

Phase II Investigation Work Plan

Area B: Parcel B11 Tradepoint Atlantic Sparrows Point, Maryland

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1.0 INTRODUCTION

1.1. INTRODUCTION

ARM Group LLC (ARM), on behalf of EnviroAnalytics Group, LLC (EAG), has prepared the following Work Plan to complete a Phase II Investigation on a portion of the Tradepoint Atlantic property that has been designated as Area B: Parcel B11 (the Site). Parcel B11 is comprised of 92.1 acres of the approximately 3,100-acre former plant property located as shown on **Figure 1**.

Site characterization of Parcel B11 will be performed in compliance with requirements pursuant to the following:

- Administrative Consent Order (ACO) between Tradepoint Atlantic (formerly Sparrows Point Terminal, LLC) and the Maryland Department of the Environment (MDE), effective September 12, 2014; and
- Settlement Agreement and Covenant Not to Sue (SA) between Tradepoint Atlantic (formerly Sparrows Point Terminal, LLC) and the United States Environmental Protection Agency (USEPA) effective November 25, 2014.

An application to enter the full Tradepoint Atlantic property (3,100 acres) into the Maryland Department of the Environment Voluntary Cleanup Program (MDE-VCP) was submitted to the MDE and delivered on June 27, 2014. The property's current and anticipated future use is Tier 3 (Industrial) and plans for the property include demolition and redevelopment over the next several years. Parcel B11 is also part of the acreage that remains subject to the requirements of the Multimedia Consent Decree between Bethlehem Steel Corporation, the USEPA, and the MDE (effective October 8, 1997) as documented in correspondence received from the USEPA on September 12, 2014.

Tradepoint Atlantic has developed an initial master plan that shows potential future development areas across the entire Tradepoint Atlantic property. This master plan is a working document and it is expected to undergo subsequent revisions in the future. The plan shows that 100% of the total area within Parcel B11 may ultimately be proposed for development.

The objective of this Phase II Investigation is to identify the presence or absence of any existing hazardous conditions for future tenants or personnel working on the Site. During the Phase II Investigation, soil samples will be collected for analysis from a total of 33 soil borings to assess the presence or absence of soil contamination. Groundwater at the Site will be investigated via the Coke Point Area Corrective Measures Study, ongoing semi-annual monitoring of the Coke Point Landfill, and ongoing monitoring of the Coke Oven Area (COA).

Following the receipt of analytical data, a Phase II Investigation Report will be prepared to summarize the findings. As development projects continue to be proposed on the Tradepoint Atlantic property in the future, the results obtained during this Phase II Investigation will be 1) incorporated into a human health Screening Level Risk Assessment (SLRA) within a Response and Development Work Plan (RADWP) to evaluate any potential risks to future workers in the development area; or 2) evaluated within an alternative supplemental SLRA document for areas that are not proposed for development.

1.2. SITE BACKGROUND

From the late 1800s until 2012, the production and manufacturing of steel was conducted at Sparrows Point. Iron and steel production operations and processes at Sparrows Point included raw material handling, coke production, sinter production, iron production, steel production, and semi-finished and finished product preparation. In 1970, Sparrows Point was the largest steel facility in the United States, producing hot and cold rolled sheets, coated materials, pipes, plates, and rod and wire. The steel making operations at the facility ceased in fall 2012.

Groundcover at the Site is comprised of 100% non-native fill materials (i.e., slag) based on the approximate shoreline of the Sparrows Point Peninsula in 1916, as shown on **Figure 2** (Adapted from Figure 2-20 in the Description of Current Conditions (DCC) Report prepared by Rust Environment and Infrastructure, dated January 1998).

1.2.1. Coke Point Area

Parcel B11 is positioned within the approximately 308-acre Coke Point Area of the Tradepoint Atlantic property. The Site is bounded to the north by the historic COA (within Parcel B10) and to the south by the Coke Point Landfill (within Parcel B12). Groundwater in the vicinity of the Coke Point Landfill is monitored according to a semi-annual schedule. The most recent monitoring event is discussed in the Coke Point and Greys Landfills Semi-Annual Groundwater Monitoring Report, dated August 26, 2019.

The COA to the north of the Site has several operational interim measure remediation cells. These operations are discussed in the “Draft Pre-Design Investigation Summary Report” for the Former COA (Key Environmental Inc., dated October 9, 2015). A portion of one of the COA interim measure remediation cells (Cell 5) extends into the boundary of the Site.

1.2.2. Dredged Material Containment Facility

The western portion of the Site is occupied by the historic Mud Disposal Area (identified as such on historical drawings) which has also been identified as the Dredged Material Containment Facility (DMCF). According to historic aerial imagery in the Phase I Environmental Site Assessment (ESA) prepared by Weaver Boos Consultants dated May 19, 2014, the area began

receiving dredged material in the mid-1960s. The DMCF was previously investigated by Hillis-Carnes Engineering Associates (HCEA). An environmental sampling report documenting this investigation is included as **Appendix A**. Due to the completion of this previous investigation, the 27.9-acre DMCF was excluded when calculating the sampling density requirements for the purpose of this Phase II Investigation.

1.2.3. Materials Processing, Recovery, and Storage

During the steel plant operations, Fritz Enterprises occupied a slag processing plant at the Site. The slag processing plant activities included the excavation of slag materials from the subsurface that were then processed through a portable screener to recover metal. MCM Construction Inc. (MCM) requested to take over the metal reclamation activities in the southern portion of the Sparrows Point property in October 2015. During the MCM metals reclamation activities, grading brought the Site elevation down to approximately 8 feet above mean sea level (amsl). Several test pits were completed within the metals reclamation area to determine the approximate depth that groundwater would be expected to be encountered in the vicinity of the Coke Point Area. Groundwater is anticipated to be encountered in the soil cores at approximately 8 to 10 feet below ground surface (bgs). Recently, the slag processing and metals reclamation operations have concluded within the vicinity of Parcel B11.

In addition to Fritz Enterprises, Kinder Morgan Terminals historically occupied a portion of the Site. According to its website, Kinder Morgan's activities included bulk storage of coke, pumice gypsum, granulated slag, ferro alloys, manganese ore, ferro silicon, steel coils, and break bulk cargos.

1.2.4. Pre-Investigation Site Visit

A site visit of Parcel B11 was completed by ARM staff on November 12, 2018 in order to observe current conditions at the Site. ARM staff observed the DMCF and surrounding berm, material stockpiles located throughout the Site, and slag reclamation machinery. A photograph log from the November 2018 site visit has been included as **Appendix B**. The findings from the site visit were incorporated into the sampling plan, and soil boring locations were adjusted to try to minimize the potential conflicts with material stockpiles and other restrictions which may be encountered in the field.

1.2.5. Background Environmental Data

Parcel B11 is within the Coke Point Area and is bordered by the COA and the Coke Point Landfill, each of which has an ongoing groundwater monitoring program. The COA groundwater is sampled quarterly and the Coke Point Landfill groundwater is sampled semi-annually. The results from each groundwater sampling event are reported to the MDE within routine monitoring reports. Analytical results for groundwater below portions of the Site were also presented to the MDE in 2019 in the Former COA Interim Measures Supplemental Investigation Report, dated August 2,

2019. Extensive groundwater sampling occurred throughout the COA as part of this investigation. Groundwater wells installed throughout the Coke Point Area within, and in the vicinity of, Parcel B11 are presented in **Figure 3**.

The dredged materials present within the DMCF were previously investigated by HCEA, with the results presented within the environmental sampling report included as **Appendix A**. There are no historical soil or soil gas sampling data available from the Site.

1.3. SAMPLING DESIGN AND RATIONAL

1.3.1. Soil Sampling Targets

Parcel B11 contains a total of approximately 92.1 acres. The DMCF (27.9 acres) was subtracted from the total area because it has been previously investigated by HCEA, leaving 64.2 acres to be characterized by this Phase II Investigation. The Site does not contain any maintained engineered barriers. In accordance with the relevant sampling density requirements set forth in the Quality Assurance Project Plan (QAPP) Worksheet 17 – Sampling Design and Rationale, a minimum of 33 soil boring locations are required. A total of 33 borings have been proposed. **Figure 4** shows the proposed borings on an aerial image to indicate locations of borings with regard to physical obstructions (material stockpiles) and landmarks at the Site. This figure acts as a reference map and indicates the boring IDs assigned to each location. The soil boring IDs have been abbreviated on all subsequent soil sampling figures. Sampling locations were selected as follows.

Across the whole Tradepoint Atlantic property, several buildings and facilities may have been historical sources of environmental contamination. These areas were identified as targets for sampling through a careful review of historical documents. Historical maps and drawings were geospatially referenced using Geographic Information Systems (GIS) software (ArcMap Version 10.6) and reviewed to determine the specific sampling locations. When a sampling target was identified, at least two borings were placed at or around its location using GIS software. The first sampling targets to be reviewed were Recognized Environmental Conditions (RECs), if present, that are located within the Site boundaries as shown on the REC Location Map provided in the Phase I ESA prepared by Weaver Boos dated May 19, 2014. Weaver Boos completed site visits of Sparrows Point from February 19 through 21, 2014, for the purpose of characterizing current conditions at the former steel plant. All RECs on the Tradepoint Atlantic property are required to be targeted with at least three boring locations. There were no RECs identified at the Site based on the Phase I ESA (Weaver Boos did not classify the DMCF as a REC).

The DCC Report was also reviewed to identify additional sampling targets. This report included documentation from a previous Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) and a visual site inspection (VSI) prepared by A.T. Kearney, Inc. (dated August 1993). The purpose of the VSI was to identify Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) on the property. SWMUs and AOCs, if present, were identified from

the DCC Report Figure 3-1. **Figure 5** shows the proposed borings overlain on the DCC figure, which shows the SWMUs, AOCs, and main facility areas within the parcel boundaries. There were no SWMUs or AOCs identified at the Site based on this figure, and no additional units were identified from the DCC Report Table 3-1.

Following the identification of all RECs, SWMUs, and AOCs, four sets of historical site drawings were reviewed to identify additional sampling targets. These site drawings included the 5000 Set (Plant Arrangement), the 5100 Set (Plant Index), the 5500 Set (Plant Sewer Lines), and a set of drawings indicating coke oven gas distribution drip leg locations. Sampling target locations were identified if the historical site drawings depicted industrial activities or a specific feature at a location that may have been a source of environmental contamination that impacted the Site. Drip legs are points throughout the distribution system where coke oven gas condensate was removed from the gas pipelines. The condensate from the drip legs was typically discharged to drums, although it is possible some spilled out of the drums and on to the ground. There were no drip legs identified within the Site boundary. **Figure 6** through **Figure 8** show the proposed borings and the parcel boundary overlain on the 5000 Set, 5100 Set, and 5500 Set, respectively. It should be noted that the historical drawings provide partial, but not full coverage of the Site. A summary of the specific drawings covering the Site is presented in the table below:

Parcel B 11 Historical Site Drawings Details				
<u>Set Name</u>	<u>Typical Features Shown</u>	<u>Drawing Number</u>	<u>Original Date Drawn</u>	<u>Latest Revision Date</u>
Plant Arrangement	Roads, water bodies, building/ structure footprints, electric lines, above-ground pipelines (e.g.: steam, nitrogen, etc.)	5001	3/1/1961	1/8/1982
		5002	10/22/1958	1/8/1982
		5007	10/22/1958	1/8/1982
Plant Index	Roads, water bodies, demolished buildings/structures, electric lines, above-ground pipelines	5101	<i>Unknown</i>	3/6/2008
		5102	<i>Unknown</i>	3/7/2008
		5107	<i>Unknown</i>	8/18/2008
Plant Sewer Lines	Same as above plus trenches, sumps, underground piping (includes pipe materials)	5501	3/1/1961	3/9/1982
		5502	5/21/1975	2/24/1982
		5507	8/25/1959	2/24/1982
Drip Legs	Coke Oven Gas Drip Legs Locations	5885B	<i>Unknown</i>	Sept. 1988

A figure showing the locations of former PCB-containing transformer equipment at the property was also reviewed for inclusion as additional targets. There were no possible PCB-contaminated equipment areas identified in the parcel based on this information.

The number of proposed borings that targeted a specific feature is directly related to the size and likely historical presence of materials that could have impacted the Site. Careful review of the geospatially referenced figures and review of other historical documents (previously discussed) yielded the proposed boring locations. Based on this criterion, the following sampling targets were identified at the Site: Transformer Pad, Scrap Reclaiming Pits, and Scrap Screening Station. Additional sample locations were added to fill in areas with insufficient coverage (perimeter of the DMCF and material stockpile areas) within the Site and to meet the sample density requirements set forth in the QAPP Worksheet 17 – Sampling Design and Rationale. The sample IDs, along with the specific rationale for sampling at the Site, are provided in **Appendix C**.

1.3.2. Groundwater

Groundwater at the Site will not be assessed as part of the Parcel B11 Phase II Investigation. Groundwater wells installed throughout the Coke Point Area within, and in the vicinity of, Parcel B11 are presented in **Figure 3**. The COA groundwater is sampled quarterly and the Coke Point Landfill groundwater is sampled semi-annually. Results of each sampling event are reported to the MDE within routine monitoring reports. Extensive groundwater sampling also occurred throughout the COA (and extending within Parcel B11) during the COA Interim Measures Supplemental Investigation. Groundwater at the Site will be additionally investigated via the Coke Point Area Corrective Measures Study, which is in the process of implementation. Results of this investigation will be submitted to the MDE following its completion.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

2.1. PROJECT PERSONNEL

The site characterization of Area B: Parcel B11 will be conducted by ARM under a contract with EAG. ARM will provide project planning, field sampling, and reporting support. The required drilling, Geoprobe[®] and laboratory services will be contracted directly by EAG. The management, field, and laboratory responsibilities of key project personnel are defined in this section.

The ARM Project Manager, Mr. Eric Magdar, is responsible for ensuring that all activities are conducted in accordance with this Work Plan and the contract requirements. Mr. Magdar will provide technical coordination with the MDE, USEPA, and EAG. The ARM Project Manager is responsible for managing all operations conducted for this project including:

- Ensure all personnel assigned to this project review the technical project plans before initiation of all tasks associated with the project.
- Review of project plans in a timely manner.
- Ensure proper methods/procedures are implemented to collect representative samples.
- Monitor the project budget and schedule and ensure the availability of necessary personnel, equipment, subcontractors, and other necessary services.

The lead ARM Geologist, Ms. Lisa Perrin, will be responsible for coordinating field activities including the collection, preservation, documentation, and shipment of samples. Ms. Perrin will directly communicate with the ARM Project Manager and Laboratory Project Manager on issues pertaining to sample shipments, schedules, container requirements, and other necessary issues. Ms. Perrin is also responsible for ensuring the accuracy of sample documentation including the completion of the Chain of Custody (COC) forms.

Pace Analytical Services, Inc. (PACE) of Greensburg, Pennsylvania will provide the analytical services for this project. The address for the laboratory is as follows:

Pace Analytical
1638 Roseytown Road
Greensburg, PA 15601

During the field activities, the Laboratory Project Manager will coordinate directly with the ARM Project Manager on issues regarding sample shipments, schedules, container requirements, and other field-laboratory logistics. The Laboratory Project Manager will monitor the daily activities of the laboratory, coordinate all production activities, and ensure that work is being conducted as specified in this document. Ms. Samantha Bayura will be the Laboratory Project Manager for PACE on this project.

2.2. HEALTH AND SAFETY ISSUES

Because of the potential presence of hazardous constituents in the soil and groundwater at the Site, the investigation will be conducted under a Health and Safety Plan (HASP) to protect investigation workers from possible exposure to contaminated materials. The HASP to be used during the field investigation of Parcel B11 is included as **Appendix D**.

Based on information provided to ARM, the planned site investigation activities will be conducted under Level D personal protection. The requirements of the Level D protection are defined in the attached HASP. All field personnel assigned for work at the Site have been trained in accordance with the Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response standard (29 CFR 1910.120) and other applicable OSHA training standards. All field staff will be experienced in hazardous waste site work, use of personal protective equipment (PPE), and emergency response procedures.

3.0 FIELD ACTIVITIES AND PROCEDURES

3.1. UTILITY CLEARANCE

ARM will take appropriate precautions to avoid subsurface utilities and structures during the site investigation. Prior to initiating any subsurface investigations, ARM will attempt to determine the location of utilities in the project area using the Miss Utility system. Additionally, any required state or local permits will be acquired prior to the commencement of site activities.

In addition to the Miss Utility system, EAG will clear each proposed boring with utility personnel currently working on the property. To facilitate this, ARM will locate with a GPS and mark all proposed sample locations in the field. ARM will coordinate the staking of sample locations in the field with Tradepoint Atlantic utility personnel to avoid conflicts. Historical utility drawings which may be relevant include the 5600 Set (Plant Water Lines) and 5800 Set (Plant Gas Lines).

3.2. SAMPLING PLAN

The purpose of this site characterization is to identify any existing hazardous conditions across the entire Site. A summary of the investigation plan, along with the proposed boring identification numbers and the analyses being performed, has been provided as **Appendix C**.

This Work Plan presents the methods and protocols to be used to complete the site characterization. These methods and procedures follow the MDE-VCP and USEPA guidelines. Information regarding the project organization, field activities and sampling methods, sampling equipment, sample handling and management procedures, the laboratory analytical methods and selected laboratory, quality control and quality assurance procedures, investigation-derived waste (IDW) management methods, and reporting requirements are described in detail in the QAPP that has been developed by ARM to support the investigation and remediation of the Tradepoint Atlantic property (Quality Assurance Project Plan, Revision 3 dated April 5, 2016).

The proposed schedule of this investigation is contained in this Work Plan (Section 8.0). All site characterization activities will be conducted under the HASP (**Appendix D**).

3.3. SOIL INVESTIGATION

Soil samples collected from the locations identified on **Figure 4** through **Figure 8** will be screened and analyzed in accordance with procedures referenced in the QAPP Worksheet 21 – Field SOPs (Standard Operating Procedures), SOP No. 009 – Sub-Surface Soil Sampling. Regarding soil sampling depth, a shallow sample will be collected from the 0 to 1 foot depth interval, and a deeper sample will be collected from the 4 to 5 foot depth interval. If a concrete slab or slag aggregate occupies the 0 to 1 foot bgs sample, the interval may be shifted to the depth of the first observed soil interval.

Soil samples will be analyzed for SVOCs, TAL-Metals, Oil & Grease, TPH-DRO, TPH-GRO, hexavalent chromium, and cyanide. Samples from any depth interval with a sustained photoionization detector (PID) reading of greater than 10 ppm will also be analyzed for VOCs. Additionally, the soil sample collected from the shallow interval (0 to 1 foot bgs) will be analyzed for PCBs. If the PID or other field observations indicate contamination to exist at a depth greater than 3 feet bgs but less than 9 feet bgs, and above the water table, the sample from the deeper 4 to 5 foot interval may be shifted to the depth interval indicated by the PID response. One additional sample will also be collected from the 9 to 10 foot depth interval if groundwater has not been encountered. It should be noted that no soil samples will be collected from a depth that is below the water table.

If the PID reading from the 9 to 10 foot depth interval is less than 10 ppm, all parameters will be held by the laboratory pending the analysis of the 0 to 1 and 4 to 5 foot depth interval samples. If this depth interval exhibits a sustained PID reading of 10 ppm, it will be analyzed for VOCs, SVOCs, TPH-DRO, TPH-GRO, and Oil & Grease. However, the samples for metals and cyanide will be held by the laboratory pending the analysis of the 0 to 1 and 4 to 5 foot depth interval samples. If the analyses from the 4 to 5 foot depth interval show exceedances of PALs for any constituent, the held sample from the 9 to 10 foot depth interval will be analyzed for those constituents that exhibited PAL exceedances in the overlying 4 to 5 foot sample.

After soil sampling has been concluded at a location, down-hole soil sampling equipment will be decontaminated according to procedures referenced in the QAPP Worksheet 21 – Field SOPs, SOP No. 016 – Equipment Decontamination. The decontamination procedures that will be used during the course of this investigation include Decontamination Area (Section 3.1 of the SOP), Decontamination of Sampling Equipment (Section 3.5), Decontamination of Measurement Devices & Monitoring Equipment (Section 3.7), Decontamination of Subsurface Drilling Equipment (Section 3.8), and Document and Record Keeping (Section 5). Analytical methods, sample containers, preservatives, and holding times for the sample analyses are listed in the QAPP Worksheet 19 & 30 – Sample Containers, Preservation, and Holding Times.

3.4. NAPL DELINEATION

The MDE will be notified of any initial observation of NAPL bearing soils identified in a soil boring within 2 hours of the field observation. This notification will be provided in email format to appropriate MDE representatives. Subsequent observations of NAPL bearing soils in the same immediate area will not require redundant notifications. For the purposes of this notification, NAPL bearing soil is defined as soil containing free oil (i.e., liquid oil which could potentially be drained or otherwise extracted from the soil). If minor indications of NAPL (globules or a sheen) are identified in the soil core, it will be delineated in accordance with the procedures listed below, but the initial 2-hour MDE notification will not be required (unless NAPL bearing soils are identified during the subsequent delineation). If the MDE has not previously been notified due to

the presence of NAPL bearing soils, the presence of measurable NAPL in a temporary piezometer will warrant the same 2-hour MDE notification and subsequent delineation. If the evidence of NAPL is limited to a trace detection, the potential impacts will be delineated but the initial 2-hour MDE notification will not be required.

In the event that NAPL and/or a sheen is identified in a soil boring, a temporary piezometer will be installed according to the specifications identified in SOP No. 028 – Direct Push Installation and Construction of Temporary Groundwater Sample Collection Points. ARM will immediately check the piezometer for the presence of NAPL using an oil-water interface probe in accordance with methods referenced in SOP No. 019 – Depth to Groundwater and NAPL Measurements. Each piezometer installed to delineate the presence or absence of NAPL will be checked with an oil-water interface probe immediately after installation, 48 hours after installation, and 30 days after installation. If NAPL is not detected after 30 days of equilibration time, the screening piezometer will be emptied, removed, and discarded, and the borehole will be abandoned in accordance with Maryland abandonment standards as stated in COMAR 26.04.04.34 through 36.

If measurable NAPL or sheen is present in the initial delineation piezometer, ARM will remobilize (following utility clearance) to install and inspect additional soil borings and delineation piezometers to the north, south, east, and west of the detection point at distances of approximately 25 feet. Delineation piezometers will extend into adjacent parcels (if applicable) but will not be installed off Tradepoint Atlantic property and will only be installed up to the edge of existing buildings. At each location, the continuous soil cores will be screened with a hand-held PID and inspected for evidence of NAPL, and the additional temporary piezometers will be installed to a final depth determined by ARM personnel.

Each additional piezometer installed to delineate the NAPL will be checked for the presence of product with an oil-water interface probe immediately after installation, 48 hours after installation, and again after a 30-day equilibration period. If NAPL is present within any of the piezometers, additional borings/piezometers will be added as necessary to complete the delineation. Once the MDE has given approval to abandon the delineation piezometers, each piezometer will be emptied, removed, and discarded. All boreholes will be abandoned in accordance with COMAR 26.04.04.34 through 36. A report documenting the results of the delineation, including NAPL thickness, will be submitted to the MDE.

3.5. SAMPLE DOCUMENTATION

3.5.1. Sample Numbering

Samples will be numbered in accordance with the QAPP Appendix C – Data Management Plan.

3.5.2. Sample Labels & Chain of Custody Forms

Samples will be labeled and recorded on the Chain of Custody form in accordance with methods referenced in the QAPP Worksheet 26 & 27 – Sample Handling, Custody and Disposal.

3.6. LABORATORY ANALYSIS

EAG has contracted PACE of Greensburg, Pennsylvania to perform the laboratory analysis for this project. All sample analyses to be performed are listed in **Appendix C**. The samples will be submitted for analysis with a standard turnaround time (approximately 5 workdays). The specific list of compounds and analytes that the soil samples will be analyzed for, as well as the quantitation limits and PALs, is provided in QAPP Worksheet 15 – Project Action Limits and Laboratory-Specific Detection/Quantitation Limits.

4.0 QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

All soil samples will be collected using dedicated equipment including new soil core liners and sampling kits. Each cooler temperature will be measured and documented by the laboratory upon receipt.

Quality assurance and quality control (QA/QC) samples are collected during field studies for various purposes, among which are to isolate site effects (control samples), to define background conditions (background sample), and to evaluate field/laboratory variability (spikes and blanks, trip blanks, duplicates, etc.).

The following QA/QC samples will be submitted for analysis to support the data validation:

- Trip Blank – at a rate of one per cooler with VOC samples per day
 - Soil – VOCs only
- Blind Field Duplicate – at a rate of one per twenty samples
 - Soil – VOCs, SVOCs, Metals, Oil & Grease, TPH-DRO, TPH-GRO, PCBs, hexavalent chromium, and cyanide
- Matrix Spike/Matrix Spike Duplicate – at a rate of one per twenty samples
 - Soil – VOCs, SVOCs, Metals, Oil & Grease, TPH-DRO, TPH-GRO, PCBs, and hexavalent chromium
- Field Blank and Equipment Blank – at a rate of one per twenty samples
 - Soil – VOCs, SVOCs, Metals, Oil & Grease, TPH-DRO, TPH-GRO, hexavalent chromium, and cyanide

The QA/QC samples will be collected and analyzed in accordance with the QAPP Worksheet 12 – Measurement Performance Criteria, QAPP Worksheet 20 – Field Quality Control, and QAPP Worksheet 28 – Analytical Quality Control and Corrective Action.

5.0 MANAGEMENT OF INVESTIGATION-DERIVED WASTE

All investigation derived waste (IDW) procedures will be carried out in accordance with methods referenced in the QAPP Worksheet 21 – Field SOPs, SOP No. 005 – Investigation-Derived Wastes Management.

6.0 DATA VALIDATION

For this Phase II Investigation of Parcel B11, a representative 30% of the complete analytical dataset will undergo data validation. Samples will be selected in groups according to the PACE project number assigned to each set of samples. Each PACE project number will be assigned a sequential number (from 1, 2, 3 ... n) in the order received by the laboratory until all sample groups for the Site have been received by the laboratory. The random number function will be used to randomly order the project numbers and project numbers will then be selected from top to bottom until 30% or more of the total number of samples at the Site have been identified for validation.

All data validation procedures will be carried out in accordance with the QAPP Worksheet 34 – Data Verification and Validation Inputs, QAPP Worksheet 35 – Data Verification Procedures, and QAPP Worksheet 36 – Data Validation Procedures.

7.0 REPORTING

Following the receipt of all sampling results and the designated 30% of validated data from Area B: Parcel B11, a Phase II Investigation Report will be prepared that will document the sample collection procedures and supporting rationale, and present and interpret the analytical results. Results will be presented in tabular and graphical formats as appropriate to best summarize the data for future use. The sample results will be compared against the PALs specified in the QAPP (or other direct guidance from the MDE), considering appropriate land use factors and institutional controls, to identify contaminants and exposure pathways of potential concern.

Lead, PCBs, and TPH/Oil & Grease are subject to special requirements as designated by the agencies: lead results above 10,000 mg/kg are subject to additional delineation (and possible excavation), PCB results above 50 mg/kg are subject to delineation and excavation, and TPH/Oil & Grease results above 6,200 mg/kg should be evaluated for the potential presence and mobility of NAPL in any future development planning. ARM will identify exceedances of these criteria and present recommendations for any additional site investigation activities if warranted.

As development projects continue to be proposed on the Tradepoint Atlantic property in the future, the results obtained during this Phase II investigation will be 1) incorporated into a human health SLRA within a RADWP to evaluate any potential risks to future workers in the development area; or 2) evaluated within an alternative supplemental SLRA document for areas that are not being developed. The SLRA will be conducted using standard procedures which have been approved by the MDE and USEPA, and will incorporate any additional site-specific considerations (as necessary) based on development planning.

8.0 SCHEDULE

The field activities below (including sample analysis and data validation) are planned so that they may be completed within 6 months of agency approval of this Work Plan. In addition, the investigation report will be submitted to the regulatory authorities within 2 months of completion of the field activities in accordance with these approximate timeframes:

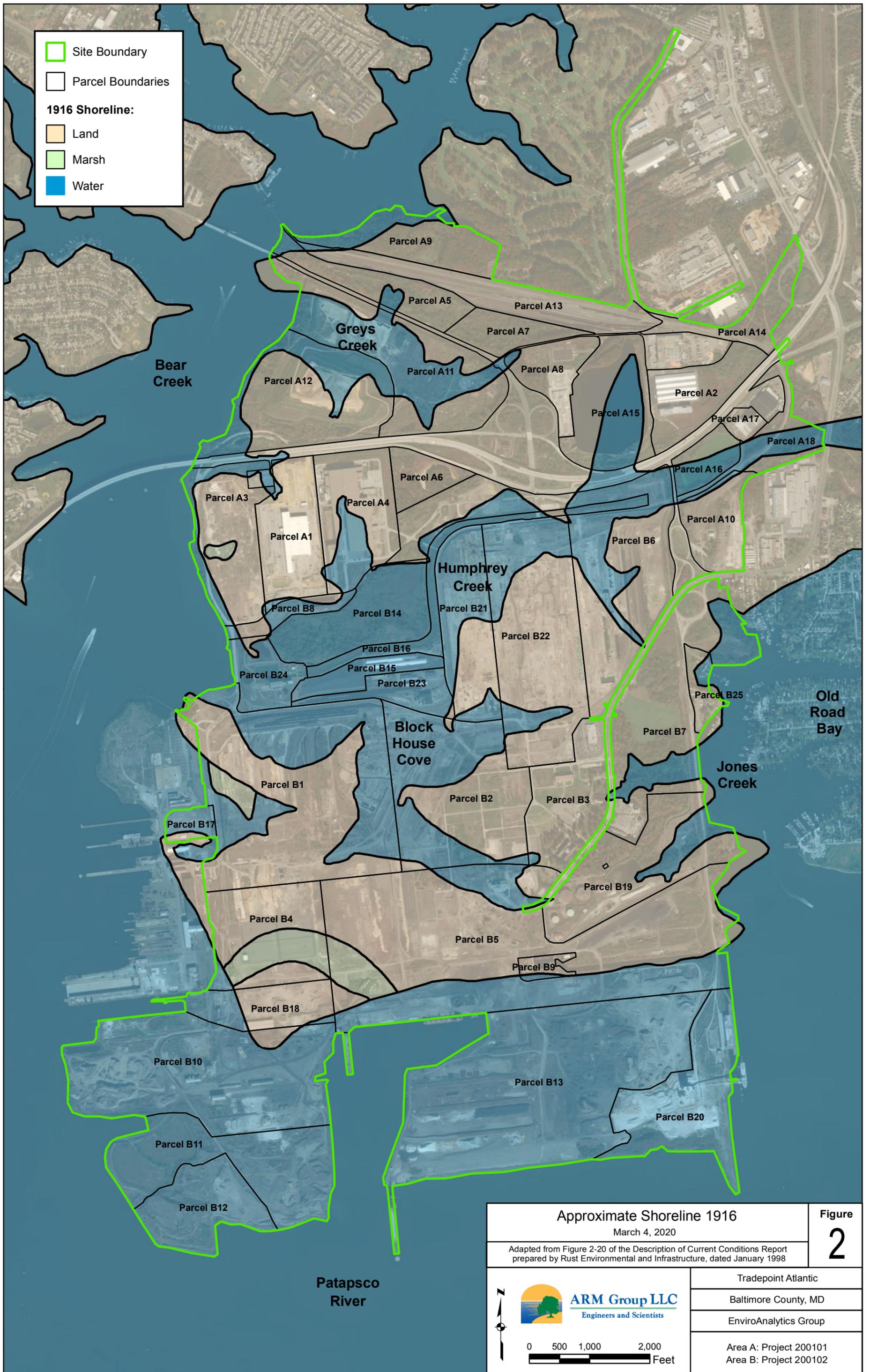
- the sample collection activities will take approximately 3 weeks to complete (including mobilization activities) once approval of the Work Plan is received;
- the sample analysis, data validation, and review is expected to require an additional 6 weeks to complete; and
- the preparation of the investigation report, including an internal QA review cycle, will require another 8 weeks.

