two GC columns exceeds 40%
N - Recovery is out of criteria
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
+ - RPD is out of criteria
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-AES - LCSD

Sample ID: KQ12463-003
Batch: 12463
Analytical Method: 6010B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/15/2009 1800

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Dissolved Iron	20	20		1	98	0.90	80-120	20	06/16/2009 2123
Dissolved Lead	0.40	0.38		1	94	0.94	80-120	20	06/16/2009 2123

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-AES - MB

Sample ID: KQ12573-001
Batch: 12573
Analytical Method: 6010B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/16/2009 1800

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Iron	ND		1	0.10	0.023	mg/L	06/18/2009 0311
Lead	0.0023	J	1	0.010	0.0019	mg/L	06/18/2009 0311

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-AES - LCS

Sample ID: KQ12573-002
Batch: 12573
Analytical Method: 6010B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/16/2009 1800

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Iron	20	21		1	104	80-120	06/18/2009 0317
Lead	0.40	0.40		1	100	80-120	06/18/2009 0317

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-AES - LCSD

Sample ID: KQ12573-003
Batch: 12573
Analytical Method: 6010B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/16/2009 1800

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Iron	20	20		1	101	2.6	80-120	20	06/18/2009 0322
Lead	0.40	0.39		1	96	3.3	80-120	20	06/18/2009 0322

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

SHEALY Chain of Custody Record

SHEALY ENVIRONMENTAL SERVICES, INC.
106 Vantage Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111

Number 102226

Client: ARCADIS	Report to Contact: Scott Bostian	Telephone No. / Fax No. / E-mail: 770-431-8666 / 770-435-2666	Quote No.
Address: 2849 Paces Ferry Rd	Sampler's Signature: Erica Maddox	Waybill No.	Page 1 of 1
City: Atlanta	State: GA	Zip Code: 30339	Printed Name: Erica Maddox	Analysis (Attach list if more space is needed.)
Project Name: HAA-13 Pimphase 1, Release 1			
Project No.: GP08HAFS, H13A, MR1	P.O. No.		Lot No.: KE06034

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	Matrix: Soil/Solid/Cake/Biosolid	Matrix: Aqueous	Matrix: Soil	Matrix: Non-Aqueous	No. of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	BTEX/MTBE	Sulfide	Lead Speciation	Total Lead + Iron	Diss. Lead + Iron	TPH	Alkalinity, Nitrate, Sulfate	Total Phosphorus	TKN	Remarks / Cooler I.D.
D-MW34 (060509)	6/5/09	0910		X			2		3	3			✓	✓	✓	✓	✓	✓	✓	✓	✓	
D-MW35 (060509)		1425		X			2		3	3			✓	✓	✓	✓	✓	✓	✓			
TB-02 (060509)		0900		X						2												

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

Sample Disposal: ☐ Return to Client ☐ Disposal by Lab

Note: All samples are retained for six weeks from receipt unless other arrangements are made.

Turn Around Time Required (Prior lab approval required for expedited TAT.): ☒ Standard ☐ Rush (Specify)

QC Requirements (Specify):

	Date	Time		Date	Time
1. Relinquished by: Erica Maddox	6/5/09	1700	1. Received by		
2. Relinquished by			2. Received by	6/6/09	
3. Relinquished by: FedEx	6/6/09	930	3. Laboratory received by	6/5/09	0930 / 1702 SAM

Comments:

LAB USE ONLY
Received on Ice (Circle) Yes No Ice Pack
SAM 6/6/09
Receipt Temp. X 3.4°C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: F-AD-012 Effective Date: 08-04-02

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

SHEALY ENVIRONMENTAL SERVICES, INC.

Shealy Environmental Services, Inc.
Document Number: F-AD-016
Revision Number: 6

Replaces Date: 09/22/06
Effective Date: 05/29/07

Sample Receipt Checklist (SRC)

Client: ARCADIS Cooler Inspected by/date: SAM 6/6/09 Lot #: KF6603J4

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Airborne Exp ☐ Other

Yes ☐	No ☑	NA ☐	1. Were custody seals present on the cooler?
Yes ☐	No ☐	NA ☑	2. If custody seals were present, were they intact and unbroken?

Cooler ID/temperature upon receipt 3.6/ °C / °C / °C / °C
/ °C / °C / °C / °C

Method: ☐ Temperature Blank ☑ Against Bottles
Method of coolant: ☑ Wet Ice ☐ Blue Ice ☐ Dry Ice ☐ None

If response is No (or Yes for 14, 15, 16), an explanation/resolution must be provided.

Yes ☐	No ☐	NA ☑	3. If temperature of any cooler exceeded 6.0°C, was Project Manager notified? PM notified by SRC, phone, note (circle one), other: _____. (For coolers received via commercial courier, PMs are to be notified immediately.
Yes ☑	No ☐	NA ☐	4. Is the commercial courier's packing slip attached to this form?
Yes ☑	No ☐	NA ☐	5. Were proper custody procedures (relinquished/received) followed?
Yes ☑	No ☐	NA ☐	6. Were sample IDs listed?
Yes ☑	No ☐	NA ☐	7. Was collection date & time listed?
Yes ☑	No ☐	NA ☐	8. Were tests to be performed listed on the COC or was quote # provided?
Yes ☑	No ☐	NA ☐	9. Did all samples arrive in the proper containers for each test?
Yes ☑	No ☐	NA ☐	10. Did all container label information (ID, date, time) agree with COC?
Yes ☑	No ☐	NA ☐	11. Did all containers arrive in good condition (unbroken, lids on, etc.)?
Yes ☑	No ☐	NA ☐	12. Was adequate sample volume available?
Yes ☐	No ☑	NA ☐	13. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
Yes ☐	No ☑	NA ☐	14. Were any samples containers missing?
Yes ☐	No ☑	NA ☐	15. Were there any excess samples not listed on COC?
Yes ☐	No ☐	NA ☑	16. Were bubbles present >"pea-size" (¼"or 6mm in diameter) in any VOA vials?
Yes ☑	No ☐	NA ☐	17. Were all metals/O&G/HEM/nutrient samples received at a pH of <2?
Yes ☑	No ☐	NA ☐	18. Were all cyanide and/or sulfide samples received at a pH >12?
Yes ☐	No ☐	NA ☑	19. Were all applicable NH3/TKN/cyanide/phenol/BNA/pest/PCB/herb (<0.2mg/L) and toxicity (<0.1mg/L) samples free of residual chlorine?
Yes ☐	No ☐	NA ☑	20. Were collection temperatures documented on the COC for NC samples?

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) _____ were received incorrectly preserved and were adjusted accordingly in sample receiving with _____ (H_2SO_4,HNO_3,HCl,NaOH) with the SR # (number) _____.

Sample(s) _____ were received with bubbles >6 mm in diameter.

Sample(s) _____ were received with TRC >0.2 mg/L for NH3/TKN/cyanide/BNA/pest/PCB/herb.

Toxicity sample(s) _____ were received with TRC >0.1 mg/L and were analyzed by method 330.5.

Date 6/5/09 FedEx Tracking Number 865594008659

Corrective Action taken, if necessary:
Was client notified: Yes ☐ No ☐
SESI employee: _____
Comments: _____

ander's
lame ARCADIS INC. Phone 770 431-8666
Company ARCADIS
Address 2839 PACES FERRY RD SE STE 400
ity ATLANTA State GA ZIP 30339-3769

Report of Analysis

ARCADIS U.S., Inc.
30 Patewood Drive
Suite 155
Greenville, SC 29615
Attention: Janet Christy

Project Name: HAA-13 Pumphouse 1, Release 1

Project Number: GP08HAFS.H13A.NA1R1

Lot Number: KF09013

Date Completed: 06/22/2009

Nisreen Saikaly
Project Manager

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.

KF09013

Case Narrative
ARCADIS U.S., Inc.
Lot Number: KF09013

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

TCLP Semivolatiles

The LCS recovery for Pyridine was outside method control limits in batch 12257. The MS results were within limits. Therefore the associated sample results were reported and no corrective action was required.

