SITE ASSESSMENT FOR PROPOSED COKE POINT DREDGED MATERIAL CONTAINMENT FACILITY AT SPARROWS POINT

BALTIMORE COUNTY, MARYLAND

APPENDIX B

Analytical Methods

Prepared for:



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APPENDIX B. SAMPLE MANAGEMENT

Soil, sediment, and site water were collected during the field sampling for the Sparrows Point Site Assessment. This appendix discusses the sample management during sample collection and analytical processing.

B.1 *IN-SITU* WATER QUALITY MEASUREMENTS

Water quality measurements were recorded *in situ* at sampling locations using a YSI water quality probe. Measurements were recorded at the surface, mid-depth, and bottom (one foot from the sediment / water interface) of the water column for the site water, surface sediment, and subsurface sediment phases. The following parameters were recorded in the field log book:

- Sampling location number
- Sampling date and time
- Water depth
- Water temperature (degrees Celsius)
- Salinity (parts per thousand)
- pH
- Dissolved oxygen (milligrams per liter)
- Turbidity (nephalometric turbidity units [NTUs])

The water quality measurements for the site water sampling are presented in **Table B-1**. Water quality measurement taken during surface and subsurface sediment sampling are presented in **Table B-2** and **B-3**, respectively. A copy of the project logbook with the raw data is located in **Appendix A**.

B.2 SITE WATER COLLECTION

Site water for chemical analysis was collected at the surface, mid-depth, and bottom (one foot from the sediment / water interface) of the water column at 18 sampling locations. Water was collected using an ISCO pump with dedicated Tygon tubing from EA's 28-ft work vessel. Water for analytical testing was stored in certified cleaned, laboratory-prepared containers with appropriate preservatives. Water samples were shipped via overnight delivery to TestAmerica–Pittsburgh on the day of collection.

Water samples were analyzed for VOCs and PAHs. Holding times for the site water began when the samples were collected and placed into the appropriate sample containers. Sample containers, preservation techniques, and holding time requirements for site water and equipment blanks are provided in **Table B-4**.

B.3 SURFACE SEDIMENT COLLECTION

Surface sediment samples were collected at 19 sampling locations to approximately 1-ft below the sediment surface using a stainless steel Van Veen grab sampler. Surface sediment samples were analyzed for metals (including mercury), VOCs, PAHs, cyanide, total organic carbon (TOC), total solids, grain size, and moisture content. VOC samples were collected using Terra Cores. VOC samples were collected from the grab sample immediately after collection, prior to sample homogenization.

After VOC samples were collected, the remaining sediment was thoroughly homogenized, placed into appropriate laboratory-cleaned containers using stainless steel spoons, and shipped via overnight delivery to TestAmerica–Pittsburgh on the day of collection. At one location (BH-SED-03A) an additional sediment sample was collected for PAH fingerprinting analysis. Sediment samples collected during each workday were stored in cooled, insulated containers onboard the work boat.

The sample containers, preservation techniques, and holding time requirements for sediment samples are provided in **Table B-4**. Because the surface sediment was not collected in a core liner, the holding time was initiated at sample collection.

B.4 SUBSURFACE SEDIMENT AND SOIL COLLECTION

Subsurface sediment samples were initially collected at a total of 24 locations around the Peninsula. Subsurface sediment samples were collected with a hollow stem auger (HSA). A SPT split spoon device was used to collect samples and rigid plastic core liners were placed inside the SPT to obtain sediment samples. Target depths for the subsurface samples were 30 ft below the sediment/water interface or to native material.

Three soil samples were collected from each of the 10 initial boreholes drilled within the Benzol Processing Area and Coal Tar Storage Area. One to three soil samples were collected in the six additional boreholes drilled in the Benzol Processing Area for LNAPL delineation. Soil samples were also collected with a HSA.

Soils and sediments were divided into two-foot intervals during the boring and boring logs were recorded. Each two foot interval was screened with a PID and select samples were tested for the presence of NAPL with the Sudan IV shaker test. Based on the results of the field screening and visual observation, soil and sediment samples from impacted intervals were chosen for analytical testing.

Sediment and soil samples chosen were analyzed for metals (including mercury), VOCs, PAHs, and cyanide. Sediment samples were also tested for TOC, total solids, grain size, and moisture content. Cores were sampled for VOC analysis using the Terra Core sampling method. VOC samples were collected from the core sample as soon as possible after collection, prior to sample homogenization. Samples were than thoroughly homogenized, placed into appropriate laboratory-cleaned containers, and shipped via overnight delivery to TestAmerica–Pittsburgh on the day of collection. Samples for PAH and MAH fingerprinting were also shipped on the day of collection via overnight delivery to META Environmental, Inc. (META). The sample containers, preservation techniques, and holding time requirements for soil and sediment samples are provided in **Table B-4**. Because the subsurface sediment and the soil were processed in the field, the holding time was initiated at sample collection.

B.5 CHAIN-OF-CUSTODY RECORDS

Samples collected in the field were documented on a COC sheet that included the date and time the sample was collected, the analyses requested, and the signatures of the personnel who collected and relinquished the samples. This COC accompanied all samples shipped for sample analyses. Copies of COCs for the onshore and offshore phases of the Sparrows Point Site Assessment are located in **Appendix B**.

B.6 ANALYTICAL TESTING PROGRAM

Analytical testing of soil, sediment, site water, and NAPL was conducted by three laboratories: META Environmental, Inc. (META), PTS Laboratories, Inc. (PTS), and TestAmerica. META Environmental performed polycyclic aromatic hydrocarbon (PAH) and monocyclic aromatic hydrocarbon (MAH) fingerprinting and compound-specific stable carbon isotope ratios (CSIR) with support from Oklahoma University. PTS performed the physical NAPL analyses to determine potential mobility of the NAPL. TestAmerica-Pittsburgh performed the metals, VOCs, PAHs, cyanide, TOC and toxicity characteristic leaching procedure (TCLP), with support from TestAmerica-Burlington (grain size).

Soils and sediments were tested for the following target compounds:

- volatile organic compounds (VOCs),
- polycyclic aromatic hydrocarbons (PAHs),
- metals,
- cyanide,
- total organic carbon (TOC) (sediment only),
- grain size (sediment only),
- moisture content (sediment only),
- PAH and MAH fingerprinting (sediment only), and
- Compound-specific stable carbon isotope ratios (CSIR) (sediment only).

Water samples and NAPL samples were tested for the following target compounds:

- VOCs and
- PAHs.

NAPL samples were also tested for the following physical characteristics:

- specific gravity,
- interfacial tension,
- surface tension, and
- wettability index (only selected NAPL samples).

TCLP analysis was performed on investigation derived wastes (IDW) which were contained in drums both onshore and offshore on the barge where soil and sediment processing occurred. TCLP analysis determines how a drum with IDW can be disposed and the results of the TCLP

analysis are available in **Attachment I**. As part of the TCLP, the concentrations of eight metals, nine pesticides and herbicides, eleven SVOCs, and ten VOCs were determined.

Target analytes, target detection limits, analytical methodologies, and sample holding times were derived from the following guidance documents:

- USEPA/USACE, 1998 (EPA-823-B-98-004). Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S.-Testing Manual (Inland Testing Manual).
- USACE, 2003. (ERDC/EL TR-03-1). Evaluation of Dredged Material Proposed for Disposal at Island, Nearshore, or Upland Confined Disposal Facilities – Testing Manual. (Upland Testing Manual).
- USEPA/USACE, 1995 (EPA-823-B-95-001). *QA/QC Guidance for Sampling and Analysis of Sediments, Water, and Tissues for Dredged Material Evaluations.*
- USEPA, 2001. *Methods for Collection, Storage, and Manipulation of Sediments for Chemical and Toxicological Analyses: Technical Manual.*
- USEPA, 1997. Test Methods for Evaluating Solid Waste. Physical/Chemical Methods. EPA SW 846, 3rd edition, including Final Update III. USEPA, Washington, D.C. June.

The analytical program for this project is described in detail in the work plan (EA 2008). The work plan was reviewed and approved by MES and the Maryland Port Administration (MPA) prior to initiation of the analytical testing program. The analytical methods, detection limits, and laboratory quality control programs are presented below for META Environmental, PTS and TestAmerica laboratories (where available). Sediment sample weights were adjusted for percent moisture (up to 50 percent moisture) prior to analysis to achieve the lowest possible detection limits. Analytical results are reported on a dry weight basis. Definitions of inorganic and organic data qualifiers are presented in **Tables B-5** and **B-6**, respectively.

Following analysis the data from TestAmerica and META were validated according to the guidance document: USEPA, 1995. *Innovative Approaches to Data Validation*. USEPA-Region III. June. Any data that did not meet the validation requirements ("R" qualified) was not presented in this report. The data validation qualifiers for inorganic, organic, and metals are presented in **Tables B-7 to B-9**, respectively.

B.7 META ENVIRONMENTAL

Seven sediment samples and five soil samples were submitted to META for characterization. Seven of the sediment samples were collected in the vicinity of Sparrows Point and one sediment sample was a reference sample to represent offsite background conditions. Of the soil samples submitted to META for characterization, three were in the Benzol Processing Area and two were in the Coal Tar Storage Area. The following samples were submitted for PAH fingerprint analysis:

Location	Sample ID		
	BP-SO-B03-18		
Benzol Processing Area	BP-SO-05-6		
	BP-SO-02S		
Cool Tor Storage Area	CT-SO-B01-20		
Coal Tar Storage Area	CT-SO-B05-20		
	BH-SED-03A-00		
	BH-SED-03A-12		
	BH-SED-03E-2		
Offshore	BH-SED-05-4		
	BH-SED-10-2		
	BH-SED-13C-6		
	REFERENCE		

Samples Submitted for PAH Fingerprint Analysis

B.7.1 Analytical Methods

Two analyses were performed by META, PAH and MAH fingerprinting and CSIR. The analyses were performed following the methods below.