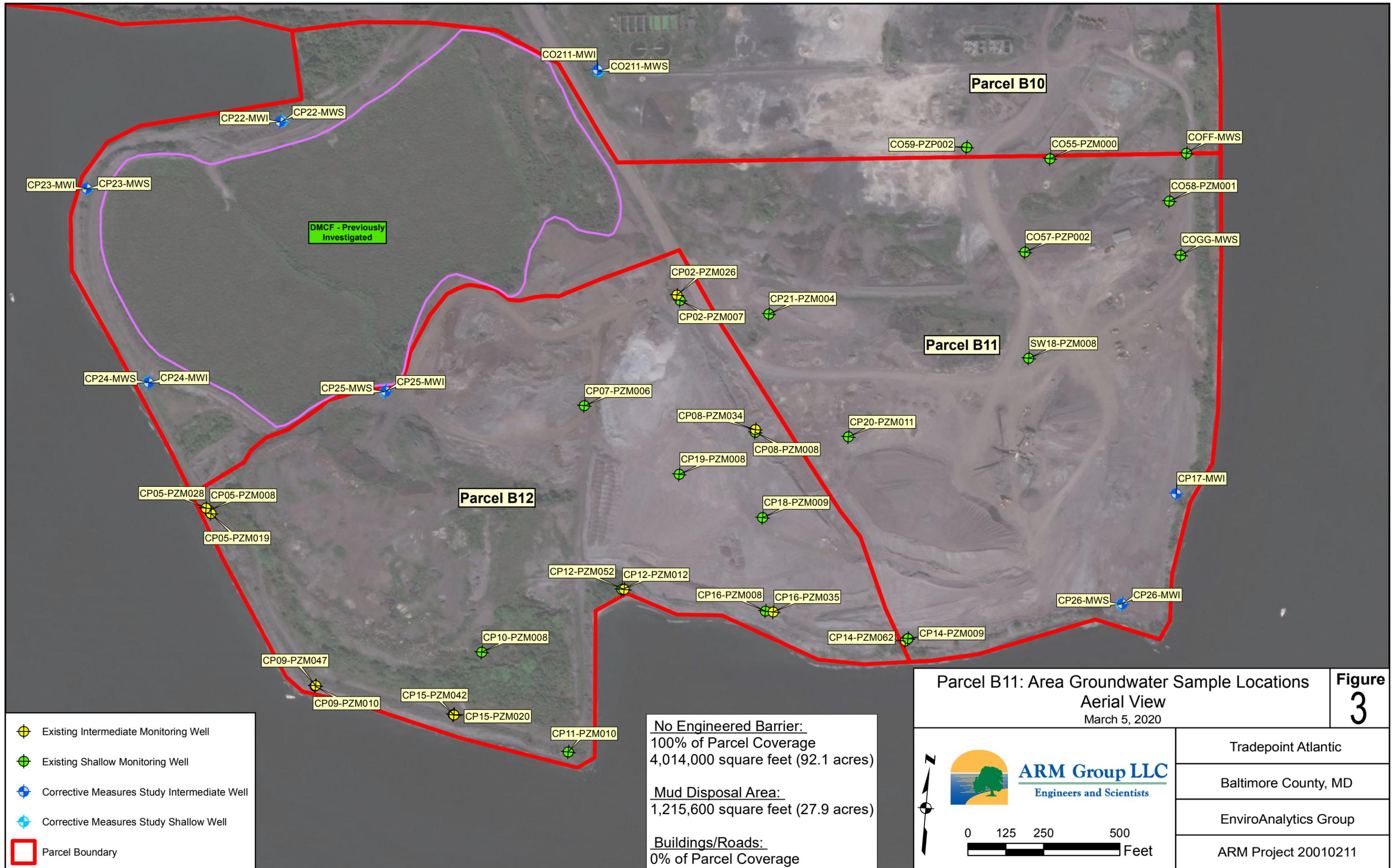
FIGURES



Site Boundary
 Parcel Boundaries
 Private Property

Tradepoint Atlantic Area A and Area B Parcels March 4, 2020		Figure 1
 	 ARM Group LLC Engineers and Scientists	Tradepoint Atlantic Baltimore County, MD EnviroAnalytics Group
	Area A: Project 200101 Area B: Project 200102	





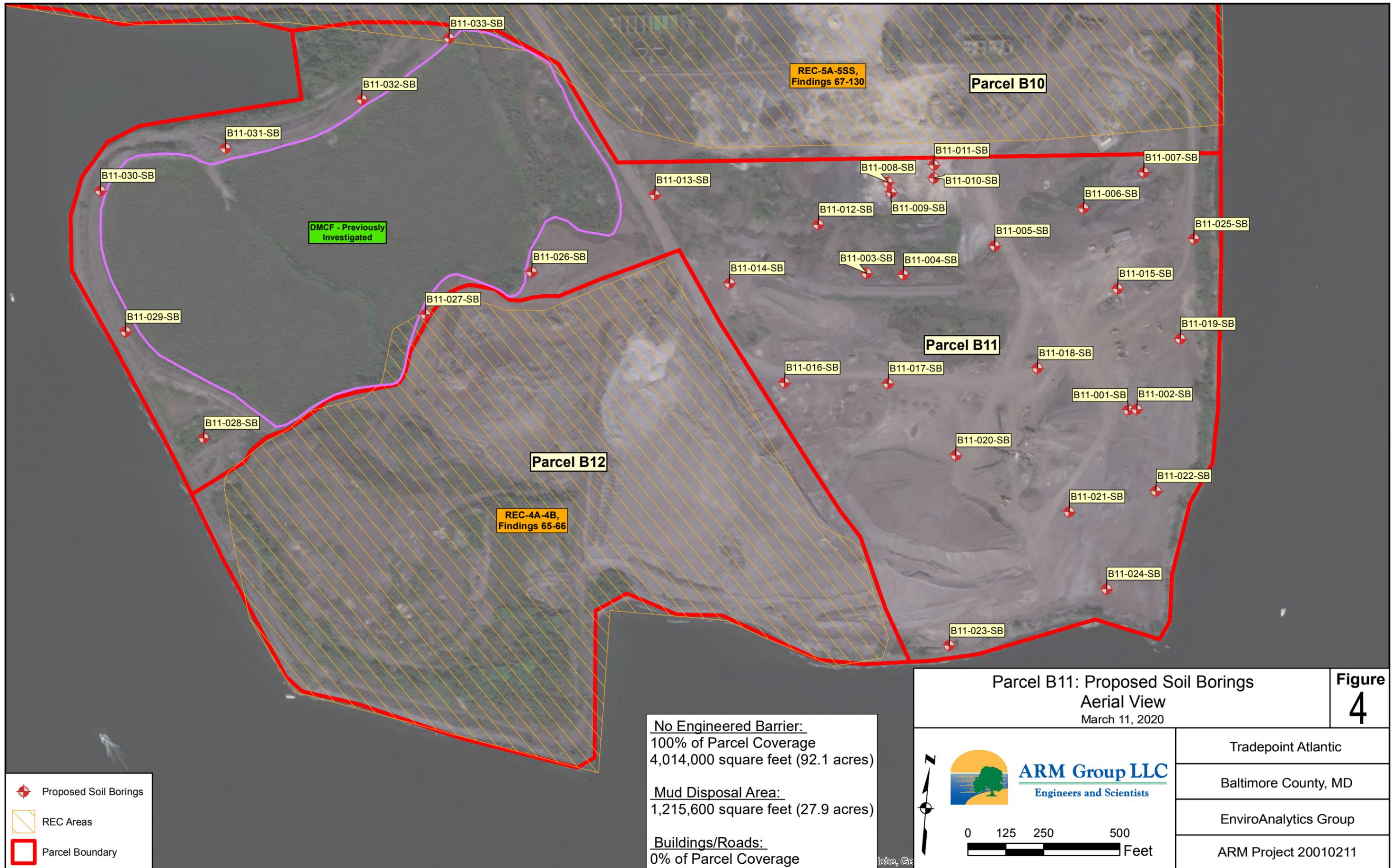
-  Existing Intermediate Monitoring Well
-  Existing Shallow Monitoring Well
-  Corrective Measures Study Intermediate Well
-  Corrective Measures Study Shallow Well
-  Parcel Boundary

No Engineered Barrier:
 100% of Parcel Coverage
 4,014,000 square feet (92.1 acres)

Mud Disposal Area:
 1,215,600 square feet (27.9 acres)

Buildings/Roads:
 0% of Parcel Coverage

Parcel B11: Area Groundwater Sample Locations Aerial View March 5, 2020		Figure 3
		Tradepoint Atlantic
		Baltimore County, MD
EnviroAnalytics Group		ARM Project 20010211



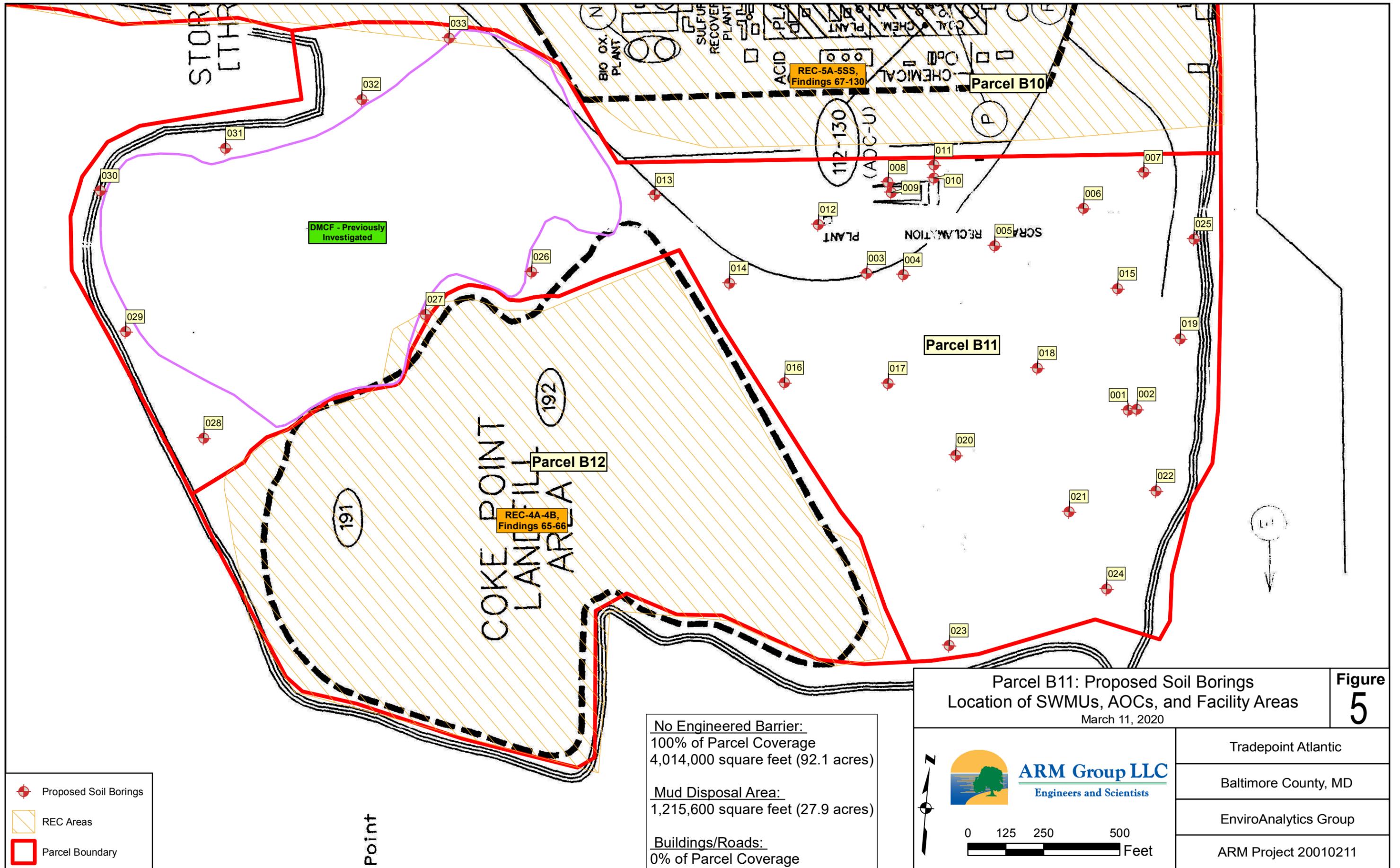
-  Proposed Soil Borings
-  REC Areas
-  Parcel Boundary

No Engineered Barrier:
 100% of Parcel Coverage
 4,014,000 square feet (92.1 acres)

Mud Disposal Area:
 1,215,600 square feet (27.9 acres)

Buildings/Roads:
 0% of Parcel Coverage

Parcel B11: Proposed Soil Borings Aerial View March 11, 2020		Figure 4
		Tradepoint Atlantic
		Baltimore County, MD
EnviroAnalytics Group		ARM Project 20010211



DMCF - Previously Investigated

REC-5A-5SS, Findings 67-130

REC-4A-4B, Findings 65-66

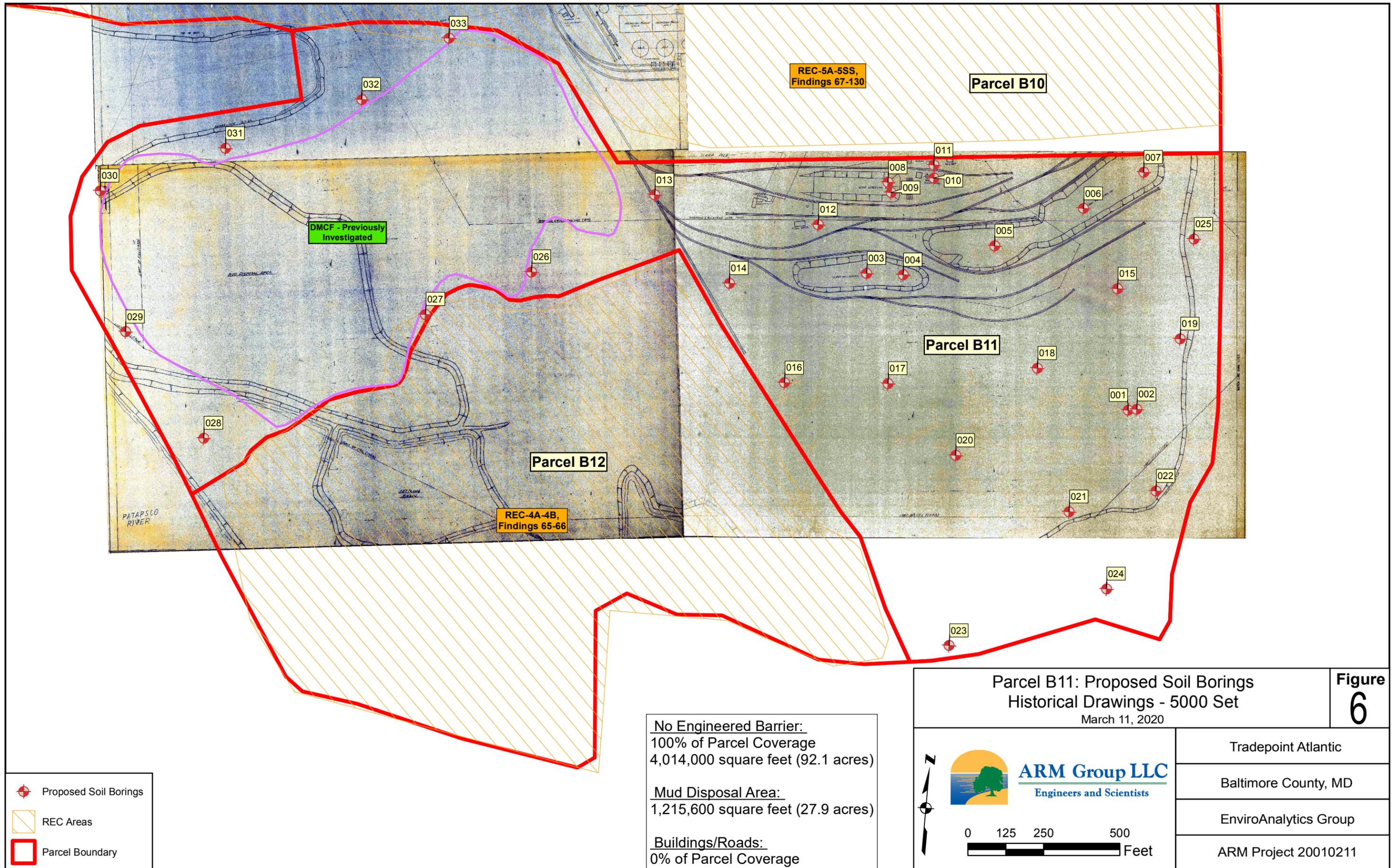
-  Proposed Soil Borings
-  REC Areas
-  Parcel Boundary

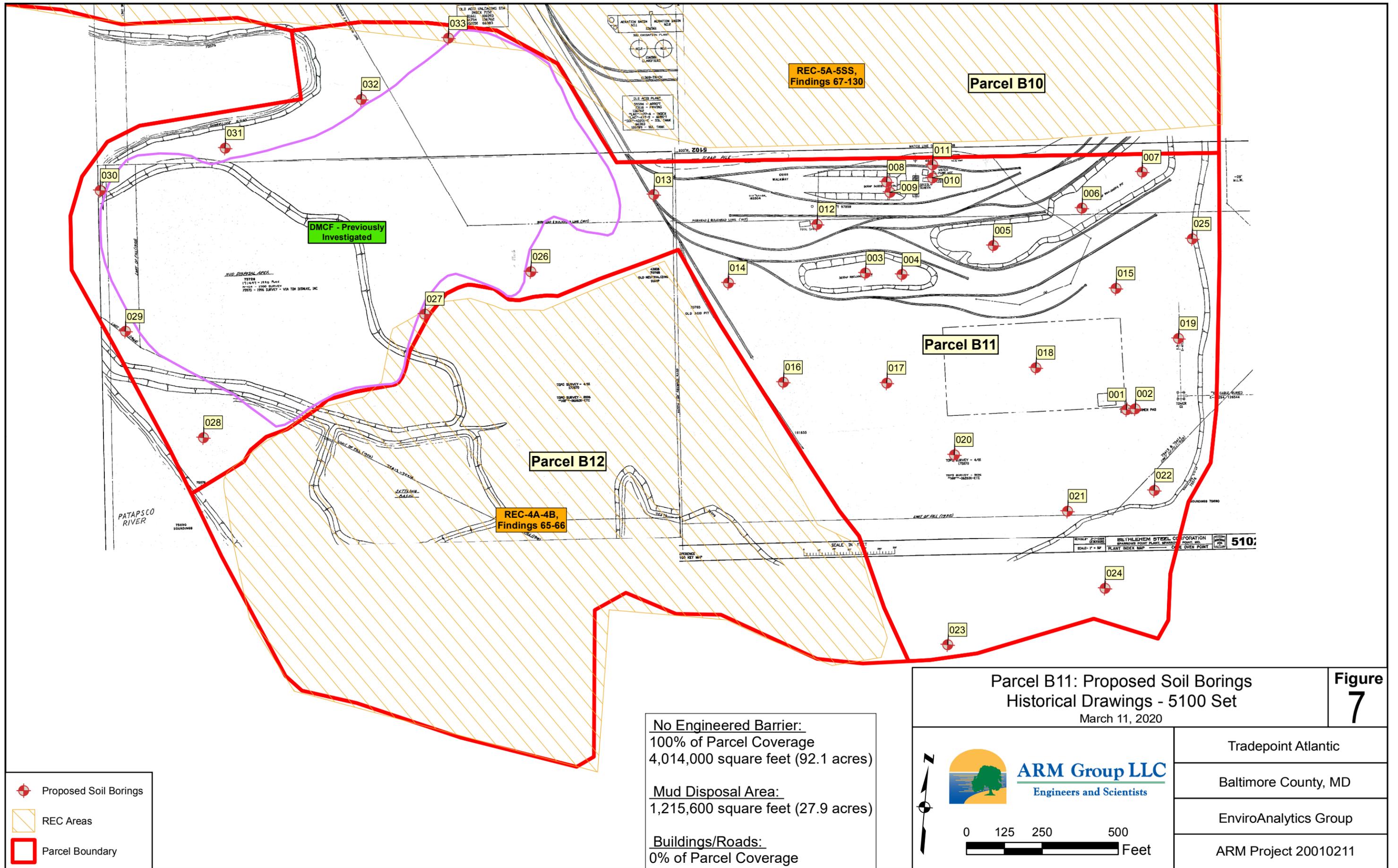
No Engineered Barrier:
 100% of Parcel Coverage
 4,014,000 square feet (92.1 acres)

Mud Disposal Area:
 1,215,600 square feet (27.9 acres)

Buildings/Roads:
 0% of Parcel Coverage

Parcel B11: Proposed Soil Borings Location of SWMUs, AOCs, and Facility Areas March 11, 2020		Figure 5
 ARM Group LLC Engineers and Scientists		
Tradepoint Atlantic Baltimore County, MD EnviroAnalytics Group ARM Project 20010211		
		





REC-5A-5SS,
Findings 67-130

Parcel B10

DMCF - Previously Investigated

Parcel B12

REC-4A-4B,
Findings 65-66

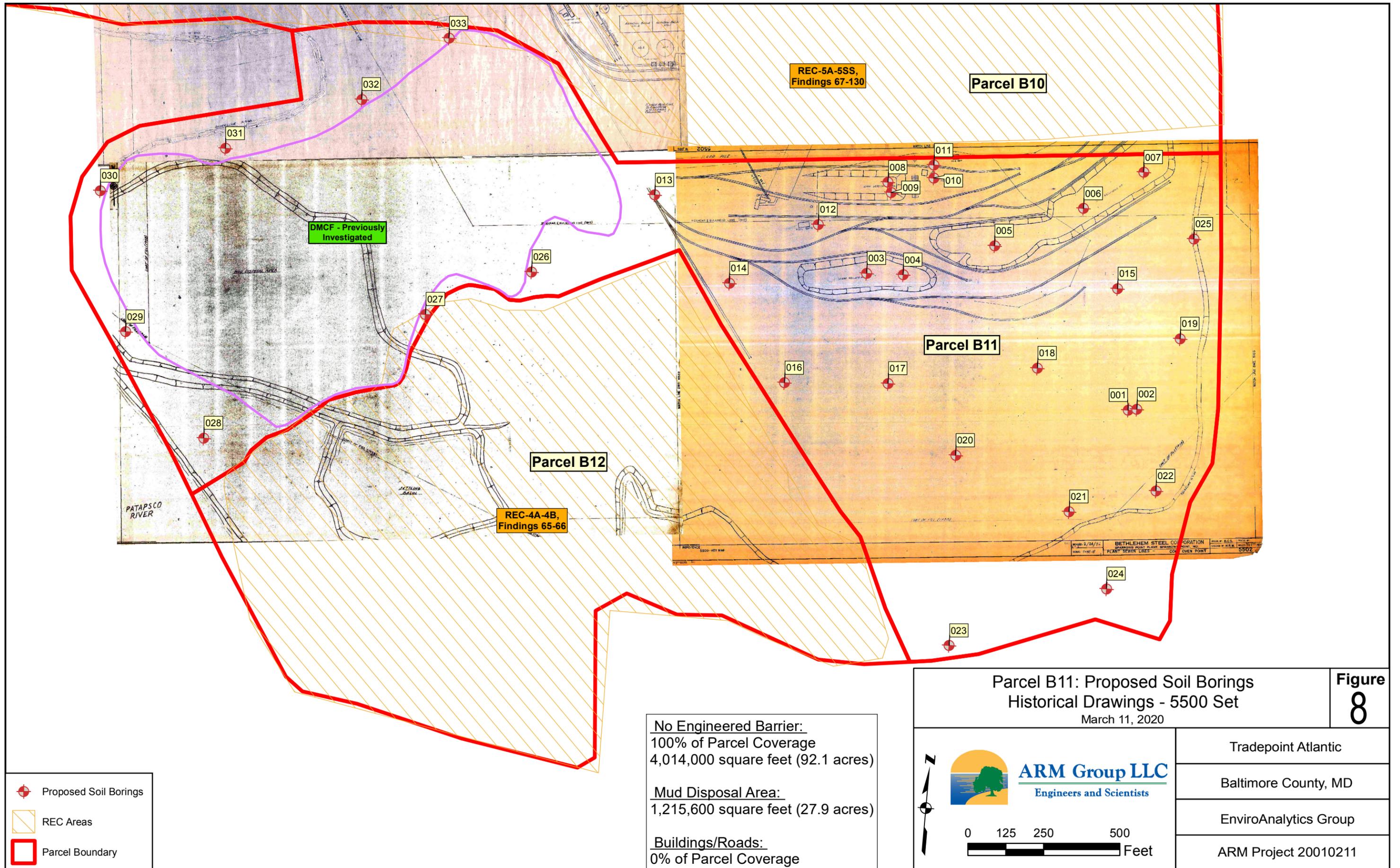
Parcel B11

Parcel B11: Proposed Soil Borings
 Historical Drawings - 5100 Set
 March 11, 2020



Tradepoint Atlantic
 Baltimore County, MD
 EnviroAnalytics Group
 ARM Project 20010211

Figure
7



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APPENDIX A

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1660 Bowman Farm Road, Suite 105

Frederick, MD 21701

301-662-2522

Fax 301-662-5575

www.hcea.com

January 8, 2018

Mr. Pete Haid
Tradeport Atlantic
1600 Sparrows Point Boulevard
Baltimore, Maryland 21219

RE: Environmental Borings
Sparrows Point Terminal
Dredged Material Containment Facility
Hillis-Carnes Project Number 17675A

Dear Mr. Haid:

Per the request of the request of Tradeport Atlantic (Client), Hillis-Carnes Engineering Associates, Inc. (HCEA) has conducted Environmental Borings at the above-referenced property (hereafter referred to as the "Site").

The Dredged Material Containment Facility (DMCF) is an approximate 26-acre area in the southwestern portion of the former Bethlehem Steel Plant at the Sparrows Point Terminal. The depth of the dredged materials across the DMCF was reportedly from the ground surface to approximately 16.5 feet below ground surface (bgs). Slag, a byproduct of the former steel manufacturing operations, was reportedly present immediately below the dredged materials.

Reportedly, there is approximately 530,000 cubic yards of dredged material in the DMCF. The purpose of the environmental sampling is to evaluate the potential innovative reuse of the material. In association with that evaluation, the Maryland Department of the Environment (MDE) has directed that one composite sample consisting of ten grab samples be collected for every 10,000 cubic yards of dredge material (i.e., 53 composite samples).

The Environmental Borings were conducted on December 5, 2017 thru December 8, 2017.

DMCF Grid Presentation

HCEA developed a grid across the approximate 26-acre DMCF to generally identify the center-point of 53 grids (each grid would be approximately 0.5 acres in size). The attached Sample Location Plan illustrates the 53 grids and the grid coordinates of the approximate center point of each grid. Further, the 53-grid DMCF has been separated into 7 areas, Area A through Area G. Each area has 7 or 8 center points.

Drilling Methodology

HCEA initially drilled 28 borings in the DMCF, specifically, 4 borings from each of the 7 Areas. These boring locations are illustrated in blue on the attached Sample Location Plan. Prior to drilling the borings, vegetation was cleared by HCEA to access each of the 28 locations. The center point of the 28 locations was then staked in the field by HCEA. In addition, HCEA contacted and coordinated with MISS UTILITY prior to drilling operations, as required by law.

At each of these 28 boring locations, the boring were drilled to a maximum depth of eighteen (18) feet or to auger refusal, whichever is encountered first. The subsurface conditions were evaluated through direct-push sampling techniques performed in accordance with industry standards. Subsurface soils were collected at 4.5-foot continuous intervals by hydraulically driving a Geoprobe^R dual tube soil sampling system. With this system, two sets of probe rods were used to retrieve continuous soil core samples from the subsurface. One set of rods (with a 2.25-inch outer diameter) was driven into the ground as an outer casing. These rods receive the driving force from the hammer and provide a sealed casing through which soil samples were recovered. The second smaller set of rods was placed inside the outer casing with a sample liner attached to the leading end of the rod string. These smaller rods hold the liner in place as the outer casing was driven to fill the liner with soil. The inner rods were then retracted to retrieve the liner containing the resulting soil column. The soil column was inspected and field screened for evidence of impact (e.g., staining, discoloration, odors and/or free liquids). In addition, the soils were screened for volatile organic compounds (VOCs) with the utilization of a calibrated photoionization detector (PID).

Sample Collection Procedure

At each of the 28 boring locations, aliquots of 3 grab samples were collected from 0 to 4.5 feet. These aliquots were placed in a laboratory-provided container and the container was placed on ice in a cooler. This pattern was repeated for the following additional depth intervals: 4.5 feet to 9.0 feet; 9.0 feet to 13.5 feet; and 13.5 feet to 18.0 feet (unless refusal was encountered). Upon completion of the fourth boring within each of the 7 Areas (Area A through Area F), 4 containers from the 0 to 4.5-foot depth interval were filled and the soil in the 4 containers represented a 12-point grab pattern for that depth interval within each Area. HCEA composited the soil in those 4 containers, resulting in a composite sample for the 0 to 4.5 foot depth interval from the 4 borings drilled in each of the 7 Areas. The compositing was conducted in a clean stainless steel mixing bowl utilizing gloved hands. This pattern was repeated for the additional depth intervals, resulting in four composite samples for each of the 7 Areas (one composite sample for each of the four depth intervals, resulting in a total of 28 composite samples).

Investigatory Derived Wastes

Investigation Derived Wastes (IDW) generated during this project included wastewater generated during decontamination procedures (i.e., of the drilling equipment and stainless steel bowl) and soil cuttings from the drilling activity. The wastewater was discharged onto the ground surface. The soil cuttings were utilized to backfill the boreholes and/or were spread out on the ground surface at the boring locations.

Quality Assurance/Quality Controls

The outer rods and the “shoe” of the leading rod was cleaned prior to use and between each sample location. In addition, at each sample interval, a clean/disposable sample liner was utilized to collect the soil samples.

The stainless steel mixing bowl was cleaned prior to use and between boring locations to prevent cross-contamination. In addition, at each sampling location a pair of clean, disposable gloves was utilized to collect and containerize the sample for laboratory analysis.

Samples collected for environmental laboratory analyses were placed in clean laboratory-provided containers with Teflon-lined lids, labeled, placed on ice in a cooler, and delivered promptly to the laboratory. All appropriate chain-of-custody procedures were utilized to track the samples from

collection to final disposition at the laboratory. The samples were analyzed using EPA methodology and within EPA's holding times.

Laboratory Testing

The following laboratory analyses/test methods were requested by the MDE for this evaluation:

- pH by EPA Method 150.1;
- Priority Pollutant Metals (13 metals) by EPA Method 6020A;
- Manganese by EPA Method 6020;
- Calcium by EPA Method 6020;
- PCBs by EPA Method 8082A; and
- Polynuclear Aromatic Hydrocarbons (PAHs) by EPA Method 8270C.
- Total Petroleum Hydrocarbons–Diesel Range Organics (20% of the composite samples)

Findings

The results of the borings indicate that the dredged material is generally present to a depth of approximately 16 feet bgs and slag was present immediately below the dredged material. Slag was encountered at relatively shallower depths in Area F, ranging between 9.5 bgs at F3 and 15 feet bgs at F6. Copies of the Boring Logs are attached to this letter.

With the exception of three borings (D6, E1, and E5), elevated PID readings were not detected in the boring intervals. With regard to these three borings, relatively strong odors were detected between 10 feet bgs and the bottoms of the borings. In addition, elevated PID readings (high of 34 ppm at D6, 26.6 ppm at E1, and 16 ppm at E5) were detected at these boring intervals.

The analytical laboratory has provided the results of the laboratory tests for the composite samples to HCEA in an Excel spreadsheet and an Excel spreadsheet is being provided to the MDE under separate cover. It is HCEA's understanding that Excel spreadsheets will be reviewed by the MDE to determine if there appears to be "homogeneity" across the DMCF; therefore, negating the need to collect soil samples from the remaining 25 grids/borings. Copies of the completed Chain-of-Custody Forms and the Laboratory Reports (pdf version) for the soil samples are attached to this letter.

Limitations

Our professional services have been performed, our findings obtained, and our conclusions prepared in accordance with customary principles and practices in the field of environmental science. This report does not warrant against future operations or conditions, nor does it warrant against conditions present of a type or at locations not investigated.

This report was prepared for the sole use of our Client and the MDE. The scope of services performed for this assessment may not be appropriate to satisfy the needs of other users, and use or re-use of this document or the findings or conclusions is at the risk of said user.

The samples delivered to the analytical laboratory for this project will be retained by the laboratory for thirty (30) days from the date that the samples were received by the laboratory. After 30 days, the laboratory will dispose of the samples. Therefore, if analyses in addition to those presented in this proposal are desired, a request for the additional analyses must be made prior to the

expiration of the laboratory's 30-day sample retention policy. Further, although the laboratory retains samples for 30 days, it should be noted that regulatory "holding times" for certain laboratory analyses are less than 30 days.

If you have any questions in regard to this report, please feel free to contact me at (410) 880-4788.

Very truly yours,

HILLIS-CARNES ENGINEERING ASSOCIATES, INC.