The surrogate recovery in batch 12257 was outside the acceptance limit. The surrogate recovery is attributed to matrix interference. The sample results are reported and no corrective action is required.

DRO

Samples -001 and -002 have an unknown pattern associated with the DRO analysis.

Sample Summary
ARCADIS U.S., Inc.
Lot Number: KF09013

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	D-MW37(060809)	Aqueous	06/08/2009 1350	06/09/2009
002	D-MW11(060809)	Aqueous	06/08/2009 1345	06/09/2009
003	IB-01(060809)	Aqueous	06/08/2009 1200	06/09/2009
004	HA13R1IDW-1(060809)	Aqueous	06/08/2009 1430	06/09/2009

(4 samples)

Executive Summary

ARCADIS U.S., Inc.

Lot Number: KF09013

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	D-MW37(060809)	Aqueous	Alkalinity	SM 2320B	8.9	J	mg/L	5
001	D-MW37(060809)	Aqueous	DOC	SM 5310D	16		mg/L	5
001	D-MW37(060809)	Aqueous	Sulfate	300.0	0.45	J	mg/L	5
001	D-MW37(060809)	Aqueous	Sulfide	SM 4500-S2 F	2.0	B	mg/L	5
001	D-MW37(060809)	Aqueous	Benzene	8260B	260		ug/L	6
001	D-MW37(060809)	Aqueous	Ethylbenzene	8260B	230		ug/L	6
001	D-MW37(060809)	Aqueous	Toluene	8260B	1200		ug/L	6
001	D-MW37(060809)	Aqueous	Xylenes (total)	8260B	850		ug/L	6
001	D-MW37(060809)	Aqueous	TPH-DRO	8015C	8900	B	ug/L	7
001	D-MW37(060809)	Aqueous	TPH-GRO	8015B	5600		ug/L	8
001	D-MW37(060809)	Aqueous	Dissolved Iron	6010B	0.70		mg/L	9
001	D-MW37(060809)	Aqueous	Dissolved Lead	6010B	0.0047	J	mg/L	9
001	D-MW37(060809)	Aqueous	Iron	6010B	1.6		mg/L	10
001	D-MW37(060809)	Aqueous	Lead	6010B	0.0048	J	mg/L	10
002	D-MW11(060809)	Aqueous	Alkalinity	SM 2320B	7.1	J	mg/L	11
002	D-MW11(060809)	Aqueous	DOC	SM 5310D	14		mg/L	11
002	D-MW11(060809)	Aqueous	Sulfate	300.0	1.2		mg/L	11
002	D-MW11(060809)	Aqueous	Sulfide	SM 4500-S2 F	2.9	B	mg/L	11
002	D-MW11(060809)	Aqueous	Benzene	8260B	62		ug/L	12
002	D-MW11(060809)	Aqueous	Ethylbenzene	8260B	270		ug/L	12
002	D-MW11(060809)	Aqueous	Toluene	8260B	340		ug/L	12
002	D-MW11(060809)	Aqueous	Xylenes (total)	8260B	1500		ug/L	12
002	D-MW11(060809)	Aqueous	TPH-DRO	8015C	14000	B	ug/L	13
002	D-MW11(060809)	Aqueous	TPH-GRO	8015B	5000		ug/L	14
002	D-MW11(060809)	Aqueous	Dissolved Iron	6010B	0.37		mg/L	15
002	D-MW11(060809)	Aqueous	Dissolved Lead	6010B	0.0081	J	mg/L	15
002	D-MW11(060809)	Aqueous	Iron	6010B	0.38		mg/L	16
002	D-MW11(060809)	Aqueous	Lead	6010B	0.0086	J	mg/L	16
004	HA13R1IDW-1(060809)	Aqueous	Ignitability (Pensky-Martens Closed-	1010A	>140		° F	18

(29 detections)

Inorganic non-metals

Client: ARCADIS U.S., Inc.
Laboratory ID: KF09013-001
Description: D-MW37(060809)
Matrix: Aqueous
Date Sampled: 06/08/2009 1350
Date Received: 06/09/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(Alkalinity) SM 2320B	1	06/10/2009 1528	PMM		12132
1		(DOC) SM 5310D	1	06/11/2009 1418	PMM		12218
1		(Nitrate - N) 353.2	1	06/10/2009 1047	WD		12171
1		(Sulfate) 300.0	1	06/19/2009 1319	DAS		12908
1		(Sulfide) SM 4500-S2 F	1	06/15/2009 1325	BM		12486

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Alkalinity		SM 2320B	8.9	J	10	3.9	mg/L	1
DOC		SM 5310D	16		1.0	0.063	mg/L	1
Nitrate - N		353.2	ND		0.020	0.0013	mg/L	1
Sulfate		300.0	0.45	J	1.0	0.13	mg/L	1
Sulfide	18496-25-8	SM 4500-S2 F	2.0	B	1.0	0.62	mg/L	1

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

Volatile Organic Compounds by GC/MS

Client: ARCADIS U.S., Inc.
Laboratory ID: KF09013-001
Description: D-MW37(060809)
Matrix: Aqueous
Date Sampled: 06/08/2009 1350
Date Received: 06/09/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	20	06/11/2009 1507	DLB		12302

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Benzene	71-43-2	8260B	260		10	0.54	ug/L	1
Ethylbenzene	100-41-4	8260B	230		10	3.4	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		10	0.38	ug/L	1
Toluene	108-88-3	8260B	1200		10	3.4	ug/L	1
Xylenes (total)	1330-20-7	8260B	850		10	3.4	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		89	52-138
Bromofluorobenzene		95	70-147
Toluene-d8		90	76-125

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

TPH - DRO

Client: ARCADIS U.S., Inc.
Laboratory ID: KF09013-001
Description: D-MW37(060809)
Matrix: Aqueous
Date Sampled: 06/08/2009 1350
Date Received: 06/09/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8015C	1	06/13/2009 1320	ASB	06/09/2009 2234	12123

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
TPH-DRO		8015C	8900	B	200	23	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
o - Terphenyl		69	53-118

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

TPH - GRO

Client: ARCADIS U.S., Inc.
Laboratory ID: KF09013-001
Description: D-MW37(060809)
Matrix: Aqueous
Date Sampled: 06/08/2009 1350
Date Received: 06/09/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	5030B	8015B	5	06/18/2009 1649	IVC		12765

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
TPH-GRO		8015B	5600		500	100	ug/L	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
Bromofluorobenzene		127	70-130

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

ICP-AES

Client: ARCADIS U.S., Inc.
Laboratory ID: KF09013-001
Description: D-MW37(060809)
Matrix: Aqueous
Date Sampled: 06/08/2009 1350
Date Received: 06/09/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3005A	6010B	1	06/16/2009 2209	CDF	06/15/2009 1800	12463

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Dissolved Iron	7439-89-6	6010B	0.70		0.10	0.023	mg/L	1
Dissolved Lead	7439-92-1	6010B	0.0047	J	0.010	0.0019	mg/L	1

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

ICP-AES

Client: ARCADIS U.S., Inc.
Laboratory ID: KF09013-001
Description: D-MW37(060809)
Matrix: Aqueous
Date Sampled: 06/08/2009 1350
Date Received: 06/09/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3005A	6010B	1	06/16/2009 2204	CDF	06/15/2009 1800	12463

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Iron	7439-89-6	6010B	1.6		0.10	0.023	mg/L	1
Lead	7439-92-1	6010B	0.0048	J	0.010	0.0019	mg/L	1

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

Inorganic non-metals

Client: ARCADIS U.S., Inc.
Laboratory ID: KF09013-002
Description: D-MW11(060809)
Matrix: Aqueous
Date Sampled: 06/08/2009 1345
Date Received: 06/09/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(Alkalinity) SM 2320B	1	06/10/2009 1602	PMM		12132
1		(DOC) SM 5310D	1	06/11/2009 1438	PMM		12218
1		(Nitrate - N) 353.2	1	06/10/2009 1048	WD		12171
1		(Sulfate) 300.0	1	06/19/2009 1342	DAS		12908
1		(Sulfide) SM 4500-S2 F	1	06/15/2009 1325	BM		12486