PAH and MAH Fingerprinting

For PAH and MAH fingerprinting, the sediment samples were prepared by solvent extraction (USEPA 3570) using dichloromethane (DCM). The extracts were spiked with internal standards and analyzed by gas chromatography / flame ionization detection (GC/FID) (USEPA 8100M) for fingerprinting and GC / Mass Spectrometry (MS) / Selected Ion Monitoring (SIM) (USEPA 8270M) for PAHs and MAHs, alkyl PAH homologues and other selected compounds. Once the chromatograms are produced using the GC/MS the chemist might go "peak-by-peak" looking for similarities and differences, comparing peak ratios, and looking for indicator compounds [as described in American Society for Testing and Materials (ASTM) Method D 5739-95].

Compound-Specific Stable Carbon Isotope Ratios (CSIR)

CSIR was performed at Oklahoma University where samples were analyzed by GC / isotope ratio mass spectrometer (IRMS) for stable carbon isotope ratios of PAHs and other semivolatile compounds. Samples were prepared by an appropriate extraction and concentration technique, such as USEPA Methods 3510, 3540C and 3545. The extracts were analyzed using a GC coupled with an IRMS via a combustion furnace heated at 1,050°C and a water trap. A similar capillary GC column is used to imitate standard GC/MS conditions. There are no standard methods for GC/IRMS.

The isotopic composition of carbon is expressed relative to a references standard that can be traced to the Peedee belemnite (PDB) standard of the University of Chicago. The results are expressed in parts per thousand (‰).

B.7.2 Detection Limits

The detection limit is a statistical concept that corresponds to the minimum concentration of an analyte above which the net analyte signal can be distinguished with a specified probability from the signal because of the noise inherent in the analytical system. The method detection limit (MDL) was developed by USEPA, and is defined as "the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero" (40 CFR 136, Appendix B). Method detection limits for PAH and MAH fingerprinting are listed in **Table B-10**.

B.7.3 Laboratory Quality Control Samples

Laboratory quality control samples are analyzed according to the META's *Laboratory Quality Assurance Plan* (META 2006) and were analyzed at a minimum at the frequency stated in the following table.

QC Sample	Frequency
Surrogate Spikes	Added to every sample, blank and spike just prior to extraction
Method (Extraction) Blanks	1 per analytical batch
Blank Spikes	1 per analytical batch
Duplicate Samples	A minimum of 1 per 20 samples, per extraction method
Internal Standards	Many methods require the addition of internal standards to every sample, blank and spike extracts.
Matrix Spike/Matrix Spike Duplicate	1 per analytical batch of 1-20 samples, per extraction method.

PAH and MAH Surrogate Spikes

Extraction surrogates were added to all the samples, blanks and spikes prior to extraction to monitor the extraction procedure. Surrogates recovered within the range of 50 to 120 percent were considered acceptable.

PAH and MAH Method Blanks

The method (reagent) blank is used to monitor laboratory contamination. The method blank is usually a sample of laboratory reagent water processed through the same analytical procedure as the sample (i.e., digested, extracted, distilled). Four blanks were analyzed during the PAH and MAH fingerprinting.

PAH and MAH Blank Spikes

A blank spike sample is a method blank spiked with a known concentration of various compounds added to it and then processed through the same analytical procedure as the samples. Blank spikes were analyzed to ensure that each of the spiked compounds was recovered within the criteria. Spiked compound recovery criteria are specific to each method, but are approximately 60 to 120 percent. Four blank spikes were run during the PAH and MAH fingerprinting.

PAH and MAH Duplicate Samples

A duplicate sample is a second aliquot of a field sample that is analyzed to monitor analytical precision associated with that particular sample. Four of the eight samples were analyzed in duplicate.

PAH and MAH Internal Standards

Internal standards are required for most methods and are added to every sample, spike and blank after extraction. Internal standard recovery criteria are specific to each method, but generally for GC/MS analysis the internal standard area must be 50 to 200 percent of the most recent, previous internal standard area and must be within 15 percent of the most recent previous continuing calibration internal standard area.

Isotope Standards

Standard mixtures at known concentrations and with known isotope ratios were analyzed prior to sample analysis and periodically after to demonstrate the performance and the stability of the IRMS. If samples analysis occurs over several days, the precision of the isotope values in the standard mix was used to estimate the variability in the analysis due to instrumental parameters.

<u>Isotope Spikes</u>

The accuracy of the data was monitored with a set of standard compounds of known isotopic composition (fully denatured n-alkanes C9, C10, C16, C19, C24, and C32) which were added to the SVOC samples. Each sample was analyzed at least two times and the standard deviations of the replicates were calculated for each internal spike and each PAH compound to estimate reproducibility. Analytes that showed unexpectedly high standard deviations (greater than 0.5) were examined for coelutions and their isotopic values determined from a portion of the peak with minimum interference.

B.8 PTS LABORATORIES

The physical properties of NAPL including specific gravity, interfacial tension, and surface tension were analyzed according to the following methods: ASTM D445, ASTM D1481 and ASTM D971. The wettability index of selected NAPL samples was analyzed using the United States Bureau of Mines (USBM) method.

B.9 TESTAMERICA

B.9.1 Analytical Methods

All inorganic and organic compounds analyzed for this project by TestAmerica were determined using the methods listed in **Table B-11**, as described in the laboratory's analytical standard operating procedures (SOPs). To meet program-specific regulatory requirements for chemicals of concern, all TestAmerica methods/SOPs were followed as stated with some specific requirements noted below:

Total Organic Carbon (TOC)

TOC in sediments was determined using the 1988 USEPA-Region II combustion oxidation procedure (the Lloyd Kahn procedure).

Polycyclic Aromatic Hydrocarbons (PAHs)

To achieve the target detection limits (TDLs) referenced in *QA/QC Guidance for Sampling and Analysis of Sediments, Water, and Tissues for Dredged Material Evaluations - Chemical Evaluations* (EPA 823-B-95-001, April 1995), the PAHs were determined utilizing SW846 Method 8270C using Selective Ion Monitoring (SIM).

<u>Metals</u>

Because of potential matrix interferences, metals were determined utilizing Inductively Coupled Plasma/ Mass Spectrometry (ICP/MS) according to the methodology specified, except for mercury. For mercury, samples were analyzed by Cold Vapor Atomic Absorption (CVAA) method (SW846 7471A).

<u>Cyanide</u>

Total cyanide was determined by method SW846 9012A. The laboratory reporting limit (RL) using this method is higher than the requested target detection limit, however, this method represents the best available technology for total cyanide determination and, therefore, the lowest possible reporting limit.

Toxicity Characteristic Leaching Procedure (TCLP)

The sediment composites were extracted following the TCLP methods specified in SW846 Method 1311. The resultant leachates were analyzed for metals, VOCs, SVOCs, chlorinated pesticides and herbicides.

B.9.2 Detection Limits

Quantitation limits applicable to this project are listed in **Tables B-12** through **B-14** for soil/sediment, aqueous, and TCLP samples, respectively. These tables include the Target Detection Limits (TDLs) referenced in the *QA/QC Guidance for Sampling and Analysis of Sediments, Water, and Tissues for Dredged Material Evaluations - Chemical Evaluations* (EPA 823-B-95-001, April 1995). All analytical parameters, except grain size analyses and wet chemistry parameters were quantified to the MDL. All detected values greater than or equal to

the MDL, but less than the laboratory reporting limit (RL), were qualified as estimated. Wet chemistry parameters were quantified to the RL.

MDL values used for soil/sediment, site water, and TCLP analyses are listed in **Tables B-12** through **B-14**, respectively. For sediment analyses, sample weights were adjusted for percent moisture (up to 50% moisture), when appropriate, prior to extraction/digestion to achieve the lowest possible reporting limits.

B.9.3 Laboratory Quality Control Samples

Quality control samples specified in the ITM were analyzed at the frequency stated in the following table. Standard Reference Materials (SRMs) were obtained from the National Institute of Standards and Technology (NIST) or a comparable source, if available. Acceptance criteria used are standard for the laboratory and can be provided upon request.

QC Sample	Frequency
Standard Reference Material	1 per analytical batch of 1-20 samples, where available
Method Blanks	1 per analytical batch of 1-20 samples
Laboratory Control Sample	1 per analytical batch of 1-20 samples
Surrogates	Spiked into all field and QC samples (Organic Analyses)
Sample Duplicates	1 per analytical batch of 1-20 samples (Inorganic Analyses)
Matrix Spike/Matrix Spike Duplicate	1 per analytical batch of 1-20 samples

<u>Standard Reference Material</u>

Standard reference materials (SRMs) represent performance-based QA/QC. A standard reference material is a soil/solution with a certified concentration that is analyzed as a sample and is used to monitor analytical accuracy.

SRMs were analyzed for the following matrix/fractions:

- Soil: metals, PAHs
- Water: PAHs
- Sediment: metals, PAHs

Control criteria apply only to those analytes having SRM true values greater than 10 times the MDL established for the method. Results of the SRMs analyses can be found in Attachment I, II and III for soils, site water, and sediments respectively.

<u>Method Blanks</u>

The method (reagent) blank is used to monitor laboratory contamination. The method blank is usually a sample of laboratory reagent water processed through the same analytical procedure as

the sample (i.e., digested, extracted, distilled). One method blank was analyzed at a frequency of one per every analytical preparation batch of 20 or fewer samples.

Laboratory Control Sample

The Laboratory Control Sample (LCS) is a fortified method blank consisting of reagent water or solid fortified with the analytes of interest for single-analyte methods and selected analytes for multi-analyte methods according to the appropriate analytical method. LCS's were prepared and analyzed with each analytical batch, and analyte recoveries were used to monitor analytical accuracy and precision.

<u>Matrix Spike (MS) / Matrix Spike Duplicate (MSD)</u>

A fortified sample (matrix spike) is an aliquot of a field sample that is fortified with the analyte(s) of interest and analyzed to monitor matrix effects associated with a particular sample. Samples to be spiked were chosen at random. The final spiked concentration of each analyte in the sample was at least 10 times the calculated MDL. A duplicate-fortified sample (matrix spike duplicate) was analyzed for every batch of 20 or fewer samples.