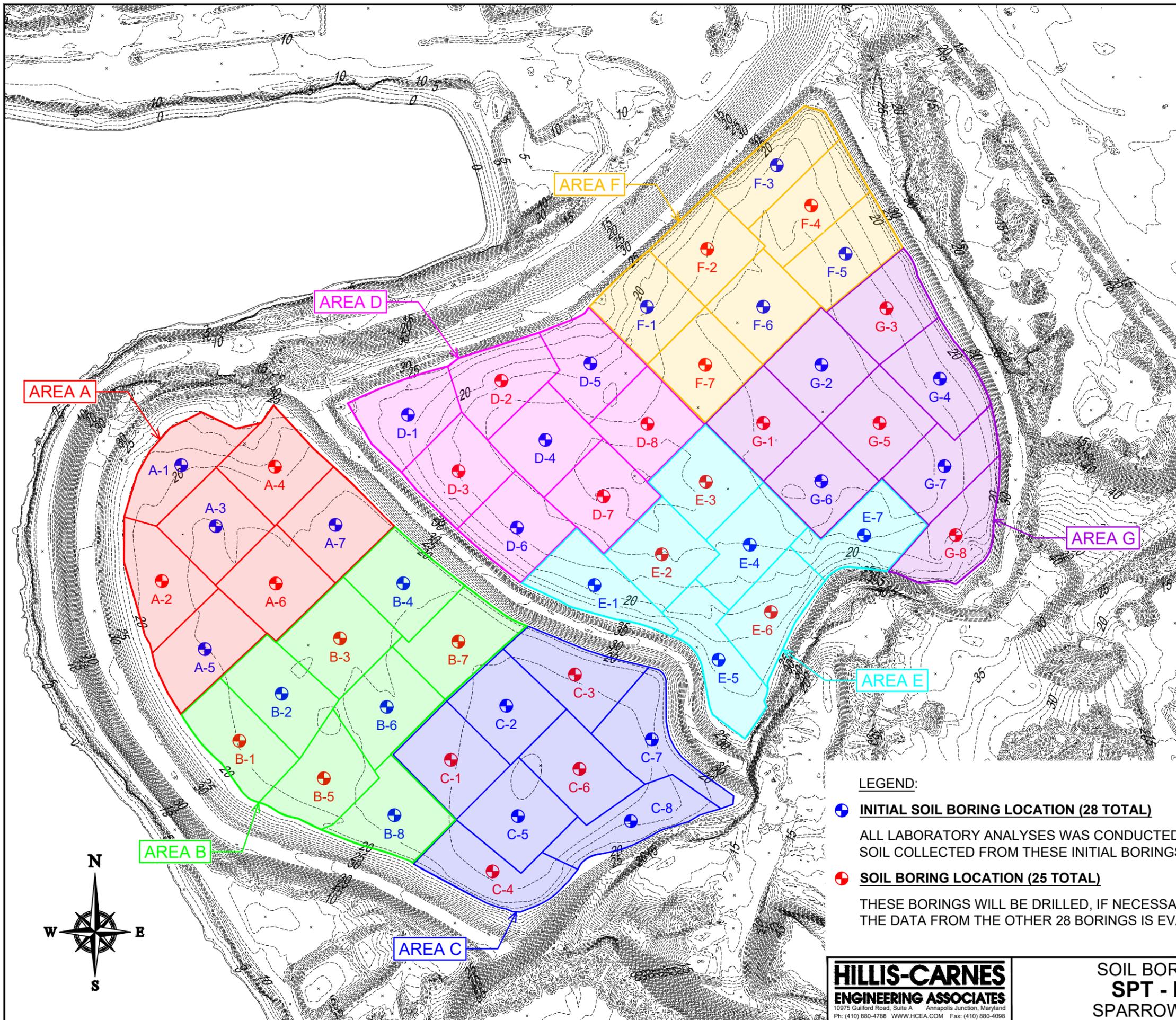


Keith M. Progin
Senior Environmental Project Manager



Gina L. Galimberti, REM
Assistant Vice President, Environmental Services Manager

Attachement Sample Location Plan
 Boring Logs
 Chain-of-Custody Forms and Laboratory Reports



AREA 'A' BORING COORDINATES	
A-1	1454637.81, 561076.97
A-2	1454607.82, 560898.00
A-3	1454691.33, 560982.72
A-4	1454782.95, 561074.54
A-5	1454674.43, 560793.00
A-6	1454784.50, 560894.26
A-7	1454876.73, 560984.73

AREA 'B' BORING COORDINATES	
B-1	1454728.01, 560651.32
B-2	1454793.28, 560724.08
B-3	1454883.62, 560809.57
B-4	1454981.55, 560894.44
B-5	1454858.63, 560593.19
B-6	1454956.17, 560703.61
B-7	1455066.93, 560804.55
B-8	1454967.75, 560536.11

AREA 'C' BORING COORDINATES	
C-1	1455055.40, 560621.86
C-2	1455141.05, 560705.29
C-3	1455247.31, 560753.52
C-4	1455119.74, 560449.41
C-5	1455159.09, 560534.81
C-6	1455254.32, 560607.77
C-7	1455366.19, 560653.43
C-8	1455333.79, 560527.26

AREA 'D' BORING COORDINATES	
D-1	1454988.85, 561154.87
D-2	1455133.38, 561207.42
D-3	1455067.03, 561067.71
D-4	1455201.60, 561116.11
D-5	1455271.34, 561234.17
D-6	1455157.70, 560980.56
D-7	1455291.34, 561028.90
D-8	1455359.46, 561140.90

AREA 'E' BORING COORDINATES	
E-1	1455277.68, 560891.81
E-2	1455381.88, 560939.19
E-3	1455449.95, 561051.23
E-4	1455517.94, 560954.00
E-5	1455469.64, 560776.41
E-6	1455550.69, 560850.17
E-7	1455694.97, 560968.79

AREA 'F' BORING COORDINATES	
F-1	1455358.91, 561321.52
F-2	1455451.97, 561411.17
F-3	1455559.80, 561540.40
F-4	1455613.09, 561478.18
F-5	1455666.17, 561403.68
F-6	1455538.86, 561321.92
F-7	1455448.92, 561231.98

AREA 'G' BORING COORDINATES	
G-1	1455538.86, 561142.04
G-2	1455628.81, 561231.98
G-3	1455729.44, 561319.20
G-4	1455812.21, 561210.57
G-5	1455718.75, 561142.04
G-6	1455628.72, 561052.28
G-7	1455819.34, 561075.66
G-8	1455836.83, 560969.13

LEGEND:

INITIAL SOIL BORING LOCATION (28 TOTAL)

ALL LABORATORY ANALYSES WAS CONDUCTED ON THE SOIL COLLECTED FROM THESE INITIAL BORINGS

SOIL BORING LOCATION (25 TOTAL)

THESE BORINGS WILL BE DRILLED, IF NECESSARY, AFTER THE DATA FROM THE OTHER 28 BORINGS IS EVALUATED

HILLIS-CARNES
ENGINEERING ASSOCIATES
 10975 Guilford Road, Suite A Annapolis Junction, Maryland
 Ph: (410) 880-4788 WWW.HCEA.COM Fax: (410) 880-4098

SOIL BORING LOCATION PLAN
SPT - DMCF BORINGS
 SPARROWS POINT, MARYLAND

PROJECT NO:	17675A	DESIGN BY:	NB
DATE:	12/19/17	DRAWN BY:	AM
SCALE:	1" = 150'	CHECKED BY:	GLG
SHEET:	1		

BORING LOG

Boring No.: A1

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/5/17
LOCATION Area A	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-2		NO RECOVERY		
2-3		SILT - BROWN	0	DRY-TO-MOIST
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-6		NO RECOVERY		
6-9		SILT/CLAY-BROWN	0	DRY-TO-MOIST
		*HIT REFUSAL AT 12', MOVED BORING		
9-10		NO RECOVERY		
10-11		SILT/CLAY - BROWN	0	DRY-TO-MOIST
11-12.5		CLAY/SILT - DARK GREY/BLACK	0	MOIST
12.5-13.5		SILT/CLAY - DARK BROWN	0	WET
13.5-14.5		NO RECOVERY		
14.5-15		SILT/SAND - DARK BROWN	0	WET
15-17.5		CLAY - GREY	0	MOIST
17.8-18		CLAY - DARK GREY	0	MOIST

Notes: MINOR PETROLEUM ODOR AT DARK GREY/BLACK SOILS

BORING LOG

Boring No.:A3

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/5/17
LOCATION Area A	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-6		NO RECOVERY		
6-9		SILT/CLAY - BROWN	0	DRY-TO-MOIST
9-10		NO RECOVERY		
10-10.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
10.5-13.5		CLAY - DARK GREY/BLACK	0	MOIST
13.5-15.5		NO RECOVERY		
15.5-17		CLAY - DARK GREY/BLACK	0	MOIST

Notes: HCEA ENCOUNTERED REFUSAL AT APPROXIMATELY 17'
MINOR PETROLEUM ODOR AT DARK GREY/BLACK SOILS

BORING LOG

Boring No.: A5

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/5/17
LOCATION Area A	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-8		NO RECOVERY		
8-9		SILT/CLAY - BROWN	0	DRY-TO-MOIST
9-10		NO RECOVERY		
10-12.5		CLAY - DARK GREY/BLACK	0	MOIST
12.5-13.5		CLAY - GREY	0	MOIST
13.5-16.5		NO RECOVERY		
16.5-17		CLAY - DARK GREY/BLACK	0	MOIST

Notes: HCEA ENCOUNTERED REFUSAL AT APPROXIMATELY 17'
MINOR PETROLEUM ODOR AT DARK GREY/BLACK SOILS

BORING LOG

Boring No.: A7

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/5/17
LOCATION Area A	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT - BROWN	0	DRY-TO-MOIST
4.5-6		NO RECOVERY		
6-8.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
8.5-9		CLAY/SILT - BROWN	0	MOIST
9-9.5		NO RECOVERY		
9.5-10.5		CLAY/SILT - DARK GREY	0	MOIST
10.5-13.5		SILT - DARK BROWN	0	WET
13.5-15.5		NO RECOVERY		
15.5-16.5		CLAY - DARK GREY/BLACK	0	MOIST

Notes: HCEA ENCOUNTERED REFUSAL AT APPROXIMATELY 16.5'
MINOR PETROLEUM ODOR AT DARK GREY/BLACK SOILS

BORING LOG

Boring No.: B2

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/5/17
LOCATION Area B	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-6		NO RECOVERY		
6-7.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
7.5-9		CLAY - DARK GREY/BLACK	0	MOIST
9-10		NO RECOVERY		
10-13.5		CLAY - DARK GREY/BLACK	0	MOIST
13.5-15.5		NO RECOVERY		
15.5-17		CLAY - BLACK	0	MOIST

Notes: HCEA ENCOUNTERED REFUSAL AT APPROXIMATELY 17'
MINOR PETROLEUM ODOR AT DARK GREY/BLACK SOILS

BORING LOG

Boring No.: B4

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/5/17
LOCATION Area B	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-5.5		NO RECOVERY		
5.5-7.5		CLAY/SILT - BROWN	0	DRY-TO-MOIST
7.5-9		CLAY - DARK GREY/BLACK	0	MOIST
9-9.5		NO RECOVERY		
9.5-10.5		CLAY - DARK GREY/BLACK	0	WET
10.5-12.5		SILT - DARK BROWN	0	WET
12.5-13.5		CLAY - DARK GREY/BLACK	0	MOIST
13.5-14.5		NO RECOVERY		
14.5-18		CLAY - DARK GREY/BLACK	0	MOIST

Notes: MINOR PETROLEUM ODOR AT DARK GREY/BLACK SOILS

BORING LOG

Boring No.: B6

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/5/17
LOCATION Area B	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-6		NO RECOVERY		
6-7.5		CLAY/SILT - BROWN	0	DRY-TO-MOIST
7.5-9		CLAY - DARK GREY/BLACK	0	MOIST
9-10		NO RECOVERY		
10-11.5		CLAY - GREY	0	MOIST
11.5-13.5		CLAY - DARK GREY/BLACK	0	MOIST
13.5-15		NO RECOVERY		
15-17		CLAY - DARK GREY/BLACK	0	WET

Notes: HCEA ENCOUNTERED REFUSAL AT APPROXIMATELY 17'
MINOR PETROLEUM ODOR AT DARK GREY/BLACK SOILS

BORING LOG

Boring No.: B8

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/5/17
LOCATION Area B	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-5.5		NO RECOVERY		
5.5-7.5		CLAY/SILT - BROWN	0	MOIST
7.5-9		CLAY - BROWN/BLACK	0	MOIST
9-10		NO RECOVERY		
10-13.5		CLAY - DARK GREY/BLACK	0	MOIST
15-16		NO RECOVERY		
16-17.5		CLAY - BLACK	0	MOIST

Notes: HCEA ENCOUNTERED REFUSAL AT APPROXIMATELY 17.5'
MINOR PETROLEUM ODOR AT DARK GREY/BLACK SOILS

BORING LOG

Boring No.: C2

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/6/17
LOCATION Area C	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-5.5		NO RECOVERY	0	DRY-TO-MOIST
5.5-6.5		CLAY/SILT - BROWN	0	DRY-TO-MOIST
6.5-9		CLAY - DARK GREY/BLACK	0	DRY-TO-MOIST
9-9.5		NO RECOVERY		
9.5-12.5		CLAY - BLACK	0	MOIST
12.5-13.5		CLAY - DARK GREY/BLACK	0	MOIST
13.5-15.5		NO RECOVERY		
15.5-16		CLAY - BLACK	0	MOIST

Notes: HCEA ENCOUNTERED REFUSAL AT APPROXIMATELY 16'
MINOR PETROLEUM ODOR AT DARK GREY/BLACK SOILS

BORING LOG

Boring No.: C5

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/6/17
LOCATION Area C	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-5.5		NO RECOVERY		
5.5-6.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
6.5-9		CLAY - DARK GREY/BLACK	0	MOIST
9-9.5		NO RECOVERY		
9.5-12		CLAY - DARK GREY	0	MOIST
12-13.5		CLAY - DARK GREY/BLACK	0	MOIST
13.5-15		CLAY - BLACK	0	MOIST
15-18		SLAG	0	WET

Notes: MINOR PETROLEUM ODOR AT DARK GREY/BLACK SOILS

BORING LOG

Boring No.: C7

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/6/17
LOCATION Area C	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-5.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
5.5-8		CLAY - DARK GREY	0	MOIST
8-9		CLAY/SAND/ROCK - DARK GREY/BLACK	0	WET
9-9.5		NO RECOVERY		
9.5-13.5		CLAY - BLACK	0	MOIST
13.5-15		NO RECOVERY		
15-16		CLAY - BLACK	0	MOIST

Notes: HCEA ENCOUNTERED REFUSAL AT APPROXIMATELY 16'
MINOR PETROLEUM ODOR AT DARK GREY/BLACK SOILS

BORING LOG

Boring No.: C8

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/6/17
LOCATION Area C	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-5.5		NO RECOVERY		
5.5-7		SILT/CLAY - BROWN	0	DRY-TO-MOIST
7-8		CLAY/SILT - DARK GREY/BLACK	0	DRY-TO-MOIST
8-9		CLAY - DARK GREY/BLACK	0	DRY-TO-MOIST
9-10		NO RECOVERY		
10-13.5		CLAY - DARK GREY/BLACK	0	MOIST
13.5-15		NO RECOVERY		
15-17		CLAY - BLACK	0	MOIST

Notes: HCEA ENCOUNTERED REFUSAL AT APPROXIMATELY 17'
MINOR PETROLEUM ODOR AT DARK GREY/BLACK SOILS

BORING LOG

Boring No.: D1

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/6/17
LOCATION Area D	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-7		NO RECOVERY		
7-9		SILT/CLAY - BROWN	0	DRY-TO-MOIST
		HCEA ENCOUNTERED REFUSL AT 9', HCEA OFFSET AND ENCOUNTERED REFUALS AT 11'. THERE WAS NO RECOVERY AT 9'-11'		

Notes: HCEA ENCOUNTERED REFUSAL AT 9' AND THEN AGAIN AT 11'
AFTER OFFSET

BORING LOG

Boring No.: D4

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/6/17
LOCATION Area D	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-5.5		NO RECOVERY		
5.5-6.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
6.5-9		CLAY - BLACK	0	MOIST
9-13.5		CLAY-BLACK	0	MOIST
13.5-14.5		NO RECOVERY		
14.5-16.5		CLAY-BLACK	0	MOIST
16.5-18		SLAG	0	WET

Notes: MINOR PETROLEUM ODOR AT BLACK SOILS

BORING LOG

Boring No.: D5

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/6/17
LOCATION Area D	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-5		NO RECOVERY		
5-8		SILT/CLAY - BROWN	0	DRY-TO-MOIST
8-9		CLAY - BLACK	0	MOIST
9-13.5		CLAY - BLACK	0	MOIST
13.5-18		NO RECOVERY-PRESUMABLY SLAG		

Notes: HCEA OBSERVED MINOR ODOR IN THE BLACK SOIL

BORING LOG

Boring No.: D6

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/6/17
LOCATION Area D	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-5.5		NO RECOVERY		
5.5-8		SILT/CLAY - BROWN	0	DRY-TO-MOIST
8-9		CLAY - DARK GREY/BLACK	0	DRY-TO-MOIST
9-10		CLAY - DARK GREY	0	MOIST
10-13.5		SILT/SAND - BROWN/GREY	34 (12')	MOIST
13.5-14.5		SILT/SAND - GREY	26 (14.5')	MOIST
14.5-18		CLAY BLACK	10 (17.5')	MOIST

Notes: HCEA OBSERVED A STRONG ODOR IN THE 10'-18' RANGE

BORING LOG

Boring No.: E1

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/8/17
LOCATION Area E	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT CLAY - BROWN	0	DRY-TO-MOIST
4.5-6		NO RECOVERY		
6-9		CLAY/SILT - BROWN	0	DRY-TO MOIST
9-10.5		CLAY/SILT DARK GREY/BLACK	0	MOIST
10.5-13.5		SLAG/ROCK/CLAY - DARK GREY/BLACK	16 (12.5')	WET
13.5-14.5		NO RECOVERY		
14.5-15		SLAG/ROCK	16	WET
15-16		CLAY - BLACK	26.6 (15')	WET

Notes: HCEA ENCOUNTERED REFUSL AT APPROXIMATELY 16'
STRONG PETROLEUM ODOR AT 10.5-16'

BORING LOG

Boring No.: E4

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/8/17
LOCATION Area E	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT CLAY - BROWN	0	DRY-TO-MOIST
4.5-5.5		NO RECOVERY		
5.5-8		CLAY/SILT - BROWN	0	DRY-TO MOIST
8-9		CLAY - DARK GREY/BLACK	0	DRY-TO-MOIST
9-13.5		CLAY - BLACK	0	MOIST
13.5-15.5		NO RECOVERY		
15.5-16.5		CLAY/ROCK - DARK GREY/BLACK	0	MOIST
16.5-18		SLAG/ROCK	0	WET

Notes: MINOR PETROLEUM ODOR AT DARK GREY/BLACK SOILS

BORING LOG

Boring No.: E5

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/8/17
LOCATION Area E	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT CLAY - BROWN	0	DRY-TO-MOIST
4.5-5.5		NO RECOVERY		
5.5-9		CLAY/SILT - BROWN	0	DRY-TO MOIST
9-10		NO RECOVERY		
10-12		SAND - BEIGE/BROWN	0	MOIST
12-13		SAND/SLAG - BLACK	0	WET
13-13.5		SLAG/ROCK	16 (12.5')	WET
13.5-14.5		NO RECOVERY		
14.5-16		CLAY/SLAG/ROCK - BLACK	10 (14.5-16)	WET

Notes: HCEA ENCOUNTERED REFUSL AT APPROXIMATELY 16'
STRONG PETROLEUM ODOR AT 13-16'

BORING LOG

Boring No.: E7

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/8/17
LOCATION Area E	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT CLAY - BROWN	0	DRY-TO-MOIST
4.5-6		NO RECOVERY		
6-7		CLAY/SILT - BROWN	0	DRY-TO MOIST
7-9		CLAY - DARK GREY/BLACK	0	DRY-TO-MOIST
9-10		NO RECVOERY		
10-13.5		CLAY - BLACK	0	MOIST
13.5-14.5		NO RECOVERY		
14.5-17		CLAY - BLACK	0	MOIST
17-18		SLAG/ROCK	0	WET

Notes: MINOR PETROLEUM ODORS WERE OBSERVED AT DARK GREY/BLACK SOILS

BORING LOG

Boring No.:F1

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/7/17
LOCATION Area F	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-5		NO RECOVERY		
5-7.5		CLAY/SILT - BROWN	0	DRY-TO-MOIST
7.5-9		CLAY - DARK GREY/BLACK	0	MOIST
9-13.5		CLAY - BLACK	0	MOIST
13.5-14		REFUSAL AT 14. OFFSET AND HIT REFUSAL AGAIN AT 14.		

Notes: HCEA ENCOUNTERED REFUSAL AT 14'
MINOR PETROLEUM ODOR AT DARK GREY/BLACK SOILS

BORING LOG

Boring No.:F3

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/7/17
LOCATION Area F	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-5.5		NO RECOVERY		
5.5-7.5		CLAY/SILT - BROWN	0	DRY-TO-MOIST
7.5-9		CLAY - DARK GREY/BLACK	0	MOIST
9.5-9.5		NO RECOVERY		
9.5-11.5		CLAY/STONE/SAND/SLAG - BLACK	0	WET
11.5-13.5		CLAY/SAND - BLACK	2	MOIST
13.5-14.5		NO RECOVERY		
14.5-16.5		SLAG	0	WET

Notes: HCEA ENCOUNTERED REFUSAL AT 16.5'
MINOR PETROLEUM ODOR AT DARK GREY/BLACK SOILS

BORING LOG

Boring No.:F5

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/7/17
LOCATION Area F	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-5.5		NO RECOVERY		
5.5-7		CLAY/SILT - BROWN	0	DRY-TO-MOIST
7-9		CLAY - DARK GREY/BLACK	0	MOIST
9-11		NO RECOVERY		
11-11.5		CLAY - DARK GREY/BLACK	0	MOIST
11.5-13.5		SLAG	0	MOIST
13.5-16		NO RECOVERY		
16-17		SLAG	0	MOIST

Notes: HCEA ENCOUNTERED REFUSAL AT 17'
MINOR PETROLEUM ODOR AT DARK GREY/BLACK SOILS

BORING LOG

Boring No.: F6

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/7/17
LOCATION Area F	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-5.5		NO RECOVERY		
5.5-7		CLAY/SILT - BROWN	0	MOIST
7-9		CLAY - DARK GREY/BLACK	0	MOIST
9-10		NO RECOVERY		
10-13.5		CLAY - BLACK	0	MOIST
13.5-15		NO RECOVERY	0	MOIST
15-18		SLAG	0	WET

Notes: MINOR PETROLEUM ODOR AT DARK GREY/BLACK SOILS

BORING LOG

Boring No.: G2

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/7/17
LOCATION Area G	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-5.5		CLAY/SILT - BROWN	0	MOIST
5.5-9		CLAY - DARK GREY/BLACK	0	MOIST
9-13.5		CLAY - BLACK	0	MOIST
13.5-14		SLAG	0	WET

Notes: HCEA ENCOUNTERED REFUSAL AT APPROXIMATELY 14'
MINOR PETROLEUM ODOR AT DARK GREY/BLACK SOILS

BORING LOG

Boring No.: G4

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/7/17
LOCATION Area G	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-7		NO RECOVERY HIT REFUSAL AT 7', OFFSET		
4.5-8		CLAY/SILT - BROWN HIT REFUSAL AT 8'	0	DRY-TO-MOIST

Notes: HCEA ENCOUNTERED REFUSAL AT APPROXIMATELY 8'

BORING LOG

Boring No.: G6

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/7/17
LOCATION Area G	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-5.5		NO RECOVERY		
5.5-7		CLAY/SILT - BROWN	0	DRY-TO-MOIST
7-9		CLAY - DARK GREY/BLACK	0	MOIST
9-10		NO RECOVERY		
10-13.5		CLAY-BLACK	0	MOIST
13.5-15		NO RECOVERY		
15-16		CLAY - BLACK	0	MOIST
16-18		SLAG	0	WET

Notes: MINOR PETROLEUM ODOR AT DARK GREY/BLACK SOILS

BORING LOG

Boring No.: G7

PROJECT Sparrows Point Terminal - Dredge Material Containment Facility	PROJECT NO. 17675A
CLIENT Trade Point Atlantic	DATE 12/7/17
LOCATION Area G	ELEV.
EXCAVATION METHOD Geoprobe - Direct Push	LOGGER Sean Harkins

ELEVATION/ DEPTH	SOIL SYMBOLS AND SAMPLERS			MOISTURE
	GRAPHIC	DESCRIPTION	PID Reading ppm	
0-3		NO RECOVERY		
3-4.5		SILT/CLAY - BROWN	0	DRY-TO-MOIST
4.5-5.5		NO RECOVERY		
5.5-6.5		CLAY/SILT - BROWN	0	DRY-TO-MOIST
6.5-9		CLAY - DARK GREY/BLACK	0	MOIST
9-13.5		CLAY - BLACK	0	MOIST
13.5-14.5		NO RECOVERY		
14.5-15.5		CLAY - BLACK	0	MOIST
15.5-18		SLAG	0	WET

Notes: MINOR PETROLEUM ODOR AT DARK GREY/BLACK SOILS

Analytical Report for
Hillis Carnes Engineering Associates
Certificate of Analysis No.: 17120521

Project Manager: Sean Harkins

Project Name : SPT-DMCF

Project ID : 17675A



December 12, 2017
Phase Separation Science, Inc.
6630 Baltimore National Pike
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PHASE SEPARATION SCIENCE, INC.



December 12, 2017

Sean Harkins
Hillis Carnes Engineering Associates
10975 Guilford Road, Ste. A
Annapolis Junction, MD 20701

Reference: PSS Work Order(s) No: **17120521**
Project Name: SPT-DMCF

Project ID.: 17675A

Dear Sean Harkins :

This report includes the analytical results from the analyses performed on the samples received under the project name referenced above and identified with the Phase Separation Science (PSS) Work Order(s) numbered **17120521**.

All work reported herein has been performed in accordance with current NELAP standards, referenced methodologies, PSS Standard Operating Procedures and the PSS Quality Assurance Manual unless otherwise noted in the Case Narrative Summary. PSS is limited in liability to the actual cost of the sample analysis done.

PSS reserves the right to return any unused samples, extracts or related solutions. Otherwise, the samples are scheduled for disposal, without any further notice, on January 9, 2018, with the exception of air canisters which are cleaned immediately following analysis. This includes any samples that were received with a request to be held but lacked a specific hold period. It is your responsibility to provide a written request defining a specific disposal date if additional storage is required. Upon receipt, the request will be acknowledged by PSS, thus extending the storage period.

This report shall not be reproduced except in full, without the written approval of an authorized PSS representative. A copy of this report will be retained by PSS for at least 5 years, after which time it will be disposed of without further notice, unless prior arrangements have been made.

We thank you for selecting Phase Separation Science, Inc. to serve your analytical needs. If you have any questions concerning this report, do not hesitate to contact us at 410-747-8770 or info@phaseonline.com.

Sincerely,

Cathy Thompson
QA Officer



Sample Summary

Client Name: Hillis Carnes Engineering Associates
Project Name: SPT-DMCF

Work Order Number(s): 17120521

Project ID: 17675A

The following samples were received under chain of custody by Phase Separation Science (PSS) on 12/05/2017 at 03:55 pm

Lab Sample Id	Sample Id	Matrix	Date/Time Collected
17120521-001	A 0-1.5	SOIL	12/05/17 10:30
17120521-002	A 4.5-9	SOIL	12/05/17 10:40
17120521-003	A 9-13.5	SOIL	12/05/17 10:50
17120521-004	A 13.5-18	SOIL	12/05/17 11:00
17120521-005	B 0-4.5	SOIL	12/05/17 14:50
17120521-006	B 4.5-9	SOIL	12/05/17 15:00
17120521-007	B 9-13.5	SOIL	12/05/17 15:10
17120521-008	B 13.5-18	SOIL	12/05/17 15:20

Please reference the Chain of Custody and Sample Receipt Checklist for specific container counts and preservatives. Any sample conditions not in compliance with sample acceptance criteria are described in Case Narrative Summary.

Notes:

1. The presence of a common laboratory contaminant such as methylene chloride may be considered a possible laboratory artifact. Where observed, appropriate consideration of data should be taken.
2. Unless otherwise noted in the case narrative, results are reported on a dry weight basis with the exception of pH, flashpoint, moisture, and paint filter test.
3. Drinking water samples collected for the purpose of compliance with SDWA may not be suitable for their intended use unless collected by a certified sampler [COMAR 26.08.05.07.C.2].
4. The analyses of 1,2-dibromo-3-chloropropane (DBCP) and 1,2-dibromoethane (EDB) by EPA 524.2 and calcium, magnesium, sodium and iron by EPA 200.8 are not currently promulgated for use in testing to meet the Safe Drinking Water Act and as such cannot be used for compliance purposes. The listings of the current promulgated methods for testing in compliance with the Safe Drinking Water Act can be found in the 40 CFR part 141.1, for the primary drinking water contaminants, and part 141.3, for the secondary drinking water contaminants.
5. Sample prepared under EPA 3550C with concentrations greater than 20 mg/Kg should employ the microtip extraction procedure if required to meet data quality objectives.
6. The analysis of acrolein by EPA 624 must be analyzed within three days of sampling unless pH is adjusted to 4-5 units [40 CFR part 136.3(e)].
7. Method 180.1, The Determination of Turbidity by Nephelometry, recommends samples over 40 NTU be diluted until the turbidity falls below 40 units. Routine samples over 40 NTU may not be diluted as long as the data quality objectives are not affected.
8. Alkalinity results analyzed by EPA 310.2 that are reported by dilution are estimated and are not in compliance with method requirements.

Standard Flags/Abbreviations:

- B** A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
- C** Results Pending Final Confirmation.
- E** The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
- Fail** The result exceeds the regulatory level for Toxicity Characteristic (TCLP) as cited in 40 CFR 261.24 Table 1.
- J** The target analyte was positively identified below the reporting limit but greater than the MDL.
- MDL** This is the Laboratory Method Detection Limit which is equivalent to the Limit of Detection (LOD). The LOD is an estimate of the minimum amount of a substance that an analytical process can reliably detect. This value will remain constant across multiple similar instrumentation and among different analysts. An LOD is analyte and matrix specific.
- ND** Not Detected at or above the reporting limit.
- RL** PSS Reporting Limit.
- U** Not detected.

Certifications:

NELAP Certifications: PA 68-03330, VA 460156
State Certifications: MD 179, WV 303
Regulated Soil Permit: P330-12-00268
NSWC USCG Accepted Laboratory
LDBE MWAA LD1997-0041-2015



Sample Summary

Client Name: Hillis Carnes Engineering Associates

Project Name: SPT-DMCF

Work Order Number(s): 17120521

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 FAX 410-788-8723

PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120521

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 12, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: A 0-1.5	Date/Time Sampled: 12/05/2017 10:30	PSS Sample ID: 17120521-001
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	% Solids: 56

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	4.4		1	12/06/17	12/07/17 17:25	1064
Arsenic	28	mg/kg	0.88		1	12/06/17	12/07/17 17:25	1064
Beryllium	ND	mg/kg	4.4		1	12/06/17	12/07/17 17:25	1064
Cadmium	ND	mg/kg	4.4		1	12/06/17	12/07/17 17:25	1064
Calcium	750	mg/kg	88		1	12/06/17	12/07/17 17:25	1064
Chromium	140	mg/kg	4.4		1	12/06/17	12/07/17 17:25	1064
Copper	88	mg/kg	4.4		1	12/06/17	12/07/17 17:25	1064
Lead	170	mg/kg	4.4		1	12/06/17	12/07/17 17:25	1064
Manganese	1,100	mg/kg	44		10	12/06/17	12/08/17 20:10	1064
Mercury	0.37	mg/kg	0.18		1	12/06/17	12/07/17 17:25	1064
Nickel	36	mg/kg	4.4		1	12/06/17	12/07/17 17:25	1064
Selenium	ND	mg/kg	4.4		1	12/06/17	12/07/17 17:25	1064
Silver	ND	mg/kg	4.4		1	12/06/17	12/07/17 17:25	1064
Thallium	ND	mg/kg	3.5		1	12/06/17	12/07/17 17:25	1064
Zinc	270	mg/kg	18		1	12/06/17	12/07/17 17:25	1064

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C

Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.088		1	12/05/17	12/06/17 12:07	1029
PCB-1221	ND	mg/kg	0.088		1	12/05/17	12/06/17 12:07	1029
PCB-1232	ND	mg/kg	0.088		1	12/05/17	12/06/17 12:07	1029
PCB-1242	ND	mg/kg	0.088		1	12/05/17	12/06/17 12:07	1029
PCB-1248	ND	mg/kg	0.088		1	12/05/17	12/06/17 12:07	1029
PCB-1254	ND	mg/kg	0.088		1	12/05/17	12/06/17 12:07	1029
PCB-1260	ND	mg/kg	0.088		1	12/05/17	12/06/17 12:07	1029

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CERTIFICATE OF ANALYSIS

No: 17120521

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 12, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: A 0-1.5	Date/Time Sampled: 12/05/2017 10:30	PSS Sample ID: 17120521-001
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	% Solids: 56

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	30		1	12/08/17	12/11/17 19:29	1055
Acenaphthylene	ND	ug/kg	30		1	12/08/17	12/11/17 19:29	1055
Anthracene	ND	ug/kg	30		1	12/08/17	12/11/17 19:29	1055
Benzo(a)anthracene	60	ug/kg	30		1	12/08/17	12/11/17 19:29	1055
Benzo(a)pyrene	65	ug/kg	30		1	12/08/17	12/11/17 19:29	1055
Benzo(b)fluoranthene	61	ug/kg	30		1	12/08/17	12/11/17 19:29	1055
Benzo(g,h,i)perylene	37	ug/kg	30		1	12/08/17	12/11/17 19:29	1055
Benzo(k)fluoranthene	55	ug/kg	30		1	12/08/17	12/11/17 19:29	1055
Chrysene	71	ug/kg	30		1	12/08/17	12/11/17 19:29	1055
Dibenz(a,h)Anthracene	ND	ug/kg	30		1	12/08/17	12/11/17 19:29	1055
Fluoranthene	70	ug/kg	30		1	12/08/17	12/11/17 19:29	1055
Fluorene	ND	ug/kg	30		1	12/08/17	12/11/17 19:29	1055
Indeno(1,2,3-c,d)Pyrene	48	ug/kg	30		1	12/08/17	12/11/17 19:29	1055
2-Methylnaphthalene	ND	ug/kg	30		1	12/08/17	12/11/17 19:29	1055
Naphthalene	68	ug/kg	30		1	12/08/17	12/11/17 19:29	1055
Phenanthrene	ND	ug/kg	30		1	12/08/17	12/11/17 19:29	1055
Pyrene	58	ug/kg	30		1	12/08/17	12/11/17 19:29	1055

Sample ID: A 0-1.5	Date/Time Sampled: 12/05/2017 10:30	PSS Sample ID: 17120521-001
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	4.0	SU			1	12/06/17	12/06/17 12:17	1061

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120521

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 12, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: A 4.5-9	Date/Time Sampled: 12/05/2017 10:40	PSS Sample ID: 17120521-002
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	% Solids: 61

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	3.8		1	12/06/17	12/07/17 17:29	1064
Arsenic	23	mg/kg	0.75		1	12/06/17	12/07/17 17:29	1064
Beryllium	ND	mg/kg	3.8		1	12/06/17	12/07/17 17:29	1064
Cadmium	ND	mg/kg	3.8		1	12/06/17	12/07/17 17:29	1064
Calcium	960	mg/kg	75		1	12/06/17	12/07/17 17:29	1064
Chromium	140	mg/kg	3.8		1	12/06/17	12/07/17 17:29	1064
Copper	86	mg/kg	3.8		1	12/06/17	12/07/17 17:29	1064
Lead	120	mg/kg	3.8		1	12/06/17	12/07/17 17:29	1064
Manganese	930	mg/kg	38		10	12/06/17	12/08/17 20:13	1064
Mercury	0.32	mg/kg	0.15		1	12/06/17	12/07/17 17:29	1064
Nickel	34	mg/kg	3.8		1	12/06/17	12/07/17 17:29	1064
Selenium	ND	mg/kg	3.8		1	12/06/17	12/07/17 17:29	1064
Silver	ND	mg/kg	3.8		1	12/06/17	12/07/17 17:29	1064
Thallium	ND	mg/kg	3.0		1	12/06/17	12/07/17 17:29	1064
Zinc	300	mg/kg	15		1	12/06/17	12/07/17 17:29	1064