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Alkalinity		SM 2320B	7.1	J	10	3.9	mg/L	1
DOC		SM 5310D	14		1.0	0.063	mg/L	1
Nitrate - N		353.2	ND		0.020	0.0013	mg/L	1
Sulfate		300.0	1.2		1.0	0.13	mg/L	1
Sulfide	18496-25-8	SM 4500-S2 F	2.9	B	1.0	0.62	mg/L	1

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

Volatile Organic Compounds by GC/MS

Client: ARCADIS U.S., Inc.
Laboratory ID: KF09013-002
Description: D-MW11(060809)
Matrix: Aqueous
Date Sampled: 06/08/2009 1345
Date Received: 06/09/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	5	06/11/2009 1756	DLB		12302

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Benzene	71-43-2	8260B	62		2.5	0.14	ug/L	1
Ethylbenzene	100-41-4	8260B	270		2.5	0.85	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		2.5	0.094	ug/L	1
Toluene	108-88-3	8260B	340		2.5	0.85	ug/L	1
Xylenes (total)	1330-20-7	8260B	1500		2.5	0.85	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		90	52-138
Bromofluorobenzene		100	70-147
Toluene-d8		90	76-125

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

TPH - DRO

Client: ARCADIS U.S., Inc.
Laboratory ID: KF09013-002
Description: D-MW11(060809)
Matrix: Aqueous
Date Sampled: 06/08/2009 1345
Date Received: 06/09/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8015C	1	06/13/2009 1339	ASB	06/09/2009 2234	12123

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
TPH-DRO		8015C	14000	B	200	23	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
o - Terphenyl		82	53-118

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

TPH - GRO

Client: ARCADIS U.S., Inc.
Laboratory ID: KF09013-002
Description: D-MW11(060809)
Matrix: Aqueous
Date Sampled: 06/08/2009 1345
Date Received: 06/09/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	5030B	8015B	2	06/18/2009 1714	IVC		12765

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
TPH-GRO		8015B	5000		200	40	ug/L	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
Bromofluorobenzene		122	70-130

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

ICP-AES

Client: ARCADIS U.S., Inc.
Laboratory ID: KF09013-002
Description: D-MW11(060809)
Matrix: Aqueous
Date Sampled: 06/08/2009 1345
Date Received: 06/09/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3005A	6010B	1	06/16/2009 2219	CDF	06/15/2009 1800	12463

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Dissolved Iron	7439-89-6	6010B	0.37		0.10	0.023	mg/L	1
Dissolved Lead	7439-92-1	6010B	0.0081	J	0.010	0.0019	mg/L	1

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

ICP-AES

Client: ARCADIS U.S., Inc.
Laboratory ID: KF09013-002
Description: D-MW11(060809)
Matrix: Aqueous
Date Sampled: 06/08/2009 1345
Date Received: 06/09/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3005A	6010B	1	06/16/2009 2214	CDF	06/15/2009 1800	12463

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Iron	7439-89-6	6010B	0.38		0.10	0.023	mg/L	1
Lead	7439-92-1	6010B	0.0086	J	0.010	0.0019	mg/L	1

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

Volatile Organic Compounds by GC/MS

Client: ARCADIS U.S., Inc.
Laboratory ID: KF09013-003
Description: IB-01(060809)
Matrix: Aqueous
Date Sampled: 06/08/2009 1200
Date Received: 06/09/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/11/2009 1334	DLB		12302

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Benzene	71-43-2	8260B	ND		0.50	0.027	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.17	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.019	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.17	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		0.50	0.17	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		89	52-138
Bromofluorobenzene		95	70-147
Toluene-d8		90	76-125

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

Inorganic non-metals

Client: ARCADIS U.S., Inc.
Laboratory ID: KF09013-004
Description: HA13R1IDW-1(060809)
Matrix: Aqueous
Date Sampled: 06/08/2009 1430
Date Received: 06/09/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(Ignitability) 1010A	1	06/10/2009 1548	PMM		
1		(pH) SM 4500-H B	1	06/09/2009 1430	HBB		12150

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Ignitability (Pensky-Martens Closed-Cup)		1010A	>140				° F	1
pH		SM 4500-H B	5.24				su	1

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

TCLP Volatiles

Client: ARCADIS U.S., Inc.
Laboratory ID: KF09013-004
Description: HA13R1IDW-1(060809)
Matrix: Aqueous
Date Sampled: 06/08/2009 1430
Date Received: 06/09/2009

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Leachate Date
1	1311/5030B	8260B	10	06/19/2009 1442	DLB		12825	06/11/2009 0000

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Benzene	71-43-2	8260B	ND		0.050		mg/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		0.10		mg/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.050		mg/L	1
Chlorobenzene	108-90-7	8260B	ND		0.050		mg/L	1
Chloroform	67-66-3	8260B	ND		0.050		mg/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.050		mg/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.050		mg/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.050		mg/L	1
Trichloroethene	79-01-6	8260B	ND		0.050		mg/L	1
Vinyl chloride	75-01-4	8260B	ND		0.010		mg/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		88	70-130
Bromofluorobenzene		99	70-130
Toluene-d8		92	70-130

PQL = Practical quantitation limit
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
P = The RPD between two GC columns exceeds 40%
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
N = Recovery is out of criteria
H = Out of holding time

TCLP Semivolatiles

Client: ARCADIS U.S., Inc.
Description: HA13R1IDW-1(060809)
Date Sampled: 06/08/2009 1430
Date Received: 06/09/2009

Laboratory ID: KF09013-004
Matrix: Aqueous

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Leachate Date
1	1311/3520C	8270D	1	06/14/2009 0640	GLR	06/11/2009 1723	12257	06/11/2009 0000

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
1,4-Dichlorobenzene	106-46-7	8270D	ND		0.050		mg/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		0.10		mg/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.050		mg/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.050		mg/L	1
Hexachloroethane	67-72-1	8270D	ND		0.050		mg/L	1
2-Methylphenol	95-48-7	8270D	ND		0.050		mg/L	1
3 & 4-Methylphenol	106-44-5	8270D	ND		0.10		mg/L	1
Nitrobenzene	98-95-3	8270D	ND		0.050		mg/L	1
Pentachlorophenol	87-86-5	8270D	ND		0.25		mg/L	1
Pyridine	110-86-1	8270D	ND		0.050		mg/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.050		mg/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.050		mg/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,4,6-Tribromophenol		108	41-144
2-Fluorobiphenyl		109	37-129
2-Fluorophenol		96	24-127
Nitrobenzene-d5		123	38-127
Phenol-d5		98	28-128
Terphenyl-d14		105	10-148

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"
B = Detected in the method blank
J = Estimated result < PQL and ≥ MDL
N = Recovery is out of criteria
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
H = Out of holding time

QC Summary

Inorganic non-metals - MB

Sample ID: KQ12132-001
Batch: 12132
Analytical Method: SM 2320B
Matrix: Aqueous

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Alkalinity	ND		1	10	3.9	mg/L	06/10/2009 0713

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCS

Sample ID: KQ12132-002
Batch: 12132
Analytical Method: SM 2320B
Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Alkalinity	100	100		1	100	90-110	06/10/2009 0729

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCSD

Sample ID: KQ12132-003
Batch: 12132
Analytical Method: SM 2320B

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Alkalinity	100	100		1	102	2.2	90-110	20	06/10/2009 0745

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MS

Sample ID: KF09013-001MS
Batch: 12132
Analytical Method: SM 2320B
Matrix: Aqueous

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Alkalinity	8.9	100	110		1	101	70-130	06/10/2009 1540

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MSD

Sample ID: KF09013-001MD
Batch: 12132
Analytical Method: SM 2320B
Matrix: Aqueous

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Alkalinity	8.9	100	110		1	103	1.9	70-130	20	06/10/2009 1553

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MB

Sample ID: KQ12150-001
Batch: 12150
Analytical Method: SM 4500-H B

Matrix: Aqueous

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
pH	ND		1	0.0		su	06/09/2009 1430