Sample Duplicates

A sample duplicate is a second aliquot of a field sample that is analyzed to monitor analytical precision associated with that particular sample. Sample duplicates were performed for every batch of 20 or fewer samples for those analytes that did not have MS/MSD analyses.

<u>Surrogates</u>

Surrogates are organic compounds that are similar to analytes of interest in chemical composition, extraction, and chromatography, but are not normally found in environmental samples. These compounds were spiked into all blank, standards, samples, and spiked samples prior to analysis for organic parameters. Generally, surrogates are not used for inorganic analyses. Percent recoveries were calculated for each surrogate. Surrogates were spiked into samples according to the requirements of the reference analytical method. Surrogate spike recoveries were evaluated against standard limits used by the laboratory, and were used to assess method performance and sample measurement bias. If sample dilution caused the surrogate concentration to fall below the quantitation limit, surrogate recoveries were not calculated.

Location	Depth (ft MLW)	Date	Time	Depth Interval	Temperature (°C)	Salinity (ppt)	Dissolved Oxygen (mg/L)	рН	Turbidity (NTU)
				Surface	3.58	9.71	12.1	8.44	6.6
BH-W-01	21.2	2/2/2009	1126	Mid-Depth	1.84	13.0	12.2	8.36	5.3
				Bottom	2.10	13.3	12.0	7.95	4.8
				Surface	3.07	9.53	14.0	8.38	5.3
BH-W-02	7.2	2/2/2009	1203	Mid-Depth	2.67	9.75	14.1	8.41	6.7
				Bottom	2.41	11.4	14.0	8.38	7.5
				Surface	3.26	9.53	14.4	8.4	8.0
BH-W-03A	2.2	2/2/2009	1236	Mid-Depth	3.00	9.65	14.5	8.38	6.7
				Bottom	2.46	10.0	14.8	8.44	4.0
				Surface	2.65	9.28	14.3	8.43	4.3
BH-W-03B	10.8	2/2/2009	1336	Mid-Depth	2.62	9.41	14.3	8.47	3.8
				Bottom	2.14	11.0	14.1	8.37	7.9
				Surface	2.66	9.35	13.9	8.52	5.0
BH-W-03C	13.4	2/2/2009	1405	Mid-Depth	2.28	10.5	13.9	8.47	4.5
				Bottom	1.91	11.3	13.8	8.41	5.0
				Surface	2.78	9.34	14.0	8.43	4.5
BH-W-04	9.6	6 2/2/2009	1443	Mid-Depth	2.60	9.45	13.7	8.56	4.8
				Bottom	2.18	10.3	13.6	8.60	8.0
				Surface	2.8	9.39	14.3	8.57	7.1
BH-W-05	3.7	2/2/2009	1555	Mid-Depth	2.82	9.38	13.8	8.61	7.1
	-05 5.1 2/2/20			Bottom	2.74	9.44	13.8	8.61	6.9
		2/3/2009	1007	Surface	2.11	10.9	12.8	8.39	5.8
BH-W-06	13.1			Mid-Depth	2.10	11.0	12.8	8.45	5.9
				Bottom	2.21	13.2	12.4	8.26	7.5
				Surface	2.09	10.9	13.2	8.41	6.0
BH-W-07	12.4	2/3/2009	1035	Mid-Depth	2.08	11.0	13.1	8.44	6.5
				Bottom	2.11	11.3	12.9	8.39	7.3
				Surface	2.18	10.8	13.1	8.43	6.2
BH-W-08	12.5	2/3/2009	1108	Mid-Depth	2.19	11.0	13.0	8.43	8.6
				Bottom	2.18	11.1	13.2	8.44	9.1
				Surface	2.2	11.1	12.9	8.39	7.2
BH-W-09	9.1	2/3/2009	1141	Mid-Depth	2.2	11.1	12.9	8.44	7.1
				Bottom	2.19	11.3	12.8	8.46	9.0
				Surface	2.12	10.4	13.1	8.41	5.5
BH-W-10	7.1	2/3/2009	1232	Mid-Depth	2.11	10.5	13.1	8.5	5.4
				Bottom	2.13	10.7	13.0	8.5	6.0
				Surface	2.17	10.5	13.8	8.41	5.0
BH-W-11	12.6	2/3/2009	1300	Mid-Depth	2.22	10.8	13.7	8.44	5.5
				Bottom	2.28	11.3	13.5	8.41	6.3
				Surface	2.21	10.8	13.6	8.37	11.1
BH-W-12	18.1	2/3/2009	1325	Mid-Depth	2.17	11.0	13.6	8.48	7.0
				Bottom	2.18	13.1	13.1	8.23	6.3
				Surface	2.25	10.9	13.8	8.31	10
BH-W-13A	6.0	2/3/2009	1349	Mid-Depth	2.19	10.9	13.7	8.52	6.8
				Bottom	2.17	10.9	13.7	8.55	8.8

Table B-1. In-Situ Water Quality Measurements at Site Water Sampling Locations Sparrows Point Site Assessment (2009)

Location	Depth (ft MLW)	Date	Time	Depth Interval	Temperature (°C)	Salinity (ppt)	Dissolved Oxygen (mg/L)	рН	Turbidity (NTU)
				Surface	2.17	10.9	13.7	8.41	5.7
BH-W-13B	19.2	2/3/2009	1419	Mid-Depth	2.14	11.5	13.4	8.32	5.6
				Bottom	2.19	13.1	12.6	8.08	5.7
		2/3/2009	009 1446	Surface	2.18	11.0	13.1	8.53	14.2
BH-W-13C	31.8			Mid-Depth	2.10	13.6	12.9	8.24	5.4
				Bottom	2.62	15.1	10.5	7.73	8.1
BH-W-14			1515	Surface	2.26	11.0	13.4	8.55	6.4
	23.9	2/3/2009		Mid-Depth	2.15	11.7	13.2	8.34	5.8
				Bottom	2.27	14.0	12.8	8.01	6.9

Table B-1. (continued)

Location	Depth (ft MLW)	Date	Time	Depth Interval	Temperature (°C)	Salinity (ppt)	Dissolved Oxygen (mg/L)	рН	Turbidity (NTU)
				Surface	3.07	12.5	13.9	8.03	7.3
BH-SED-01	23.5	2/6/2009	1050	Mid-Depth	2.08	14.9	13.3	7.88	9.2
				Bottom	2.21	15.6	11.8	7.74	42.8
				Surface	1.86	13.7	13.1	7.90	6.0
BH-SED-02	8.3	2/6/2009	1123	Mid-Depth	1.66	14.7	12.9	8.04	7.1
				Bottom	1.66	14.9	12.9	8.03	7.1
				Surface	1.55	14.6	13.4	7.99	6.3
BH-SED-03A	10.0	2/6/2009	1226	Mid-Depth	1.49	14.6	13.3	8.06	6.9
				Bottom	1.41	14.5	13.2	8.07	6.9
				Surface	1.60	14.6	13.6	8.21	6.7
BH-SED-03B	13.4	2/6/2009	1258	Mid-Depth	1.49	14.7	13.6	8.21	7.0
				Bottom	1.44	14.9	13.5	8.13	7.3
				Surface	1.75	14.8	13.9	8.3	6.7
BH-SED-03C	14.4	2/6/2009	1334	Mid-Depth	1.58	14.6	13.8	8.19	7.3
				Bottom	1.57	14.6	13.4	8.19	7.2
				Surface	1.85	14.8	14.2	8.27	7.3
BH-SED-04	8.7	2/6/2009	1402	Mid-Depth	1.82	14.6	14.1	8.26	8.5
	1 0.1 2,0/20			Bottom	1.72	14.9	13.8	8.14	9.7
				Surface	1.65	14.7	14.3	8.28	8.9
BH-SED-05	4.8	2/6/2009	1434	Mid-Depth	1.59	14.7	14.1	8.32	8.5
	3LD-03 4.8 2/0			Bottom	1.48	14.7	14.1	8.32	8.5
				Surface	2.00	9.7	14.2	8.42	5.2
BH-SED-06	12.7	12.7 2/9/2009	1023	Mid-Depth	2.00	11.2	14.6	8.41	5.4
				Bottom	2.04	11.4	14.2	8.41	7.5
				Surface	2.17	9.57	14.2	8.42	5.3
BH-SED-07	11.0	2/9/2009	1049	Mid-Depth	2.09	10.3	14.2	8.50	5.4
				Bottom	2.19	13.3	14.0	8.33	8.1
				Surface	2.08	9.00	14.2	8.56	4.7
BH-SED-08	12.6	2/9/2009	1112	Mid-Depth	2.03	9.56	14.2	8.81	5.4
				Bottom	2.08	11.0	14.1	8.74	7.5
				Surface	2.26	8.88	14.5	8.60	4.5
BH-SED-09	9.9	2/9/2009	1153	Mid-Depth	2.08	9.97	14.7	8.55	6.3
				Bottom	2.01	10.6	14.8	8.54	7.3
				Surface	2.45	9.14	14.4	8.76	5.0
BH-SED-10	8.1	2/9/2009	1217	Mid-Depth	2.06	9.86	14.4	8.60	5.4
				Bottom	2.02	10.1	14.4	8.58	6.6
				Surface	2.27	8.80	14.4	8.59	4.4
BH-SED-11	12.8	2/9/2009	1243	Mid-Depth	2.13	9.12	14.4	8.59	4.9
				Bottom	2.04	14.2	14.0	8.17	10.5
				Surface	2.33	8.74	14.4	8.55	4.5
BH-SED-12	16.4	2/9/2009	1305	Mid-Depth	1.98	11.0	14.4	8.56	5.9
				Bottom	1.94	14.1	13.5	8.19	9.1
				Surface	2.95	8.87	14.6	8.62	4.3
BH-SED-13A	10.6	2/9/2009	1421	Mid-Depth	2.67	9.01	14.8	8.57	4.5
				Bottom	1.93	11.6	14.7	8.51	8.2

Table B-2. In-Situ Water Quality Measurements at Surface Sediment Sampling Locations Sparrows Point Site Assessment (2009)