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C

Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.084		1	12/05/17	12/06/17 12:35	1029
PCB-1221	ND	mg/kg	0.084		1	12/05/17	12/06/17 12:35	1029
PCB-1232	ND	mg/kg	0.084		1	12/05/17	12/06/17 12:35	1029
PCB-1242	ND	mg/kg	0.084		1	12/05/17	12/06/17 12:35	1029
PCB-1248	ND	mg/kg	0.084		1	12/05/17	12/06/17 12:35	1029
PCB-1254	ND	mg/kg	0.084		1	12/05/17	12/06/17 12:35	1029
PCB-1260	ND	mg/kg	0.084		1	12/05/17	12/06/17 12:35	1029

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120521

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 12, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: A 4.5-9	Date/Time Sampled: 12/05/2017 10:40	PSS Sample ID: 17120521-002
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	% Solids: 61

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	27		1	12/08/17	12/11/17 21:19	1055
Acenaphthylene	ND	ug/kg	27		1	12/08/17	12/11/17 21:19	1055
Anthracene	ND	ug/kg	27		1	12/08/17	12/11/17 21:19	1055
Benzo(a)anthracene	120	ug/kg	27		1	12/08/17	12/11/17 21:19	1055
Benzo(a)pyrene	150	ug/kg	27		1	12/08/17	12/11/17 21:19	1055
Benzo(b)fluoranthene	150	ug/kg	27		1	12/08/17	12/11/17 21:19	1055
Benzo(g,h,i)perylene	94	ug/kg	27		1	12/08/17	12/11/17 21:19	1055
Benzo(k)fluoranthene	120	ug/kg	27		1	12/08/17	12/11/17 21:19	1055
Chrysene	140	ug/kg	27		1	12/08/17	12/11/17 21:19	1055
Dibenz(a,h)Anthracene	ND	ug/kg	27		1	12/08/17	12/11/17 21:19	1055
Fluoranthene	150	ug/kg	27		1	12/08/17	12/11/17 21:19	1055
Fluorene	ND	ug/kg	27		1	12/08/17	12/11/17 21:19	1055
Indeno(1,2,3-c,d)Pyrene	120	ug/kg	27		1	12/08/17	12/11/17 21:19	1055
2-Methylnaphthalene	ND	ug/kg	27		1	12/08/17	12/11/17 21:19	1055
Naphthalene	170	ug/kg	27		1	12/08/17	12/11/17 21:19	1055
Phenanthrene	35	ug/kg	27		1	12/08/17	12/11/17 21:19	1055
Pyrene	140	ug/kg	27		1	12/08/17	12/11/17 21:19	1055

Sample ID: A 4.5-9	Date/Time Sampled: 12/05/2017 10:40	PSS Sample ID: 17120521-002
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	3.8	SU			1	12/06/17	12/06/17 12:17	1061

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120521

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 12, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: A 9-13.5	Date/Time Sampled: 12/05/2017 10:50	PSS Sample ID: 17120521-003
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	% Solids: 56

PP Metals plus Calcium and Manganese Analytical Method: SW-846 6020 A Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	3.1		1	12/06/17	12/07/17 17:33	1064
Arsenic	25	mg/kg	0.62		1	12/06/17	12/07/17 17:33	1064
Beryllium	ND	mg/kg	3.1		1	12/06/17	12/07/17 17:33	1064
Cadmium	ND	mg/kg	3.1		1	12/06/17	12/07/17 17:33	1064
Calcium	2,200	mg/kg	62		1	12/06/17	12/07/17 17:33	1064
Chromium	160	mg/kg	3.1		1	12/06/17	12/07/17 17:33	1064
Copper	110	mg/kg	3.1		1	12/06/17	12/07/17 17:33	1064
Lead	320	mg/kg	3.1		1	12/06/17	12/07/17 17:33	1064
Manganese	2,400	mg/kg	31		10	12/06/17	12/08/17 20:17	1064
Mercury	0.66	mg/kg	0.13		1	12/06/17	12/07/17 17:33	1064
Nickel	40	mg/kg	3.1		1	12/06/17	12/07/17 17:33	1064
Selenium	3.7	mg/kg	3.1		1	12/06/17	12/07/17 17:33	1064
Silver	ND	mg/kg	3.1		1	12/06/17	12/07/17 17:33	1064
Thallium	ND	mg/kg	2.5		1	12/06/17	12/07/17 17:33	1064
Zinc	970	mg/kg	13		1	12/06/17	12/07/17 17:33	1064

Total Petroleum Hydrocarbons - DRO Analytical Method: SW-846 8015 C Preparation Method: SW3550C

HF - Heavier fuel/oil pattern observed in sample.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
TPH-DRO (Diesel Range Organics)	35	mg/kg	18	HF	1	12/06/17	12/07/17 12:38	1045

Polychlorinated Biphenyls Analytical Method: SW-846 8082 A Preparation Method: SW3550C
 Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.089		1	12/05/17	12/06/17 13:03	1029
PCB-1221	ND	mg/kg	0.089		1	12/05/17	12/06/17 13:03	1029
PCB-1232	ND	mg/kg	0.089		1	12/05/17	12/06/17 13:03	1029
PCB-1242	ND	mg/kg	0.089		1	12/05/17	12/06/17 13:03	1029
PCB-1248	ND	mg/kg	0.089		1	12/05/17	12/06/17 13:03	1029
PCB-1254	ND	mg/kg	0.089		1	12/05/17	12/06/17 13:03	1029
PCB-1260	ND	mg/kg	0.089		1	12/05/17	12/06/17 13:03	1029

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120521

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 12, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: A 9-13.5	Date/Time Sampled: 12/05/2017 10:50	PSS Sample ID: 17120521-003
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	% Solids: 56

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	30		1	12/08/17	12/11/17 22:14	1055
Acenaphthylene	ND	ug/kg	30		1	12/08/17	12/11/17 22:14	1055
Anthracene	37	ug/kg	30		1	12/08/17	12/11/17 22:14	1055
Benzo(a)anthracene	200	ug/kg	30		1	12/08/17	12/11/17 22:14	1055
Benzo(a)pyrene	340	ug/kg	30		1	12/08/17	12/11/17 22:14	1055
Benzo(b)fluoranthene	290	ug/kg	30		1	12/08/17	12/11/17 22:14	1055
Benzo(g,h,i)perylene	230	ug/kg	30		1	12/08/17	12/11/17 22:14	1055
Benzo(k)fluoranthene	250	ug/kg	30		1	12/08/17	12/11/17 22:14	1055
Chrysene	270	ug/kg	30		1	12/08/17	12/11/17 22:14	1055
Dibenz(a,h)Anthracene	45	ug/kg	30		1	12/08/17	12/11/17 22:14	1055
Fluoranthene	200	ug/kg	30		1	12/08/17	12/11/17 22:14	1055
Fluorene	ND	ug/kg	30		1	12/08/17	12/11/17 22:14	1055
Indeno(1,2,3-c,d)Pyrene	260	ug/kg	30		1	12/08/17	12/11/17 22:14	1055
2-Methylnaphthalene	34	ug/kg	30		1	12/08/17	12/11/17 22:14	1055
Naphthalene	280	ug/kg	30		1	12/08/17	12/11/17 22:14	1055
Phenanthrene	79	ug/kg	30		1	12/08/17	12/11/17 22:14	1055
Pyrene	230	ug/kg	30		1	12/08/17	12/11/17 22:14	1055

Sample ID: A 9-13.5	Date/Time Sampled: 12/05/2017 10:50	PSS Sample ID: 17120521-003
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	6.6	SU			1	12/06/17	12/06/17 12:17	1061

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120521

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 12, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: A 13.5-18	Date/Time Sampled: 12/05/2017 11:00	PSS Sample ID: 17120521-004
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	% Solids: 53

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	3.9		1	12/06/17	12/07/17 17:56	1064
Arsenic	31	mg/kg	0.79		1	12/06/17	12/07/17 17:56	1064
Beryllium	ND	mg/kg	3.9		1	12/06/17	12/07/17 17:56	1064
Cadmium	ND	mg/kg	3.9		1	12/06/17	12/07/17 17:56	1064
Calcium	2,400	mg/kg	79		1	12/06/17	12/07/17 17:56	1064
Chromium	170	mg/kg	3.9		1	12/06/17	12/07/17 17:56	1064
Copper	130	mg/kg	3.9		1	12/06/17	12/07/17 17:56	1064
Lead	160	mg/kg	3.9		1	12/06/17	12/07/17 17:56	1064
Manganese	2,100	mg/kg	39		10	12/06/17	12/08/17 20:21	1064
Mercury	0.39	mg/kg	0.16		1	12/06/17	12/07/17 17:56	1064
Nickel	42	mg/kg	3.9		1	12/06/17	12/07/17 17:56	1064
Selenium	4.1	mg/kg	3.9		1	12/06/17	12/07/17 17:56	1064
Silver	ND	mg/kg	3.9		1	12/06/17	12/07/17 17:56	1064
Thallium	ND	mg/kg	3.1		1	12/06/17	12/07/17 17:56	1064
Zinc	560	mg/kg	16		1	12/06/17	12/07/17 17:56	1064

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C

Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.098		1	12/05/17	12/06/17 13:32	1029
PCB-1221	ND	mg/kg	0.098		1	12/05/17	12/06/17 13:32	1029
PCB-1232	ND	mg/kg	0.098		1	12/05/17	12/06/17 13:32	1029
PCB-1242	ND	mg/kg	0.098		1	12/05/17	12/06/17 13:32	1029
PCB-1248	ND	mg/kg	0.098		1	12/05/17	12/06/17 13:32	1029
PCB-1254	ND	mg/kg	0.098		1	12/05/17	12/06/17 13:32	1029
PCB-1260	ND	mg/kg	0.098		1	12/05/17	12/06/17 13:32	1029

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120521

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 12, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: A 13.5-18	Date/Time Sampled: 12/05/2017 11:00	PSS Sample ID: 17120521-004
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	% Solids: 53

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	31		1	12/08/17	12/11/17 20:24	1055
Acenaphthylene	ND	ug/kg	31		1	12/08/17	12/11/17 20:24	1055
Anthracene	ND	ug/kg	31		1	12/08/17	12/11/17 20:24	1055
Benzo(a)anthracene	71	ug/kg	31		1	12/08/17	12/11/17 20:24	1055
Benzo(a)pyrene	95	ug/kg	31		1	12/08/17	12/11/17 20:24	1055
Benzo(b)fluoranthene	74	ug/kg	31		1	12/08/17	12/11/17 20:24	1055
Benzo(g,h,i)perylene	55	ug/kg	31		1	12/08/17	12/11/17 20:24	1055
Benzo(k)fluoranthene	81	ug/kg	31		1	12/08/17	12/11/17 20:24	1055
Chrysene	85	ug/kg	31		1	12/08/17	12/11/17 20:24	1055
Dibenz(a,h)Anthracene	ND	ug/kg	31		1	12/08/17	12/11/17 20:24	1055
Fluoranthene	89	ug/kg	31		1	12/08/17	12/11/17 20:24	1055
Fluorene	ND	ug/kg	31		1	12/08/17	12/11/17 20:24	1055
Indeno(1,2,3-c,d)Pyrene	70	ug/kg	31		1	12/08/17	12/11/17 20:24	1055
2-Methylnaphthalene	ND	ug/kg	31		1	12/08/17	12/11/17 20:24	1055
Naphthalene	200	ug/kg	31		1	12/08/17	12/11/17 20:24	1055
Phenanthrene	ND	ug/kg	31		1	12/08/17	12/11/17 20:24	1055
Pyrene	83	ug/kg	31		1	12/08/17	12/11/17 20:24	1055

Sample ID: A 13.5-18	Date/Time Sampled: 12/05/2017 11:00	PSS Sample ID: 17120521-004
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	6.7	SU			1	12/06/17	12/06/17 12:17	1061

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CERTIFICATE OF ANALYSIS

No: 17120521

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 12, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: B 0-4.5	Date/Time Sampled: 12/05/2017 14:50	PSS Sample ID: 17120521-005
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	% Solids: 62

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	3.9		1	12/06/17	12/07/17 18:00	1064
Arsenic	22	mg/kg	0.78		1	12/06/17	12/07/17 18:00	1064
Beryllium	ND	mg/kg	3.9		1	12/06/17	12/07/17 18:00	1064
Cadmium	ND	mg/kg	3.9		1	12/06/17	12/07/17 18:00	1064
Calcium	630	mg/kg	78		1	12/06/17	12/07/17 18:00	1064
Chromium	140	mg/kg	3.9		1	12/06/17	12/07/17 18:00	1064
Copper	86	mg/kg	3.9		1	12/06/17	12/07/17 18:00	1064
Lead	130	mg/kg	3.9		1	12/06/17	12/07/17 18:00	1064
Manganese	1,500	mg/kg	39		10	12/06/17	12/08/17 20:25	1064
Mercury	0.36	mg/kg	0.16		1	12/06/17	12/07/17 18:00	1064
Nickel	37	mg/kg	3.9		1	12/06/17	12/07/17 18:00	1064
Selenium	ND	mg/kg	3.9		1	12/06/17	12/07/17 18:00	1064
Silver	ND	mg/kg	3.9		1	12/06/17	12/07/17 18:00	1064
Thallium	ND	mg/kg	3.1		1	12/06/17	12/07/17 18:00	1064
Zinc	280	mg/kg	16		1	12/06/17	12/07/17 18:00	1064

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C
 Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.077		1	12/05/17	12/06/17 14:00	1029
PCB-1221	ND	mg/kg	0.077		1	12/05/17	12/06/17 14:00	1029
PCB-1232	ND	mg/kg	0.077		1	12/05/17	12/06/17 14:00	1029
PCB-1242	ND	mg/kg	0.077		1	12/05/17	12/06/17 14:00	1029
PCB-1248	ND	mg/kg	0.077		1	12/05/17	12/06/17 14:00	1029
PCB-1254	ND	mg/kg	0.077		1	12/05/17	12/06/17 14:00	1029
PCB-1260	ND	mg/kg	0.077		1	12/05/17	12/06/17 14:00	1029

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CERTIFICATE OF ANALYSIS

No: 17120521

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 12, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: B 0-4.5	Date/Time Sampled: 12/05/2017 14:50	PSS Sample ID: 17120521-005
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	% Solids: 62

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	27		1	12/08/17	12/12/17 01:26	1055
Acenaphthylene	ND	ug/kg	27		1	12/08/17	12/12/17 01:26	1055
Anthracene	ND	ug/kg	27		1	12/08/17	12/12/17 01:26	1055
Benzo(a)anthracene	110	ug/kg	27		1	12/08/17	12/12/17 01:26	1055
Benzo(a)pyrene	140	ug/kg	27		1	12/08/17	12/12/17 01:26	1055
Benzo(b)fluoranthene	130	ug/kg	27		1	12/08/17	12/12/17 01:26	1055
Benzo(g,h,i)perylene	89	ug/kg	27		1	12/08/17	12/12/17 01:26	1055
Benzo(k)fluoranthene	120	ug/kg	27		1	12/08/17	12/12/17 01:26	1055
Chrysene	140	ug/kg	27		1	12/08/17	12/12/17 01:26	1055
Dibenz(a,h)Anthracene	ND	ug/kg	27		1	12/08/17	12/12/17 01:26	1055
Fluoranthene	140	ug/kg	27		1	12/08/17	12/12/17 01:26	1055
Fluorene	ND	ug/kg	27		1	12/08/17	12/12/17 01:26	1055
Indeno(1,2,3-c,d)Pyrene	110	ug/kg	27		1	12/08/17	12/12/17 01:26	1055
2-Methylnaphthalene	ND	ug/kg	27		1	12/08/17	12/12/17 01:26	1055
Naphthalene	180	ug/kg	27		1	12/08/17	12/12/17 01:26	1055
Phenanthrene	42	ug/kg	27		1	12/08/17	12/12/17 01:26	1055
Pyrene	130	ug/kg	27		1	12/08/17	12/12/17 01:26	1055

Sample ID: B 0-4.5	Date/Time Sampled: 12/05/2017 14:50	PSS Sample ID: 17120521-005
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	4.2	SU			1	12/06/17	12/06/17 12:17	1061

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CERTIFICATE OF ANALYSIS

No: 17120521

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 12, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: B 4.5-9	Date/Time Sampled: 12/05/2017 15:00	PSS Sample ID: 17120521-006
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	% Solids: 54

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	4.0		1	12/06/17	12/07/17 18:04	1064
Arsenic	24	mg/kg	0.80		1	12/06/17	12/07/17 18:04	1064
Beryllium	ND	mg/kg	4.0		1	12/06/17	12/07/17 18:04	1064
Cadmium	ND	mg/kg	4.0		1	12/06/17	12/07/17 18:04	1064
Calcium	1,900	mg/kg	80		1	12/06/17	12/07/17 18:04	1064
Chromium	140	mg/kg	4.0		1	12/06/17	12/07/17 18:04	1064
Copper	84	mg/kg	4.0		1	12/06/17	12/07/17 18:04	1064
Lead	130	mg/kg	4.0		1	12/06/17	12/07/17 18:04	1064
Manganese	2,800	mg/kg	40		10	12/06/17	12/08/17 20:29	1064
Mercury	0.33	mg/kg	0.16		1	12/06/17	12/07/17 18:04	1064
Nickel	49	mg/kg	4.0		1	12/06/17	12/07/17 18:04	1064
Selenium	ND	mg/kg	4.0		1	12/06/17	12/07/17 18:04	1064
Silver	ND	mg/kg	4.0		1	12/06/17	12/07/17 18:04	1064
Thallium	ND	mg/kg	3.2		1	12/06/17	12/07/17 18:04	1064
Zinc	570	mg/kg	16		1	12/06/17	12/07/17 18:04	1064

Total Petroleum Hydrocarbons - DRO

Analytical Method: SW-846 8015 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
TPH-DRO (Diesel Range Organics)	ND	mg/kg	18		1	12/06/17	12/07/17 13:36	1045

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C

Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.095		1	12/05/17	12/06/17 14:28	1029
PCB-1221	ND	mg/kg	0.095		1	12/05/17	12/06/17 14:28	1029
PCB-1232	ND	mg/kg	0.095		1	12/05/17	12/06/17 14:28	1029
PCB-1242	ND	mg/kg	0.095		1	12/05/17	12/06/17 14:28	1029
PCB-1248	ND	mg/kg	0.095		1	12/05/17	12/06/17 14:28	1029
PCB-1254	ND	mg/kg	0.095		1	12/05/17	12/06/17 14:28	1029
PCB-1260	ND	mg/kg	0.095		1	12/05/17	12/06/17 14:28	1029

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CERTIFICATE OF ANALYSIS

No: 17120521

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 12, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: B 4.5-9	Date/Time Sampled: 12/05/2017 15:00	PSS Sample ID: 17120521-006
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	% Solids: 54

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	31		1	12/08/17	12/11/17 19:57	1055
Acenaphthylene	ND	ug/kg	31		1	12/08/17	12/11/17 19:57	1055
Anthracene	ND	ug/kg	31		1	12/08/17	12/11/17 19:57	1055
Benzo(a)anthracene	53	ug/kg	31		1	12/08/17	12/11/17 19:57	1055
Benzo(a)pyrene	62	ug/kg	31		1	12/08/17	12/11/17 19:57	1055
Benzo(b)fluoranthene	50	ug/kg	31		1	12/08/17	12/11/17 19:57	1055
Benzo(g,h,i)perylene	35	ug/kg	31		1	12/08/17	12/11/17 19:57	1055
Benzo(k)fluoranthene	53	ug/kg	31		1	12/08/17	12/11/17 19:57	1055
Chrysene	61	ug/kg	31		1	12/08/17	12/11/17 19:57	1055
Dibenz(a,h)Anthracene	ND	ug/kg	31		1	12/08/17	12/11/17 19:57	1055
Fluoranthene	64	ug/kg	31		1	12/08/17	12/11/17 19:57	1055
Fluorene	ND	ug/kg	31		1	12/08/17	12/11/17 19:57	1055
Indeno(1,2,3-c,d)Pyrene	43	ug/kg	31		1	12/08/17	12/11/17 19:57	1055
2-Methylnaphthalene	ND	ug/kg	31		1	12/08/17	12/11/17 19:57	1055
Naphthalene	97	ug/kg	31		1	12/08/17	12/11/17 19:57	1055
Phenanthrene	ND	ug/kg	31		1	12/08/17	12/11/17 19:57	1055
Pyrene	58	ug/kg	31		1	12/08/17	12/11/17 19:57	1055

Sample ID: B 4.5-9	Date/Time Sampled: 12/05/2017 15:00	PSS Sample ID: 17120521-006
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	6.0	SU			1	12/06/17	12/06/17 12:17	1061

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CERTIFICATE OF ANALYSIS

No: 17120521

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 12, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: B 9-13.5	Date/Time Sampled: 12/05/2017 15:10	PSS Sample ID: 17120521-007
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	% Solids: 54

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	3.2		1	12/06/17	12/07/17 03:05	1064
Arsenic	34	mg/kg	0.63		1	12/06/17	12/07/17 03:05	1064
Beryllium	ND	mg/kg	3.2		1	12/06/17	12/07/17 03:05	1064
Cadmium	ND	mg/kg	3.2		1	12/06/17	12/07/17 03:05	1064
Calcium	2,200	mg/kg	63		1	12/06/17	12/07/17 03:05	1064
Chromium	200	mg/kg	3.2		1	12/06/17	12/07/17 03:05	1064
Copper	170	mg/kg	3.2		1	12/06/17	12/07/17 03:05	1064
Lead	280	mg/kg	3.2		1	12/06/17	12/07/17 03:05	1064
Manganese	880	mg/kg	32		10	12/06/17	12/08/17 20:56	1064
Mercury	0.53	mg/kg	0.13		1	12/06/17	12/07/17 03:05	1064
Nickel	38	mg/kg	3.2		1	12/06/17	12/07/17 03:05	1064
Selenium	4.2	mg/kg	3.2		1	12/06/17	12/07/17 03:05	1064
Silver	ND	mg/kg	3.2		1	12/06/17	12/07/17 03:05	1064
Thallium	ND	mg/kg	2.5		1	12/06/17	12/07/17 03:05	1064
Zinc	620	mg/kg	13		1	12/06/17	12/07/17 03:05	1064

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C
 Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.097		1	12/05/17	12/06/17 14:56	1029
PCB-1221	ND	mg/kg	0.097		1	12/05/17	12/06/17 14:56	1029
PCB-1232	ND	mg/kg	0.097		1	12/05/17	12/06/17 14:56	1029
PCB-1242	ND	mg/kg	0.097		1	12/05/17	12/06/17 14:56	1029
PCB-1248	ND	mg/kg	0.097		1	12/05/17	12/06/17 14:56	1029
PCB-1254	ND	mg/kg	0.097		1	12/05/17	12/06/17 14:56	1029
PCB-1260	ND	mg/kg	0.097		1	12/05/17	12/06/17 14:56	1029

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120521

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 12, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: B 9-13.5	Date/Time Sampled: 12/05/2017 15:10	PSS Sample ID: 17120521-007
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	% Solids: 54

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	30		1	12/08/17	12/12/17 12:01	1055
Acenaphthylene	ND	ug/kg	30		1	12/08/17	12/12/17 12:01	1055
Anthracene	ND	ug/kg	30		1	12/08/17	12/12/17 12:01	1055
Benzo(a)anthracene	96	ug/kg	30		1	12/08/17	12/12/17 12:01	1055
Benzo(a)pyrene	130	ug/kg	30		1	12/08/17	12/12/17 12:01	1055
Benzo(b)fluoranthene	94	ug/kg	30		1	12/08/17	12/12/17 12:01	1055
Benzo(g,h,i)perylene	83	ug/kg	30		1	12/08/17	12/12/17 12:01	1055
Benzo(k)fluoranthene	120	ug/kg	30		1	12/08/17	12/12/17 12:01	1055
Chrysene	110	ug/kg	30		1	12/08/17	12/12/17 12:01	1055
Dibenz(a,h)Anthracene	ND	ug/kg	30		1	12/08/17	12/12/17 12:01	1055
Fluoranthene	130	ug/kg	30		1	12/08/17	12/12/17 12:01	1055
Fluorene	ND	ug/kg	30		1	12/08/17	12/12/17 12:01	1055
Indeno(1,2,3-c,d)Pyrene	100	ug/kg	30		1	12/08/17	12/12/17 12:01	1055
2-Methylnaphthalene	ND	ug/kg	30		1	12/08/17	12/12/17 12:01	1055
Naphthalene	220	ug/kg	30		1	12/08/17	12/12/17 12:01	1055
Phenanthrene	35	ug/kg	30		1	12/08/17	12/12/17 12:01	1055
Pyrene	110	ug/kg	30		1	12/08/17	12/12/17 12:01	1055

Sample ID: B 9-13.5	Date/Time Sampled: 12/05/2017 15:10	PSS Sample ID: 17120521-007
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	6.7	SU			1	12/06/17	12/06/17 12:17	1061

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120521

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 12, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: B 13.5-18	Date/Time Sampled: 12/05/2017 15:20	PSS Sample ID: 17120521-008
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	% Solids: 51

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	4.8		1	12/06/17	12/07/17 03:09	1064
Arsenic	37	mg/kg	0.96		1	12/06/17	12/07/17 03:09	1064
Beryllium	ND	mg/kg	4.8		1	12/06/17	12/07/17 03:09	1064
Cadmium	ND	mg/kg	4.8		1	12/06/17	12/07/17 03:09	1064
Calcium	3,200	mg/kg	96		1	12/06/17	12/07/17 03:09	1064
Chromium	190	mg/kg	4.8		1	12/06/17	12/07/17 03:09	1064
Copper	130	mg/kg	4.8		1	12/06/17	12/07/17 03:09	1064
Lead	170	mg/kg	4.8		1	12/06/17	12/07/17 03:09	1064
Manganese	2,100	mg/kg	48		10	12/06/17	12/08/17 21:00	1064
Mercury	0.39	mg/kg	0.19		1	12/06/17	12/07/17 03:09	1064
Nickel	54	mg/kg	4.8		1	12/06/17	12/07/17 03:09	1064
Selenium	ND	mg/kg	4.8		1	12/06/17	12/07/17 03:09	1064
Silver	ND	mg/kg	4.8		1	12/06/17	12/07/17 03:09	1064
Thallium	ND	mg/kg	3.9		1	12/06/17	12/07/17 03:09	1064
Zinc	590	mg/kg	19		1	12/06/17	12/07/17 03:09	1064

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C

Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.097		1	12/05/17	12/06/17 15:25	1029
PCB-1221	ND	mg/kg	0.097		1	12/05/17	12/06/17 15:25	1029
PCB-1232	ND	mg/kg	0.097		1	12/05/17	12/06/17 15:25	1029
PCB-1242	ND	mg/kg	0.097		1	12/05/17	12/06/17 15:25	1029
PCB-1248	ND	mg/kg	0.097		1	12/05/17	12/06/17 15:25	1029
PCB-1254	ND	mg/kg	0.097		1	12/05/17	12/06/17 15:25	1029
PCB-1260	ND	mg/kg	0.097		1	12/05/17	12/06/17 15:25	1029

OFFICES:
 6630 BALTIMORE NATIONAL PIKE
 ROUTE 40 WEST
 BALTIMORE, MD 21228
 410-747-8770
 800-932-9047
 FAX 410-788-8723

PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120521

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 12, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: B 13.5-18	Date/Time Sampled: 12/05/2017 15:20	PSS Sample ID: 17120521-008
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	% Solids: 51

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	33		1	12/08/17	12/11/17 19:02	1055
Acenaphthylene	ND	ug/kg	33		1	12/08/17	12/11/17 19:02	1055
Anthracene	ND	ug/kg	33		1	12/08/17	12/11/17 19:02	1055
Benzo(a)anthracene	48	ug/kg	33		1	12/08/17	12/11/17 19:02	1055
Benzo(a)pyrene	74	ug/kg	33		1	12/08/17	12/11/17 19:02	1055
Benzo(b)fluoranthene	56	ug/kg	33		1	12/08/17	12/11/17 19:02	1055
Benzo(g,h,i)perylene	46	ug/kg	33		1	12/08/17	12/11/17 19:02	1055
Benzo(k)fluoranthene	63	ug/kg	33		1	12/08/17	12/11/17 19:02	1055
Chrysene	62	ug/kg	33		1	12/08/17	12/11/17 19:02	1055
Dibenz(a,h)Anthracene	ND	ug/kg	33		1	12/08/17	12/11/17 19:02	1055
Fluoranthene	46	ug/kg	33		1	12/08/17	12/11/17 19:02	1055
Fluorene	ND	ug/kg	33		1	12/08/17	12/11/17 19:02	1055
Indeno(1,2,3-c,d)Pyrene	54	ug/kg	33		1	12/08/17	12/11/17 19:02	1055
2-Methylnaphthalene	ND	ug/kg	33		1	12/08/17	12/11/17 19:02	1055
Naphthalene	64	ug/kg	33		1	12/08/17	12/11/17 19:02	1055
Phenanthrene	ND	ug/kg	33		1	12/08/17	12/11/17 19:02	1055
Pyrene	52	ug/kg	33		1	12/08/17	12/11/17 19:02	1055

Sample ID: B 13.5-18	Date/Time Sampled: 12/05/2017 15:20	PSS Sample ID: 17120521-008
Matrix: SOIL	Date/Time Received: 12/05/2017 15:55	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	6.8	SU			1	12/06/17	12/06/17 12:17	1061



Case Narrative Summary

Client Name: Hillis Carnes Engineering Associates

Project Name: SPT-DMCF

Work Order Number(s): 17120521

Project ID: 17675A

Any holding time exceedances, deviations from the method specifications, regulatory requirements or variations to the procedures outlined in the PSS Quality Assurance Manual are outlined below.

The analyses of chlorine, pH, dissolved oxygen, temperature and sulfite for drinking water and non-potable samples tested for compliance have a maximum holding time of 15 minutes. As such, all laboratory analyses for these analytes exceed holding times.

Matrix spike and matrix spike duplicate analyses may not be performed due to insufficient sample quantity. In these instances, a laboratory control sample and laboratory control sample duplicate are analyzed unless otherwise noted or specified in the method.

Sample Receipt:

All sample receipt conditions were acceptable.

General Comments:

DRO analysis for samples 004 and 007 removed, per client.

Analytical:

Polyaromatic Hydrocarbons (PAHs)

Batch: 148784

Benzo-b-fluoranthene and benzo-k-fluoranthene do not meet resolution criteria.

TCL Semivolatile Organic Compounds

Batch: 148758

Benzo-b-fluoranthene and benzo-k-fluoranthene do not meet resolution criteria.

NELAP accreditation was held for all analyses performed unless noted below. See www.phaseonline.com for complete PSS scope of accreditation.