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - Duplicate

Sample ID: KF09013-004DU
Batch: 12150
Analytical Method: SM 4500-H B

Matrix: Aqueous

Parameter	Sample Amount (su)	Result	Q	Dil	% RPD	% RPD Limit	Analysis Date
pH	5.24	5.32		1	1.5	20	06/09/2009 1430

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MB

Sample ID: KQ12171-001
Batch: 12171
Analytical Method: 353.2
Matrix: Aqueous

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Nitrate - N	ND		1	0.020	0.0013	mg/L	06/10/2009 0000

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCS

Sample ID: KQ12171-002
Batch: 12171
Analytical Method: 353.2
Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Nitrate - N	0.80	0.86		1	108	90-110	06/10/2009 0000

PQL = Practical quantitation limit
P = The RPD between two GC columns exceeds 40%
N - Recovery is out of criteria
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
+ - RPD is out of criteria
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCSD

Sample ID: KQ12171-003
Batch: 12171
Analytical Method: 353.2

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Nitrate - N	0.80	0.87		1	108	0.81	90-110	20	06/10/2009 0000

PQL = Practical quantitation limit
P = The RPD between two GC columns exceeds 40%
N - Recovery is out of criteria
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
+ - RPD is out of criteria
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MB

Sample ID: KQ12218-001
Batch: 12218
Analytical Method: SM 5310D

Matrix: Aqueous

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
DOC	ND		1	1.0	0.063	mg/L	06/11/2009 1316

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCS

Sample ID: KQ12218-002
Batch: 12218
Analytical Method: SM 5310D
Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
DOC	20	20		1	100	90-110	06/11/2009 1337

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCSD

Sample ID: KQ12218-003
Batch: 12218
Analytical Method: SM 5310D

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
DOC	20	20		1	99	1.0	90-110	20	06/11/2009 1357

PQL = Practical quantitation limit
P = The RPD between two GC columns exceeds 40%
N - Recovery is out of criteria
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
+ - RPD is out of criteria
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MS

Sample ID: KF09013-002MS
Batch: 12218
Analytical Method: SM 5310D
Matrix: Aqueous

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
DOC	14	20	33		1	94	70-130	06/11/2009 1459

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MSD

Sample ID: KF09013-002MD
Batch: 12218
Analytical Method: SM 5310D
Matrix: Aqueous

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
DOC	14	20	33		1	94	0.21	70-130	20	06/11/2009 1519

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MB

Sample ID: KQ12486-001
Batch: 12486
Analytical Method: SM 4500-S2 F

Matrix: Aqueous

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Sulfide	0.64	J	1	1.0	0.62	mg/L	06/15/2009 1325

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCS

Sample ID: KQ12486-002
Batch: 12486
Analytical Method: SM 4500-S2 F

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Sulfide	10	10		1	100	80-120	06/15/2009 1325

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCSD

Sample ID: KQ12486-003
Batch: 12486
Analytical Method: SM 4500-S2 F

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Sulfide	10	10		1	103	3.5	80-120	20	06/15/2009 1325

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - MB

Sample ID: KQ12908-001
Batch: 12908
Analytical Method: 300.0
Matrix: Aqueous

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Sulfate	ND		1	1.0	0.13	mg/L	06/19/2009 1030

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCS

Sample ID: KQ12908-002
Batch: 12908
Analytical Method: 300.0
Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Sulfate	20	19		1	97	90-110	06/19/2009 1053

PQL = Practical quantitation limit
P = The RPD between two GC columns exceeds 40%
N - Recovery is out of criteria
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
+ - RPD is out of criteria
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Inorganic non-metals - LCSD

Sample ID: KQ12908-003
Batch: 12908
Analytical Method: 300.0
Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Sulfate	20	20		1	101	4.0	90-110	20	06/19/2009 1115

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - MB

Sample ID: KQ12302-001
Batch: 12302
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Benzene	ND		1	0.50	0.027	ug/L	06/11/2009 1137
Ethylbenzene	ND		1	0.50	0.17	ug/L	06/11/2009 1137
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.019	ug/L	06/11/2009 1137
Toluene	ND		1	0.50	0.17	ug/L	06/11/2009 1137
Xylenes (total)	ND		1	0.50	0.17	ug/L	06/11/2009 1137

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		97	70-130
1,2-Dichloroethane-d4		88	70-130
Toluene-d8		89	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCS

Sample ID: KQ12302-002
Batch: 12302
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	50	51		1	102	70-130	06/11/2009 1004
Ethylbenzene	50	49		1	99	70-130	06/11/2009 1004
Methyl tertiary butyl ether (MTBE)	50	52		1	105	70-130	06/11/2009 1004
Toluene	50	49		1	99	70-130	06/11/2009 1004
Xylenes (total)	100	98		1	98	70-130	06/11/2009 1004

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		97	70-130
1,2-Dichloroethane-d4		85	70-130
Toluene-d8		87	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCSD

Sample ID: KQ12302-003
Batch: 12302
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	50	52		1	103	1.6	70-130	20	06/11/2009 1027
Ethylbenzene	50	51		1	102	3.5	70-130	20	06/11/2009 1027
Methyl tertiary butyl ether (MTBE)	50	53		1	106	1.0	70-130	20	06/11/2009 1027
Toluene	50	51		1	101	2.7	70-130	20	06/11/2009 1027
Xylenes (total)	100	100		1	101	3.4	70-130	20	06/11/2009 1027

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		97	70-130
1,2-Dichloroethane-d4		84	70-130
Toluene-d8		87	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

TCLP Volatiles - MB

Sample ID: KQ12825-001
Batch: 12825
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 1311/5030B

Leachate Date: 06/11/2009 0000

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Benzene	ND		10	0.050		mg/L	06/19/2009 1107
2-Butanone (MEK)	ND		10	0.10		mg/L	06/19/2009 1107
Carbon tetrachloride	ND		10	0.050		mg/L	06/19/2009 1107
Chlorobenzene	ND		10	0.050		mg/L	06/19/2009 1107
Chloroform	ND		10	0.050		mg/L	06/19/2009 1107
1,2-Dichloroethane	ND		10	0.050		mg/L	06/19/2009 1107
1,1-Dichloroethene	ND		10	0.050		mg/L	06/19/2009 1107
Tetrachloroethene	ND		10	0.050		mg/L	06/19/2009 1107
Trichloroethene	ND		10	0.050		mg/L	06/19/2009 1107
Vinyl chloride	ND		10	0.010		mg/L	06/19/2009 1107

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		99	70-130
1,2-Dichloroethane-d4		87	70-130
Toluene-d8		94	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

TCLP Volatiles - LCS

Sample ID: KQ12825-002
Batch: 12825
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 1311/5030B

Leachate Date: 06/11/2009 0000

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	0.50	0.50		10	99	72-127	06/19/2009 1003
2-Butanone (MEK)	1.0	0.85		10	85	60-140	06/19/2009 1003
Carbon tetrachloride	0.50	0.53		10	106	37-166	06/19/2009 1003
Chlorobenzene	0.50	0.48		10	96	78-129	06/19/2009 1003
Chloroform	0.50	0.44		10	87	63-123	06/19/2009 1003
1,2-Dichloroethane	0.50	0.49		10	98	59-143	06/19/2009 1003
1,1-Dichloroethene	0.50	0.55		10	111	50-132	06/19/2009 1003
Tetrachloroethene	0.50	0.51		10	102	70-130	06/19/2009 1003
Trichloroethene	0.50	0.50		10	101	73-124	06/19/2009 1003
Vinyl chloride	0.50	0.49		10	99	29-159	06/19/2009 1003

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		100	70-130
1,2-Dichloroethane-d4		87	70-130
Toluene-d8		96	70-130

PQL = Practical quantitation limit

ND = Not detected at or above the MDL

P = The RPD between two GC columns exceeds 40%

J = Estimated result < PQL and ≥ MDL

N - Recovery is out of criteria

+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

TCLP Volatiles - MS

Sample ID: KF09013-004MS
Batch: 12825
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 1311/5030B
Leachate Date: 06/11/2009 0000