Location	Depth (ft MLW)	Date	Time	Depth Interval	Temperature (°C)	Salinity (ppt)	Dissolved Oxygen (mg/L)	рН	Turbidity (NTU)
				Surface	2.71	8.84	14.6	8.60	4.5
BH-SED-13B	22.4	2/9/2009	1438	Mid-Depth	1.91	13.9	14.3	8.36	6.2
				Bottom	2.07	15.3	13.0	7.89	9.0
BH-SED-13C	29.2	2/9/2009	1503	Surface	2.81	8.84	14.6	8.58	4.5
				Mid-Depth	2.03	14.4	13.6	8.05	9.6
				Bottom	2.38	16.1	10.3	7.60	14.5
			1530	Surface	2.85	9.03	14.5	8.58	4.9
BH-SED-14	24.6	2/9/2009		Mid-Depth	2.38	10.9	14.5	8.43	7.4
				Bottom	2.07	14.8	12.3	8.02	10.6
REFERENCE	17.1	17.1 2/9/2009	1602	Surface	3.11	10.9	14.3	8.51	3.7
				Mid-Depth	2.88	13.4	14.6	8.45	4.9
				Bottom	2.47	14.8	13.7	7.06	16.2

Table B-2. (continued)

Location	Depth (MLW ft)	Date	Time	Depth Interval	Temperature (°C)	Salinity (ppt)	Dissolved Oxygen (mg/L)	рН	Turbidity (NTU)
				Surface	10.2	12.1	12.7	8.37	7.0
BH-SED-01	21.9	2/16/2009	1315	Mid-Depth	4.58	13.3	13.7	8.27	5.9
				Bottom	4.26	13.3	13.5	8.11	15.0
				Surface	-	-	-	-	-
BH-SED-02*	8.4	-	-	Mid-Depth	-	-	-	-	-
				Bottom	-	-	-	-	-
				Surface	2.60	9.91	15.6	8.58	6.2
BH-SED-03A	5.5	2/25/2009	1120	Mid-Depth	-	-	-	-	-
				Bottom	2.75	11.4	15.7	8.59	9.8
				Surface	6.20	13.0	13.4	8.41	6.0
BH-SED-03B	10.9	2/17/2009	1230	Mid-Depth	4.34	13.3	13.9	8.40	8.7
				Bottom	4.22	13.2	13.9	8.38	7.9
				Surface	4.72	12.9	14.1	8.44	6.6
BH-SED-03C	14.8	2/17/2009	1015	Mid-Depth	4.13	13.2	14.2	8.45	7.3
				Bottom	4.13	13.5	14.0	8.37	8.1
				Surface	5.93	7.25	9.5	8.65	4.9
BH-SED-03D	15.8	3/11/2009	1305	Mid-Depth	5.72	7.73	9.3	8.58	4.7
				Bottom	5.26	8.54	7.7	8.26	6.7
				Surface	5.46	6.45	9.9	8.73	4.8
BH-SED-03E	17.6	3/9/2009	9/2009 1050	Mid-Depth	4.99	7.02	10.1	8.71	4.5
				Bottom	4.56	8.76	9.3	8.47	5.0
		3/4/2009	3/4/2009 1605	Surface	3.48	11.3	12.8	8.59	6.7
BH-SED-04	12			Mid-Depth	2.57	11.4	12.9	8.59	10.2
				Bottom	2.39	11.5	12.1	8.41	9.5
				Surface	2.95	11.2	13.9	8.32	14.4
BH-SED-05	6.9	3/4/2009	1354	Mid-Depth	2.42	11.6	13.4	8.20	8.6
				Bottom	2.41	11.5	13.0	8.16	8.3
				Surface	5.24	9.93	14.6	8.62	3.4
BH-SED-06	14.6	2/17/2009	1458	Mid-Depth	5.18	10.0	14.7	8.60	3.3
				Bottom	4.56	13.0	14.7	8.49	5.1
				Surface	2.10	7.6	14.5	8.46	6.3
BH-SED-07	13.4	3/5/2009	1035	Mid-Depth	2.57	10.2	13.7	8.40	6.5
				Bottom	2.56	10.6	13.5	8.39	7.5
				Surface	-	-	-	-	-
BH-SED-08*	9.7	-	-	Mid-Depth	-	-	-	-	-
				Bottom	-	-	-	-	-
				Surface	3.59	5.59	15.7	8.82	7.0
BH-SED-09 10.8	10.8	2/26/2009	1555	Mid-Depth	3.65	5.61	15.7	8.83	7.4
				Bottom	3.05	8.61	15.3	8.59	10.9
				Surface	2.97	13.7	15.6	8.67	11.1
BH-SED-10	9.1	2/24/2009	1324	Mid-Depth	2.94	14.2	15.7	8.68	11.7
			Bottom	2.90	13.8	15.7	8.65	10.9	
				Surface	2.97	13.4	15.6	8.53	13.2
BH-SED-11	13.1	2/24/2009	1555	Mid-Depth	2.92	13.8	15.6	8.48	22.8
				Bottom	2.68	13.8	15.3	8.33	15.4

Table B-3. In-Situ Water Quality Measurements at Subsurface Sediment Locations Sparrows Point Site Assessment (2009)

*No data were collected because of weather conditions

Location	Depth (MLW ft)	Date	Time	Depth Interval	Temperature (°C)	Salinity (ppt)	Dissolved Oxygen (mg/L)	рН	Turbidity (NTU)
				Surface	4.26	12.3	13.4	8.35	7.6
BH-SED-12	14.1	2/13/2009	1337	Mid-Depth	4.10	12.4	13.5	8.34	7.0
				Bottom	3.88	12.6	13.3	8.24	7.2
				Surface	2.96	5.82	15.5	8.83	8.7
BH-SED-13A	9.4	2/25/2009	1415	Mid-Depth	2.47	6.32	15.3	8.78	7.9
				Bottom	2.66	13.5	15.0	8.54	9.4
				Surface	2.59	5.81	17.4	8.77	8.4
BH-SED-13B	17.9	2/26/2009	1111	Mid-Depth	2.75	13.3	16.6	8.44	8.6
				Bottom	2.97	13.8	13.5	8.00	9.6
			1113	Surface	2.72	13.5	-	8.36	10.0
BH-SED-13C	12.6	3/4/2009		Mid-Depth	2.20	11.5	-	8.37	13.1
				Bottom	2.45	11.7	-	8.35	10.6
		2/26/2009	1318	Surface	3.12	5.74	15.7	8.75	6.6
BH-SED-14	24.5			Mid-Depth	3.15	13.4	15.2	8.32	5.9
				Bottom	3.00	13.5	13.8	7.87	10.7
				Surface	5.75	6.42	9.1	8.76	7.3
BH-SED-15	20.1	3/11/2009	1056	Mid-Depth	5.38	7.58	9.0	8.72	6.9
				Bottom	3.40	13.1	5.9	7.80	15.0
				Surface	5.68	8.33	8.1	8.53	18.1
BH-SED-16	15.9	3/12/2009	1020	Mid-Depth	5.24	9.22	7.9	8.32	14.5
				Bottom	4.93	9.82	7.1	8.07	13.0
				Surface	5.42	8.28	9.0	8.54	5.9
BH-SED-17	16.6	3/10/2009	1045	Mid-Depth	5.05	8.60	8.8	8.47	5.6
				Bottom	4.39	9.76	7.9	8.22	7.6
				Surface	5.34	8.02	9.8	8.63	5.5
BH-SED-18	18.2	3/10/2009	1233	Mid-Depth	5.26	8.22	9.5	8.61	5.5
				Bottom	4.26	10.2	8.3	8.22	8.5

 Table B-3. (continued)

*No data were collected due to weather conditions

Parameter	Analytical Method	Container	Preservation	Holding Time
ONSHORE SOILS AND	OFFSHORE SEDIM	ENTS	•	
Volatile Organic Compounds	SW846 5035A/8260B	2 – Terra Cores	4±2°C	48 hours (prep) 14 days (analysis)
PAHs	SW846 8270C SIM	8 oz. wide-mouth glass, Teflon-lined cap	4±2°C	14 days (extraction) 40 days (analysis)
Metals	SW846 6010B and 7471A	8 oz. wide-mouth glass, Teflon-lined cap	4±2°C	180 days 28 days (Hg)
Cyanide	SW846 9012A	8 oz. wide-mouth glass, Teflon-lined cap	4±2°C	14 days
ONSHORE NAPL				
Volatile Organic Compounds	SW846 5035A/8260B	2 – 40 ml glass vials	4±2°C	14 days
PAHs	SW846 8270C SIM	2 – 40 ml glass vials	4±2°C	14 days (extraction) 40 days (analysis)
OFFSHORE SEDIMENT	S ONLY			
Grain Size	ASTM D422	32 oz. glass	4±2°C	6 months
Moisture	D2216-90	4 oz. wide-mouth glass, Teflon-lined cap	4±2°C	NA
Total Organic Carbon	Lloyd Kahn	Same as 32 oz. Jar for grain size	4±2°C	14 days
PAH and Monocyclic Aromatic Hydrocarbon (MAH) Fingerprinting	EPA 8100M, EPA 8270M, ASTM D 5739-95	4 oz. wide-mouth glass, Teflon-lined cap	4±2°C	14 days (extraction) 40 days (analysis)
OFFSHORE SITE WATE	R			
Volatile Organic Compounds	SW846 8260B	3 – 40 ml glass vials	4±2°C HCl pH <2	14 days
PAHs	SW846 8270C SIM	2 – 1 liter amber glass	4±2°C	7 days (extraction) 40 days (analysis)
TOXICITY CHARACTE	RISTIC LEACHING	G PROCEDURE (TCLP)		
Metals (including mercury)	SW846 1311, 6010B and 7470A	2 – 4 oz. wide-mouth glass, Teflon-lined cap	4°C	180 days (metals extraction) 28 days (mercury extraction) 28 days (analysis)
Volatile Organic Compounds	SW846 1311, 8260B	4 oz. wide-mouth glass, Teflon-lined cap	4°C (no headspace)	14 days (extraction) 14 days (analysis)
Semivolatiles, Pesticides, Herbicides	SW846 1311, 8270C/8081A/ 8151A	32 oz. wide-mouth glass, Teflon-lined cap	4°C	14 days (extraction) 7 days (preparative extraction) 40 days (analysis)

Table B-4. Sample Containers, Preservation Techniques, and Holding Times Sparrows Point Site Assessment (2009)

NA – Not Applicable

C (Concentration) qualifiers:

- **B** Estimated result; reported value is less than the project-specified Reporting Limit (RL), but greater than the method-specified Instrument Detection Limit (IDL) or Method Detection Limit (MDL).
- **U** Analyte analyzed for but not detected (concentration is less than the method-specified Instrument Detection Limit (IDL) or MDL.