Analytical Data Package Information Summary

Work Order(s): 17120521

Report Prepared For: Hillis Carnes Engineering Associates, Annapo

Project Name: SPT-DMCF

Project Manager: Sean Harkins

Method	Client Sample Id	Analysis Type	Lab Sample Id	Analyst	Mtx	Prep Batch	Analytical Batch	Sampled	Prepared	Analyzed
SM2540G	A 0-1.5	Initial	17120521-001	1067	S	148619	148619	12/05/2017	12/06/2017 15:58	12/06/2017 15:58
	A 4.5-9	Initial	17120521-002	1067	S	148619	148619	12/05/2017	12/06/2017 15:58	12/06/2017 15:58
	A 9-13.5	Initial	17120521-003	1067	S	148619	148619	12/05/2017	12/06/2017 15:58	12/06/2017 15:58
	A 13.5-18	Initial	17120521-004	1067	S	148619	148619	12/05/2017	12/06/2017 15:58	12/06/2017 15:58
	B 0-4.5	Initial	17120521-005	1067	S	148619	148619	12/05/2017	12/06/2017 15:58	12/06/2017 15:58
	B 4.5-9	Initial	17120521-006	1067	S	148619	148619	12/05/2017	12/06/2017 15:58	12/06/2017 15:58
	B 9-13.5	Initial	17120521-007	1067	S	148619	148619	12/05/2017	12/06/2017 15:58	12/06/2017 15:58
	B 13.5-18	Initial	17120521-008	1067	S	148619	148619	12/05/2017	12/06/2017 15:58	12/06/2017 15:58
SW-846 6020 A	B 9-13.5	Initial	17120521-007	1064	S	69022	148651	12/05/2017	12/06/2017 10:11	12/07/2017 03:05
	B 13.5-18	Initial	17120521-008	1064	S	69022	148651	12/05/2017	12/06/2017 10:11	12/07/2017 03:09
	A 0-1.5	Initial	17120521-001	1064	S	69022	148669	12/05/2017	12/06/2017 10:11	12/07/2017 17:25
	A 4.5-9	Initial	17120521-002	1064	S	69022	148669	12/05/2017	12/06/2017 10:11	12/07/2017 17:29
	A 9-13.5	Initial	17120521-003	1064	S	69022	148669	12/05/2017	12/06/2017 10:11	12/07/2017 17:33
	A 13.5-18	Initial	17120521-004	1064	S	69022	148669	12/05/2017	12/06/2017 10:11	12/07/2017 17:56
	B 0-4.5	Initial	17120521-005	1064	S	69022	148669	12/05/2017	12/06/2017 10:11	12/07/2017 18:00
	B 4.5-9	Initial	17120521-006	1064	S	69022	148669	12/05/2017	12/06/2017 10:11	12/07/2017 18:04
	69022-1-BKS	BKS	69022-1-BKS	1064	S	69022	148669	-----	12/06/2017 10:11	12/07/2017 16:08
	69022-1-BLK	BLK	69022-1-BLK	1064	S	69022	148669	-----	12/06/2017 10:11	12/07/2017 16:04
	X207-001-outfall S	MS	17120512-001 S	1064	S	69022	148669	12/04/2017	12/06/2017 10:11	12/07/2017 16:15
	X207-001-outfall SD	MSD	17120512-001 SD	1064	S	69022	148669	12/04/2017	12/06/2017 10:11	12/07/2017 16:19
	A 0-1.5	Reanalysis	17120521-001	1064	S	69022	148709	12/05/2017	12/06/2017 10:11	12/08/2017 20:10
	A 4.5-9	Reanalysis	17120521-002	1064	S	69022	148709	12/05/2017	12/06/2017 10:11	12/08/2017 20:13
	A 9-13.5	Reanalysis	17120521-003	1064	S	69022	148709	12/05/2017	12/06/2017 10:11	12/08/2017 20:17
	A 13.5-18	Reanalysis	17120521-004	1064	S	69022	148709	12/05/2017	12/06/2017 10:11	12/08/2017 20:21
	B 0-4.5	Reanalysis	17120521-005	1064	S	69022	148709	12/05/2017	12/06/2017 10:11	12/08/2017 20:25
	B 4.5-9	Reanalysis	17120521-006	1064	S	69022	148709	12/05/2017	12/06/2017 10:11	12/08/2017 20:29
	B 9-13.5	Reanalysis	17120521-007	1064	S	69022	148709	12/05/2017	12/06/2017 10:11	12/08/2017 20:56
	B 13.5-18	Reanalysis	17120521-008	1064	S	69022	148709	12/05/2017	12/06/2017 10:11	12/08/2017 21:00



Analytical Data Package Information Summary

Work Order(s): 17120521

Report Prepared For: Hillis Carnes Engineering Associates, Annapo

Project Name: SPT-DMCF

Project Manager: Sean Harkins

Method	Client Sample Id	Analysis Type	Lab Sample Id	Analyst	Mtx	Prep Batch	Analytical Batch	Sampled	Prepared	Analyzed
SW-846 8015 C	A 9-13.5	Initial	17120521-003	1045	S	69020	148653	12/05/2017	12/06/2017 08:53	12/07/2017 12:38
	B 4.5-9	Initial	17120521-006	1045	S	69020	148653	12/05/2017	12/06/2017 08:53	12/07/2017 13:36
	S-1 S	MS	17120523-001 S	1045	S	69020	148653	12/04/2017	12/06/2017 08:53	12/07/2017 11:28
	S-1 SD	MSD	17120523-001 SD	1045	S	69020	148653	12/04/2017	12/06/2017 08:53	12/07/2017 11:53
	69020-1-BKS	BKS	69020-1-BKS	1045	S	69020	148654	-----	12/06/2017 08:53	12/07/2017 11:28
	69020-1-BLK	BLK	69020-1-BLK	1045	S	69020	148654	-----	12/06/2017 08:53	12/07/2017 11:04
	69020-1-BSD	BSD	69020-1-BSD	1045	S	69020	148654	-----	12/06/2017 08:53	12/07/2017 11:53
SW-846 8082 A	A 0-1.5	Initial	17120521-001	1029	S	69016	148643	12/05/2017	12/05/2017 19:16	12/06/2017 12:07
	A 4.5-9	Initial	17120521-002	1029	S	69016	148643	12/05/2017	12/05/2017 19:16	12/06/2017 12:35
	A 9-13.5	Initial	17120521-003	1029	S	69016	148643	12/05/2017	12/05/2017 19:16	12/06/2017 13:03
	A 13.5-18	Initial	17120521-004	1029	S	69016	148643	12/05/2017	12/05/2017 19:16	12/06/2017 13:32
	B 0-4.5	Initial	17120521-005	1029	S	69016	148643	12/05/2017	12/05/2017 19:16	12/06/2017 14:00
	B 4.5-9	Initial	17120521-006	1029	S	69016	148643	12/05/2017	12/05/2017 19:16	12/06/2017 14:28
	B 9-13.5	Initial	17120521-007	1029	S	69016	148643	12/05/2017	12/05/2017 19:16	12/06/2017 14:56
	B 13.5-18	Initial	17120521-008	1029	S	69016	148643	12/05/2017	12/05/2017 19:16	12/06/2017 15:25
	69016-1-BKS	BKS	69016-1-BKS	1029	S	69016	148643	-----	12/05/2017 19:16	12/06/2017 10:16
	69016-1-BLK	BLK	69016-1-BLK	1029	S	69016	148643	-----	12/05/2017 19:16	12/06/2017 09:47
	69016-1-BSD	BSD	69016-1-BSD	1029	S	69016	148643	-----	12/05/2017 19:16	12/06/2017 10:44
	A 0-1.5 S	MS	17120521-001 S	1029	S	69016	148643	12/05/2017	12/05/2017 19:16	12/06/2017 11:11
	A 0-1.5 SD	MSD	17120521-001 SD	1029	S	69016	148643	12/05/2017	12/05/2017 19:16	12/06/2017 11:39
SW-846 8270 C	A 0-1.5	Initial	17120521-001	1055	S	69073	148758	12/05/2017	12/08/2017 08:41	12/11/2017 19:29
	A 4.5-9	Initial	17120521-002	1055	S	69073	148758	12/05/2017	12/08/2017 08:41	12/11/2017 21:19
	A 9-13.5	Initial	17120521-003	1055	S	69073	148758	12/05/2017	12/08/2017 08:41	12/11/2017 22:14
	A 13.5-18	Initial	17120521-004	1055	S	69073	148758	12/05/2017	12/08/2017 08:41	12/11/2017 20:24
	B 0-4.5	Initial	17120521-005	1055	S	69073	148758	12/05/2017	12/08/2017 08:41	12/12/2017 01:26
	B 4.5-9	Initial	17120521-006	1055	S	69073	148758	12/05/2017	12/08/2017 08:41	12/11/2017 19:57
	B 13.5-18	Initial	17120521-008	1055	S	69073	148758	12/05/2017	12/08/2017 08:41	12/11/2017 19:02
	69073-1-BKS	BKS	69073-1-BKS	1055	S	69073	148758	-----	12/08/2017 08:41	12/11/2017 15:23



Analytical Data Package Information Summary

Work Order(s): 17120521

Report Prepared For: Hillis Carnes Engineering Associates, Annapo

Project Name: SPT-DMCF

Project Manager: Sean Harkins

Method	Client Sample Id	Analysis Type	Lab Sample Id	Analyst	Mtx	Prep Batch	Analytical Batch	Sampled	Prepared	Analyzed
SW-846 8270 C	69073-1-BLK	BLK	69073-1-BLK	1055	S	69073	148758	-----	12/08/2017 08:41	12/11/2017 14:56
	69073-1-BSD	BSD	69073-1-BSD	1055	S	69073	148758	-----	12/08/2017 08:41	12/11/2017 15:51
	TE1 S	MS	17120702-001 S	1055	S	69073	148758	12/06/2017	12/08/2017 08:41	12/11/2017 16:18
	TE1 SD	MSD	17120702-001 SD	1055	S	69073	148758	12/06/2017	12/08/2017 08:41	12/11/2017 16:45
	B 9-13.5	Initial	17120521-007	1055	S	69073	148784	12/05/2017	12/08/2017 08:41	12/12/2017 12:01
SW-846 9045 D	A 0-1.5	Initial	17120521-001	1061	S	148589	148589	12/05/2017	12/06/2017 12:17	12/06/2017 12:17
	A 4.5-9	Initial	17120521-002	1061	S	148589	148589	12/05/2017	12/06/2017 12:17	12/06/2017 12:17
	A 9-13.5	Initial	17120521-003	1061	S	148589	148589	12/05/2017	12/06/2017 12:17	12/06/2017 12:17
	A 13.5-18	Initial	17120521-004	1061	S	148589	148589	12/05/2017	12/06/2017 12:17	12/06/2017 12:17
	B 0-4.5	Initial	17120521-005	1061	S	148589	148589	12/05/2017	12/06/2017 12:17	12/06/2017 12:17
	B 4.5-9	Initial	17120521-006	1061	S	148589	148589	12/05/2017	12/06/2017 12:17	12/06/2017 12:17
	B 9-13.5	Initial	17120521-007	1061	S	148589	148589	12/05/2017	12/06/2017 12:17	12/06/2017 12:17
	B 13.5-18	Initial	17120521-008	1061	S	148589	148589	12/05/2017	12/06/2017 12:17	12/06/2017 12:17
	G-1 D	MD	17120518-001 D	1061	S	148589	148589	12/05/2017	12/06/2017 12:17	12/06/2017 12:17

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120521

Hillis Carnes Engineering Associates SPT-DMCF

Analytical Method: SW-846 8082 A

Seq Number: 148643
PSS Sample ID: 17120521-001

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/05/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	80		61-150	%	12/06/17 12:07
Tetrachloro-m-xylene	59		42-142	%	12/06/17 12:07

Analytical Method: SW-846 8270 C

Seq Number: 148758
PSS Sample ID: 17120521-001

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	85		32-107	%	12/11/17 19:29
2-Fluorophenol	80		34-113	%	12/11/17 19:29
Nitrobenzene-d5	89		35-123	%	12/11/17 19:29
Phenol-d6	83		34-120	%	12/11/17 19:29
Terphenyl-D14	91		46-154	%	12/11/17 19:29
2,4,6-Tribromophenol	95		31-113	%	12/11/17 19:29

Analytical Method: SW-846 8082 A

Seq Number: 148643
PSS Sample ID: 17120521-002

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/05/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	81		61-150	%	12/06/17 12:35
Tetrachloro-m-xylene	66		42-142	%	12/06/17 12:35

Analytical Method: SW-846 8270 C

Seq Number: 148758
PSS Sample ID: 17120521-002

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	82		32-107	%	12/11/17 21:19
2-Fluorophenol	74		34-113	%	12/11/17 21:19
Nitrobenzene-d5	89		35-123	%	12/11/17 21:19
Phenol-d6	79		34-120	%	12/11/17 21:19
Terphenyl-D14	85		46-154	%	12/11/17 21:19
2,4,6-Tribromophenol	80		31-113	%	12/11/17 21:19

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120521

Hillis Carnes Engineering Associates SPT-DMCF

Analytical Method: SW-846 8082 A

Seq Number: 148643
PSS Sample ID: 17120521-003

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/05/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	85		61-150	%	12/06/17 13:03
Tetrachloro-m-xylene	65		42-142	%	12/06/17 13:03

Analytical Method: SW-846 8015 C

Seq Number: 148653
PSS Sample ID: 17120521-003

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/06/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
o-Terphenyl	90		34-133	%	12/07/17 12:38

Analytical Method: SW-846 8270 C

Seq Number: 148758
PSS Sample ID: 17120521-003

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	85		32-107	%	12/11/17 22:14
2-Fluorophenol	78		34-113	%	12/11/17 22:14
Nitrobenzene-d5	90		35-123	%	12/11/17 22:14
Phenol-d6	81		34-120	%	12/11/17 22:14
Terphenyl-D14	90		46-154	%	12/11/17 22:14
2,4,6-Tribromophenol	83		31-113	%	12/11/17 22:14

Analytical Method: SW-846 8082 A

Seq Number: 148643
PSS Sample ID: 17120521-004

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/05/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	83		61-150	%	12/06/17 13:32
Tetrachloro-m-xylene	64		42-142	%	12/06/17 13:32

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120521

Hillis Carnes Engineering Associates SPT-DMCF

Analytical Method: SW-846 8270 C

Seq Number: 148758
PSS Sample ID: 17120521-004

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	75		32-107	%	12/11/17 20:24
2-Fluorophenol	70		34-113	%	12/11/17 20:24
Nitrobenzene-d5	79		35-123	%	12/11/17 20:24
Phenol-d6	73		34-120	%	12/11/17 20:24
Terphenyl-D14	80		46-154	%	12/11/17 20:24
2,4,6-Tribromophenol	81		31-113	%	12/11/17 20:24

Analytical Method: SW-846 8082 A

Seq Number: 148643
PSS Sample ID: 17120521-005

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/05/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	79		61-150	%	12/06/17 14:00
Tetrachloro-m-xylene	59		42-142	%	12/06/17 14:00

Analytical Method: SW-846 8270 C

Seq Number: 148758
PSS Sample ID: 17120521-005

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	80		32-107	%	12/12/17 01:26
2-Fluorophenol	72		34-113	%	12/12/17 01:26
Nitrobenzene-d5	82		35-123	%	12/12/17 01:26
Phenol-d6	75		34-120	%	12/12/17 01:26
Terphenyl-D14	85		46-154	%	12/12/17 01:26
2,4,6-Tribromophenol	89		31-113	%	12/12/17 01:26

Analytical Method: SW-846 8082 A

Seq Number: 148643
PSS Sample ID: 17120521-006

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/05/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	75		61-150	%	12/06/17 14:28
Tetrachloro-m-xylene	57		42-142	%	12/06/17 14:28

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120521

Hillis Carnes Engineering Associates SPT-DMCF

Analytical Method: SW-846 8015 C

Seq Number: 148653
PSS Sample ID: 17120521-006

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/06/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
o-Terphenyl	87		34-133	%	12/07/17 13:36

Analytical Method: SW-846 8270 C

Seq Number: 148758
PSS Sample ID: 17120521-006

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	75		32-107	%	12/11/17 19:57
2-Fluorophenol	72		34-113	%	12/11/17 19:57
Nitrobenzene-d5	81		35-123	%	12/11/17 19:57
Phenol-d6	76		34-120	%	12/11/17 19:57
Terphenyl-D14	82		46-154	%	12/11/17 19:57
2,4,6-Tribromophenol	84		31-113	%	12/11/17 19:57

Analytical Method: SW-846 8082 A

Seq Number: 148643
PSS Sample ID: 17120521-007

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/05/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	84		61-150	%	12/06/17 14:56
Tetrachloro-m-xylene	66		42-142	%	12/06/17 14:56

Analytical Method: SW-846 8270 C

Seq Number: 148784
PSS Sample ID: 17120521-007

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	72		32-107	%	12/12/17 12:01
2-Fluorophenol	66		34-113	%	12/12/17 12:01
Nitrobenzene-d5	74		35-123	%	12/12/17 12:01
Phenol-d6	64		34-120	%	12/12/17 12:01
Terphenyl-D14	77		46-154	%	12/12/17 12:01
2,4,6-Tribromophenol	71		31-113	%	12/12/17 12:01

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120521

Hillis Carnes Engineering Associates SPT-DMCF

Analytical Method: SW-846 8082 A

Seq Number: 148643

PSS Sample ID: 17120521-008

Matrix: Soil

Prep Method: SW3550C

Date Prep: 12/05/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	81		61-150	%	12/06/17 15:25
Tetrachloro-m-xylene	61		42-142	%	12/06/17 15:25

Analytical Method: SW-846 8270 C

Seq Number: 148758

PSS Sample ID: 17120521-008

Matrix: Soil

Prep Method: SW3550C

Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	80		32-107	%	12/11/17 19:02
2-Fluorophenol	74		34-113	%	12/11/17 19:02
Nitrobenzene-d5	90		35-123	%	12/11/17 19:02
Phenol-d6	80		34-120	%	12/11/17 19:02
Terphenyl-D14	83		46-154	%	12/11/17 19:02
2,4,6-Tribromophenol	87		31-113	%	12/11/17 19:02

F = RPD exceeded the laboratory control limits

X = Recovery of MS, MSD or both outside of QC Criteria

H= Recovery of BS,BSD or both exceeded the laboratory control limits

L = Recovery of BS,BSD or both below the laboratory control limits

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120521

Hillis Carnes Engineering Associates
SPT-DMCF

Analytical Method: SW-846 6020 A

Seq Number: 148669

MB Sample Id: 69022-1-BLK

Matrix: Solid

LCS Sample Id: 69022-1-BKS

Prep Method: SW3050B

Date Prep: 12/06/17

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
Antimony	<2.414	19.31	22.02	114	80-120	mg/kg	12/07/17 16:08	
Arsenic	<0.4829	19.31	19.79	102	80-120	mg/kg	12/07/17 16:08	
Beryllium	<2.414	19.31	18.94	98	80-120	mg/kg	12/07/17 16:08	
Cadmium	<2.414	19.31	18.57	96	80-120	mg/kg	12/07/17 16:08	
Calcium	<48.29	193.1	194.9	101	80-120	mg/kg	12/07/17 16:08	
Chromium	<2.414	19.31	18.71	97	80-120	mg/kg	12/07/17 16:08	
Copper	<2.414	19.31	18.98	98	80-120	mg/kg	12/07/17 16:08	
Lead	<2.414	19.31	18.63	96	80-120	mg/kg	12/07/17 16:08	
Manganese	<2.414	19.31	18.92	98	80-120	mg/kg	12/07/17 16:08	
Mercury	<0.09657	0.4829	0.4824	100	80-120	mg/kg	12/07/17 16:08	
Nickel	<2.414	19.31	19.18	99	80-120	mg/kg	12/07/17 16:08	
Selenium	<2.414	19.31	19.51	101	80-120	mg/kg	12/07/17 16:08	
Silver	<2.414	19.31	20.86	108	80-120	mg/kg	12/07/17 16:08	
Thallium	<1.931	19.31	17.22	89	80-120	mg/kg	12/07/17 16:08	
Zinc	<9.657	96.57	92.02	95	80-120	mg/kg	12/07/17 16:08	

Analytical Method: SW-846 8082 A

Seq Number: 148643

MB Sample Id: 69016-1-BLK

Matrix: Solid

LCS Sample Id: 69016-1-BKS

Prep Method: SW3550C

Date Prep: 12/05/17

LCSD Sample Id: 69016-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
PCB-1016	<0.04955	0.4955	0.3573	72	0.3649	74	60-110	2	25	mg/kg	12/06/17 10:16	
PCB-1260	<0.04955	0.4955	0.3109	63	0.3163	64	60-98	2	25	mg/kg	12/06/17 10:16	

Surrogate	MB %Rec	MB Flag	LCS Result	LCS Flag	LCSD Result	LCSD Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	88		82		82		61-150	%	12/06/17 10:16
Tetrachloro-m-xylene	82		72		74		42-142	%	12/06/17 10:16

Analytical Method: SW-846 8082 A

Seq Number: 148643

Parent Sample Id: 17120521-001

Matrix: Soil

MS Sample Id: 17120521-001 S

Prep Method: SW3550C

Date Prep: 12/05/17

MSD Sample Id: 17120521-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
PCB-1016	<0.09262	0.9262	0.6653	72	0.6588	71	45-130	1	30	mg/kg	12/06/17 11:11	
PCB-1260	<0.09262	0.9262	0.5873	63	0.5890	64	30-125	0	30	mg/kg	12/06/17 11:11	

Surrogate	MS Result	MS Flag	MSD Result	MSD Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	81		83		61-150	%	12/06/17 11:11
Tetrachloro-m-xylene	69		66		42-142	%	12/06/17 11:11

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120521

Hillis Carnes Engineering Associates
SPT-DMCF

Analytical Method: SW-846 8015 C

Seq Number: 148654

MB Sample Id: 69020-1-BLK

Matrix: Solid

LCS Sample Id: 69020-1-BKS

Prep Method: SW3550C

Date Prep: 12/06/17

LCSD Sample Id: 69020-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
TPH-DRO (Diesel Range Organics)	<9.977	33.26	29.41	88	29.33	88	54-123	0	25	mg/kg	12/07/17 11:28	
Surrogate	MB %Rec	MB Flag	LCS Result	LCS Flag	LCSD Result	LCSD Flag	Limits	Units	Analysis Date			
o-Terphenyl	91		89		78		34-133	%	12/07/17 11:28			

Analytical Method: SW-846 8270 C

Seq Number: 148758

MB Sample Id: 69073-1-BLK

Matrix: Solid

LCS Sample Id: 69073-1-BKS

Prep Method: SW3550C

Date Prep: 12/08/17

LCSD Sample Id: 69073-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Acenaphthene	<16.64	1331	1111	83	1047	79	60-116	6	25	ug/kg	12/11/17 15:23	
Acenaphthylene	<16.64	1331	1130	85	1055	79	61-112	7	25	ug/kg	12/11/17 15:23	
Anthracene	<16.64	1331	1188	89	1119	84	66-115	6	25	ug/kg	12/11/17 15:23	
Benzo(a)anthracene	<16.64	1331	1238	93	1152	86	71-113	7	25	ug/kg	12/11/17 15:23	
Benzo(a)pyrene	<16.64	1331	1228	92	1137	85	69-118	8	25	ug/kg	12/11/17 15:23	
Benzo(b)fluoranthene	<16.64	1331	1202	90	1137	85	65-126	6	25	ug/kg	12/11/17 15:23	
Benzo(g,h,i)perylene	<16.64	1331	1204	90	1099	82	69-112	9	25	ug/kg	12/11/17 15:23	
Benzo(k)fluoranthene	<16.64	1331	1154	87	1082	81	57-129	6	25	ug/kg	12/11/17 15:23	
Chrysene	<16.64	1331	1290	97	1208	91	72-114	7	25	ug/kg	12/11/17 15:23	
Dibenz(a,h)Anthracene	<16.64	1331	1179	89	1091	82	72-110	8	25	ug/kg	12/11/17 15:23	
Fluoranthene	<16.64	1331	1175	88	1089	82	69-119	8	25	ug/kg	12/11/17 15:23	
Fluorene	<16.64	1331	1150	86	1076	81	65-115	7	25	ug/kg	12/11/17 15:23	
Indeno(1,2,3-c,d)Pyrene	<16.64	1331	1067	80	981.7	74	60-127	8	25	ug/kg	12/11/17 15:23	
2-Methylnaphthalene	<16.64	1331	1117	84	1073	80	70-109	4	25	ug/kg	12/11/17 15:23	
Naphthalene	<16.64	1331	1112	84	1041	78	59-108	7	25	ug/kg	12/11/17 15:23	
Phenanthrene	<16.64	1331	1065	80	1006	75	67-117	6	25	ug/kg	12/11/17 15:23	
Pyrene	<16.64	1331	1196	90	1111	83	77-111	7	25	ug/kg	12/11/17 15:23	
Surrogate	MB %Rec	MB Flag	LCS Result	LCS Flag	LCSD Result	LCSD Flag	Limits	Units	Analysis Date			
2-Fluorobiphenyl	98		86		86		32-107	%	12/11/17 15:23			
2-Fluorophenol	99		87		88		34-113	%	12/11/17 15:23			
Nitrobenzene-d5	109		92		95		35-123	%	12/11/17 15:23			
Phenol-d6	98		88		92		34-120	%	12/11/17 15:23			
Terphenyl-D14	90		86		88		46-154	%	12/11/17 15:23			
2,4,6-Tribromophenol	98		100		98		31-113	%	12/11/17 15:23			

F = RPD exceeded the laboratory control limits
X = Recovery of MS, MSD or both outside of QC Criteria
H= Recovery of BS,BSD or both exceeded the laboratory control limits
L = Recovery of BS,BSD or both below the laboratory control limits



Phase Separation Science, Inc

Sample Receipt Checklist

Work Order # 17120521 **Received By** Thomas Wingate
Client Name Hillis Carnes Engineering Associates **Date Received** 12/05/2017 03:55:00 PM
Project Name SPT-DMCF **Delivered By** Client
Project Number 17675A **Tracking No** Not Applicable
Disposal Date 01/09/2018 **Logged In By** Thomas Wingate

Shipping Container(s)

No. of Coolers 1

Custody Seal(s) Intact? N/A

Seal(s) Signed / Dated? N/A

Ice Present

Temp (deg C) 4

Temp Blank Present No

Documentation

COC agrees with sample labels? Yes

Chain of Custody Yes

Sampler Name Sean Harkins

MD DW Cert. No. N/A

Sample Container

Appropriate for Specified Analysis? Yes

Intact? Yes

Labeled and Labels Legible? Yes

Custody Seal(s) Intact? Not Applicable

Seal(s) Signed / Dated Not Applicable

Total No. of Samples Received 8

Total No. of Containers Received 24

Preservation

Total Metals (pH<2) N/A

Dissolved Metals, filtered within 15 minutes of collection (pH<2) N/A

Orthophosphorus, filtered within 15 minutes of collection N/A

Cyanides (pH>12) N/A

Sulfide (pH>9) N/A

TOC, DOC (field filtered), COD, Phenols (pH<2) N/A

TOX, TKN, NH3, Total Phos (pH<2) N/A

VOC, BTEX (VOA Vials Rcvd Preserved) (pH<2) N/A

Do VOA vials have zero headspace? N/A

624 VOC (Rcvd at least one unpreserved VOA vial) N/A

524 VOC (Rcvd with trip blanks) (pH<2) N/A

Comments: (Any "No" response must be detailed in the comments section below.)

For any improper preservation conditions, list sample ID, preservative added (reagent ID number) below as well as documentation of any client notification as well as client instructions. Samples for pH, chlorine and dissolved oxygen should be analyzed as soon as possible, preferably in the field at the time of sampling. Samples which require thermal preservation shall be considered acceptable when received at a temperature above freezing to 6°C. Samples that are hand delivered on the day that they are collected may not meet these criteria but shall be considered acceptable if there is evidence that the chilling process has begun such as arrival on ice.

Samples Inspected/Checklist Completed By:

Thomas Wingate

Date: 12/05/2017

PM Review and Approval:

Amber Confer

Date: 12/06/2017

Analytical Report for
Hillis Carnes Engineering Associates
Certificate of Analysis No.: 17120630

Project Manager: Keith Progin

Project Name : SPT-DMCF

Project ID : 17675A



December 13, 2017
Phase Separation Science, Inc.
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Baltimore, MD 21228
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PHASE SEPARATION SCIENCE, INC.



December 13, 2017

Keith Progin
Hillis Carnes Engineering Associates
10975 Guilford Road, Ste. A
Annapolis Junction, MD 20701

Reference: PSS Work Order(s) No: **17120630**
Project Name: SPT-DMCF

Project ID.: 17675A

Dear Keith Progin :

This report includes the analytical results from the analyses performed on the samples received under the project name referenced above and identified with the Phase Separation Science (PSS) Work Order(s) numbered **17120630**.

All work reported herein has been performed in accordance with current NELAP standards, referenced methodologies, PSS Standard Operating Procedures and the PSS Quality Assurance Manual unless otherwise noted in the Case Narrative Summary. PSS is limited in liability to the actual cost of the sample analysis done.

PSS reserves the right to return any unused samples, extracts or related solutions. Otherwise, the samples are scheduled for disposal, without any further notice, on January 10, 2018, with the exception of air canisters which are cleaned immediately following analysis. This includes any samples that were received with a request to be held but lacked a specific hold period. It is your responsibility to provide a written request defining a specific disposal date if additional storage is required. Upon receipt, the request will be acknowledged by PSS, thus extending the storage period.

This report shall not be reproduced except in full, without the written approval of an authorized PSS representative. A copy of this report will be retained by PSS for at least 5 years, after which time it will be disposed of without further notice, unless prior arrangements have been made.

We thank you for selecting Phase Separation Science, Inc. to serve your analytical needs. If you have any questions concerning this report, do not hesitate to contact us at 410-747-8770 or info@phaseonline.com.

Sincerely,

Dan Prucnal

Laboratory Manager



Sample Summary

Client Name: Hillis Carnes Engineering Associates
Project Name: SPT-DMCF

Work Order Number(s): 17120630

Project ID: 17675A

The following samples were received under chain of custody by Phase Separation Science (PSS) on 12/06/2017 at 03:55 pm

Lab Sample Id	Sample Id	Matrix	Date/Time Collected
17120630-001	C 0-4.5	SOIL	12/06/17 10:10
17120630-002	C 4.5-9	SOIL	12/06/17 10:20
17120630-003	C 9-13.5	SOIL	12/06/17 10:30
17120630-004	C 13.5-18	SOIL	12/06/17 10:40
17120630-005	D 0-4.5	SOIL	12/06/17 14:30
17120630-006	D 4.5-9	SOIL	12/06/17 14:40
17120630-007	D 9-13.5	SOIL	12/06/17 14:50
17120630-008	D 13.5-18	SOIL	12/06/17 15:00

Please reference the Chain of Custody and Sample Receipt Checklist for specific container counts and preservatives. Any sample conditions not in compliance with sample acceptance criteria are described in Case Narrative Summary.

Notes:

1. The presence of a common laboratory contaminant such as methylene chloride may be considered a possible laboratory artifact. Where observed, appropriate consideration of data should be taken.
2. Unless otherwise noted in the case narrative, results are reported on a dry weight basis with the exception of pH, flashpoint, moisture, and paint filter test.
3. Drinking water samples collected for the purpose of compliance with SDWA may not be suitable for their intended use unless collected by a certified sampler [COMAR 26.08.05.07.C.2].
4. The analyses of 1,2-dibromo-3-chloropropane (DBCP) and 1,2-dibromoethane (EDB) by EPA 524.2 and calcium, magnesium, sodium and iron by EPA 200.8 are not currently promulgated for use in testing to meet the Safe Drinking Water Act and as such cannot be used for compliance purposes. The listings of the current promulgated methods for testing in compliance with the Safe Drinking Water Act can be found in the 40 CFR part 141.1, for the primary drinking water contaminants, and part 141.3, for the secondary drinking water contaminants.
5. Sample prepared under EPA 3550C with concentrations greater than 20 mg/Kg should employ the microtip extraction procedure if required to meet data quality objectives.
6. The analysis of acrolein by EPA 624 must be analyzed within three days of sampling unless pH is adjusted to 4-5 units [40 CFR part 136.3(e)].
7. Method 180.1, The Determination of Turbidity by Nephelometry, recommends samples over 40 NTU be diluted until the turbidity falls below 40 units. Routine samples over 40 NTU may not be diluted as long as the data quality objectives are not affected.
8. Alkalinity results analyzed by EPA 310.2 that are reported by dilution are estimated and are not in compliance with method requirements.

Standard Flags/Abbreviations:

- B** A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
- C** Results Pending Final Confirmation.
- E** The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
- Fail** The result exceeds the regulatory level for Toxicity Characteristic (TCLP) as cited in 40 CFR 261.24 Table 1.
- J** The target analyte was positively identified below the reporting limit but greater than the MDL.
- MDL** This is the Laboratory Method Detection Limit which is equivalent to the Limit of Detection (LOD). The LOD is an estimate of the minimum amount of a substance that an analytical process can reliably detect. This value will remain constant across multiple similar instrumentation and among different analysts. An LOD is analyte and matrix specific.
- ND** Not Detected at or above the reporting limit.
- RL** PSS Reporting Limit.
- U** Not detected.