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	ND	0.50	0.51		10	101	70-127	06/19/2009 1421
2-Butanone (MEK)	ND	1.0	1.0		10	102	60-140	06/19/2009 1421
Carbon tetrachloride	ND	0.50	0.54		10	108	37-166	06/19/2009 1421
Chlorobenzene	ND	0.50	0.46		10	92	78-129	06/19/2009 1421
Chloroform	ND	0.50	0.43		10	86	63-123	06/19/2009 1421
1,2-Dichloroethane	ND	0.50	0.48		10	95	59-143	06/19/2009 1421
1,1-Dichloroethene	ND	0.50	0.58		10	115	50-132	06/19/2009 1421
Tetrachloroethene	ND	0.50	0.50		10	101	70-130	06/19/2009 1421
Trichloroethene	ND	0.50	0.51		10	101	73-124	06/19/2009 1421
Vinyl chloride	ND	0.50	0.51		10	102	29-159	06/19/2009 1421

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		101	70-130
1,2-Dichloroethane-d4		90	70-130
Toluene-d8		94	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

TCLP Semivolatiles - MB

Sample ID: KQ12257-001
Batch: 12257
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 1311/3520C
Prep Date: 06/11/2009 1723 Leachate Date: 06/11/2009 0000

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
1,4-Dichlorobenzene	ND		1	0.050		mg/L	06/14/2009 0558
2,4,5-Trichlorophenol	ND		1	0.050		mg/L	06/14/2009 0558
2,4,6-Trichlorophenol	ND		1	0.050		mg/L	06/14/2009 0558
2,4-Dinitrotoluene	ND		1	0.10		mg/L	06/14/2009 0558
2-Methylphenol	ND		1	0.050		mg/L	06/14/2009 0558
3 & 4-Methylphenol	ND		1	0.10		mg/L	06/14/2009 0558
Hexachlorobenzene	ND		1	0.050		mg/L	06/14/2009 0558
Hexachlorobutadiene	ND		1	0.050		mg/L	06/14/2009 0558
Hexachloroethane	ND		1	0.050		mg/L	06/14/2009 0558
Nitrobenzene	ND		1	0.050		mg/L	06/14/2009 0558
Pentachlorophenol	ND		1	0.25		mg/L	06/14/2009 0558
Pyridine	ND		1	0.050		mg/L	06/14/2009 0558

Surrogate	Q	% Rec	Acceptance Limit
2,4,6-Tribromophenol		93	41-144
2-Fluorobiphenyl		108	37-129
2-Fluorophenol		84	24-127
Nitrobenzene-d5		98	38-127
Phenol-d5		99	28-128
Terphenyl-d14		106	10-148

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

TCLP Semivolatiles - LCS

Sample ID: KQ12257-002
Batch: 12257
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 1311/3520C
Prep Date: 06/11/2009 1723 Leachate Date: 06/11/2009 0000

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,4-Dichlorobenzene	1.0	0.98		1	98	30-130	06/15/2009 1817
2,4,5-Trichlorophenol	1.0	1.0		1	106	30-130	06/15/2009 1817
2,4,6-Trichlorophenol	1.0	1.0		1	100	30-130	06/15/2009 1817
2,4-Dinitrotoluene	1.0	0.95		1	95	30-130	06/15/2009 1817
2-Methylphenol	1.0	0.88		1	88	30-130	06/15/2009 1817
3 & 4-Methylphenol	2.0	2.0		1	101	30-130	06/15/2009 1817
Hexachlorobenzene	1.0	1.1		1	110	30-130	06/15/2009 1817
Hexachlorobutadiene	1.0	1.0		1	104	30-130	06/15/2009 1817
Hexachloroethane	1.0	1.0		1	100	30-130	06/15/2009 1817
Nitrobenzene	1.0	1.0		1	103	30-130	06/15/2009 1817
Pentachlorophenol	1.0	0.96		1	96	30-130	06/15/2009 1817
Pyridine	1.0	ND	N	1	0.0	30-130	06/15/2009 1817

Surrogate	Q	% Rec	Acceptance Limit
2,4,6-Tribromophenol		128	41-144
2-Fluorobiphenyl		124	37-129
2-Fluorophenol		108	24-127
Nitrobenzene-d5		114	38-127
Phenol-d5		111	28-128
Terphenyl-d14		120	10-148

PQL = Practical quantitation limit
P = The RPD between two GC columns exceeds 40%
N - Recovery is out of criteria
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
+ - RPD is out of criteria
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

TCLP Semivolatiles - MS

Sample ID: KF09013-004MS
Batch: 12257
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 1311/3520C
Prep Date: 06/11/2009 1723 Leachate Date: 06/11/2009 0000

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,4-Dichlorobenzene	ND	1.0	0.94		1	94	30-130	06/14/2009 0702
2,4-Dinitrotoluene	ND	1.0	0.89		1	89	30-130	06/14/2009 0702
Hexachlorobenzene	ND	1.0	1.1		1	110	30-130	06/14/2009 0702
Hexachlorobutadiene	ND	1.0	1.0		1	101	30-130	06/14/2009 0702
Hexachloroethane	ND	1.0	0.99		1	99	30-130	06/14/2009 0702
2-Methylphenol	ND	1.0	0.93		1	93	30-130	06/14/2009 0702
3 & 4-Methylphenol	ND	2.0	2.2		1	109	30-130	06/14/2009 0702
Nitrobenzene	ND	1.0	1.1		1	110	30-130	06/14/2009 0702
Pentachlorophenol	ND	1.0	0.90		1	90	30-130	06/14/2009 0702
Pyridine	ND	1.0	0.52		1	52	30-130	06/14/2009 0702
2,4,5-Trichlorophenol	ND	1.0	1.0		1	102	30-130	06/14/2009 0702
2,4,6-Trichlorophenol	ND	1.0	0.96		1	96	30-130	06/14/2009 0702

Surrogate	Q	% Rec	Acceptance Limit
2,4,6-Tribromophenol		115	41-144
2-Fluorobiphenyl		117	37-129
2-Fluorophenol		97	24-127
Nitrobenzene-d5	N	150	38-127
Phenol-d5		116	28-128
Terphenyl-d14		109	10-148

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

TPH - DRO - MB

Sample ID: KQ12123-001
Batch: 12123
Analytical Method: 8015C

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/09/2009 2234

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
TPH-DRO	57	J	1	200	23	ug/L	06/13/2009 0909

Surrogate	Q	% Rec	Acceptance Limit
o - Terphenyl		88	53-118

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

TPH - DRO - LCS

Sample ID: KQ12123-002
Batch: 12123
Analytical Method: 8015C

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/09/2009 2234

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH-DRO	2500	2200		1	90	70-130	06/13/2009 0928

Surrogate	Q	% Rec	Acceptance Limit
o - Terphenyl		87	53-118

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

TPH - GRO - MB

Sample ID: KQ12765-001
Batch: 12765
Analytical Method: 8015B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
TPH-GRO	ND		1	100	20	ug/L	06/18/2009 1510

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		122	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

TPH - GRO - LCS

Sample ID: KQ12765-002
Batch: 12765
Analytical Method: 8015B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH-GRO	1000	960		1	96	70-130	06/18/2009 1420

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		117	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

TPH - GRO - LCSD

Sample ID: KQ12765-003
Batch: 12765
Analytical Method: 8015B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH-GRO	1000	940		1	94	1.6	70-130	20	06/18/2009 1445

Surrogate	Q	% Rec	Acceptance Limit
Bromofluorobenzene		115	70-130

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-AES - MB

Sample ID: KQ12463-001
Batch: 12463
Analytical Method: 6010B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/15/2009 1800

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Iron	ND		1	0.10	0.023	mg/L	06/16/2009 2112
Lead	ND		1	0.010	0.0019	mg/L	06/16/2009 2112

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-AES - LCS

Sample ID: KQ12463-002
Batch: 12463
Analytical Method: 6010B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/15/2009 1800

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Iron	20	20		1	99	80-120	06/16/2009 2117
Lead	0.40	0.38		1	95	80-120	06/16/2009 2117

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-AES - LCSD

Sample ID: KQ12463-003
Batch: 12463
Analytical Method: 6010B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/15/2009 1800