Q (Quality control) qualifiers:

- **E** Matrix interference; the serial dilution was outside of the percent difference control limits.
- J Method blank contamination. This qualifier is used when the analyte is found in the associated method blank as well as in the sample. It indicates possible/probable blank contamination. For Gas Chromatography/ Mass Spectrophotometry (GC/MS) analyses, this qualifier is used for a Tentatively Identified Compound (TIC), as well as, for a positively identified target compound.
- **M** Duplicate injection precision not met.
- **N** Spiked sample recovery is not within control limits.
- **S** Reported value is determined by the method of standard additions (MSA).
- W Postdigestion spike for furnace Atomic Absorption Spectrophotometric (AAS) AAS analysis is out of control limits (85-115%) and sample absorbance is less than 50% of spike absorbance.
- * Duplicate analyses and/or relative percent difference (RPD) is not within control limits.
- + Correlation coefficient for MSA is less than 0.995.

C (Concentration) qualifiers:

- **COL** There was more than 40% difference between initial and confirmation results. The lower result was reported. (PCBs only)
- **EST** PCB congeners flagged with "EST" indicate that the value is estimated because of coelution with another PCB congener
- **G** Elevated reporting limit, reporting limit elevated because of matrix interference.
- I Matrix interference
- J Estimated result; reported value is less than the project-specified Reporting Limit (RL), but greater than the method-specified Instrument Detection Limit (IDL) or Method Detection Limit (MDL).
- **PG** Compound was detected, but the percent difference between the original and confirmation analyses between the two GC columns is greater than 40%. The highest value is presented
- **Q** Compound was detected, but as an estimated maximum possible concentration (EMPC).
- U Analyte analyzed but not detected (concentration is less than the method-specified Instrument Detection Limit (IDL) or MDL.

Q (Quality control) qualifiers:

- A Tentatively identified compound is a suspected aldol condensation
- **B** Method blank contamination. This qualifier is used when the analyte is found in the associated method blank as well as in the sample. It indicates possible/probable blank contamination
- **D** Compound analyzed at a secondary dilution factor
- **E** Compound was over the calibration range
- **M** Duplicate injection precision not met.
- **N** Identification of tentatively identified compound is based on a mass spectral library search
- * Duplicate analysis is not within control limits.
- + Correlation coefficient for MSA is less than 0.995.

(NO CODE) Confirmed identification

- **B** Not detected substantially above the level reported in laboratory or field blanks.
- **J** The analyte is present. The reported value may not be accurate or precise.
- **K** The analyte is present. The reported value may be biased high. The actual value is expected to be lower than reported.
- **L** The analyte is present. The reported value may be biased low. The actual value is expected to be higher than reported.
- **R** Unreliable result. Analyte may or may not be present in the samples. Supporting data are necessary to confirm result.
- **U** The analyte was analyzed for, but was not detected. The associated number indicates the approximate sample concentration necessary to be detected.
- **UJ** The analyte was analyzed for, but was not detected. The associated quantitation limit is an estimate and may be inaccurate or imprecise.
- **UL** The analyte was not detected, and the reported quantitation limit is probably higher than reported.

(NO CODE) Confirmed identification

- **B** Not detected substantially above the level reported in laboratory or field blanks.
- **J** The analyte is present. The reported value may not be accurate or precise.
- **K** The analyte is present. The reported value may be biased high. The actual value is expected to be lower than reported.
- **L** The analyte is present. The reported value may be biased low. The actual value is expected to be higher than reported.
- **N** Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
- **NJ** Quantitative identification questionable due to poor resolution. Presumptively present at approximate quantity.
- **Q** No analytical result.
- **R** Unreliable result. Analyte may or may not be present in the samples. Supporting data are necessary to confirm result.
- **U** The analyte was analyzed for, but was not detected. The associated number indicates the approximate sample concentration necessary to be detected.
- **UJ** The analyte was analyzed for, but was not detected. The associated quantitation limit is an estimate and may be inaccurate or imprecise.
- **UL** The analyte was not detected, and the reported quantitation limit is probably higher than reported.

- **J** The associated value is an estimated quantity.
- **K** The analyte is present. The reported value may be biased high. The actual value is expected to be lower than reported.
- **L** The analyte is present. The reported value may be biased low. The actual value is expected to be higher than reported.
- **R** The data are unusable. (Note: The analyte may or may not be present.)
- U The analyte was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
- **UJ** The analyte was analyzed for, but was not detected. The associated detection limit is an estimate and may be inaccurate or imprecise.
- **UL** The analyte was not detected, and the reported quantitation limit is probably higher than reported.

Parameter	Units	Laboratory MDL
Acenaphthene	µg/kg	0.543
Acenaphthylene	µg/kg	0.52
Anthracene	µg/kg	0.471
Benzene	µg/kg	0.832
Benzo[a]anthracene	µg/kg	0.803
Benzo[a]pyrene	µg/kg	1.21
Benzo[b]fluoranthene	µg/kg	0.908
Benzo[e]pyrene	µg/kg	0.606
Benzo[ghi]perylene	µg/kg	0.774
Benzo[k]fluoranthene	µg/kg	1.13
n-Butylbenzene	µg/kg	1.57
sec-Butylbenzene	µg/kg	0.517
Chrysene	µg/kg	0.638
Dibenzo[a,h]anthracene	µg/kg	1.36
Dibenzofuran	µg/kg	0.797
Dibenzothiophene	μg/kg	0.41
Ethylbenzene	μg/kg	0.65
Fluoranthene	µg/kg	0.702
Fluorene	µg/kg	0.715
Indeno[1,2,3-cd]pyrene	µg/kg	1.16
Isopropylbenzene	µg/kg	0.34
p-Isopropyltoluene	µg/kg	0.874
1-Methylnaphthalene	µg/kg	0.524
2-Methylnaphthalene	µg/kg	1.42
Naphthalene	µg/kg	1.48
Phenanthrene	µg/kg	0.546
n-Propylbenzene	µg/kg	0.625
Pyrene	μg/kg	0.66
Styrene	µg/kg	0.906
Toluene	μg/kg	0.796
1,2,4-Trimethylbenzene	µg/kg	0.767
1,3,5-Trimethylbenzene	µg/kg	0.422
m/p-Xylenes	µg/kg	2.74
o-Xylene	µg/kg	0.722

Table B-10. Analytical Method Detection Limits From METAEnvironmental For Soil and Sediment Samples

Table B-11. Analytical Methods

Stuffark ColleanupLiquid-liquid Partitioning3665ASUSEPA 1997Sulfark CleanupTreatment with copper or mercury or TBA3660A/BSUSEPA 1997ORGANICSVolatile Organic Compounds (VOC)Gas Chromatography/Mass Spectrometry8260BS,W.N.I.USEPA 1997Semivolatile Organic Compounds (SVOC)Gas Chromatography/Mass Spectrometry8270CLUSEPA 1997Polycyclic Aromatic Hydrocarbons (PAH)Gas Chromatography/Mass Spectrometry8270CLUSEPA 1997Organochlorine PesticidesGas Chromatography / ECD881ALUSEPA 1997METALSHerbicidesGas Chromatography – ECD881ALUSEPA 1997ArsenicAtomic Emission – ICP/MS6020SUSEPA 1997ArsenicAtomic Emission – ICP/MS6020SUSEPA 1997BariumAtomic Emission – ICP/MS6020SUSEPA 1997CadmiumAtomic Emission – ICP/MS6020SUSEPA 1997CadmiumAtomic Emission – ICP/MS6020SUSEPA 1997CadmiumAtomic Emission – ICP/MS6020S,LUSEPA 1997ChromatumAtomic Emission – ICP/MS6020S,LUSEPA 1997ChromiumAtomic Emission – ICP/MS6020S,LUSEPA 1997ChromiumAtomic Emission – ICP/MS6020S,LUSEPA 1997ChromiumAtomic Emission – ICP/MS6020S,LUSEPA 1997ChromiumAtomic Emission – ICP/MS6020S,LUSEPA 1	PARAMETER ORGANICS – EXTRACTION CLEANUP	METHOD	METHOD #	MATRIX	REFERENCE
Sulfur CleanupTreatment with copper or mercury or TBA3660A/BSUSEPA 1997ORGANICSVolatile Organic Compounds (VOC)Gas Chromatography/Mass Spectrometry8260BS.W.N.LUSEPA 1997Semivolatile Organic Compounds (SVOC)Gas Chromatography/Mass Spectrometry8270CLUSEPA 1997Polycyclic Aromatic Hydrocarbons (PAH)Gas Chromatography/Mass Spectrometry-SIM8270C SIMS.W.NUSEPA 1997Organochlorine PesticidesGas Chromatography – ECD8081ALUSEPA 1997HerbicidesGas Chromatography – ECD801ALUSEPA 1997AntimonyAtomic Emission – ICP/MS6020SUSEPA 1997AntimonyAtomic Emission – ICP/MS6020SUSEPA 1997BariumAtomic Emission – ICP/MS6020SUSEPA 1997CadmiumAtomic Emission – ICP/MS6020SUSEPA 1997ChromatumAtomic Emission – ICP/MS6020SUSEPA 1997ChromatumAtomic Emission – ICP/MS6020SUSEPA 1997ChromatumAtomic Emission – ICP/MS6020SUSEPA 1997ChromatumAtomic Emission – ICP/MS6020SUSEPA 1997Nicke		Liquid-liquid Partitioning	3665A	S	USEPA 1997
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Total Organic Carbon Combustion Oxidation Lloyd Kahn S USEPA 1988		Colorimetric - Automated	9012A	S	USEPA 1997
PHYSICAL PROPERTIES	•	Combustion Oxidation	Lloyd Kahn	S	USEPA 1988
	PHYSICAL PROPERTIES				
Grain Size (Sieve and Hydrometer) D422 S ASTM 1995			D422	S	ASTM 1995
Moisture ContentD2216-90SASTM 1990					
TCLPLeaching Procedure1311SUSEPA 1997	-	Leaching Procedure	1311	S	USEPA 1997