Certifications:

NELAP Certifications: PA 68-03330, VA 460156
State Certifications: MD 179, WV 303
Regulated Soil Permit: P330-12-00268
NSWC USCG Accepted Laboratory
LDBE MWAA LD1997-0041-2015



Sample Summary

Client Name: Hillis Carnes Engineering Associates

Project Name: SPT-DMCF

Work Order Number(s): 17120630

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120630

Hillis Carnes Engineering Associates, Annapolis Junction, MD

December 13, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: C 0-4.5	Date/Time Sampled: 12/06/2017 10:10	PSS Sample ID: 17120630-001
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	% Solids: 64

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	3.8		1	12/08/17	12/08/17 21:19	1064
Arsenic	25	mg/kg	0.76		1	12/08/17	12/08/17 21:19	1064
Beryllium	ND	mg/kg	3.8		1	12/08/17	12/08/17 21:19	1064
Cadmium	ND	mg/kg	3.8		1	12/08/17	12/08/17 21:19	1064
Calcium	1,100	mg/kg	76		1	12/08/17	12/08/17 21:19	1064
Chromium	130	mg/kg	3.8		1	12/08/17	12/08/17 21:19	1064
Copper	75	mg/kg	3.8		1	12/08/17	12/08/17 21:19	1064
Lead	140	mg/kg	3.8		1	12/08/17	12/08/17 21:19	1064
Manganese	780	mg/kg	38		10	12/08/17	12/11/17 17:55	1064
Mercury	0.31	mg/kg	0.15		1	12/08/17	12/08/17 21:19	1064
Nickel	35	mg/kg	3.8		1	12/08/17	12/08/17 21:19	1064
Selenium	ND	mg/kg	3.8		1	12/08/17	12/08/17 21:19	1064
Silver	ND	mg/kg	3.8		1	12/08/17	12/08/17 21:19	1064
Thallium	ND	mg/kg	3.0		1	12/08/17	12/08/17 21:19	1064
Zinc	250	mg/kg	15		1	12/08/17	12/08/17 21:19	1064

Total Petroleum Hydrocarbons - DRO

Analytical Method: SW-846 8015 C

Preparation Method: SW3550C

HF - Heavier fuel/oil pattern observed in sample.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
TPH-DRO (Diesel Range Organics)	25	mg/kg	16	HF	1	12/07/17	12/08/17 17:32	1045

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C

Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.077		1	12/07/17	12/08/17 12:06	1029
PCB-1221	ND	mg/kg	0.077		1	12/07/17	12/08/17 12:06	1029
PCB-1232	ND	mg/kg	0.077		1	12/07/17	12/08/17 12:06	1029
PCB-1242	ND	mg/kg	0.077		1	12/07/17	12/08/17 12:06	1029
PCB-1248	ND	mg/kg	0.077		1	12/07/17	12/08/17 12:06	1029
PCB-1254	ND	mg/kg	0.077		1	12/07/17	12/08/17 12:06	1029
PCB-1260	ND	mg/kg	0.077		1	12/07/17	12/08/17 12:06	1029

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120630

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 13, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: C 0-4.5	Date/Time Sampled: 12/06/2017 10:10	PSS Sample ID: 17120630-001
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	% Solids: 64

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	26		1	12/08/17	12/12/17 15:11	1055
Acenaphthylene	ND	ug/kg	26		1	12/08/17	12/12/17 15:11	1055
Anthracene	ND	ug/kg	26		1	12/08/17	12/12/17 15:11	1055
Benzo(a)anthracene	100	ug/kg	26		1	12/08/17	12/12/17 15:11	1055
Benzo(a)pyrene	120	ug/kg	26		1	12/08/17	12/12/17 15:11	1055
Benzo(b)fluoranthene	120	ug/kg	26		1	12/08/17	12/12/17 15:11	1055
Benzo(g,h,i)perylene	84	ug/kg	26		1	12/08/17	12/12/17 15:11	1055
Benzo(k)fluoranthene	120	ug/kg	26		1	12/08/17	12/12/17 15:11	1055
Chrysene	130	ug/kg	26		1	12/08/17	12/12/17 15:11	1055
Dibenz(a,h)Anthracene	ND	ug/kg	26		1	12/08/17	12/12/17 15:11	1055
Fluoranthene	130	ug/kg	26		1	12/08/17	12/12/17 15:11	1055
Fluorene	ND	ug/kg	26		1	12/08/17	12/12/17 15:11	1055
Indeno(1,2,3-c,d)Pyrene	100	ug/kg	26		1	12/08/17	12/12/17 15:11	1055
2-Methylnaphthalene	ND	ug/kg	26		1	12/08/17	12/12/17 15:11	1055
Naphthalene	130	ug/kg	26		1	12/08/17	12/12/17 15:11	1055
Phenanthrene	34	ug/kg	26		1	12/08/17	12/12/17 15:11	1055
Pyrene	130	ug/kg	26		1	12/08/17	12/12/17 15:11	1055

Sample ID: C 0-4.5	Date/Time Sampled: 12/06/2017 10:10	PSS Sample ID: 17120630-001
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	4.3	SU			1	12/07/17	12/07/17 11:36	1061

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CERTIFICATE OF ANALYSIS

No: 17120630

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 13, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: C 4.5-9	Date/Time Sampled: 12/06/2017 10:20	PSS Sample ID: 17120630-002
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	% Solids: 53

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	3.8		1	12/08/17	12/08/17 22:02	1064
Arsenic	24	mg/kg	0.76		1	12/08/17	12/08/17 22:02	1064
Beryllium	ND	mg/kg	3.8		1	12/08/17	12/08/17 22:02	1064
Cadmium	ND	mg/kg	3.8		1	12/08/17	12/08/17 22:02	1064
Calcium	3,600	mg/kg	76		1	12/08/17	12/08/17 22:02	1064
Chromium	140	mg/kg	3.8		1	12/08/17	12/08/17 22:02	1064
Copper	90	mg/kg	3.8		1	12/08/17	12/08/17 22:02	1064
Lead	160	mg/kg	3.8		1	12/08/17	12/08/17 22:02	1064
Manganese	3,800	mg/kg	38		10	12/08/17	12/11/17 17:59	1064
Mercury	0.36	mg/kg	0.15		1	12/08/17	12/08/17 22:02	1064
Nickel	52	mg/kg	3.8		1	12/08/17	12/08/17 22:02	1064
Selenium	ND	mg/kg	3.8		1	12/08/17	12/08/17 22:02	1064
Silver	ND	mg/kg	3.8		1	12/08/17	12/08/17 22:02	1064
Thallium	ND	mg/kg	3.0		1	12/08/17	12/08/17 22:02	1064
Zinc	560	mg/kg	15		1	12/08/17	12/08/17 22:02	1064

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C

Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.091		1	12/07/17	12/08/17 12:34	1029
PCB-1221	ND	mg/kg	0.091		1	12/07/17	12/08/17 12:34	1029
PCB-1232	ND	mg/kg	0.091		1	12/07/17	12/08/17 12:34	1029
PCB-1242	ND	mg/kg	0.091		1	12/07/17	12/08/17 12:34	1029
PCB-1248	ND	mg/kg	0.091		1	12/07/17	12/08/17 12:34	1029
PCB-1254	ND	mg/kg	0.091		1	12/07/17	12/08/17 12:34	1029
PCB-1260	ND	mg/kg	0.091		1	12/07/17	12/08/17 12:34	1029

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CERTIFICATE OF ANALYSIS

No: 17120630

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 13, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: C 4.5-9	Date/Time Sampled: 12/06/2017 10:20	PSS Sample ID: 17120630-002
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	% Solids: 53

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	31		1	12/08/17	12/12/17 14:16	1055
Acenaphthylene	ND	ug/kg	31		1	12/08/17	12/12/17 14:16	1055
Anthracene	ND	ug/kg	31		1	12/08/17	12/12/17 14:16	1055
Benzo(a)anthracene	81	ug/kg	31		1	12/08/17	12/12/17 14:16	1055
Benzo(a)pyrene	100	ug/kg	31		1	12/08/17	12/12/17 14:16	1055
Benzo(b)fluoranthene	81	ug/kg	31		1	12/08/17	12/12/17 14:16	1055
Benzo(g,h,i)perylene	68	ug/kg	31		1	12/08/17	12/12/17 14:16	1055
Benzo(k)fluoranthene	91	ug/kg	31		1	12/08/17	12/12/17 14:16	1055
Chrysene	98	ug/kg	31		1	12/08/17	12/12/17 14:16	1055
Dibenz(a,h)Anthracene	ND	ug/kg	31		1	12/08/17	12/12/17 14:16	1055
Fluoranthene	100	ug/kg	31		1	12/08/17	12/12/17 14:16	1055
Fluorene	ND	ug/kg	31		1	12/08/17	12/12/17 14:16	1055
Indeno(1,2,3-c,d)Pyrene	80	ug/kg	31		1	12/08/17	12/12/17 14:16	1055
2-Methylnaphthalene	ND	ug/kg	31		1	12/08/17	12/12/17 14:16	1055
Naphthalene	150	ug/kg	31		1	12/08/17	12/12/17 14:16	1055
Phenanthrene	41	ug/kg	31		1	12/08/17	12/12/17 14:16	1055
Pyrene	110	ug/kg	31		1	12/08/17	12/12/17 14:16	1055

Sample ID: C 4.5-9	Date/Time Sampled: 12/06/2017 10:20	PSS Sample ID: 17120630-002
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	6.7	SU			1	12/07/17	12/07/17 11:36	1061

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CERTIFICATE OF ANALYSIS

No: 17120630

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 13, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: C 9-13.5	Date/Time Sampled: 12/06/2017 10:30	PSS Sample ID: 17120630-003
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	% Solids: 55

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	3.1		1	12/08/17	12/08/17 22:06	1064
Arsenic	23	mg/kg	0.61		1	12/08/17	12/08/17 22:06	1064
Beryllium	ND	mg/kg	3.1		1	12/08/17	12/08/17 22:06	1064
Cadmium	ND	mg/kg	3.1		1	12/08/17	12/08/17 22:06	1064
Calcium	2,200	mg/kg	61		1	12/08/17	12/08/17 22:06	1064
Chromium	140	mg/kg	3.1		1	12/08/17	12/08/17 22:06	1064
Copper	110	mg/kg	3.1		1	12/08/17	12/08/17 22:06	1064
Lead	180	mg/kg	3.1		1	12/08/17	12/08/17 22:06	1064
Manganese	1,300	mg/kg	31		10	12/08/17	12/11/17 18:02	1064
Mercury	0.33	mg/kg	0.12		1	12/08/17	12/08/17 22:06	1064
Nickel	35	mg/kg	3.1		1	12/08/17	12/08/17 22:06	1064
Selenium	3.1	mg/kg	3.1		1	12/08/17	12/08/17 22:06	1064
Silver	ND	mg/kg	3.1		1	12/08/17	12/08/17 22:06	1064
Thallium	ND	mg/kg	2.5		1	12/08/17	12/08/17 22:06	1064
Zinc	470	mg/kg	12		1	12/08/17	12/08/17 22:06	1064

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C

Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.090		1	12/07/17	12/08/17 13:02	1029
PCB-1221	ND	mg/kg	0.090		1	12/07/17	12/08/17 13:02	1029
PCB-1232	ND	mg/kg	0.090		1	12/07/17	12/08/17 13:02	1029
PCB-1242	ND	mg/kg	0.090		1	12/07/17	12/08/17 13:02	1029
PCB-1248	ND	mg/kg	0.090		1	12/07/17	12/08/17 13:02	1029
PCB-1254	ND	mg/kg	0.090		1	12/07/17	12/08/17 13:02	1029
PCB-1260	ND	mg/kg	0.090		1	12/07/17	12/08/17 13:02	1029

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CERTIFICATE OF ANALYSIS

No: 17120630

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 13, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: C 9-13.5	Date/Time Sampled: 12/06/2017 10:30	PSS Sample ID: 17120630-003
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	% Solids: 55

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	30		1	12/08/17	12/12/17 13:06	1055
Acenaphthylene	ND	ug/kg	30		1	12/08/17	12/12/17 13:06	1055
Anthracene	ND	ug/kg	30		1	12/08/17	12/12/17 13:06	1055
Benzo(a)anthracene	88	ug/kg	30		1	12/08/17	12/12/17 13:06	1055
Benzo(a)pyrene	120	ug/kg	30		1	12/08/17	12/12/17 13:06	1055
Benzo(b)fluoranthene	80	ug/kg	30		1	12/08/17	12/12/17 13:06	1055
Benzo(g,h,i)perylene	71	ug/kg	30		1	12/08/17	12/12/17 13:06	1055
Benzo(k)fluoranthene	120	ug/kg	30		1	12/08/17	12/12/17 13:06	1055
Chrysene	110	ug/kg	30		1	12/08/17	12/12/17 13:06	1055
Dibenz(a,h)Anthracene	ND	ug/kg	30		1	12/08/17	12/12/17 13:06	1055
Fluoranthene	110	ug/kg	30		1	12/08/17	12/12/17 13:06	1055
Fluorene	ND	ug/kg	30		1	12/08/17	12/12/17 13:06	1055
Indeno(1,2,3-c,d)Pyrene	89	ug/kg	30		1	12/08/17	12/12/17 13:06	1055
2-Methylnaphthalene	ND	ug/kg	30		1	12/08/17	12/12/17 13:06	1055
Naphthalene	160	ug/kg	30		1	12/08/17	12/12/17 13:06	1055
Phenanthrene	ND	ug/kg	30		1	12/08/17	12/12/17 13:06	1055
Pyrene	97	ug/kg	30		1	12/08/17	12/12/17 13:06	1055

Sample ID: C 9-13.5	Date/Time Sampled: 12/06/2017 10:30	PSS Sample ID: 17120630-003
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	6.9	SU			1	12/07/17	12/07/17 11:36	1061

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CERTIFICATE OF ANALYSIS

No: 17120630

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 13, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: C 13.5-18	Date/Time Sampled: 12/06/2017 10:40	PSS Sample ID: 17120630-004
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	% Solids: 53

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	4.1		1	12/08/17	12/08/17 22:09	1064
Arsenic	29	mg/kg	0.82		1	12/08/17	12/08/17 22:09	1064
Beryllium	ND	mg/kg	4.1		1	12/08/17	12/08/17 22:09	1064
Cadmium	ND	mg/kg	4.1		1	12/08/17	12/08/17 22:09	1064
Calcium	7,100	mg/kg	82		1	12/08/17	12/08/17 22:09	1064
Chromium	170	mg/kg	4.1		1	12/08/17	12/08/17 22:09	1064
Copper	120	mg/kg	4.1		1	12/08/17	12/08/17 22:09	1064
Lead	160	mg/kg	4.1		1	12/08/17	12/08/17 22:09	1064
Manganese	2,300	mg/kg	41		10	12/08/17	12/11/17 18:06	1064
Mercury	0.33	mg/kg	0.16		1	12/08/17	12/08/17 22:09	1064
Nickel	40	mg/kg	4.1		1	12/08/17	12/08/17 22:09	1064
Selenium	ND	mg/kg	4.1		1	12/08/17	12/08/17 22:09	1064
Silver	ND	mg/kg	4.1		1	12/08/17	12/08/17 22:09	1064
Thallium	ND	mg/kg	3.3		1	12/08/17	12/08/17 22:09	1064
Zinc	510	mg/kg	16		1	12/08/17	12/08/17 22:09	1064

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C

Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.093		1	12/07/17	12/08/17 13:30	1029
PCB-1221	ND	mg/kg	0.093		1	12/07/17	12/08/17 13:30	1029
PCB-1232	ND	mg/kg	0.093		1	12/07/17	12/08/17 13:30	1029
PCB-1242	ND	mg/kg	0.093		1	12/07/17	12/08/17 13:30	1029
PCB-1248	ND	mg/kg	0.093		1	12/07/17	12/08/17 13:30	1029
PCB-1254	ND	mg/kg	0.093		1	12/07/17	12/08/17 13:30	1029
PCB-1260	ND	mg/kg	0.093		1	12/07/17	12/08/17 13:30	1029

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120630

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 13, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: C 13.5-18	Date/Time Sampled: 12/06/2017 10:40	PSS Sample ID: 17120630-004
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	% Solids: 53

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	31		1	12/08/17	12/12/17 00:31	1055
Acenaphthylene	ND	ug/kg	31		1	12/08/17	12/12/17 00:31	1055
Anthracene	34	ug/kg	31		1	12/08/17	12/12/17 00:31	1055
Benzo(a)anthracene	110	ug/kg	31		1	12/08/17	12/12/17 00:31	1055
Benzo(a)pyrene	140	ug/kg	31		1	12/08/17	12/12/17 00:31	1055
Benzo(b)fluoranthene	110	ug/kg	31		1	12/08/17	12/12/17 00:31	1055
Benzo(g,h,i)perylene	85	ug/kg	31		1	12/08/17	12/12/17 00:31	1055
Benzo(k)fluoranthene	120	ug/kg	31		1	12/08/17	12/12/17 00:31	1055
Chrysene	120	ug/kg	31		1	12/08/17	12/12/17 00:31	1055
Dibenz(a,h)Anthracene	ND	ug/kg	31		1	12/08/17	12/12/17 00:31	1055
Fluoranthene	140	ug/kg	31		1	12/08/17	12/12/17 00:31	1055
Fluorene	ND	ug/kg	31		1	12/08/17	12/12/17 00:31	1055
Indeno(1,2,3-c,d)Pyrene	110	ug/kg	31		1	12/08/17	12/12/17 00:31	1055
2-Methylnaphthalene	ND	ug/kg	31		1	12/08/17	12/12/17 00:31	1055
Naphthalene	140	ug/kg	31		1	12/08/17	12/12/17 00:31	1055
Phenanthrene	40	ug/kg	31		1	12/08/17	12/12/17 00:31	1055
Pyrene	120	ug/kg	31		1	12/08/17	12/12/17 00:31	1055

Sample ID: C 13.5-18	Date/Time Sampled: 12/06/2017 10:40	PSS Sample ID: 17120630-004
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	8.7	SU			1	12/07/17	12/07/17 11:36	1061

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120630

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 13, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: D 0-4.5	Date/Time Sampled: 12/06/2017 14:30	PSS Sample ID: 17120630-005
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	% Solids: 65

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	2.7		1	12/08/17	12/08/17 22:13	1064
Arsenic	22	mg/kg	0.55		1	12/08/17	12/08/17 22:13	1064
Beryllium	ND	mg/kg	2.7		1	12/08/17	12/08/17 22:13	1064
Cadmium	ND	mg/kg	2.7		1	12/08/17	12/08/17 22:13	1064
Calcium	1,200	mg/kg	55		1	12/08/17	12/08/17 22:13	1064
Chromium	110	mg/kg	2.7		1	12/08/17	12/08/17 22:13	1064
Copper	56	mg/kg	2.7		1	12/08/17	12/08/17 22:13	1064
Lead	100	mg/kg	2.7		1	12/08/17	12/08/17 22:13	1064
Manganese	1,100	mg/kg	27		10	12/08/17	12/11/17 18:30	1064
Mercury	0.23	mg/kg	0.11		1	12/08/17	12/08/17 22:13	1064
Nickel	31	mg/kg	2.7		1	12/08/17	12/08/17 22:13	1064
Selenium	ND	mg/kg	2.7		1	12/08/17	12/08/17 22:13	1064
Silver	ND	mg/kg	2.7		1	12/08/17	12/08/17 22:13	1064
Thallium	ND	mg/kg	2.2		1	12/08/17	12/08/17 22:13	1064
Zinc	200	mg/kg	11		1	12/08/17	12/08/17 22:13	1064

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C

Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.076		1	12/07/17	12/08/17 13:58	1029
PCB-1221	ND	mg/kg	0.076		1	12/07/17	12/08/17 13:58	1029
PCB-1232	ND	mg/kg	0.076		1	12/07/17	12/08/17 13:58	1029
PCB-1242	ND	mg/kg	0.076		1	12/07/17	12/08/17 13:58	1029
PCB-1248	ND	mg/kg	0.076		1	12/07/17	12/08/17 13:58	1029
PCB-1254	ND	mg/kg	0.076		1	12/07/17	12/08/17 13:58	1029
PCB-1260	ND	mg/kg	0.076		1	12/07/17	12/08/17 13:58	1029

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120630

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 13, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: D 0-4.5	Date/Time Sampled: 12/06/2017 14:30	PSS Sample ID: 17120630-005
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	% Solids: 65

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	26		1	12/08/17	12/11/17 23:36	1055
Acenaphthylene	ND	ug/kg	26		1	12/08/17	12/11/17 23:36	1055
Anthracene	ND	ug/kg	26		1	12/08/17	12/11/17 23:36	1055
Benzo(a)anthracene	86	ug/kg	26		1	12/08/17	12/11/17 23:36	1055
Benzo(a)pyrene	110	ug/kg	26		1	12/08/17	12/11/17 23:36	1055
Benzo(b)fluoranthene	85	ug/kg	26		1	12/08/17	12/11/17 23:36	1055
Benzo(g,h,i)perylene	64	ug/kg	26		1	12/08/17	12/11/17 23:36	1055
Benzo(k)fluoranthene	100	ug/kg	26		1	12/08/17	12/11/17 23:36	1055
Chrysene	100	ug/kg	26		1	12/08/17	12/11/17 23:36	1055
Dibenz(a,h)Anthracene	ND	ug/kg	26		1	12/08/17	12/11/17 23:36	1055
Fluoranthene	120	ug/kg	26		1	12/08/17	12/11/17 23:36	1055
Fluorene	ND	ug/kg	26		1	12/08/17	12/11/17 23:36	1055
Indeno(1,2,3-c,d)Pyrene	79	ug/kg	26		1	12/08/17	12/11/17 23:36	1055
2-Methylnaphthalene	ND	ug/kg	26		1	12/08/17	12/11/17 23:36	1055
Naphthalene	120	ug/kg	26		1	12/08/17	12/11/17 23:36	1055
Phenanthrene	37	ug/kg	26		1	12/08/17	12/11/17 23:36	1055
Pyrene	110	ug/kg	26		1	12/08/17	12/11/17 23:36	1055

Sample ID: D 0-4.5	Date/Time Sampled: 12/06/2017 14:30	PSS Sample ID: 17120630-005
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	4.9	SU			1	12/07/17	12/07/17 11:36	1061

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120630

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 13, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: D 4.5-9	Date/Time Sampled: 12/06/2017 14:40	PSS Sample ID: 17120630-006
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	% Solids: 56

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	3.6		1	12/08/17	12/08/17 22:17	1064
Arsenic	17	mg/kg	0.72		1	12/08/17	12/08/17 22:17	1064
Beryllium	ND	mg/kg	3.6		1	12/08/17	12/08/17 22:17	1064
Cadmium	ND	mg/kg	3.6		1	12/08/17	12/08/17 22:17	1064
Calcium	2,200	mg/kg	72		1	12/08/17	12/08/17 22:17	1064
Chromium	120	mg/kg	3.6		1	12/08/17	12/08/17 22:17	1064
Copper	75	mg/kg	3.6		1	12/08/17	12/08/17 22:17	1064
Lead	100	mg/kg	3.6		1	12/08/17	12/08/17 22:17	1064
Manganese	1,500	mg/kg	36		10	12/08/17	12/11/17 18:34	1064
Mercury	0.30	mg/kg	0.14		1	12/08/17	12/08/17 22:17	1064
Nickel	42	mg/kg	3.6		1	12/08/17	12/08/17 22:17	1064
Selenium	ND	mg/kg	3.6		1	12/08/17	12/08/17 22:17	1064
Silver	ND	mg/kg	3.6		1	12/08/17	12/08/17 22:17	1064
Thallium	ND	mg/kg	2.9		1	12/08/17	12/08/17 22:17	1064
Zinc	320	mg/kg	14		1	12/08/17	12/08/17 22:17	1064

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C
 Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.089		1	12/07/17	12/08/17 14:27	1029
PCB-1221	ND	mg/kg	0.089		1	12/07/17	12/08/17 14:27	1029
PCB-1232	ND	mg/kg	0.089		1	12/07/17	12/08/17 14:27	1029
PCB-1242	ND	mg/kg	0.089		1	12/07/17	12/08/17 14:27	1029
PCB-1248	ND	mg/kg	0.089		1	12/07/17	12/08/17 14:27	1029
PCB-1254	ND	mg/kg	0.089		1	12/07/17	12/08/17 14:27	1029
PCB-1260	ND	mg/kg	0.089		1	12/07/17	12/08/17 14:27	1029

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120630

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 13, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: D 4.5-9	Date/Time Sampled: 12/06/2017 14:40	PSS Sample ID: 17120630-006
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	% Solids: 56

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	30		1	12/08/17	12/12/17 00:58	1055
Acenaphthylene	ND	ug/kg	30		1	12/08/17	12/12/17 00:58	1055
Anthracene	ND	ug/kg	30		1	12/08/17	12/12/17 00:58	1055
Benzo(a)anthracene	88	ug/kg	30		1	12/08/17	12/12/17 00:58	1055
Benzo(a)pyrene	120	ug/kg	30		1	12/08/17	12/12/17 00:58	1055
Benzo(b)fluoranthene	110	ug/kg	30		1	12/08/17	12/12/17 00:58	1055
Benzo(g,h,i)perylene	70	ug/kg	30		1	12/08/17	12/12/17 00:58	1055
Benzo(k)fluoranthene	90	ug/kg	30		1	12/08/17	12/12/17 00:58	1055
Chrysene	110	ug/kg	30		1	12/08/17	12/12/17 00:58	1055
Dibenz(a,h)Anthracene	ND	ug/kg	30		1	12/08/17	12/12/17 00:58	1055
Fluoranthene	120	ug/kg	30		1	12/08/17	12/12/17 00:58	1055
Fluorene	ND	ug/kg	30		1	12/08/17	12/12/17 00:58	1055
Indeno(1,2,3-c,d)Pyrene	85	ug/kg	30		1	12/08/17	12/12/17 00:58	1055
2-Methylnaphthalene	ND	ug/kg	30		1	12/08/17	12/12/17 00:58	1055
Naphthalene	180	ug/kg	30		1	12/08/17	12/12/17 00:58	1055
Phenanthrene	30	ug/kg	30		1	12/08/17	12/12/17 00:58	1055
Pyrene	110	ug/kg	30		1	12/08/17	12/12/17 00:58	1055

Sample ID: D 4.5-9	Date/Time Sampled: 12/06/2017 14:40	PSS Sample ID: 17120630-006
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	6.1	SU			1	12/07/17	12/07/17 11:36	1061

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120630

Hillis Carnes Engineering Associates, Annapolis Junction, MD

December 13, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: D 9-13.5	Date/Time Sampled: 12/06/2017 14:50	PSS Sample ID: 17120630-007
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	% Solids: 74

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	2.6		1	12/08/17	12/08/17 22:21	1064
Arsenic	11	mg/kg	0.52		1	12/08/17	12/08/17 22:21	1064
Beryllium	ND	mg/kg	2.6		1	12/08/17	12/08/17 22:21	1064
Cadmium	ND	mg/kg	2.6		1	12/08/17	12/08/17 22:21	1064
Calcium	54,000	mg/kg	5,200		100	12/08/17	12/11/17 18:37	1064
Chromium	430	mg/kg	2.6		1	12/08/17	12/08/17 22:21	1064
Copper	180	mg/kg	2.6		1	12/08/17	12/08/17 22:21	1064
Lead	210	mg/kg	2.6		1	12/08/17	12/08/17 22:21	1064
Manganese	16,000	mg/kg	260		100	12/08/17	12/11/17 18:37	1064
Mercury	0.48	mg/kg	0.10		1	12/08/17	12/08/17 22:21	1064
Nickel	34	mg/kg	2.6		1	12/08/17	12/08/17 22:21	1064
Selenium	ND	mg/kg	2.6		1	12/08/17	12/08/17 22:21	1064
Silver	ND	mg/kg	2.6		1	12/08/17	12/08/17 22:21	1064
Thallium	ND	mg/kg	2.1		1	12/08/17	12/08/17 22:21	1064
Zinc	800	mg/kg	10		1	12/08/17	12/08/17 22:21	1064

Total Petroleum Hydrocarbons - DRO

Analytical Method: SW-846 8015 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
TPH-DRO (Diesel Range Organics)	760	mg/kg	67		5	12/07/17	12/11/17 11:52	1045

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C

Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.069		1	12/07/17	12/08/17 14:55	1029
PCB-1221	ND	mg/kg	0.069		1	12/07/17	12/08/17 14:55	1029
PCB-1232	ND	mg/kg	0.069		1	12/07/17	12/08/17 14:55	1029
PCB-1242	ND	mg/kg	0.069		1	12/07/17	12/08/17 14:55	1029
PCB-1248	ND	mg/kg	0.069		1	12/07/17	12/08/17 14:55	1029
PCB-1254	ND	mg/kg	0.069		1	12/07/17	12/08/17 14:55	1029
PCB-1260	ND	mg/kg	0.069		1	12/07/17	12/08/17 14:55	1029

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120630

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 13, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: D 9-13.5	Date/Time Sampled: 12/06/2017 14:50	PSS Sample ID: 17120630-007
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	% Solids: 74

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	2,600	ug/kg	220		10	12/08/17	12/12/17 17:58	1055
Acenaphthylene	5,800	ug/kg	220		10	12/08/17	12/12/17 17:58	1055
Anthracene	9,100	ug/kg	220		10	12/08/17	12/12/17 17:58	1055
Benzo(a)anthracene	6,900	ug/kg	220		10	12/08/17	12/12/17 17:58	1055
Benzo(a)pyrene	5,600	ug/kg	220		10	12/08/17	12/12/17 17:58	1055
Benzo(b)fluoranthene	4,400	ug/kg	220		10	12/08/17	12/12/17 17:58	1055
Benzo(g,h,i)perylene	3,000	ug/kg	220		10	12/08/17	12/12/17 17:58	1055
Benzo(k)fluoranthene	4,700	ug/kg	220		10	12/08/17	12/12/17 17:58	1055
Chrysene	6,800	ug/kg	220		10	12/08/17	12/12/17 17:58	1055
Dibenz(a,h)Anthracene	630	ug/kg	220		10	12/08/17	12/12/17 17:58	1055
Fluoranthene	20,000	ug/kg	220		10	12/08/17	12/12/17 17:58	1055
Fluorene	7,900	ug/kg	220		10	12/08/17	12/12/17 17:58	1055
Indeno(1,2,3-c,d)Pyrene	3,600	ug/kg	220		10	12/08/17	12/12/17 17:58	1055
2-Methylnaphthalene	4,000	ug/kg	220		10	12/08/17	12/12/17 17:58	1055
Naphthalene	69,000	ug/kg	1,100		50	12/08/17	12/12/17 17:31	1055
Phenanthrene	29,000	ug/kg	1,100		50	12/08/17	12/12/17 17:31	1055
Pyrene	17,000	ug/kg	220		10	12/08/17	12/12/17 17:58	1055

Sample ID: D 9-13.5	Date/Time Sampled: 12/06/2017 14:50	PSS Sample ID: 17120630-007
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	9.8	SU			1	12/07/17	12/07/17 11:36	1061

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CERTIFICATE OF ANALYSIS

No: 17120630

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 13, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: D 13.5-18	Date/Time Sampled: 12/06/2017 15:00	PSS Sample ID: 17120630-008
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	% Solids: 57

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	3.4		1	12/08/17	12/08/17 22:25	1064
Arsenic	20	mg/kg	0.67		1	12/08/17	12/08/17 22:25	1064
Beryllium	ND	mg/kg	3.4		1	12/08/17	12/08/17 22:25	1064
Cadmium	ND	mg/kg	3.4		1	12/08/17	12/08/17 22:25	1064
Calcium	40,000	mg/kg	6,700		100	12/08/17	12/11/17 18:41	1064
Chromium	430	mg/kg	3.4		1	12/08/17	12/08/17 22:25	1064
Copper	79	mg/kg	3.4		1	12/08/17	12/08/17 22:25	1064
Lead	130	mg/kg	3.4		1	12/08/17	12/08/17 22:25	1064
Manganese	13,000	mg/kg	340		100	12/08/17	12/11/17 18:41	1064
Mercury	0.29	mg/kg	0.14		1	12/08/17	12/08/17 22:25	1064
Nickel	35	mg/kg	3.4		1	12/08/17	12/08/17 22:25	1064
Selenium	ND	mg/kg	3.4		1	12/08/17	12/08/17 22:25	1064
Silver	ND	mg/kg	3.4		1	12/08/17	12/08/17 22:25	1064
Thallium	ND	mg/kg	2.7		1	12/08/17	12/08/17 22:25	1064
Zinc	400	mg/kg	14		1	12/08/17	12/08/17 22:25	1064

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C
 Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.088		1	12/07/17	12/08/17 15:30	1029
PCB-1221	ND	mg/kg	0.088		1	12/07/17	12/08/17 15:30	1029
PCB-1232	ND	mg/kg	0.088		1	12/07/17	12/08/17 15:30	1029
PCB-1242	ND	mg/kg	0.088		1	12/07/17	12/08/17 15:30	1029
PCB-1248	ND	mg/kg	0.088		1	12/07/17	12/08/17 15:30	1029
PCB-1254	ND	mg/kg	0.088		1	12/07/17	12/08/17 15:30	1029
PCB-1260	ND	mg/kg	0.088		1	12/07/17	12/08/17 15:30	1029

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120630

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 13, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: D 13.5-18	Date/Time Sampled: 12/06/2017 15:00	PSS Sample ID: 17120630-008
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	% Solids: 57

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	29		1	12/08/17	12/11/17 23:09	1055
Acenaphthylene	ND	ug/kg	29		1	12/08/17	12/11/17 23:09	1055
Anthracene	ND	ug/kg	29		1	12/08/17	12/11/17 23:09	1055
Benzo(a)anthracene	57	ug/kg	29		1	12/08/17	12/11/17 23:09	1055
Benzo(a)pyrene	64	ug/kg	29		1	12/08/17	12/11/17 23:09	1055
Benzo(b)fluoranthene	49	ug/kg	29		1	12/08/17	12/11/17 23:09	1055
Benzo(g,h,i)perylene	35	ug/kg	29		1	12/08/17	12/11/17 23:09	1055
Benzo(k)fluoranthene	54	ug/kg	29		1	12/08/17	12/11/17 23:09	1055
Chrysene	64	ug/kg	29		1	12/08/17	12/11/17 23:09	1055
Dibenz(a,h)Anthracene	ND	ug/kg	29		1	12/08/17	12/11/17 23:09	1055
Fluoranthene	98	ug/kg	29		1	12/08/17	12/11/17 23:09	1055
Fluorene	ND	ug/kg	29		1	12/08/17	12/11/17 23:09	1055
Indeno(1,2,3-c,d)Pyrene	43	ug/kg	29		1	12/08/17	12/11/17 23:09	1055
2-Methylnaphthalene	ND	ug/kg	29		1	12/08/17	12/11/17 23:09	1055
Naphthalene	2,700	ug/kg	29		1	12/08/17	12/11/17 23:09	1055
Phenanthrene	68	ug/kg	29		1	12/08/17	12/11/17 23:09	1055
Pyrene	85	ug/kg	29		1	12/08/17	12/11/17 23:09	1055

Sample ID: D 13.5-18	Date/Time Sampled: 12/06/2017 15:00	PSS Sample ID: 17120630-008
Matrix: SOIL	Date/Time Received: 12/06/2017 15:55	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	9.1	SU			1	12/07/17	12/07/17 11:36	1061



Case Narrative Summary

Client Name: Hillis Carnes Engineering Associates

Project Name: SPT-DMCF

Work Order Number(s): 17120630

Project ID: 17675A

Any holding time exceedances, deviations from the method specifications, regulatory requirements or variations to the procedures outlined in the PSS Quality Assurance Manual are outlined below.

The analyses of chlorine, pH, dissolved oxygen, temperature and sulfite for drinking water and non-potable samples tested for compliance have a maximum holding time of 15 minutes. As such, all laboratory analyses for these analytes exceed holding times.

Matrix spike and matrix spike duplicate analyses may not be performed due to insufficient sample quantity. In these instances, a laboratory control sample and laboratory control sample duplicate are analyzed unless otherwise noted or specified in the method.

Sample Receipt:

Sample(s) received at 0 degrees but no samples were frozen.

Analytical:

RCRA Metals

Batch: 148712

Matrix spike and/or matrix spike duplicate (MS/MSD) exceedances identified; see MS summary form.

The concentration of the following analyte(s) in the reference sample was greater than four times the matrix spike concentration : calcium, manganese, zinc

Polychlorinated Biphenyls

Batch: 148743

Surrogate recoveries affected by sample matrix.

Polyaromatic Hydrocarbons (PAHs)

Batch: 148784

Benzo-b-fluoranthene and benzo-k-fluoranthene do not meet resolution criteria.

Surrogate recoveries affected by sample dilution.

TCL Semivolatile Organic Compounds

Batch: 148758

Benzo-b-fluoranthene and benzo-k-fluoranthene do not meet resolution criteria.

NELAP accreditation was held for all analyses performed unless noted below. See www.phaseonline.com for complete PSS scope of accreditation.