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Iron	20	20		1	98	0.90	80-120	20	06/16/2009 2123
Lead	0.40	0.38		1	94	0.94	80-120	20	06/16/2009 2123

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-AES - MB

Sample ID: KQ12463-001
Batch: 12463
Analytical Method: 6010B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/15/2009 1800

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Dissolved Iron	ND		1	0.10	0.023	mg/L	06/16/2009 2112
Dissolved Lead	ND		1	0.010	0.0019	mg/L	06/16/2009 2112

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-AES - LCS

Sample ID: KQ12463-002
Batch: 12463
Analytical Method: 6010B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/15/2009 1800

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Dissolved Iron	20	20		1	99	80-120	06/16/2009 2117
Dissolved Lead	0.40	0.38		1	95	80-120	06/16/2009 2117

PQL = Practical quantitation limit
P = The RPD between two GC columns exceeds 40%
N - Recovery is out of criteria
ND = Not detected at or above the MDL
J = Estimated result < PQL and ≥ MDL
+ - RPD is out of criteria
Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-AES - LCSD

Sample ID: KQ12463-003
Batch: 12463
Analytical Method: 6010B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/15/2009 1800

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Dissolved Iron	20	20		1	98	0.90	80-120	20	06/16/2009 2123
Dissolved Lead	0.40	0.38		1	94	0.94	80-120	20	06/16/2009 2123

PQL = Practical quantitation limit
ND = Not detected at or above the MDL
P = The RPD between two GC columns exceeds 40%
J = Estimated result < PQL and ≥ MDL
N - Recovery is out of criteria
+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

SHEALY ENVIRONMENTAL SERVICES, INC.

106 Vantage Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111

SHEALY Chain of Custody Record

Number 102134

Client: ARCADIS	Report to Contact: Scott Bostian	Telephone No. / Fax No. / E-mail: 770-431-8666 / 770-435-2666	Quote No.
Address: 2849 Paces Ferry Rd	Sampler's Signature: Erica Maddox	Waybill No.	Page 1 of 1
City: Atlanta / State: GA / Zip Code: 30339	Printed Name: Erica Maddox	Analysis (Attach list if more space is needed.)	
Project Name: HAA-13 Pumphouse 1 Release 1			
Project No.: GP08HAFS. H13A. NAIR1	P.O. No.		Lot No. HF09013

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	Sampled Grab / Composite	Matrix: Aqueous	Matrix: Soil	Matrix: Non-Aqueous	No. of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	NaHSO4	BTEX/MTBE	SVOCs	Dissolved Fe, Mn & Lead	TPH	PCBs in Water & Solids	TCLP VOCs	TCLP SVOCs	TCLP Metals (Ag, As, Ba, Cd, Cr, Pb, Se, Hg)	Remarks / Cooler I.D.
D-MW37(060809)	6/8/09	1350	G	X			2		1	5	1		✓	✓	✓	✓	✓	✓				
D-MW11(060809)		1345	G	X			2		1	5	1		✓	✓	✓	✓	✓	✓				
IB-01(060809)		1200	G	X						2			✓									
HA13R1IOW-1(060809)	↓	1430	G	X			3			3			SVOC			VOC			✓	✓	✓	

Possible Hazard Identification: [ ] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison [ ] Unknown

Sample Disposal: [ ] Return to Client [ ] Disposal by Lab

Note: All samples are retained for six weeks from receipt unless other arrangements are made.

Turn Around Time Required (Prior lab approval required for expedited TAT.): [ ] Standard [ ] Rush (Specify)

QC Requirements (Specify):

	Date	Time		Date	Time
1. Relinquished by: Erica Maddox	6-8-09	1500	1. Received by		
2. Relinquished by	Date	Time	2. Received by	Date	Time
3. Relinquished by: FedEx	Date 6/9/09	Time 0915	3. Laboratory received by	Date 6/9/09	Time 0915

Comments:

LAB USE ONLY
Received on Ice (Circle) (Yes) No Ice Pack

Receipt Temp. 3.5 °C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s), PINK-Field/Client Copy

Shealy Environmental Services, Inc.
Document Number: F-AD-016
Revision Number: 6

Replaces Date: 09/22/06
Effective Date: 05/29/07

Sample Receipt Checklist (SRC)

Client: Arcadis Cooler Inspected by/date: DMP / 6/9/08 Lot #: KF09013

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Airborne Exp ☐ Other

Yes ☐	No ☑	NA ☐	1. Were custody seals present on the cooler?
Yes ☐	No ☐	NA ☑	2. If custody seals were present, were they intact and unbroken?

Cooler ID/temperature upon receipt 3.5 / ___ °C ___ / ___ °C ___ / ___ °C ___ / ___ °C
___ / ___ °C ___ / ___ °C ___ / ___ °C ___ / ___ °C

Method: ☐ Temperature Blank ☑ Against Bottles
Method of coolant: ☑ Wet Ice ☐ Blue Ice ☐ Dry Ice ☐ None

If response is No (or Yes for 14, 15, 16), an explanation/resolution must be provided.

Yes ☐	No ☐	NA ☑	3. If temperature of any cooler exceeded 6.0°C, was Project Manager notified? PM notified by SRC, phone, note (circle one), other: _____. (For coolers received via commercial courier, PMs are to be notified immediately.
Yes ☑	No ☐	NA ☐	4. Is the commercial courier's packing slip attached to this form?
Yes ☐	No ☑	NA ☐	5. Were proper custody procedures (relinquished/received) followed?
Yes ☑	No ☐	NA ☐	6. Were sample IDs listed?
Yes ☑	No ☐	NA ☐	7. Was collection date & time listed?
Yes ☑	No ☐	NA ☐	8. Were tests to be performed listed on the COC or was quote # provided?
Yes ☑	No ☐	NA ☐	9. Did all samples arrive in the proper containers for each test?
Yes ☑	No ☐	NA ☐	10. Did all container label information (ID, date, time) agree with COC?
Yes ☑	No ☐	NA ☐	11. Did all containers arrive in good condition (unbroken, lids on, etc.)?
Yes ☑	No ☐	NA ☐	12. Was adequate sample volume available?
Yes ☑	No ☐	NA ☐	13. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
Yes ☐	No ☑	NA ☐	14. Were any samples containers missing?
Yes ☐	No ☑	NA ☐	15. Were there any excess samples not listed on COC?
Yes ☐	No ☑	NA ☐	16. Were bubbles present >"pea-size" (¼"or 6mm in diameter) in any VOA vials?
Yes ☑	No ☐	NA ☐	17. Were all metals/O&G/HEM/nutrient samples received at a pH of <2?
Yes ☑	No ☐	NA ☐	18. Were all cyanide and/or sulfide samples received at a pH >12?
Yes ☐	No ☐	NA ☑	19. Were all applicable NH3/TKN/cyanide/phenol/BNA/pest/PCB/herb (<0.2mg/L) and toxicity (<0.1mg/L) samples free of residual chlorine?
Yes ☐	No ☐	NA ☑	20. Were collection temperatures documented on the COC for NC samples?

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s)_____ were received incorrectly preserved and were adjusted accordingly in sample receiving with _____ (H_2SO_4,HNO_3,HCl,NaOH) with the SR # (number) _____.

Sample(s)_____ were received with bubbles >6 mm in diameter.

Sample(s)_____ were received with TRC >0.2 mg/L for NH3/TKN/cyanide/BNA/pest/PCB/herb.

Toxicity sample(s)_____ were received with TRC >0.1 mg/L and were analyzed by method 330.5.

Corrective Action taken, if necessary:

Was client notified: Yes ☐ No ☐ Did client respond: Yes ☐ No ☐

SESI employee:_____ Date of response: _____

Comments:_____

Client Name: Arcadis
Contact: Scott Bostian
Address: 2849 Paces Ferry Rd.
Atlanta, GA 30339

Lab Proj #: P0906093
Report Date: 06/18/09
Client Proj Name: Hunter Stewart
Client Proj #: GP08HAFS.H13A.NA1R1

Laboratory Results

Total pages in data package: 10

Lab Sample #	Client Sample ID
P0906093-01	D-MW34(060509)
P0906093-02	D-MW35(060509)
P0906093-03	D-MW1(060509)
P0906093-04	D-MW2(060509)
P0906093-05	D-MW42(060509)
P0906093-06	D-MW41(060509)
P0906093-07	D-MW19(060509)

Microseeps test results meet all the requirements of the NELAC standards or provide reasons and/or justification if they do not.