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Parameter	Units	Laboratory RL (MDL) ^(a)	Recommended TDL ^(b)
Volatile Organic Compounds - Gas Chromatogra	phy / Mass Spectrometry	y (SW846 8260B)	
Acrolein	µg/kg	100	-
Acrylonitrile	μg/kg	100	-
Benzene	μg/kg	5	10
Bromodichloromethane	μg/kg	5	-
Bromoform	µg/kg	5	-
Bromomethane	μg/kg	5	-
2-Butanone (MEK)	μg/kg	5	20
Carbon tetrachloride	μg/kg	5	-
Chloroethane	μg/kg	5	-
2-Chloroethyl vinyl ether	μg/kg	10	_
Chloroform	μg/kg	5	-
			-
Chloromethane	µg/kg	5	-
Dibromochloromethane	μg/kg	5	-
1,2-Dichlorobenzene	μg/kg	5	20
1,3-Dichlorobenzene	μg/kg	5	20
1,4-Dichlorobenzene	μg/kg	5	20
trans-1,2-Dichloroethene	μg/kg	5	-
Dichlorodifluoromethane	μg/kg	5	-
1,1-Dichloroethane	μg/kg	5	-
1,2-Dichloroethane	μg/kg	5	-
1.1-Dichloroethene	μg/kg	5	-
1,2-Dichloropropane	μg/kg	5	-
cis-1,3-Dichloropropene	μg/kg	5	-
trans-1,3-Dichloropropene	μg/kg	5	
Ethylbenzene		5	10
	μg/kg		10
Methylene chloride	µg/kg	5	-
1,1,2,2-Tetrachloroethane	µg/kg	5	-
Tetrachloroethene	µg/kg	5	10
Toluene	μg/kg	5	10
1,1,1-Trichloroethane	µg/kg	5	-
1,1,2-Trichloroethane	μg/kg	5	-
Trichloroethene	μg/kg	5	10
Trichlorofluoromethane	µg/kg	5	-
Vinyl chloride	μg/kg	5	-
Polynuclear Aromatic Hydrocarbons (PAHs) – Ga (SW846 8270C SIM)			-
Acenaphthene	µg/kg	6.7	20
Acenaphthylene	µg/kg	6.7 (1.93)	20
Anthracene	μg/kg	6.7	20
Benzo[a]anthracene	μg/kg	6.7	20
Benzo[b]fluoranthene	μg/kg	6.7	20
Benzo[k]fluoranthene	µg/kg	6.7	20
Benzo[a]pyrene	μg/kg	6.7	20
Benzo[ghi]perylene	µg/kg	6.7	20
Chrysene	μg/kg	6.7	20
Dibenzo[a,h]anthracene	μg/kg	6.7 (2.11)	20
Fluoranthene		6.7	20 20
	μg/kg		
Fluorene	μg/kg	6.7	20
1 [100]	10/20	6.7	20
	µg/kg		• •
1-Methylnaphthalene	μg/kg	6.7	20
1-Methylnaphthalene 2-Methylnaphthalene	μg/kg μg/kg	6.7	20
1-Methylnaphthalene 2-Methylnaphthalene Naphthalene	μg/kg	6.7 6.7	20 20
Indeno[1,2,3-cd]pyrene 1-Methylnaphthalene 2-Methylnaphthalene Naphthalene Phenanthrene	μg/kg μg/kg	6.7	20

Table B-12. Analytical Project Limits from TestAmerica for Soil and Sediment Samples

(a) RL=Reporting Limit, MDL = Method Detection Limit. MDLs are provided if RL is > TDL. Values \ge MDL and < RL will be qualified as estimated. MDLs are required to be updated periodically, and are subject to change.

(b) Target Detection Limit (TDL) from the QA/QC Guidance Document (USEPA, April 1995).

Parameter	Units	Laboratory RL (MDL) ^(a)	Recommended TDL ^(b)
Wet Chemistry Parameters			
TOC (Lloyd Kahn)	mg/kg	500	1000
Cyanide (SW846 9012A)	mg/kg	0.50	2.0
Metals - Cold Vapor (USEPA 245.6)			
Mercury	mg/kg	0.033	0.2
Metals – Inductively Coupled Plasma (SW846	6010B/7471A)		
Antimony	mg/kg	0.2	2.5
Arsenic	mg/kg	0.1	5.0
Beryllium	mg/kg	0.1	2.5
Cadmium	mg/kg	0.1	0.3
Chromium	mg/kg	0.2	5.0
Copper	mg/kg	0.2	5.0
Lead	mg/kg	0.1	5.0
Nickel	mg/kg	1.0	5.0
Selenium	mg/kg	0.5	1.0
Silver	mg/kg	0.1	0.2
Thallium	mg/kg	0.1	0.2
Zinc	mg/kg	0.5	15

Table B-12. Analytical Project Limits for Soil and Sediment Samples (continued)

⁽a) RL=Reporting Limit, MDL = Method Detection Limit. MDLs are provided if RL is > TDL. Values \ge MDL and < RL will be qualified as estimated. MDLs are required to be updated periodically, and are subject to change.

⁽b) Target Detection Limit (TDL) from the QA/QC Guidance Document (USEPA, April 1995).

Parameter	Units	Laboratory RL ^(a)	Recommended TDL ^(b)
	tography / Mass Spectrometry	y (SW846 8260B)	
Acrolein	µg/L	100	-
Acrylonitrile	µg/L	100	-
Benzene	µg/L	5	5
Bromodichloromethane	µg/L	5	-
Bromoform	µg/L	5	-
Bromomethane	µg/L	5	-
2-Butanone (MEK)	µg/L	5	-
Carbon tetrachloride	µg/L	5	-
Chloroethane	µg/L	5	-
2-Chloroethyl vinyl ether	µg/L	10	-
Chloroform	µg/L	5	5
Chloromethane	µg/L	5	-
Dibromochloromethane	µg/L	5	-
1,2-Dichlorobenzene	μg/L	5	-
1,3-Dichlorobenzene	µg/L	5	-
1,4-Dichlorobenzene	μg/L	5	-
trans-1,2-Dichloroethene	μg/L	5	-
Dichlorodifluoromethane	μg/L	5	-
1,1-Dichloroethane	µg/L	5	-
1,2-Dichloroethane	µg/L	5	-
1,1-Dichloroethene	µg/L	5	-
1,2-Dichloropropane	µg/L	5	-
cis-1,3-Dichloropropene	µg/L	5	-
trans-1,3-Dichloropropene	µg/L	5	-
Ethylbenzene	μg/L	5	5
Methylene chloride	µg/L	5	-
1,1,2,2-Tetrachloroethane	μg/L	5	-
Tetrachloroethene	μg/L	5	5
Toluene	μg/L	5	5
1,1,1-Trichloroethane	μg/L	5	-
1,1,2-Trichloroethane	μg/L	5	-
Trichloroethene	μg/L	5	5
Trichlorofluoromethane	μg/L	5	-
Vinyl chloride	μg/L	5	-
Polynuclear Aromatic Hydrocarbons (PAHs	s) – Gas Chromatography / Ma	uss Spectrometry - Selec	ted Ion Monitoring
(SW846 8270C SIM)			
Acenaphthene	µg/L	0.20	10
Acenaphthylene	μg/L	0.20	10
Anthracene	µg/L	0.20	10
Benzo[a]anthracene	μg/L	0.20	10
Benzo[b]fluoranthene	μg/L	0.20	10
Benzo[k]fluoranthene	µg/L	0.20	10
Benzo[a]pyrene	μg/L	0.20	10
Benzo[ghi]perylene	µg/L	0.20	10
Chrysene	µg/L	0.20	10
Dibenzo[a,h]anthracene	µg/L	0.20	10
Fluoranthene	µg/L	0.20	10
Fluorene	$\mu g/L$	0.20	10
	_	0.20	10
Indeno[1,2,3-cd]pyrene	μg/L	0.20	10
Indeno[1,2,3-cd]pyrene 1-Methylnaphthalene	μg/L μg/L	0.20	10
1-Methylnaphthalene 2-Methylnaphthalene Naphthalene	μg/L	0.20	10
1-Methylnaphthalene 2-Methylnaphthalene	μg/L μg/L	0.20 0.20	10 10

Table B-13. Analytical Project Limits from TestAmerica for Aqueous Samples

(a) RL=Reporting Limit, MDL = Method Detection Limit. Values ≥ MDL and < RL will be qualified as estimated.
(b) Target Detection Limit (TDL) from the QA/QC Guidance Document (EPA, April 1995).