Analytical Data Package Information Summary

Work Order(s): 17120630

Report Prepared For: Hillis Carnes Engineering Associates, Annapo

Project Name: SPT-DMCF

Project Manager: Keith Progin

Method	Client Sample Id	Analysis Type	Lab Sample Id	Analyst	Mtx	Prep Batch	Analytical Batch	Sampled	Prepared	Analyzed
SM2540G	C 0-4.5	Initial	17120630-001	1067	S	148695	148695	12/06/2017	12/08/2017 15:13	12/08/2017 15:13
	C 4.5-9	Initial	17120630-002	1067	S	148695	148695	12/06/2017	12/08/2017 15:13	12/08/2017 15:13
	C 9-13.5	Initial	17120630-003	1067	S	148695	148695	12/06/2017	12/08/2017 15:13	12/08/2017 15:13
	C 13.5-18	Initial	17120630-004	1067	S	148695	148695	12/06/2017	12/08/2017 15:13	12/08/2017 15:13
	D 0-4.5	Initial	17120630-005	1067	S	148695	148695	12/06/2017	12/08/2017 15:13	12/08/2017 15:13
	D 4.5-9	Initial	17120630-006	1067	S	148695	148695	12/06/2017	12/08/2017 15:13	12/08/2017 15:13
	D 9-13.5	Initial	17120630-007	1067	S	148695	148695	12/06/2017	12/08/2017 15:13	12/08/2017 15:13
	D 13.5-18	Initial	17120630-008	1067	S	148695	148695	12/06/2017	12/08/2017 15:13	12/08/2017 15:13
SW-846 6020 A	C 0-4.5	Initial	17120630-001	1064	S	69077	148712	12/06/2017	12/08/2017 10:07	12/08/2017 21:19
	C 4.5-9	Initial	17120630-002	1064	S	69077	148712	12/06/2017	12/08/2017 10:07	12/08/2017 22:02
	C 9-13.5	Initial	17120630-003	1064	S	69077	148712	12/06/2017	12/08/2017 10:07	12/08/2017 22:06
	C 13.5-18	Initial	17120630-004	1064	S	69077	148712	12/06/2017	12/08/2017 10:07	12/08/2017 22:09
	D 0-4.5	Initial	17120630-005	1064	S	69077	148712	12/06/2017	12/08/2017 10:07	12/08/2017 22:13
	D 4.5-9	Initial	17120630-006	1064	S	69077	148712	12/06/2017	12/08/2017 10:07	12/08/2017 22:17
	D 9-13.5	Initial	17120630-007	1064	S	69077	148712	12/06/2017	12/08/2017 10:07	12/08/2017 22:21
	D 13.5-18	Initial	17120630-008	1064	S	69077	148712	12/06/2017	12/08/2017 10:07	12/08/2017 22:25
	69077-1-BKS	BKS	69077-1-BKS	1064	S	69077	148712	-----	12/08/2017 10:07	12/08/2017 21:16
	69077-1-BLK	BLK	69077-1-BLK	1064	S	69077	148712	-----	12/08/2017 10:07	12/08/2017 21:12
	C 0-4.5 S	MS	17120630-001 S	1064	S	69077	148712	12/06/2017	12/08/2017 10:07	12/08/2017 21:23
	C 0-4.5 S	Reanalysis	17120630-001 S	1064	S	69077	148712	12/06/2017	12/08/2017 10:07	12/08/2017 21:23
	C 0-4.5 SD	MSD	17120630-001 SD	1064	S	69077	148712	12/06/2017	12/08/2017 10:07	12/08/2017 21:27
	C 0-4.5 SD	Reanalysis	17120630-001 SD	1064	S	69077	148712	12/06/2017	12/08/2017 10:07	12/08/2017 21:27
	C 0-4.5	Reanalysis	17120630-001	1064	S	69077	148780	12/06/2017	12/08/2017 10:07	12/11/2017 17:55
	C 4.5-9	Reanalysis	17120630-002	1064	S	69077	148780	12/06/2017	12/08/2017 10:07	12/11/2017 17:59
	C 9-13.5	Reanalysis	17120630-003	1064	S	69077	148780	12/06/2017	12/08/2017 10:07	12/11/2017 18:02
	C 13.5-18	Reanalysis	17120630-004	1064	S	69077	148780	12/06/2017	12/08/2017 10:07	12/11/2017 18:06
	D 0-4.5	Reanalysis	17120630-005	1064	S	69077	148780	12/06/2017	12/08/2017 10:07	12/11/2017 18:30
	D 4.5-9	Reanalysis	17120630-006	1064	S	69077	148780	12/06/2017	12/08/2017 10:07	12/11/2017 18:34
	D 9-13.5	Reanalysis	17120630-007	1064	S	69077	148780	12/06/2017	12/08/2017 10:07	12/11/2017 18:37



Analytical Data Package Information Summary

Work Order(s): 17120630

Report Prepared For: Hillis Carnes Engineering Associates, Annapo

Project Name: SPT-DMCF

Project Manager: Keith Progin

Method	Client Sample Id	Analysis Type	Lab Sample Id	Analyst	Mtx	Prep Batch	Analytical Batch	Sampled	Prepared	Analyzed
SW-846 6020 A	D 13.5-18	Reanalysis	17120630-008	1064	S	69077	148780	12/06/2017	12/08/2017 10:07	12/11/2017 18:41
SW-846 8015 C	GP-1 S	MS	17120606-001 S	1045	S	69052	148706	12/06/2017	12/07/2017 09:31	12/08/2017 14:14
	GP-1 SD	MSD	17120606-001 SD	1045	S	69052	148706	12/06/2017	12/07/2017 09:31	12/08/2017 14:39
	C 0-4.5	Initial	17120630-001	1045	S	69052	148707	12/06/2017	12/07/2017 09:31	12/08/2017 17:32
	69052-1-BKS	BKS	69052-1-BKS	1045	S	69052	148707	-----	12/07/2017 09:31	12/08/2017 14:14
	69052-1-BLK	BLK	69052-1-BLK	1045	S	69052	148707	-----	12/07/2017 09:31	12/08/2017 13:50
	69052-1-BSD	BSD	69052-1-BSD	1045	S	69052	148707	-----	12/07/2017 09:31	12/08/2017 14:39
	D 9-13.5	Initial	17120630-007	1045	S	69052	148730	12/06/2017	12/07/2017 09:31	12/11/2017 11:52
SW-846 8082 A	C 0-4.5	Initial	17120630-001	1029	S	69062	148743	12/06/2017	12/07/2017 13:33	12/08/2017 12:06
	C 4.5-9	Initial	17120630-002	1029	S	69062	148743	12/06/2017	12/07/2017 13:33	12/08/2017 12:34
	C 9-13.5	Initial	17120630-003	1029	S	69062	148743	12/06/2017	12/07/2017 13:33	12/08/2017 13:02
	C 13.5-18	Initial	17120630-004	1029	S	69062	148743	12/06/2017	12/07/2017 13:33	12/08/2017 13:30
	D 0-4.5	Initial	17120630-005	1029	S	69062	148743	12/06/2017	12/07/2017 13:33	12/08/2017 13:58
	D 4.5-9	Initial	17120630-006	1029	S	69062	148743	12/06/2017	12/07/2017 13:33	12/08/2017 14:27
	D 9-13.5	Initial	17120630-007	1029	S	69062	148743	12/06/2017	12/07/2017 13:33	12/08/2017 14:55
	D 13.5-18	Initial	17120630-008	1029	S	69062	148743	12/06/2017	12/07/2017 13:33	12/08/2017 15:30
	69062-1-BKS	BKS	69062-1-BKS	1029	S	69062	148743	-----	12/07/2017 13:33	12/08/2017 09:46
	69062-1-BLK	BLK	69062-1-BLK	1029	S	69062	148743	-----	12/07/2017 13:33	12/08/2017 09:18
	69062-1-BSD	BSD	69062-1-BSD	1029	S	69062	148743	-----	12/07/2017 13:33	12/08/2017 10:14
	S-1 S	MS	17120523-001 S	1029	S	69062	148743	12/04/2017	12/07/2017 13:33	12/08/2017 10:42
	S-1 SD	MSD	17120523-001 SD	1029	S	69062	148743	12/04/2017	12/07/2017 13:33	12/08/2017 11:10
SW-846 8270 C	C 13.5-18	Initial	17120630-004	1055	S	69073	148758	12/06/2017	12/08/2017 08:41	12/12/2017 00:31
	D 0-4.5	Initial	17120630-005	1055	S	69073	148758	12/06/2017	12/08/2017 08:41	12/11/2017 23:36
	D 4.5-9	Initial	17120630-006	1055	S	69073	148758	12/06/2017	12/08/2017 08:41	12/12/2017 00:58
	D 13.5-18	Initial	17120630-008	1055	S	69073	148758	12/06/2017	12/08/2017 08:41	12/11/2017 23:09
	69073-1-BKS	BKS	69073-1-BKS	1055	S	69073	148758	-----	12/08/2017 08:41	12/11/2017 15:23
	69073-1-BLK	BLK	69073-1-BLK	1055	S	69073	148758	-----	12/08/2017 08:41	12/11/2017 14:56
	69073-1-BSD	BSD	69073-1-BSD	1055	S	69073	148758	-----	12/08/2017 08:41	12/11/2017 15:51



Analytical Data Package Information Summary

Work Order(s): 17120630

Report Prepared For: Hillis Carnes Engineering Associates, Annapo

Project Name: SPT-DMCF

Project Manager: Keith Progin

Method	Client Sample Id	Analysis Type	Lab Sample Id	Analyst	Mtx	Prep Batch	Analytical Batch	Sampled	Prepared	Analyzed
SW-846 8270 C	TE1 S	MS	17120702-001 S	1055	S	69073	148758	12/06/2017	12/08/2017 08:41	12/11/2017 16:18
	TE1 SD	MSD	17120702-001 SD	1055	S	69073	148758	12/06/2017	12/08/2017 08:41	12/11/2017 16:45
	C 0-4.5	Initial	17120630-001	1055	S	69073	148784	12/06/2017	12/08/2017 08:41	12/12/2017 15:11
	C 4.5-9	Initial	17120630-002	1055	S	69073	148784	12/06/2017	12/08/2017 08:41	12/12/2017 14:16
	C 9-13.5	Initial	17120630-003	1055	S	69073	148784	12/06/2017	12/08/2017 08:41	12/12/2017 13:06
	D 9-13.5	Initial	17120630-007	1055	S	69073	148784	12/06/2017	12/08/2017 08:41	12/12/2017 17:58
	D 9-13.5	Reanalysis	17120630-007	1055	S	69073	148784	12/06/2017	12/08/2017 08:41	12/12/2017 17:31
SW-846 9045 D	C 0-4.5	Initial	17120630-001	1061	S	148636	148636	12/06/2017	12/07/2017 11:36	12/07/2017 11:36
	C 4.5-9	Initial	17120630-002	1061	S	148636	148636	12/06/2017	12/07/2017 11:36	12/07/2017 11:36
	C 9-13.5	Initial	17120630-003	1061	S	148636	148636	12/06/2017	12/07/2017 11:36	12/07/2017 11:36
	C 13.5-18	Initial	17120630-004	1061	S	148636	148636	12/06/2017	12/07/2017 11:36	12/07/2017 11:36
	D 0-4.5	Initial	17120630-005	1061	S	148636	148636	12/06/2017	12/07/2017 11:36	12/07/2017 11:36
	D 4.5-9	Initial	17120630-006	1061	S	148636	148636	12/06/2017	12/07/2017 11:36	12/07/2017 11:36
	D 9-13.5	Initial	17120630-007	1061	S	148636	148636	12/06/2017	12/07/2017 11:36	12/07/2017 11:36
	D 13.5-18	Initial	17120630-008	1061	S	148636	148636	12/06/2017	12/07/2017 11:36	12/07/2017 11:36
	C 0-4.5 D	MD	17120630-001 D	1061	S	148636	148636	12/06/2017	12/07/2017 11:36	12/07/2017 11:36

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120630

Hillis Carnes Engineering Associates SPT-DMCF

Analytical Method: SW-846 8082 ASeq Number: 148743
PSS Sample ID: 17120630-001

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/07/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	93		61-150	%	12/08/17 12:06
Tetrachloro-m-xylene	76		42-142	%	12/08/17 12:06

Analytical Method: SW-846 8015 CSeq Number: 148707
PSS Sample ID: 17120630-001

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/07/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
o-Terphenyl	90		34-133	%	12/08/17 17:32

Analytical Method: SW-846 8270 CSeq Number: 148784
PSS Sample ID: 17120630-001

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	75		32-107	%	12/12/17 15:11
2-Fluorophenol	69		34-113	%	12/12/17 15:11
Nitrobenzene-d5	85		35-123	%	12/12/17 15:11
Phenol-d6	70		34-120	%	12/12/17 15:11
Terphenyl-D14	84		46-154	%	12/12/17 15:11
2,4,6-Tribromophenol	83		31-113	%	12/12/17 15:11

Analytical Method: SW-846 8082 ASeq Number: 148743
PSS Sample ID: 17120630-002

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/07/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	93		61-150	%	12/08/17 12:34
Tetrachloro-m-xylene	78		42-142	%	12/08/17 12:34

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120630

Hillis Carnes Engineering Associates
SPT-DMCF

Analytical Method: SW-846 8270 C

Seq Number: 148784
PSS Sample ID: 17120630-002

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	69		32-107	%	12/12/17 14:16
2-Fluorophenol	67		34-113	%	12/12/17 14:16
Nitrobenzene-d5	75		35-123	%	12/12/17 14:16
Phenol-d6	69		34-120	%	12/12/17 14:16
Terphenyl-D14	83		46-154	%	12/12/17 14:16
2,4,6-Tribromophenol	82		31-113	%	12/12/17 14:16

Analytical Method: SW-846 8082 A

Seq Number: 148743
PSS Sample ID: 17120630-003

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/07/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	94		61-150	%	12/08/17 13:02
Tetrachloro-m-xylene	78		42-142	%	12/08/17 13:02

Analytical Method: SW-846 8270 C

Seq Number: 148784
PSS Sample ID: 17120630-003

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	61		32-107	%	12/12/17 13:06
2-Fluorophenol	60		34-113	%	12/12/17 13:06
Nitrobenzene-d5	64		35-123	%	12/12/17 13:06
Phenol-d6	63		34-120	%	12/12/17 13:06
Terphenyl-D14	81		46-154	%	12/12/17 13:06
2,4,6-Tribromophenol	74		31-113	%	12/12/17 13:06

Analytical Method: SW-846 8082 A

Seq Number: 148743
PSS Sample ID: 17120630-004

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/07/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	93		61-150	%	12/08/17 13:30
Tetrachloro-m-xylene	76		42-142	%	12/08/17 13:30

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120630

Hillis Carnes Engineering Associates SPT-DMCF

Analytical Method: SW-846 8270 C

Seq Number: 148758
PSS Sample ID: 17120630-004

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	85		32-107	%	12/12/17 00:31
2-Fluorophenol	80		34-113	%	12/12/17 00:31
Nitrobenzene-d5	90		35-123	%	12/12/17 00:31
Phenol-d6	81		34-120	%	12/12/17 00:31
Terphenyl-D14	92		46-154	%	12/12/17 00:31
2,4,6-Tribromophenol	95		31-113	%	12/12/17 00:31

Analytical Method: SW-846 8082 A

Seq Number: 148743
PSS Sample ID: 17120630-005

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/07/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	95		61-150	%	12/08/17 13:58
Tetrachloro-m-xylene	74		42-142	%	12/08/17 13:58

Analytical Method: SW-846 8270 C

Seq Number: 148758
PSS Sample ID: 17120630-005

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	74		32-107	%	12/11/17 23:36
2-Fluorophenol	71		34-113	%	12/11/17 23:36
Nitrobenzene-d5	79		35-123	%	12/11/17 23:36
Phenol-d6	71		34-120	%	12/11/17 23:36
Terphenyl-D14	84		46-154	%	12/11/17 23:36
2,4,6-Tribromophenol	85		31-113	%	12/11/17 23:36

Analytical Method: SW-846 8082 A

Seq Number: 148743
PSS Sample ID: 17120630-006

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/07/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	96		61-150	%	12/08/17 14:27
Tetrachloro-m-xylene	71		42-142	%	12/08/17 14:27

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120630

Hillis Carnes Engineering Associates SPT-DMCF

Analytical Method: SW-846 8270 C

Seq Number: 148758
PSS Sample ID: 17120630-006

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	76		32-107	%	12/12/17 00:58
2-Fluorophenol	73		34-113	%	12/12/17 00:58
Nitrobenzene-d5	82		35-123	%	12/12/17 00:58
Phenol-d6	78		34-120	%	12/12/17 00:58
Terphenyl-D14	81		46-154	%	12/12/17 00:58
2,4,6-Tribromophenol	85		31-113	%	12/12/17 00:58

Analytical Method: SW-846 8082 A

Seq Number: 148743
PSS Sample ID: 17120630-007

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/07/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	153	*	61-150	%	12/08/17 14:55
Tetrachloro-m-xylene	88		42-142	%	12/08/17 14:55

Analytical Method: SW-846 8015 C

Seq Number: 148730
PSS Sample ID: 17120630-007

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/07/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
o-Terphenyl	98		34-133	%	12/11/17 11:52

Analytical Method: SW-846 8270 C

Seq Number: 148784
PSS Sample ID: 17120630-007

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	74		32-107	%	12/12/17 17:58
2-Fluorophenol	60		34-113	%	12/12/17 17:58
Nitrobenzene-d5	67		35-123	%	12/12/17 17:58
Phenol-d6	57		34-120	%	12/12/17 17:58
Terphenyl-D14	75		46-154	%	12/12/17 17:58
2,4,6-Tribromophenol	71		31-113	%	12/12/17 17:58

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120630

Hillis Carnes Engineering Associates SPT-DMCF

Analytical Method: SW-846 8082 A

Seq Number: 148743

PSS Sample ID: 17120630-008

Matrix: Soil

Prep Method: SW3550C

Date Prep: 12/07/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	93		61-150	%	12/08/17 15:30
Tetrachloro-m-xylene	76		42-142	%	12/08/17 15:30

Analytical Method: SW-846 8270 C

Seq Number: 148758

PSS Sample ID: 17120630-008

Matrix: Soil

Prep Method: SW3550C

Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	78		32-107	%	12/11/17 23:09
2-Fluorophenol	74		34-113	%	12/11/17 23:09
Nitrobenzene-d5	84		35-123	%	12/11/17 23:09
Phenol-d6	80		34-120	%	12/11/17 23:09
Terphenyl-D14	86		46-154	%	12/11/17 23:09
2,4,6-Tribromophenol	88		31-113	%	12/11/17 23:09

F = RPD exceeded the laboratory control limits

X = Recovery of MS, MSD or both outside of QC Criteria

H= Recovery of BS,BSD or both exceeded the laboratory control limits

L = Recovery of BS,BSD or both below the laboratory control limits

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120630

Hillis Carnes Engineering Associates

SPT-DMCF

Analytical Method: SW-846 9045 D

Seq Number: 148636

Matrix: Soil

Parent Sample Id: 17120630-001

MD Sample Id: 17120630-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
pH	4.267	4.271	0	10	SU	12/07/17 11:36	

Analytical Method: SW-846 6020 A

Seq Number: 148712

Matrix: Solid

Prep Method: SW3050B

Date Prep: 12/08/17

MB Sample Id: 69077-1-BLK

LCS Sample Id: 69077-1-BKS

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
Antimony	<2.074	16.59	18.00	108	80-120	mg/kg	12/08/17 21:16	
Arsenic	<0.4149	16.59	17.52	106	80-120	mg/kg	12/08/17 21:16	
Beryllium	<2.074	16.59	16.57	100	80-120	mg/kg	12/08/17 21:16	
Cadmium	<2.074	16.59	16.33	98	80-120	mg/kg	12/08/17 21:16	
Calcium	<41.49	165.9	166.7	100	80-120	mg/kg	12/08/17 21:16	
Chromium	<2.074	16.59	16.35	99	80-120	mg/kg	12/08/17 21:16	
Copper	<2.074	16.59	16.41	99	80-120	mg/kg	12/08/17 21:16	
Lead	<2.074	16.59	16.53	100	80-120	mg/kg	12/08/17 21:16	
Manganese	<2.074	16.59	16.77	101	80-120	mg/kg	12/08/17 21:16	
Mercury	<0.08297	0.4149	0.4132	100	80-120	mg/kg	12/08/17 21:16	
Nickel	<2.074	16.59	16.57	100	80-120	mg/kg	12/08/17 21:16	
Selenium	<2.074	16.59	16.50	99	80-120	mg/kg	12/08/17 21:16	
Silver	<2.074	16.59	17.92	108	80-120	mg/kg	12/08/17 21:16	
Thallium	<1.659	16.59	14.62	88	80-120	mg/kg	12/08/17 21:16	
Zinc	<8.297	82.97	81.65	98	80-120	mg/kg	12/08/17 21:16	

Analytical Method: SW-846 6020 A

Seq Number: 148712

Matrix: Soil

Prep Method: SW3050B

Date Prep: 12/08/17

Parent Sample Id: 17120630-001

MS Sample Id: 17120630-001 S

MSD Sample Id: 17120630-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Antimony	<3.076	24.61	8.177	33	10.16	37	75-125	22	30	mg/kg	12/08/17 21:23	X
Arsenic	24.94	24.61	40.65	64	46.23	78	75-125	13	30	mg/kg	12/08/17 21:23	X
Beryllium	<3.076	24.61	24.21	98	24.81	91	75-125	2	30	mg/kg	12/08/17 21:23	
Cadmium	<3.076	24.61	25.06	102	25.95	95	75-125	3	30	mg/kg	12/08/17 21:23	
Calcium	1146	246.1	1527	155	1210	24	75-125	23	30	mg/kg	12/08/17 21:23	X
Chromium	132.4	24.61	146.4	57	147.9	57	75-125	1	30	mg/kg	12/08/17 21:23	X
Copper	74.54	24.61	91.41	69	94.63	74	75-125	3	30	mg/kg	12/08/17 21:23	X
Lead	142.7	24.61	146.8	17	148.3	21	75-125	1	30	mg/kg	12/08/17 21:23	X
Manganese	773.2	24.61	916.7	583	842.3	254	75-125	8	30	mg/kg	12/08/17 21:23	X
Mercury	0.3064	0.6152	0.8539	89	0.8720	83	75-125	2	30	mg/kg	12/08/17 21:23	
Nickel	34.57	24.61	55.92	87	53.43	69	75-125	5	30	mg/kg	12/08/17 21:23	X
Selenium	<3.076	24.61	25.18	102	26.89	99	75-125	7	30	mg/kg	12/08/17 21:23	
Silver	<3.076	24.61	26.41	107	27.27	100	75-125	3	30	mg/kg	12/08/17 21:23	
Thallium	<2.461	24.61	20.42	83	22.47	83	75-125	10	20	mg/kg	12/08/17 21:23	
Zinc	245.6	123	357.2	91	337.2	67	75-125	6	30	mg/kg	12/08/17 21:23	X

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120630

Hillis Carnes Engineering Associates
SPT-DMCF

Analytical Method: SW-846 8082 A

Seq Number: 148743

MB Sample Id: 69062-1-BLK

Matrix: Solid

LCS Sample Id: 69062-1-BKS

Prep Method: SW3550C

Date Prep: 12/07/17

LCSD Sample Id: 69062-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
PCB-1016	<0.04803	0.4803	0.3585	75	0.3641	75	60-110	2	25	mg/kg	12/08/17 09:46	
PCB-1260	<0.04803	0.4803	0.3213	67	0.3302	68	60-98	3	25	mg/kg	12/08/17 09:46	

Surrogate	MB %Rec	MB Flag	LCS Result	LCS Flag	LCSD Result	LCSD Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	88		92		93		61-150	%	12/08/17 09:46
Tetrachloro-m-xylene	70		77		76		42-142	%	12/08/17 09:46

Analytical Method: SW-846 8015 C

Seq Number: 148707

MB Sample Id: 69052-1-BLK

Matrix: Solid

LCS Sample Id: 69052-1-BKS

Prep Method: SW3550C

Date Prep: 12/07/17

LCSD Sample Id: 69052-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
TPH-DRO (Diesel Range Organics)	<9.917	33.06	31.01	94	25.58	76	54-123	19	25	mg/kg	12/08/17 14:14	

Surrogate	MB %Rec	MB Flag	LCS Result	LCS Flag	LCSD Result	LCSD Flag	Limits	Units	Analysis Date
o-Terphenyl	70		84		77		34-133	%	12/08/17 14:14

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120630

Hillis Carnes Engineering Associates
SPT-DMCF

Analytical Method: SW-846 8270 C

Seq Number: 148758

MB Sample Id: 69073-1-BLK

Matrix: Solid

LCS Sample Id: 69073-1-BKS

Prep Method: SW3550C

Date Prep: 12/08/17

LCSD Sample Id: 69073-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Acenaphthene	<16.64	1331	1111	83	1047	79	60-116	6	25	ug/kg	12/11/17 15:23	
Acenaphthylene	<16.64	1331	1130	85	1055	79	61-112	7	25	ug/kg	12/11/17 15:23	
Anthracene	<16.64	1331	1188	89	1119	84	66-115	6	25	ug/kg	12/11/17 15:23	
Benzo(a)anthracene	<16.64	1331	1238	93	1152	86	71-113	7	25	ug/kg	12/11/17 15:23	
Benzo(a)pyrene	<16.64	1331	1228	92	1137	85	69-118	8	25	ug/kg	12/11/17 15:23	
Benzo(b)fluoranthene	<16.64	1331	1202	90	1137	85	65-126	6	25	ug/kg	12/11/17 15:23	
Benzo(g,h,i)perylene	<16.64	1331	1204	90	1099	82	69-112	9	25	ug/kg	12/11/17 15:23	
Benzo(k)fluoranthene	<16.64	1331	1154	87	1082	81	57-129	6	25	ug/kg	12/11/17 15:23	
Chrysene	<16.64	1331	1290	97	1208	91	72-114	7	25	ug/kg	12/11/17 15:23	
Dibenz(a,h)Anthracene	<16.64	1331	1179	89	1091	82	72-110	8	25	ug/kg	12/11/17 15:23	
Fluoranthene	<16.64	1331	1175	88	1089	82	69-119	8	25	ug/kg	12/11/17 15:23	
Fluorene	<16.64	1331	1150	86	1076	81	65-115	7	25	ug/kg	12/11/17 15:23	
Indeno(1,2,3-c,d)Pyrene	<16.64	1331	1067	80	981.7	74	60-127	8	25	ug/kg	12/11/17 15:23	
2-Methylnaphthalene	<16.64	1331	1117	84	1073	80	70-109	4	25	ug/kg	12/11/17 15:23	
Naphthalene	<16.64	1331	1112	84	1041	78	59-108	7	25	ug/kg	12/11/17 15:23	
Phenanthrene	<16.64	1331	1065	80	1006	75	67-117	6	25	ug/kg	12/11/17 15:23	
Pyrene	<16.64	1331	1196	90	1111	83	77-111	7	25	ug/kg	12/11/17 15:23	

Surrogate	MB %Rec	MB Flag	LCS Result	LCS Flag	LCSD Result	LCSD Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	98		86		86		32-107	%	12/11/17 15:23
2-Fluorophenol	99		87		88		34-113	%	12/11/17 15:23
Nitrobenzene-d5	109		92		95		35-123	%	12/11/17 15:23
Phenol-d6	98		88		92		34-120	%	12/11/17 15:23
Terphenyl-D14	90		86		88		46-154	%	12/11/17 15:23
2,4,6-Tribromophenol	98		100		98		31-113	%	12/11/17 15:23

F = RPD exceeded the laboratory control limits

X = Recovery of MS, MSD or both outside of QC Criteria

H= Recovery of BS,BSD or both exceeded the laboratory control limits

L = Recovery of BS,BSD or both below the laboratory control limits



SAMPLE CHAIN OF CUSTODY/AGREEMENT FORM

www.phaseonline.com
email: info@phaseonline.com

PHASE SEPARATION SCIENCE, INC.

1 *CLIENT: Hillis Campus (HCEA) *OFFICE LOC. A5 PSS Work Order #: 17120630 PAGE 1 OF 1

*PROJECT MGR: Kraik Progin *PHONE NO.: (410) 880-4788
 EMAIL: kprogin@hceas.com FAX NO.: ()
 *PROJECT NAME: SPT-DMLF PROJECT NO.: 17675A
 SITE LOCATION: P.O. NO.: 2041906208

2 SAMPLER(S): Sean Whelan DW CERT NO.:

LAB NO.	*SAMPLE IDENTIFICATION	*DATE (SAMPLED)	*TIME (SAMPLED)	MATRIX (See Codes)
1	C 0-4.5	12/6/17	10:10	S
2	C 4.5-9		10:20	
3	C 9-13.5		10:30	
4	C 13.5-18		10:40	
5	D 0-4.5		2:30	
6	D 4.5-9		2:40	
7	D 9-13.5		2:50	
8	D 13.5-18		3:00	

3 *Requested TAT (One TAT per COC)
 5-Day 3-Day 2-Day Other
 Next Day Emergency Other

Data Deliverables Required:
 COA QC SUMM CLP LIKE OTHER

Special Instructions:

4 # of Coolers: 1 Custody Seal: ABS
 Ice Present: Pres Temp: 0-10c
 Shipping Carrier: client

STATE RESULTS REPORTED TO:
 MD DE PA VA WV OTHER

DW COMPLIANCE? YES EDD FORMAT TYPE: _____

6630 Baltimore National Pike • Route 40 West • Baltimore, Maryland 21228 • (410) 747-8770 • (800) 932-9047 • Fax (410) 788-8723

The client (Client Name), by signing, or having client's agent sign, this "Sample Chain of Custody/Agreement Form", agrees to pay for the above requested services per the latest version of the Service Brochure or PSS-provided quotation including any and all attorney's or other reasonable fees if collection becomes necessary. * = REQUIRED



Phase Separation Science, Inc

Sample Receipt Checklist

Work Order # 17120630 **Received By** Barb Weber
Client Name Hillis Carnes Engineering Associates **Date Received** 12/06/2017 03:55:00 PM
Project Name SPT-DMCF **Delivered By** Client
Project Number 17675A **Tracking No** Not Applicable
Disposal Date 01/10/2018 **Logged In By** Thomas Wingate

Shipping Container(s)

No. of Coolers 1

Custody Seal(s) Intact? N/A
 Seal(s) Signed / Dated? N/A

Ice Present
 Temp (deg C) 1
 Temp Blank Present No

Documentation

COC agrees with sample labels? Yes
 Chain of Custody Yes

Sampler Name Sean Harkins
 MD DW Cert. No. N/A

Sample Container

Appropriate for Specified Analysis? Yes
 Intact? Yes
 Labeled and Labels Legible? Yes

Custody Seal(s) Intact? Not Applicable
 Seal(s) Signed / Dated Not Applicable

Total No. of Samples Received 8

Total No. of Containers Received 23

Preservation

Total Metals	(pH<2)	N/A
Dissolved Metals, filtered within 15 minutes of collection	(pH<2)	N/A
Orthophosphorus, filtered within 15 minutes of collection		N/A
Cyanides	(pH>12)	N/A
Sulfide	(pH>9)	N/A
TOC, DOC (field filtered), COD, Phenols	(pH<2)	N/A
TOX, TKN, NH3, Total Phos	(pH<2)	N/A
VOC, BTEX (VOA Vials Rcvd Preserved)	(pH<2)	N/A
Do VOA vials have zero headspace?		N/A
624 VOC (Rcvd at least one unpreserved VOA vial)		N/A
524 VOC (Rcvd with trip blanks)	(pH<2)	N/A

Comments: (Any "No" response must be detailed in the comments section below.)

For any improper preservation conditions, list sample ID, preservative added (reagent ID number) below as well as documentation of any client notification as well as client instructions. Samples for pH, chlorine and dissolved oxygen should be analyzed as soon as possible, preferably in the field at the time of sampling. Samples which require thermal preservation shall be considered acceptable when received at a temperature above freezing to 6°C. Samples that are hand delivered on the day that they are collected may not meet these criteria but shall be considered acceptable if there is evidence that the chilling process has begun such as arrival on ice.

Sample(s) received at 0 degrees but no samples were frozen.

Samples Inspected/Checklist Completed By:

Thomas Wingate

Date: 12/06/2017

PM Review and Approval:

Amber Confer

Date: 12/07/2017

Analytical Report for
Hillis Carnes Engineering Associates
Certificate of Analysis No.: 17120714

Project Manager: Keith Progin

Project Name : SPT-DMCF

Project ID : 17675A



December 14, 2017
Phase Separation Science, Inc.
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Baltimore, MD 21228
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PHASE SEPARATION SCIENCE, INC.



December 14, 2017

Keith Progin
Hillis Carnes Engineering Associates
10975 Guilford Road, Ste. A
Annapolis Junction, MD 20701

Reference: PSS Work Order(s) No: **17120714**
Project Name: SPT-DMCF

Project ID.: 17675A

Dear Keith Progin :

This report includes the analytical results from the analyses performed on the samples received under the project name referenced above and identified with the Phase Separation Science (PSS) Work Order(s) numbered **17120714**.

All work reported herein has been performed in accordance with current NELAP standards, referenced methodologies, PSS Standard Operating Procedures and the PSS Quality Assurance Manual unless otherwise noted in the Case Narrative Summary. PSS is limited in liability to the actual cost of the sample analysis done.

PSS reserves the right to return any unused samples, extracts or related solutions. Otherwise, the samples are scheduled for disposal, without any further notice, on January 11, 2018, with the exception of air canisters which are cleaned immediately following analysis. This includes any samples that were received with a request to be held but lacked a specific hold period. It is your responsibility to provide a written request defining a specific disposal date if additional storage is required. Upon receipt, the request will be acknowledged by PSS, thus extending the storage period.