Approved By: Debbie Hallo ***Date:*** 6-18-09

Project Manager: Debbie Hallo

The analytical results reported here are reliable and usable to the precision expressed in this report. As required by some regulating authorities, a full discussion of the uncertainty in our analytical results can be obtained at our web site or through customer service. Unless otherwise specified, all results are reported on a wet weight basis.

As a valued client we would appreciate your comments on our service.
Please call customer service at (412)826-5245 or email customerservice@microseeps.com.

Case Narrative:

Client Name: Arcadis
Contact: Scott Bostian
Address: 2849 Paces Ferry Rd.
Atlanta, GA 30339

Lab Proj #: P0906093
Report Date: 06/18/09
Client Proj Name: Hunter Stewart
Client Proj #: GP08HAFS.H13A.NA1R1

Sample Description	Matrix	Lab Sample #	Sampled Date/Time	Received
D-MW34(060509)	Water	P0906093-01	05 Jun. 09 9:10	06 Jun. 09 10.20

Analyte(s)	Flag	Result	PQL	Units	Method #	Analysis Date	By
RiskAnalysis							
N Methane		2900.000	0.100	ug/L	AM20GAX	6/17/09	rw

Data Qualifiers. J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

Client Name: Arcadis
Contact: Scott Bostian
Address: 2849 Paces Ferry Rd.
Atlanta, GA 30339

Lab Proj #: P0906093
Report Date: 06/18/09
Client Proj Name: Hunter Stewart
Client Proj #: GP08HAFS.H13A.NA1R1

Sample Description	Matrix	Lab Sample #	Sampled Date/Time	Received
D-MW35(060509)	Water	P0906093-02	05 Jun. 09 14:25	06 Jun. 09 10:20

Analyte(s)	Flag	Result	PQL	Units	Method #	Analysis Date	By
RiskAnalysis							
N Methane		890.000	0.100	ug/L	AM20GAX	6/17/09	rw

Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

Client Name: Arcadis
Contact: Scott Bostian
Address: 2849 Paces Ferry Rd.
Atlanta, GA 30339

Lab Proj #: P0906093
Report Date: 06/18/09
Client Proj Name: Hunter Stewart
Client Proj #: GP08HAFS.H13A.NA1R1

Sample Description	Matrix	Lab Sample #	Sampled Date/Time	Received
D-MW1(060509)	Water	P0906093-03	05 Jun. 09 11:15	06 Jun. 09 10:20

Analyte(s)	Flag	Result	PQL	Units	Method #	Analysis Date	By
RiskAnalysis							
N Methane		1200.000	0.100	ug/L	AM20GAX	6/17/09	rw

Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

Client Name: Arcadis
Contact: Scott Bostian
Address: 2849 Paces Ferry Rd.
Atlanta, GA 30339

Lab Proj #: P0906093
Report Date: 06/18/09
Client Proj Name: Hunter Stewart
Client Proj #: GP08HAFS.H13A.NA1R1

Sample Description	Matrix	Lab Sample #	Sampled Date/Time	Received
D-MW2(060509)	Water	P0906093-04	05 Jun. 09 13:00	06 Jun. 09 10:20

Analyte(s)	Flag	Result	PQL	Units	Method #	Analysis Date	By
RiskAnalysis							
N Methane		1200.000	0.100	ug/L	AM20GAX	6/17/09	rw

Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

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Contact: Scott Bostian
Address: 2849 Paces Ferry Rd.
Atlanta, GA 30339

Lab Proj #: P0906093
Report Date: 06/18/09
Client Proj Name: Hunter Stewart
Client Proj #: GP08HAFS.H13A.NA1R1

Sample Description	Matrix	Lab Sample #	Sampled Date/Time	Received
D-MW42(060509)	Water	P0906093-05	05 Jun. 09 11:15	06 Jun. 09 10:20

Analyte(s)	Flag	Result	PQL	Units	Method #	Analysis Date	By
RiskAnalysis							
N Methane		200.000	0.100	ug/L	AM20GAX	6/17/09	rw

Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

Client Name: Arcadis
Contact: Scott Bostian
Address: 2849 Paces Ferry Rd.
Atlanta, GA 30339

Lab Proj #: P0906093
Report Date: 06/18/09
Client Proj Name: Hunter Stewart
Client Proj #: GP08HAFS.H13A.NA1R1

Sample Description	Matrix	Lab Sample #	Sampled Date/Time	Received
D-MW41(060509)	Water	P0906093-06	05 Jun. 09 12.30	06 Jun. 09 10:20

Analyte(s)	Flag	Result	PQL	Units	Method #	Analysis Date	By
RiskAnalysis							
N Methane		76.000	0.100	ug/L	AM20GAX	6/17/09	rw

Client Name: Arcadis
Contact: Scott Bostian
Address: 2849 Paces Ferry Rd.
Atlanta, GA 30339

Lab Proj #: P0906093
Report Date: 06/18/09
Client Proj Name: Hunter Stewart
Client Proj #: GP08HAFS.H13A.NA1R1

Sample Description	Matrix	Lab Sample #	Sampled Date/Time	Received
D-MW19(060509)	Water	P0906093-07	05 Jun. 09 13:50	06 Jun. 09 10:20

Analyte(s)	Flag	Result	PQL	Units	Method #	Analysis Date	By
RiskAnalysis							
N Methane		1100.000	0.100	ug/L	AM20GAX	6/17/09	rw

Data Qualifiers. J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

Client Name: Arcadis
Contact: Scott Bostian
Address: 2849 Paces Ferry Rd.
Atlanta, GA 30339

Lab Proj #: P0906093
Report Date: 06/18/09
Client Proj Name: Hunter Stewart
Client Proj #: GP08HAFS.H13A.NA1R1

Prep Method: In House Dissolved Gas Sample Preparation
Analysis Method: Light Hydrocarbons (C1-C4) in Water

M090618026-MB

	Result		TrueSpikeConc.	RDL	%Recovery	Ctl Limits
Methane	< 0.100	ug/L		0.100		- NA

M090618026-LCS

	Result		TrueSpikeConc.	%Recovery	Ctl Limits
Methane	880.000	ug/L	825.00	107.00	75 - 125

M090618026-LCSD

	Result		TrueSpikeConc.	%Recovery	Ctl Limits	RPD	RPD Ctl Limits
Methane	880.000	ug/L	825.00	107.00	75 - 125	0.00	0 - 20

Outlined Results indicate results outside of Control limits

Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

Microseeps Lab. Proj. # Pace

CHAIN - OF - CUSTODY RECORD

Microseeps COC cont. # 1 of 1

Phone: (412) 826-5245 | Microseeps, Inc. - 220 William Pitt Way - Pittsburgh, PA 15238 | Fax No. : (412) 826-3433

Company : ARCADIS

Co. Address : 2849 Paces Ferry Rd, Atlanta GA 30339

Phone # : 770-431-8666 Fax # : 770-435-2666

Proj. Manager : Scott Bostian

Proj. Name/Number : HAA-D Pumphouse 1 Release 1, GP08HAFS. 1173.0021

Sampler's signature : Dana Madden

Cooler Temp.