Parameter	Units	Laboratory RL (MDL) ^(a)	Recommended TDL ^(b)
Metals - Cold Vapor (SW846 1311/7470A)			
Mercury	mg/L	0.0002	0.2
Metals - Atomic Emission Inductively Coupled Plas	sma/Mass Spectrometry - (S	SW846 1311/6010B)	
Arsenic	mg/L	0.50	5.0
Barium	mg/L	10	100
Cadmium	mg/L	0.10	1.0
Chromium	mg/L	0.50	5.0
Lead	mg/L	0.5	5.0
Selenium	mg/L	0.25	1.0
Silver	mg/L	0.25	5.0
Volatile Organics - Gas Chromatography/Mass Spo	ectrometry - (SW846 1311/8	8260B)	
Benzene	mg/L	0.050	0.50
2-Butanone (Methyl Ethyl Ketone)	mg/L	0.050	200
Carbon tetrachloride	mg/L	0.050	0.50
Chlorobenzene	mg/L	0.050	100
Chloroform	mg/L	0.050	6.0
1,2-Dichloroethane	mg/L	0.050	0.50
1,1-Dichloroethene	mg/L	0.050	0.70
Tetrachloroethene	mg/L	0.050	0.50
Trichloroethene	mg/L	0.050	0.70
Vinyl Chloride	mg/L	0.050	0.20
Semivolatile Organics - Gas Chromatography/Mas	ss Snoctromotry - (SW846 1	311/8270()	
Cresols (total)	mg/L	0.050	200
1,4-Dichlorobenzene	mg/L	0.010	7.5
2,4-Dinitrotoluene	mg/L mg/L	0.010	0.13
Hexachlorobenzene	mg/L	0.010	0.13
Hexachlorobutadiene	mg/L	0.010	0.13
Hexachloroethane	mg/L	0.050	3.0
Nitrobenzene	mg/L	0.050	2.0
Pentachlorophenol	mg/L mg/L	0.01	100
Pyridine	mg/L	0.05	5.0
2,4,5-Trichlorophenol	mg/L mg/L	0.050	400
2,4,6-Trichlorophenol	mg/L	0.050	2.0
Organochlorine Pesticides - Gas Chromatography/	Electron Capture Detector	- (SW846 1311/8081A)	2 ml final extract
volume)	-	,	
Gamma-BHC (Lindane)	mg/L	0.0005	0.40
Chlordane (technical)	mg/L	0.005	0.030
Endrin	mg/L	0.0005	0.020
Heptachlor	mg/L	0.0005	0.0080
Heptachlor epoxide	mg/L	0.0005	0.0080
Methoxychlor	mg/L	0.001	10
Toxaphene	mg/L	0.02	0.50
Chlorophenoxy Acid Herbicides - Gas Chromatogr	aphy/ Electron Capture De	tector - (SW846 1311/81	51A)
2,4-D	mg/L	0.04	10
		0.01	

Table B-14. Project Limits from TestAmerica for TCLP Samples

RL=Reporting Limit, MDL= Method Detection Limit. MDLs are provided if RL is >TDL. Values \geq MDL and < RL will be qualified as estimated. MDLs are required to be updated periodically, and are subject to change. Target Detection Limit (TDL) from the QA/QC Guidance Document (USEPA/USACE, April 1995). The TDL for TCLP parameters are the Toxicity Characteristic Rule's Regulatory Level (40 CFR 261.24) (a)

(b)

OFFSHORE INVESTIGATION CHAIN-OF-CUSTODY DOCUMENTATION

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		Phone: 410-329-5137										1 1	301 Alpha Drive, RI	
5 Loveton Circle		Field Contact:		18									Pittsburgh, PA 1523	8
Sparks, MD 21152		Todd Ward Phone: 410-746-1250		82									phone: 412-963-242	0
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and Techno	logy, In	с.									В		1							TestAmerica - Pittsburgh	
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				Phone: 410-746-1250		•	ĺ	· .	_	4 D	s 50	2								phone: 412-963-2428 fax: 412-963-2468	
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and Techno	ology, h		,	Frank Barranco Phone: 410-329-5137						0	60B	-						Laboratory: TestAmerica - Pittsburgh 301 Alpha Drive, RIDC Park
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Page /	of	/		Sediment Samples		ntainers	10B/74	012A	Size ASTM D422	Content	rganic (anic Car	0C	ds				ATTN: Carrie Gamber
Date	Time	Waler	Sediment	Sample Identification		No. of Containers	Metals 6010B/7471A	Cyanide 9012A	Grain Size	Moisture Content ASTM D2216-90	Volatile Organic Cmpds 5035A/8260B	Total Organic Carbon (Lloyd Kahn)	PAHs 8270C	Total Solids				Remarks
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and Technol	logy, In	i c.		Phone: 410-329-5137		.	.	· ·		m i								TestAmerica - Pittsburgh
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Client:				Project Manager:			Par	ame	ters/1	Meth	od N	Jumi	bers	for A	Anal	sis			Chain of Custody Record
EA Enginee	ring Sci	ience,		Frank Barranco															Laboratory:
and Technol	logy, In	c.								~									TestAmerica - Pittsburgh
				Phone: 410-329-5137						60E									301 Alpha Drive, RIDC Park
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Sparks, MD	21152			Todd Ward					216	ISA	Ä								
				Phone: 410-746-1250					D D	503	Š								phone: 412-963-2428
Project Nam	e: Sparre	ows P	oint O	ffshore Areas				52	IM	spo	E								fax: 412-963-2468
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Page 1	of	1		Sediment Samples	No. of Containers	Metals 6010B/7471A	Cyanide 9012A	Grain Size ASTM D422	Moisture Content ASTM D2216-90	Volatile Organic Cmpds 5035A/8260B	Total Organic Carbon (Lloyd Kahn)	ပ္ပ	s						
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Client:				Project Ma	nager:	- <u>-</u> [Par	ame	ters/	Meth	ind N	- Vum	hers	for	Analy	/sis		- <u>-</u>	Chain of Custody Record
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				Phone: 41	0-329-5137			1		~	60E								30	1 Alpha Drive, RIDC Park
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Sparks, MD	21152			Todd War	ď					216	5A	dК								
				Phone: 41	0-746-1250					D2	503	loy							ph	one: 412-963-2428
Project Nam	e: Sparr	ows P	oint O	ffshore Areas					5	M	spo	Ę							fax	:: 412-963-2468
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Client:				Project Manager:			Para	meters	/Meth	d Nut	nbers	for .	Analy	sis		Chain of Custody Record
EA Engine				Karin Olsen					ΙT							Laboratory:
and Techn	ology, In	IC.							1 1							TestAmerica - Pittsburgh
				Phone: 410-329-5112												301 Alpha Drive, RIDC Park
15 Lovetor				Field Contact:	1								[]			Pittsburgh, PA 15238
Sparks, MI	D 21152			Karin Olsen												
		- <u></u> -		Phone: 443.465.9783								ł				phone: 412-963-2428
Project Nan	ne: Sparr	ows P	oint O	ffshore Areas												fax: 412-963-2468
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Page 1	of	1		Sediment Samples	No. of Containers	EPA 1311										ATTN: Carrie Gamber
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ONSHORE INVESTIGATION CHAIN-OF-CUSTODY DOCUMENTATION

COC #01

Client:				EA Project Manager:			Pa	rame	ters/1	Metho	l Nur	nbers	for /	Anal	ysis		Chain of Custody Record
Maryland E	nvironı	nental	l	Karin Olsen						-							Laboratory:
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				Phone: 410-329-5112		1.	15	1		i	1		1	ii		i	301 Alpha Drive, RIDC Park
MES Contact				EA Field Contact:		<u>Š</u>	là.	1									Pittsburgh, PA 15238
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Phone: 410-7				Phone: 717-487-6632		١ĕ,	1 È			2	2						phone: 412-963-2428
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Page 1	of	1		Soil Samples	ontaine	IV PVI	PPL) a	8260B	(9012	202	\$						ATTN: Carrie Gamber
Date	Time	NAPL	Soil	Sample Identification	No. of Containers	SVOC and PAHs 8270C (low level)	Metals (PPL) and Mercury 6020/7471A		Cyanide (9012A)	MABI WOCC DAILS							Remarks
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CHAIN OF CUSTODY RECORD

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ADD	RESS	301 Alpha	Drive, Pittsbu	urgh, PA 15238			-		If	Authoria	zed *												aenv.com
EMA	IL	tara.martz(@testamericai	nc.com			-	1 W	Veek														
PHO	NE	412-963-24	430	FAX	412-963-2468	}	-	Oth	ner					گي.	0		Par	ramet	ters				
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COC #OZ

Client:	EA Project Manager:	T		Par	ame	eters/	Method	Nun	nbers 1	for A	haivs	sis		Chain of Custody Record
Maryland Environmental	Karin Ölsen							T	TT	Ť	Ĩ	T	T	Laboratory:
Service											1			TestAmerica - Pittsburgh
	Phone: 410-329-5112			15							[301 Alpha Drive, RIDC Park
MES Contact:	EA Field Contact:	1	sel	Ś							(Pittsburgh, PA 15238
Megan Simon	Steve Yankay		v le	1 2							1			1 Kisourgh, 1 A 15256
Phone: 410-729-8334	Phone: 717-487-6632		lov	y 6										
Project Name: Sparrows Point - RCR		- 1	Ŭ	C.I.]	l 🗄			- 1				phone: 412-963-2428
			270	Mer			D d							fax: 412-963-2468
Project#: 14534.06	Quote Number 18001868	ers	Hs 8	Pg	6	(A	hus							
Page 1 of 1	Soil Samples	ontain	Ad bo	PPL) a	8260E	(901								ATTN: Carrie Gamber
Date Time Z	Sample Identification	No. of Containers	SVOC and PAHs 8270C (low level)	Metals (PPL) and Mercury 6020/7471A	VOCS (8260B)	Cyanide (9012A)	NAPI - VOCs and PAHs							Remarks
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	P-50-B01-8	5	X	X	X	X								Run SRMs on metals, PAHs
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<u> </u>														5 day turn-around -time for all samples
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lient;				EA Project Manager:			Pa	ame	ters/N	/lethod]	Numi	bers	for A	nalysi	s		Chain of Custody Record
faryland E	nvironn	nental	l	Karin Olsen													Laboratory:
ervice							₹										TestAmerica - Pittsburgh
				Phone: 410-329-5112		ଳ	47										301 Alpha Drive, RIDC Park
AES Contac	t:			EA Field Contact:		ŝ	50										Pittsburgh, PA 15238
legan Simo	Dn			Steve Yankay		MO	8										
hone: 410-7				Phone: 717-487-6632		00	្រុទ្ធ			Is						1 1	phone: 412-963-2428
roject Nam	e: Sparro	ows Po	oint - F	CRA Onshore Sampling		10	fer			PAI							fax: 412-963-2468
roject#:	14534	1.06		Quote Number 18001868	2	80 80	γ P		2	[pu						1	
age 1	of	1		Soil Samples	ntaine	I PAH	PL) an	260B)	9012/	NAPL - VOCs and PAHs							ATTN: Carrie Gamber
				····	Ĵ	and	Ē	8	-e								
Date	Time	NAPL	Soil	Sample Identification	No. of Containers	SVOC and PAHs 8270C (low level)	Metals (PPL) and Mercury 6020/7471A	VOCS (8260B)	Cyanide (9012A)	NAPL							Remarks
Tulog	900		x	BP-50-Rol-14	8	X	X	x	X								SEE PROJECT SPECIFIC ANALYTE LIST
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	900		X	BP-50-B01-14 MSD	8	K	K	X	1								Run SRMs on metals, PAHs
	930		X	BP-50-B0/-20	9	X	Х	X	X								
	1230		~	BP-50-804-10	8	X	X	K	X								5 day turn-around -time for all samples
	1510		X	BP-50-804-16	8	٨	X	~	X								
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	Clie	ent:		-		EA Project Manager:			Pa	ame	ters/	Method	l Nu	nber	s for	Ana	lvsis			Chain of	Custody Record
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	Ser	vice							12									ĺ		TestAmerica - Pittsburg	-
						Phone: 410-329-5112		କ	15											301 Alpha Drive, RIDC	Park
	ME	S Contac	:t:			EA Field Contact:		ev	ର୍ଚ୍ଚ											Pittsburgh, PA 15238	
	Me	gan Sim	on			Steve Yankay		Å	3				1								
	Pho	ne: 410-'	729-833	4		Phone: 717-487-6632		Įĕ	<u>}</u>			_								phone: 412-963-2428	
	Pro	ject Nam	e: Sparre	ows P	oint -	RCRA Onshore Sampling		١×	Mercury 6020/7471A			. T P C								fax: 412-963-2468	
	Pro	ject#:	1453	4.06		Quote Number 18001868	£	Is 82	N PC		(Y	1 pue									
	Pag	je I	of	1		Soil Samples	ontain	IA Da	PPL) a	(8260B)	(9012									ATTN: Carrie Gamber	•
		Date	Time	NAPL	Soil	Sample Identification	No. of Containers	SVOC and PAHs 8270C (low level)			Cyanide (9012A)	NAPI - VOCe and PAHe		<u>.</u>						R	emarks
	51	22109	0820		x	BP-50-B04-24	10	x	X	X	x	X				<u> </u>				SEE PROJECT SPECI	FIC ANALYTE LIST
		1	124 S		X	BP-50-B02-08	Ю	X	X	X	X	<u> </u>									
		1	1345		X	BP-50-B02-14	σι	X	X	X	×	X						<u> </u>		Run SRMs on metals, P	AHs
	-	L	1410		X	BP-50-B02-20	ю	X	X	X	\times	X									
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Client:				EA Project Manager:			Par	ame	ters/N	viethod	Numi	bers	for A	nalv	sis			Chain of Custody Record
Maryland H	Environ	menta	ıl	Karin Olsen						T	T T					1		Laboratory:
Service							≤											TestAmerica - Pittsburgh
				Phone: 410-329-5112	1		47											301 Alpha Drive, RIDC Park
MES Contac	ct:			EA Field Contact:		eve	120								1			Pittsburgh, PA 15238
Megan Sim	on			Steve Yankay]	Å	60							1				
Phone: 410-		4		Phone: 717-487-6632		8	کر ا											phone: 412-963-2428
			oint - I	CRA Onshore Sampling	1	NS.				H								fax: 412-963-2468
Project#:	1453			Quote Number 18001868		5	Ŵ			d P								
110]0.07.	1455	4.00			ainers	AHs) and	(B)	012A	Cs an								ATTN: Carrie Gamber
Page 1	of	1	T	Soil Samples	out;	R I	PPL	826	୭	2								
Date	Time	NAPL	Soil	Sample Identification	No. of Containers	SVOC and PAHs 8270C (low level)	Metals (PPL) and Mercury 6020/7471A	VOCS (8260B)	Cyanide (9012A)	NAPL - VOCs and PAHs								Remarks
5/27/09	0945	•	x	BP-50-B05-8	8	X	X	٨	X									SEE PROJECT SPECIFIC ANALYTE LIST
	1050		1	BP-50-BO5-14	8	x			x									
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CHAIN OF CUSTODY RECORD

PRO.	JECT	Sparrows F	Point RCRA Sampling - Onshore													\frown					
CON	TACT	Tara Martz					Turi	n Arou	nd Time		M	ЕТ	A	ł		\sim	2	Env	iron	mental, Inc.	
COM	PANY	TestAmerio	ca			Sta	andar	rd 🕅]	4	9 Cla	arend	lon S	t `	Wate	ertov	vn, N	lassa	achus	setts - 02472	
ADD	RESS	301 Alpha	Drive, Pittsburgh, PA 15238]	lf Authori	•	Tel (617)	923-	4662	- F	ax (e	617)	923-	4610) - w	ww.metaenv.c	com
EMA	IL	tara.martz(@testamericainc.com	·		1 1	Week	· []			6	حلخ								
РНО	NE	412-963-24	430 FAX	412-963-2468		Ot	her					4			Par	amet	ers				
SAM	PLED BY	51										Int Finger	'			/			-1		
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Samp #	Date	Time	Field Sample ID	Sire	C/P	Grab	Composite	# of Containers	Matrix	Preserv.	Site in	wohrs								Comme	nts
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			<u> </u>	* Surcharges may apply														_	_		

CHAIN OF CUSTODY RECORD

PRO	JECT	Sparrows P	Point RCRA Sampling - Onshore					2												
CON	ТАСТ	Tara Martz				1	- Curn	Arour	nd Time]	M	ЕТ	A	A		\sim	\mathcal{I}	Env	viron	nental, Inc.
COM	PANY	TestAmeric	ca			Star	ndaro	d 🖊	\overline{r}	4				t	Wat	terto	wn, I			etts - 02472
ADD	RESS	301 Alpha	Drive, Pittsburgh, PA 15238				If	f Authori	zed *	1										ww.metaenv.com
EMA	IL	tara.martz@	@testamericainc.com			1 W	/eek		1			IJ	0							
РНО	NE	412-963-24	430 FAX 412-963-2468			Oth	er					ŝ	-		Pa	rame	ters		_	
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	Print Name	STEVEN	VYANKAY Sign	$\leq \gamma$	~)_	-					भ	5/					'		
	Print Name		Sign	/								THE Freedom	222			1				1
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Maryland	Environ	menta	1	Karin Olsen			4									Laboratory: TestAmerica - Pittsburgh	
Service				Phone: 410-329-5112			E									301 Alpha Drive, RIDC Park	
MES Cont	act:			EA Field Contact:		vel	Ľ0									Pittsburgh, PA 15238	
Megan Sir				Steve Yankay		N N	202										
Phone: 410		34		Phone: 717-487-6632		ê	È		ļ		1					phone: 412-963-2428	
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Page 1	of	1		Soil Samples	No. of Containers	SVOC and PAHs 8270C (low level)	Metals (PPL) and Mercury 6020/7471A	VOCS (8260B)	Cyanide (9012A)	NAPL - VOCs and PAHs							
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Client:				EA Project	Manager:	T			Par	ame	ters/	Metho	d Nur	nbers	for	Anah	/sis		Chain of Custody Record
Maryland I	Environ	menta	I	Karin Olse		f	Т							T	<u> </u>		Ţ		Laboratory:
Service						1			ΙV										TestAmerica - Pittsburgh
				Phone: 410	-329-5112			æ	147										301 Alpha Drive, RIDC Park
MES Contac	et:			EA Field Co	ontact:			leve	20/1										Pittsburgh, PA 15238
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Phone: 410-				Phone: 717	and the second second second second second second second second second second second second second second second			Č D	ury.				2						phone: 412-963-2428
Project Nam	ie: Sparn	ows P	oint - l	RCRA Onshore Sa	mpling			2700	Mercury 6020/7471A				Z						fax: 412-963-2468
Project#:	1453	4.06		Quote Num	ber 18001868		S	Hs 8.		()	(x		and						ATTN: Carrie Gamber
Page 1	of	1	r		Soil Samples		Contain	Ad but	(PPL) a	(8260E	(901)		500						
Date	Time	NAPL	Soil	Samj	ple Identification		No. of Containers	SVOC and PAHs 8270C (low level)	Metals (PPL) and	VOCS (8260B)	Cyanide (9012A)		NAFL - VUUS and FAIDS						Remarks
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COM	PANY	TestAmeri	ca							_	Star	ndard	d 🕅]4	9 Cla	arenc	lon S	t	Wat	ertov	vn, M	lassa	achus	setts -	02472
ADD	RESS	301 Alpha	Drive, Pi	ittsburgh, I	PA 15238	3						lf	Authori	zed *	Tel ((617)	923-	4662	2 - F	ax (617)	923-	461() - w	ww.me	taenv.com
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Maryland Environmental Karin Olsen Laboratory: Service Phone: 410-329-5112 TestAmerica - Pittsburgh MES Contact: EA Field Contact: 301 Alpha Drive, RIDC Park Megan Simon Steve Yankay Phone: 717-487-6632 Project Name: Sparrows Point - RCRA Onshore Sampling TestAmerica - Pittsburgh, PA 15238 Project#: 14534.06 Quote Number 18001868	Client:				EA Proje	ct Manager:			Par	ame	ters/N	lethod	Num	bers	for	Analy	vsis			Chain of Custody Record
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Service				×											Laboratory:
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Phone: 410-729-8334	Phone: 717-487-6632		lov J	<u>у</u> б											
Project Name: Sparrows Point - RCR	RA Onshore Sampling	-	ğ	LCUI			1	Hs							phone: 412-963-2428
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Page 1 of 1	Soil Samples	ntainer	I PAH	PL) and	260B)	9012A		OCs an							ATTN: Carrie Gamber
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