Parameters Requested: Methane

Results to :

Invoice to :

Sample ID	Sample Description	Sample Type: Water	Vapor	Solid	Date	Time	# bottles	Methane	Remarks :
D-MW34(060509)		X			6/5/09	0910	2	✓	
D-MW35 (060509)		X			1425	6/5/09	2	✓	
D-MW1 (060509)		X			1115	↓	2	✓	
D-MW2 (060509		X			1300	↓	2	✓	
D-MW42 (060509)		X			1115		2	✓	
D-MW41 (060509)		X			1230		2	✓	
D-MW19(060509)		X			1350		2	✓	

Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
Dana Madden	ARCADIS	6/5/09	1700	Maureen Rowley	Microseeps	6/6/09	1200
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :
						6/8	1400
Relinquished by :	Company :	Date :	Time :	Received by :	Company :	Date :	Time :

WHITE COPY : Accompany Samples YELLOW COPY : Laboratory File PINK COPY : Submitter

APPLIED SPECIATION
AND CONSULTING, LLC

953 Industry Drive Tukwila, WA 98188
Tel: (206) 219-3779 Fax: (206) 388-3485
www.appliedspeciation.com

June 30, 2009

Nisveen Saikaly
Shealy Environmental Services, Inc.
106 Vantage Point Drive
West Columbia, SC 29172
(803) 791-9700

Re: Organic Lead Analyses

Dear Ms. Saikaly,

Attached is the report associated with two (2) aqueous samples submitted for organic lead quantification on June 9, 2009. The samples were received on June 10, 2009 in a sealed container at -0.5^{o}C. Organic lead quantitation was performed by extraction following HML Method 939-M and analysis via inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS). Any analytical issues associated with the analysis are addressed in the following report.

If you have any questions, please feel free to contact me at your convenience.

Sincerely,

Russell Gerads
Vice President
Applied Speciation and Consulting, LLC

Applied Speciation and Consulting, LLC

Report Prepared for:

Nisveen Saikaly
Shealy Environmental Services, Inc.
106 Vantage Point Drive
West Columbia, SC 29172

Project: Organic Lead Analyses

June 30, 2009

1. Sample Reception

Two (2) aqueous samples in glass jars (not supplied by Applied Speciation and Consulting) were submitted for organic lead quantification on June 9, 2009. The samples were received in acceptable condition on June 10, 2009 in a sealed container at -0.5^{o}C.

The samples were received in a laminar flow clean hood void of trace metals contamination and ultra-violet radiation. Upon reception, the samples were immediately transferred to a secure monitored refrigerator maintained at a temperature of 4^{o}C until extraction and analysis could be performed.

2. Sample Preparation

All sample preparation is performed in laminar flow clean hoods known to be free from trace metals contamination. All applied water for dilutions and sample preservatives are monitored for contamination to account for any biases associated with the sample results.

Organic Lead Quantification by ICP-DRC-MS All samples were extracted in accordance with HML Method 939-M. Extraction was performed on June 29, 2009.

3. Sample Analysis

All sample analysis is precluded by a minimum of a five-point calibration curve spanning the entire concentration range of interest. Calibration curves are performed at the beginning of each analytical day. All calibration curves, associated with each species of interest, are standardized by linear regression resulting in a response factor. All sample results are **instrument blank corrected** to account for any operational biases associated with the analytical platform.

Prior to sample analysis, all calibration curves are verified using second source standards which are identified as initial calibration verification standards (ICV).

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4. Analytical Issues

The overall analyses went very well and no significant analytical issues were encountered. All quality control parameters associated with these samples were within acceptance limits.

The samples were initially extracted and analyzed for organic lead on June 22, 2009. The recovery for the laboratory control sample (LCS) was below the established control limit of 75%. The samples were re-extracted and analyzed on June 29, 2009 resulting in acceptable recoveries for all quality control parameters. The concentration for organic lead was comparable between the two extractions.

If you have any questions or concerns regarding this report, please feel free to contact me at (206) 219-3779.

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Organic Lead Results for Shealy Envioronmental Services, Inc
Contact: Nisveen Saikaly
Project Name: Organic Lead

Date: June 30, 2009
Report Generated by: Russell Gerads
Applied Speciation and Consulting, LLC

Sample ID	Organic Pb
D-Min34(060509)	341
D-MW35(060509)	ND (<23)

All results are reported in ug/L

Organic Lead Results for Shealy Envioronmental Services, Inc
Contact: Nisveen Saikaly
Project Name: Organic Lead

Date: June 30, 2009
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Applied Speciation and Consulting, LLC

Quality Control Summary - Preparation Blank Summary

Analyte (ug/L)	PBW1	PBW2	PBW3	PBW4	Mean	StdDev	eMDL
Organic Pb	-16	-14	-3	-22	-14	8	23

eMDL = Estimated Method Detection Limit

Quality Control Summary - Certified Reference Materials

Analyte (ug/L)	CRM	True Value	Result	Recovery
Tetramethyl Pb	LCS	7651	7309	95.5

Organic Lead Results for Shealy Envioronmental Services, Inc
Contact: Nisveen Saikaly
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Date: June 30, 2009
Report Generated by: Russell Gerads
Applied Speciation and Consulting, LLC

Quality Control Summary - Matrix Duplicates

Analyte (ug/L)	Sample ID	Rep 1	Rep 2	Mean	RPD
Organic Pb	D-MW35(060509)	ND (<23)	25.0762	NC	NC

ND = Not detected at the applied dilution
NC = Value was not calculated due to one or more concentrations below the eMDL

Quality Control Summary - Matrix Spike/ Matrix Spike Duplicate

Analyte (ug/L)	Sample ID	Spike Conc	MS Result	Recovery	Spike Conc	MSD Result	Recovery	RPD
Organic Pb	D-MW35(060509)	7651	7342	96.0	7651	7098	92.8	3.4

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Contact: Nisveen Saikaly
Project Name: Organic Lead

Date: June 30, 2009
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Date: June 30, 2009
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Organic Lead Results for Shealy Envioronmental Services, Inc
Contact: Nisveen Saikaly
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ARCADIS

Appendix D

Calcium Peroxide Dosing Calculations

Calcium Peroxide Initial Injection Dosing Calculations
Hunter AAF PH1 R1

Parameter	Value	Unit	Note / Reference
Injection zone thickness	15	ft	
Length of injection line	120	ft	6 wells with 20-foot spacing
Width of injection line	20	ft	
Soil bulk density	110	lb/ft3	
Total porosity	0.30		
Mobile porosity	0.15		
Injection radius (ROI)	10	ft	
Number of injection point	6		
Background chemical oxygen demand (COD) in water	104	mg/L	average value of baseline sampling event data from PH1 R2
Natural organic matter in soil	200	mg/kg	assumed valve
Groundwater seepage velocity	0.52	ft/day	
Concentration of BTEX through the injection line	15,640	ug/L	total BTEX concentration in D-MW34 (just downgradient of the north injection line) in June 2009
Longevity of calcium peroxide	180	days	
Oxygen utilization factor for BTEX	3	g O2/g BTEX	from Wiedemeier et. al., 1999[2]
Oxygen content of CaO2 product	17%	by weight	from Solvay (vendor of calcium peroxide)
Safety factor for CaO2 dosing	1.5		

Treatment zone volume	36,000	ft3	
Mass of soil in treatment zone	1,800,000	kg	=treatment zone volume* soil bulk density
Volumetric flow of groudwater through treatement zone	140	ft3/day	=seepage velocity* length*thickness of treatment zone*mobile porosity
BTEX mass through barrier per day	0.06	kg/day	=BTEX concentration* volumetric flow of groundwater
BTEX mass through barrier between injection events	11	kg	=BTEX mass through barrier per day* longevity of CaO2
Oxygen mass required for BTEX degradation	35	kg	=BTEX mass* oxygen utilization factor for BTEX
Oxygen mass required for background COD in water	74	kg	=COD concentration in water* volumetric flow of groundwater*longevity of CaO2
Oxygen mass required for background COD in soil	360	kg	=COD concentration in soil* mass of soil in treatment zone
Total oxygen required	469	kg	=sum of all oxygen demand
Mass of CaO2 product required	2,711	kg	=total oxygen demand / oxygen content of CaO2 product
Total injection volume	4,241	ft3	=PI*(ROI)^2*screen length*mobile porosity*number of injection well
CaO2 dosing concentration	34	g/L	=mass of CaO2 product required / injection volume *safety factor
CaO2 dosing concentration	3.4%	calcium peroxide product by weight	

Notes:
1. Shaded cells denote calculated values.
2. Wiedemeier, T.H., Rifai, H.S., Wilson, J.T., and Newell, C., 1999. Natural Attenuation of Fuels and Chlorinated Solvents in the Subsurface, John Wiley and Sons.