This report shall not be reproduced except in full, without the written approval of an authorized PSS representative. A copy of this report will be retained by PSS for at least 5 years, after which time it will be disposed of without further notice, unless prior arrangements have been made.

We thank you for selecting Phase Separation Science, Inc. to serve your analytical needs. If you have any questions concerning this report, do not hesitate to contact us at 410-747-8770 or info@phaseonline.com.

Sincerely,

Dan Prucnal

Laboratory Manager



Sample Summary

Client Name: Hillis Carnes Engineering Associates
Project Name: SPT-DMCF

Work Order Number(s): 17120714

Project ID: 17675A

The following samples were received under chain of custody by Phase Separation Science (PSS) on 12/07/2017 at 03:35 pm

Lab Sample Id	Sample Id	Matrix	Date/Time Collected
17120714-001	F 0-4.5	SOIL	12/07/17 10:00
17120714-002	F 4.5-9	SOIL	12/07/17 10:10
17120714-003	F 9-13.5	SOIL	12/07/17 10:20
17120714-004	F 13.5-18	SOIL	12/07/17 10:30
17120714-005	G 0-4.5	SOIL	12/07/17 14:00
17120714-006	G 4.5-9	SOIL	12/07/17 14:10
17120714-007	G 9-13.5	SOIL	12/07/17 14:20
17120714-008	G 13.5-18	SOIL	12/07/17 14:30

Please reference the Chain of Custody and Sample Receipt Checklist for specific container counts and preservatives. Any sample conditions not in compliance with sample acceptance criteria are described in Case Narrative Summary.

Notes:

1. The presence of a common laboratory contaminant such as methylene chloride may be considered a possible laboratory artifact. Where observed, appropriate consideration of data should be taken.
2. Unless otherwise noted in the case narrative, results are reported on a dry weight basis with the exception of pH, flashpoint, moisture, and paint filter test.
3. Drinking water samples collected for the purpose of compliance with SDWA may not be suitable for their intended use unless collected by a certified sampler [COMAR 26.08.05.07.C.2].
4. The analyses of 1,2-dibromo-3-chloropropane (DBCP) and 1,2-dibromoethane (EDB) by EPA 524.2 and calcium, magnesium, sodium and iron by EPA 200.8 are not currently promulgated for use in testing to meet the Safe Drinking Water Act and as such cannot be used for compliance purposes. The listings of the current promulgated methods for testing in compliance with the Safe Drinking Water Act can be found in the 40 CFR part 141.1, for the primary drinking water contaminants, and part 141.3, for the secondary drinking water contaminants.
5. Sample prepared under EPA 3550C with concentrations greater than 20 mg/Kg should employ the microtip extraction procedure if required to meet data quality objectives.
6. The analysis of acrolein by EPA 624 must be analyzed within three days of sampling unless pH is adjusted to 4-5 units [40 CFR part 136.3(e)].
7. Method 180.1, The Determination of Turbidity by Nephelometry, recommends samples over 40 NTU be diluted until the turbidity falls below 40 units. Routine samples over 40 NTU may not be diluted as long as the data quality objectives are not affected.
8. Alkalinity results analyzed by EPA 310.2 that are reported by dilution are estimated and are not in compliance with method requirements.

Standard Flags/Abbreviations:

- B** A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
- C** Results Pending Final Confirmation.
- E** The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
- Fail** The result exceeds the regulatory level for Toxicity Characteristic (TCLP) as cited in 40 CFR 261.24 Table 1.
- J** The target analyte was positively identified below the reporting limit but greater than the MDL.
- MDL** This is the Laboratory Method Detection Limit which is equivalent to the Limit of Detection (LOD). The LOD is an estimate of the minimum amount of a substance that an analytical process can reliably detect. This value will remain constant across multiple similar instrumentation and among different analysts. An LOD is analyte and matrix specific.
- ND** Not Detected at or above the reporting limit.
- RL** PSS Reporting Limit.
- U** Not detected.

Certifications:

NELAP Certifications: PA 68-03330, VA 460156
State Certifications: MD 179, WV 303
Regulated Soil Permit: P330-12-00268
NSWC USCG Accepted Laboratory
LDBE MWAA LD1997-0041-2015



Sample Summary

Client Name: Hillis Carnes Engineering Associates

Project Name: SPT-DMCF

Work Order Number(s): 17120714

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 BALTIMORE, MD 21228
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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120714

Hillis Carnes Engineering Associates, Annapolis Junction, MD

December 14, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: F 0-4.5	Date/Time Sampled: 12/07/2017 10:00	PSS Sample ID: 17120714-001
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	% Solids: 63

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	3.4		1	12/11/17	12/11/17 23:28	1064
Arsenic	22	mg/kg	0.67		1	12/11/17	12/11/17 23:28	1064
Beryllium	ND	mg/kg	3.4		1	12/11/17	12/11/17 23:28	1064
Cadmium	ND	mg/kg	3.4		1	12/11/17	12/11/17 23:28	1064
Calcium	720	mg/kg	67		1	12/11/17	12/11/17 23:28	1064
Chromium	120	mg/kg	3.4		1	12/11/17	12/11/17 23:28	1064
Copper	70	mg/kg	3.4		1	12/11/17	12/11/17 23:28	1064
Lead	110	mg/kg	3.4		1	12/11/17	12/11/17 23:28	1064
Manganese	790	mg/kg	34		10	12/11/17	12/12/17 18:07	1064
Mercury	0.29	mg/kg	0.13		1	12/11/17	12/11/17 23:28	1064
Nickel	34	mg/kg	3.4		1	12/11/17	12/11/17 23:28	1064
Selenium	ND	mg/kg	3.4		1	12/11/17	12/11/17 23:28	1064
Silver	ND	mg/kg	3.4		1	12/11/17	12/11/17 23:28	1064
Thallium	ND	mg/kg	2.7		1	12/11/17	12/11/17 23:28	1064
Zinc	220	mg/kg	13		1	12/11/17	12/11/17 23:28	1064

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C

Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.081		1	12/08/17	12/11/17 11:42	1029
PCB-1221	ND	mg/kg	0.081		1	12/08/17	12/11/17 11:42	1029
PCB-1232	ND	mg/kg	0.081		1	12/08/17	12/11/17 11:42	1029
PCB-1242	ND	mg/kg	0.081		1	12/08/17	12/11/17 11:42	1029
PCB-1248	ND	mg/kg	0.081		1	12/08/17	12/11/17 11:42	1029
PCB-1254	ND	mg/kg	0.081		1	12/08/17	12/11/17 11:42	1029
PCB-1260	ND	mg/kg	0.081		1	12/08/17	12/11/17 11:42	1029

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120714

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 14, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: F 0-4.5	Date/Time Sampled: 12/07/2017 10:00	PSS Sample ID: 17120714-001
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	% Solids: 63

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	26		1	12/12/17	12/13/17 23:22	1059
Acenaphthylene	ND	ug/kg	26		1	12/12/17	12/13/17 23:22	1059
Anthracene	ND	ug/kg	26		1	12/12/17	12/13/17 23:22	1059
Benzo(a)anthracene	110	ug/kg	26		1	12/12/17	12/13/17 23:22	1059
Benzo(a)pyrene	160	ug/kg	26		1	12/12/17	12/13/17 23:22	1059
Benzo(b)fluoranthene	140	ug/kg	26		1	12/12/17	12/13/17 23:22	1059
Benzo(g,h,i)perylene	110	ug/kg	26		1	12/12/17	12/13/17 23:22	1059
Benzo(k)fluoranthene	140	ug/kg	26		1	12/12/17	12/13/17 23:22	1059
Chrysene	130	ug/kg	26		1	12/12/17	12/13/17 23:22	1059
Dibenz(a,h)Anthracene	ND	ug/kg	26		1	12/12/17	12/13/17 23:22	1059
Fluoranthene	130	ug/kg	26		1	12/12/17	12/13/17 23:22	1059
Fluorene	ND	ug/kg	26		1	12/12/17	12/13/17 23:22	1059
Indeno(1,2,3-c,d)Pyrene	130	ug/kg	26		1	12/12/17	12/13/17 23:22	1059
2-Methylnaphthalene	ND	ug/kg	26		1	12/12/17	12/13/17 23:22	1059
Naphthalene	88	ug/kg	26		1	12/12/17	12/13/17 23:22	1059
Phenanthrene	41	ug/kg	26		1	12/12/17	12/13/17 23:22	1059
Pyrene	130	ug/kg	26		1	12/12/17	12/13/17 23:22	1059

Sample ID: F 0-4.5	Date/Time Sampled: 12/07/2017 10:00	PSS Sample ID: 17120714-001
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	4.1	SU			1	12/08/17	12/08/17 11:55	1061

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120714

Hillis Carnes Engineering Associates, Annapolis Junction, MD

December 14, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: F 4.5-9	Date/Time Sampled: 12/07/2017 10:10	PSS Sample ID: 17120714-002
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	% Solids: 51

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	3.7		1	12/11/17	12/11/17 23:32	1064
Arsenic	29	mg/kg	0.75		1	12/11/17	12/11/17 23:32	1064
Beryllium	ND	mg/kg	3.7		1	12/11/17	12/11/17 23:32	1064
Cadmium	ND	mg/kg	3.7		1	12/11/17	12/11/17 23:32	1064
Calcium	3,400	mg/kg	75		1	12/11/17	12/11/17 23:32	1064
Chromium	140	mg/kg	3.7		1	12/11/17	12/11/17 23:32	1064
Copper	84	mg/kg	3.7		1	12/11/17	12/11/17 23:32	1064
Lead	210	mg/kg	3.7		1	12/11/17	12/11/17 23:32	1064
Manganese	2,000	mg/kg	37		10	12/11/17	12/12/17 18:11	1064
Mercury	0.31	mg/kg	0.15		1	12/11/17	12/11/17 23:32	1064
Nickel	46	mg/kg	3.7		1	12/11/17	12/11/17 23:32	1064
Selenium	ND	mg/kg	3.7		1	12/11/17	12/11/17 23:32	1064
Silver	ND	mg/kg	3.7		1	12/11/17	12/11/17 23:32	1064
Thallium	ND	mg/kg	3.0		1	12/11/17	12/11/17 23:32	1064
Zinc	440	mg/kg	15		1	12/11/17	12/11/17 23:32	1064

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C

Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.095		1	12/08/17	12/11/17 12:16	1029
PCB-1221	ND	mg/kg	0.095		1	12/08/17	12/11/17 12:16	1029
PCB-1232	ND	mg/kg	0.095		1	12/08/17	12/11/17 12:16	1029
PCB-1242	ND	mg/kg	0.095		1	12/08/17	12/11/17 12:16	1029
PCB-1248	ND	mg/kg	0.095		1	12/08/17	12/11/17 12:16	1029
PCB-1254	ND	mg/kg	0.095		1	12/08/17	12/11/17 12:16	1029
PCB-1260	ND	mg/kg	0.095		1	12/08/17	12/11/17 12:16	1029

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CERTIFICATE OF ANALYSIS

No: 17120714

Hillis Carnes Engineering Associates, Annapolis Junction, MD

December 14, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: F 4.5-9	Date/Time Sampled: 12/07/2017 10:10	PSS Sample ID: 17120714-002
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	% Solids: 51

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	33		1	12/12/17	12/13/17 21:38	1059
Acenaphthylene	ND	ug/kg	33		1	12/12/17	12/13/17 21:38	1059
Anthracene	ND	ug/kg	33		1	12/12/17	12/13/17 21:38	1059
Benzo(a)anthracene	61	ug/kg	33		1	12/12/17	12/13/17 21:38	1059
Benzo(a)pyrene	85	ug/kg	33		1	12/12/17	12/13/17 21:38	1059
Benzo(b)fluoranthene	68	ug/kg	33		1	12/12/17	12/13/17 21:38	1059
Benzo(g,h,i)perylene	45	ug/kg	33		1	12/12/17	12/13/17 21:38	1059
Benzo(k)fluoranthene	69	ug/kg	33		1	12/12/17	12/13/17 21:38	1059
Chrysene	64	ug/kg	33		1	12/12/17	12/13/17 21:38	1059
Dibenz(a,h)Anthracene	ND	ug/kg	33		1	12/12/17	12/13/17 21:38	1059
Fluoranthene	72	ug/kg	33		1	12/12/17	12/13/17 21:38	1059
Fluorene	ND	ug/kg	33		1	12/12/17	12/13/17 21:38	1059
Indeno(1,2,3-c,d)Pyrene	56	ug/kg	33		1	12/12/17	12/13/17 21:38	1059
2-Methylnaphthalene	ND	ug/kg	33		1	12/12/17	12/13/17 21:38	1059
Naphthalene	59	ug/kg	33		1	12/12/17	12/13/17 21:38	1059
Phenanthrene	ND	ug/kg	33		1	12/12/17	12/13/17 21:38	1059
Pyrene	68	ug/kg	33		1	12/12/17	12/13/17 21:38	1059

Sample ID: F 4.5-9	Date/Time Sampled: 12/07/2017 10:10	PSS Sample ID: 17120714-002
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	6.5	SU			1	12/08/17	12/08/17 11:55	1061

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CERTIFICATE OF ANALYSIS

No: 17120714

Hillis Carnes Engineering Associates, Annapolis Junction, MD

December 14, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: F 9-13.5	Date/Time Sampled: 12/07/2017 10:20	PSS Sample ID: 17120714-003
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	% Solids: 55

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	3.1		1	12/11/17	12/11/17 23:36	1064
Arsenic	20	mg/kg	0.62		1	12/11/17	12/11/17 23:36	1064
Beryllium	ND	mg/kg	3.1		1	12/11/17	12/11/17 23:36	1064
Cadmium	ND	mg/kg	3.1		1	12/11/17	12/11/17 23:36	1064
Calcium	58,000	mg/kg	6,200		100	12/11/17	12/12/17 18:15	1064
Chromium	390	mg/kg	3.1		1	12/11/17	12/11/17 23:36	1064
Copper	86	mg/kg	3.1		1	12/11/17	12/11/17 23:36	1064
Lead	140	mg/kg	3.1		1	12/11/17	12/11/17 23:36	1064
Manganese	13,000	mg/kg	310		100	12/11/17	12/12/17 18:15	1064
Mercury	0.29	mg/kg	0.12		1	12/11/17	12/11/17 23:36	1064
Nickel	37	mg/kg	3.1		1	12/11/17	12/11/17 23:36	1064
Selenium	ND	mg/kg	3.1		1	12/11/17	12/11/17 23:36	1064
Silver	ND	mg/kg	3.1		1	12/11/17	12/11/17 23:36	1064
Thallium	ND	mg/kg	2.5		1	12/11/17	12/11/17 23:36	1064
Zinc	410	mg/kg	12		1	12/11/17	12/11/17 23:36	1064

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C

Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.091		1	12/08/17	12/11/17 12:44	1029
PCB-1221	ND	mg/kg	0.091		1	12/08/17	12/11/17 12:44	1029
PCB-1232	ND	mg/kg	0.091		1	12/08/17	12/11/17 12:44	1029
PCB-1242	ND	mg/kg	0.091		1	12/08/17	12/11/17 12:44	1029
PCB-1248	ND	mg/kg	0.091		1	12/08/17	12/11/17 12:44	1029
PCB-1254	ND	mg/kg	0.091		1	12/08/17	12/11/17 12:44	1029
PCB-1260	ND	mg/kg	0.091		1	12/08/17	12/11/17 12:44	1029

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CERTIFICATE OF ANALYSIS

No: 17120714

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 14, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: F 9-13.5	Date/Time Sampled: 12/07/2017 10:20	PSS Sample ID: 17120714-003
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	% Solids: 55

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	30		1	12/12/17	12/13/17 22:56	1059
Acenaphthylene	ND	ug/kg	30		1	12/12/17	12/13/17 22:56	1059
Anthracene	ND	ug/kg	30		1	12/12/17	12/13/17 22:56	1059
Benzo(a)anthracene	77	ug/kg	30		1	12/12/17	12/13/17 22:56	1059
Benzo(a)pyrene	110	ug/kg	30		1	12/12/17	12/13/17 22:56	1059
Benzo(b)fluoranthene	85	ug/kg	30		1	12/12/17	12/13/17 22:56	1059
Benzo(g,h,i)perylene	59	ug/kg	30		1	12/12/17	12/13/17 22:56	1059
Benzo(k)fluoranthene	92	ug/kg	30		1	12/12/17	12/13/17 22:56	1059
Chrysene	83	ug/kg	30		1	12/12/17	12/13/17 22:56	1059
Dibenz(a,h)Anthracene	ND	ug/kg	30		1	12/12/17	12/13/17 22:56	1059
Fluoranthene	100	ug/kg	30		1	12/12/17	12/13/17 22:56	1059
Fluorene	ND	ug/kg	30		1	12/12/17	12/13/17 22:56	1059
Indeno(1,2,3-c,d)Pyrene	79	ug/kg	30		1	12/12/17	12/13/17 22:56	1059
2-Methylnaphthalene	ND	ug/kg	30		1	12/12/17	12/13/17 22:56	1059
Naphthalene	140	ug/kg	30		1	12/12/17	12/13/17 22:56	1059
Phenanthrene	31	ug/kg	30		1	12/12/17	12/13/17 22:56	1059
Pyrene	100	ug/kg	30		1	12/12/17	12/13/17 22:56	1059

Sample ID: F 9-13.5	Date/Time Sampled: 12/07/2017 10:20	PSS Sample ID: 17120714-003
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	11.8	SU			1	12/08/17	12/08/17 11:55	1061

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CERTIFICATE OF ANALYSIS

No: 17120714

Hillis Carnes Engineering Associates, Annapolis Junction, MD

December 14, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: F 13.5-18	Date/Time Sampled: 12/07/2017 10:30	PSS Sample ID: 17120714-004
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	% Solids: 89

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	2.8		1	12/11/17	12/11/17 23:40	1064
Arsenic	3.9	mg/kg	0.55		1	12/11/17	12/11/17 23:40	1064
Beryllium	ND	mg/kg	2.8		1	12/11/17	12/11/17 23:40	1064
Cadmium	ND	mg/kg	2.8		1	12/11/17	12/11/17 23:40	1064
Calcium	130,000	mg/kg	5,500		100	12/11/17	12/12/17 18:38	1064
Chromium	1,500	mg/kg	280		100	12/11/17	12/12/17 18:38	1064
Copper	78	mg/kg	2.8		1	12/11/17	12/11/17 23:40	1064
Lead	87	mg/kg	2.8		1	12/11/17	12/11/17 23:40	1064
Manganese	57,000	mg/kg	2,600		1000	12/11/17	12/14/17 01:44	1064
Mercury	ND	mg/kg	0.11		1	12/11/17	12/11/17 23:40	1064
Nickel	17	mg/kg	2.8		1	12/11/17	12/11/17 23:40	1064
Selenium	ND	mg/kg	2.8		1	12/11/17	12/11/17 23:40	1064
Silver	ND	mg/kg	2.8		1	12/11/17	12/11/17 23:40	1064
Thallium	ND	mg/kg	2.2		1	12/11/17	12/11/17 23:40	1064
Zinc	640	mg/kg	11		1	12/11/17	12/11/17 23:40	1064

Total Petroleum Hydrocarbons - DRO

Analytical Method: SW-846 8015 C

Preparation Method: SW3550C

HF - Heavier fuel/oil pattern observed in sample.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
TPH-DRO (Diesel Range Organics)	23	mg/kg	11	HF	1	12/08/17	12/10/17 23:10	1045

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C

Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.054		1	12/08/17	12/11/17 13:12	1029
PCB-1221	ND	mg/kg	0.054		1	12/08/17	12/11/17 13:12	1029
PCB-1232	ND	mg/kg	0.054		1	12/08/17	12/11/17 13:12	1029
PCB-1242	ND	mg/kg	0.054		1	12/08/17	12/11/17 13:12	1029
PCB-1248	ND	mg/kg	0.054		1	12/08/17	12/11/17 13:12	1029
PCB-1254	ND	mg/kg	0.054		1	12/08/17	12/11/17 13:12	1029
PCB-1260	ND	mg/kg	0.054		1	12/08/17	12/11/17 13:12	1029

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CERTIFICATE OF ANALYSIS

No: 17120714

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 14, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: F 13.5-18	Date/Time Sampled: 12/07/2017 10:30	PSS Sample ID: 17120714-004
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	% Solids: 89

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	19		1	12/12/17	12/13/17 23:49	1059
Acenaphthylene	ND	ug/kg	19		1	12/12/17	12/13/17 23:49	1059
Anthracene	ND	ug/kg	19		1	12/12/17	12/13/17 23:49	1059
Benzo(a)anthracene	33	ug/kg	19		1	12/12/17	12/13/17 23:49	1059
Benzo(a)pyrene	30	ug/kg	19		1	12/12/17	12/13/17 23:49	1059
Benzo(b)fluoranthene	29	ug/kg	19		1	12/12/17	12/13/17 23:49	1059
Benzo(g,h,i)perylene	19	ug/kg	19		1	12/12/17	12/13/17 23:49	1059
Benzo(k)fluoranthene	23	ug/kg	19		1	12/12/17	12/13/17 23:49	1059
Chrysene	31	ug/kg	19		1	12/12/17	12/13/17 23:49	1059
Dibenz(a,h)Anthracene	ND	ug/kg	19		1	12/12/17	12/13/17 23:49	1059
Fluoranthene	63	ug/kg	19		1	12/12/17	12/13/17 23:49	1059
Fluorene	ND	ug/kg	19		1	12/12/17	12/13/17 23:49	1059
Indeno(1,2,3-c,d)Pyrene	21	ug/kg	19		1	12/12/17	12/13/17 23:49	1059
2-Methylnaphthalene	ND	ug/kg	19		1	12/12/17	12/13/17 23:49	1059
Naphthalene	140	ug/kg	19		1	12/12/17	12/13/17 23:49	1059
Phenanthrene	52	ug/kg	19		1	12/12/17	12/13/17 23:49	1059
Pyrene	53	ug/kg	19		1	12/12/17	12/13/17 23:49	1059

Sample ID: F 13.5-18	Date/Time Sampled: 12/07/2017 10:30	PSS Sample ID: 17120714-004
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	11.6	SU			1	12/08/17	12/08/17 11:55	1061

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CERTIFICATE OF ANALYSIS

No: 17120714

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 14, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: G 0-4.5	Date/Time Sampled: 12/07/2017 14:00	PSS Sample ID: 17120714-005
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	% Solids: 64

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	3.2		1	12/11/17	12/11/17 23:44	1064
Arsenic	21	mg/kg	0.63		1	12/11/17	12/11/17 23:44	1064
Beryllium	ND	mg/kg	3.2		1	12/11/17	12/11/17 23:44	1064
Cadmium	ND	mg/kg	3.2		1	12/11/17	12/11/17 23:44	1064
Calcium	640	mg/kg	63		1	12/11/17	12/11/17 23:44	1064
Chromium	110	mg/kg	3.2		1	12/11/17	12/11/17 23:44	1064
Copper	62	mg/kg	3.2		1	12/11/17	12/11/17 23:44	1064
Lead	99	mg/kg	3.2		1	12/11/17	12/11/17 23:44	1064
Manganese	760	mg/kg	32		10	12/11/17	12/12/17 18:42	1064
Mercury	0.25	mg/kg	0.13		1	12/11/17	12/11/17 23:44	1064
Nickel	33	mg/kg	3.2		1	12/11/17	12/11/17 23:44	1064
Selenium	ND	mg/kg	3.2		1	12/11/17	12/11/17 23:44	1064
Silver	ND	mg/kg	3.2		1	12/11/17	12/11/17 23:44	1064
Thallium	ND	mg/kg	2.5		1	12/11/17	12/11/17 23:44	1064
Zinc	240	mg/kg	13		1	12/11/17	12/11/17 23:44	1064

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C

Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.079		1	12/08/17	12/11/17 13:41	1029
PCB-1221	ND	mg/kg	0.079		1	12/08/17	12/11/17 13:41	1029
PCB-1232	ND	mg/kg	0.079		1	12/08/17	12/11/17 13:41	1029
PCB-1242	ND	mg/kg	0.079		1	12/08/17	12/11/17 13:41	1029
PCB-1248	ND	mg/kg	0.079		1	12/08/17	12/11/17 13:41	1029
PCB-1254	ND	mg/kg	0.079		1	12/08/17	12/11/17 13:41	1029
PCB-1260	ND	mg/kg	0.079		1	12/08/17	12/11/17 13:41	1029

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120714

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 14, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: G 0-4.5	Date/Time Sampled: 12/07/2017 14:00	PSS Sample ID: 17120714-005
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	% Solids: 64

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	26		1	12/12/17	12/13/17 22:04	1059
Acenaphthylene	ND	ug/kg	26		1	12/12/17	12/13/17 22:04	1059
Anthracene	ND	ug/kg	26		1	12/12/17	12/13/17 22:04	1059
Benzo(a)anthracene	58	ug/kg	26		1	12/12/17	12/13/17 22:04	1059
Benzo(a)pyrene	75	ug/kg	26		1	12/12/17	12/13/17 22:04	1059
Benzo(b)fluoranthene	62	ug/kg	26		1	12/12/17	12/13/17 22:04	1059
Benzo(g,h,i)perylene	50	ug/kg	26		1	12/12/17	12/13/17 22:04	1059
Benzo(k)fluoranthene	63	ug/kg	26		1	12/12/17	12/13/17 22:04	1059
Chrysene	64	ug/kg	26		1	12/12/17	12/13/17 22:04	1059
Dibenz(a,h)Anthracene	ND	ug/kg	26		1	12/12/17	12/13/17 22:04	1059
Fluoranthene	69	ug/kg	26		1	12/12/17	12/13/17 22:04	1059
Fluorene	ND	ug/kg	26		1	12/12/17	12/13/17 22:04	1059
Indeno(1,2,3-c,d)Pyrene	56	ug/kg	26		1	12/12/17	12/13/17 22:04	1059
2-Methylnaphthalene	ND	ug/kg	26		1	12/12/17	12/13/17 22:04	1059
Naphthalene	40	ug/kg	26		1	12/12/17	12/13/17 22:04	1059
Phenanthrene	ND	ug/kg	26		1	12/12/17	12/13/17 22:04	1059
Pyrene	62	ug/kg	26		1	12/12/17	12/13/17 22:04	1059

Sample ID: G 0-4.5	Date/Time Sampled: 12/07/2017 14:00	PSS Sample ID: 17120714-005
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	4.1	SU			1	12/08/17	12/08/17 11:55	1061

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120714

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 14, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: G 4.5-9	Date/Time Sampled: 12/07/2017 14:10	PSS Sample ID: 17120714-006
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	% Solids: 51

PP Metals plus Calcium and Manganese Analytical Method: SW-846 6020 A Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	3.6		1	12/11/17	12/11/17 23:48	1064
Arsenic	21	mg/kg	0.71		1	12/11/17	12/11/17 23:48	1064
Beryllium	ND	mg/kg	3.6		1	12/11/17	12/11/17 23:48	1064
Cadmium	4.8	mg/kg	3.6		1	12/11/17	12/12/17 17:52	1064
Calcium	2,000	mg/kg	71		1	12/11/17	12/11/17 23:48	1064
Chromium	140	mg/kg	3.6		1	12/11/17	12/11/17 23:48	1064
Copper	110	mg/kg	3.6		1	12/11/17	12/11/17 23:48	1064
Lead	130	mg/kg	3.6		1	12/11/17	12/11/17 23:48	1064
Manganese	3,100	mg/kg	36		10	12/11/17	12/12/17 18:46	1064
Mercury	0.30	mg/kg	0.14		1	12/11/17	12/11/17 23:48	1064
Nickel	67	mg/kg	3.6		1	12/11/17	12/11/17 23:48	1064
Selenium	ND	mg/kg	3.6		1	12/11/17	12/11/17 23:48	1064
Silver	ND	mg/kg	3.6		1	12/11/17	12/11/17 23:48	1064
Thallium	ND	mg/kg	2.9		1	12/11/17	12/11/17 23:48	1064
Zinc	840	mg/kg	14		1	12/11/17	12/11/17 23:48	1064

Total Petroleum Hydrocarbons - DRO Analytical Method: SW-846 8015 C Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
TPH-DRO (Diesel Range Organics)	ND	mg/kg	20		1	12/08/17	12/11/17 15:51	1045

Polychlorinated Biphenyls Analytical Method: SW-846 8082 A Preparation Method: SW3550C
 Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.096		1	12/08/17	12/11/17 14:08	1029
PCB-1221	ND	mg/kg	0.096		1	12/08/17	12/11/17 14:08	1029
PCB-1232	ND	mg/kg	0.096		1	12/08/17	12/11/17 14:08	1029
PCB-1242	ND	mg/kg	0.096		1	12/08/17	12/11/17 14:08	1029
PCB-1248	ND	mg/kg	0.096		1	12/08/17	12/11/17 14:08	1029
PCB-1254	ND	mg/kg	0.096		1	12/08/17	12/11/17 14:08	1029
PCB-1260	ND	mg/kg	0.096		1	12/08/17	12/11/17 14:08	1029

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120714

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 14, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: G 4.5-9	Date/Time Sampled: 12/07/2017 14:10	PSS Sample ID: 17120714-006
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	% Solids: 51

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	33		1	12/12/17	12/13/17 21:12	1059
Acenaphthylene	ND	ug/kg	33		1	12/12/17	12/13/17 21:12	1059
Anthracene	ND	ug/kg	33		1	12/12/17	12/13/17 21:12	1059
Benzo(a)anthracene	53	ug/kg	33		1	12/12/17	12/13/17 21:12	1059
Benzo(a)pyrene	71	ug/kg	33		1	12/12/17	12/13/17 21:12	1059
Benzo(b)fluoranthene	59	ug/kg	33		1	12/12/17	12/13/17 21:12	1059
Benzo(g,h,i)perylene	39	ug/kg	33		1	12/12/17	12/13/17 21:12	1059
Benzo(k)fluoranthene	62	ug/kg	33		1	12/12/17	12/13/17 21:12	1059
Chrysene	62	ug/kg	33		1	12/12/17	12/13/17 21:12	1059
Dibenz(a,h)Anthracene	ND	ug/kg	33		1	12/12/17	12/13/17 21:12	1059
Fluoranthene	69	ug/kg	33		1	12/12/17	12/13/17 21:12	1059
Fluorene	ND	ug/kg	33		1	12/12/17	12/13/17 21:12	1059
Indeno(1,2,3-c,d)Pyrene	49	ug/kg	33		1	12/12/17	12/13/17 21:12	1059
2-Methylnaphthalene	ND	ug/kg	33		1	12/12/17	12/13/17 21:12	1059
Naphthalene	65	ug/kg	33		1	12/12/17	12/13/17 21:12	1059
Phenanthrene	ND	ug/kg	33		1	12/12/17	12/13/17 21:12	1059
Pyrene	61	ug/kg	33		1	12/12/17	12/13/17 21:12	1059

Sample ID: G 4.5-9	Date/Time Sampled: 12/07/2017 14:10	PSS Sample ID: 17120714-006
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	6.4	SU			1	12/08/17	12/08/17 11:55	1061

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120714

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 14, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: G 9-13.5	Date/Time Sampled: 12/07/2017 14:20	PSS Sample ID: 17120714-007
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	% Solids: 50

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	3.6		1	12/11/17	12/11/17 23:51	1064
Arsenic	26	mg/kg	0.72		1	12/11/17	12/11/17 23:51	1064
Beryllium	ND	mg/kg	3.6		1	12/11/17	12/11/17 23:51	1064
Cadmium	ND	mg/kg	3.6		1	12/11/17	12/11/17 23:51	1064
Calcium	2,200	mg/kg	72		1	12/11/17	12/11/17 23:51	1064
Chromium	140	mg/kg	3.6		1	12/11/17	12/11/17 23:51	1064
Copper	96	mg/kg	3.6		1	12/11/17	12/11/17 23:51	1064
Lead	150	mg/kg	3.6		1	12/11/17	12/11/17 23:51	1064
Manganese	2,200	mg/kg	36		10	12/11/17	12/12/17 18:50	1064
Mercury	0.33	mg/kg	0.14		1	12/11/17	12/11/17 23:51	1064
Nickel	46	mg/kg	3.6		1	12/11/17	12/11/17 23:51	1064
Selenium	ND	mg/kg	3.6		1	12/11/17	12/11/17 23:51	1064
Silver	ND	mg/kg	3.6		1	12/11/17	12/11/17 23:51	1064
Thallium	ND	mg/kg	2.9		1	12/11/17	12/11/17 23:51	1064
Zinc	470	mg/kg	14		1	12/11/17	12/11/17 23:51	1064

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C

Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.10		1	12/08/17	12/11/17 14:37	1029
PCB-1221	ND	mg/kg	0.10		1	12/08/17	12/11/17 14:37	1029
PCB-1232	ND	mg/kg	0.10		1	12/08/17	12/11/17 14:37	1029
PCB-1242	ND	mg/kg	0.10		1	12/08/17	12/11/17 14:37	1029
PCB-1248	ND	mg/kg	0.10		1	12/08/17	12/11/17 14:37	1029
PCB-1254	ND	mg/kg	0.10		1	12/08/17	12/11/17 14:37	1029
PCB-1260	ND	mg/kg	0.10		1	12/08/17	12/11/17 14:37	1029

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120714

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 14, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: G 9-13.5	Date/Time Sampled: 12/07/2017 14:20	PSS Sample ID: 17120714-007
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	% Solids: 50

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	33		1	12/12/17	12/13/17 22:30	1059
Acenaphthylene	ND	ug/kg	33		1	12/12/17	12/13/17 22:30	1059
Anthracene	ND	ug/kg	33		1	12/12/17	12/13/17 22:30	1059
Benzo(a)anthracene	62	ug/kg	33		1	12/12/17	12/13/17 22:30	1059
Benzo(a)pyrene	70	ug/kg	33		1	12/12/17	12/13/17 22:30	1059
Benzo(b)fluoranthene	58	ug/kg	33		1	12/12/17	12/13/17 22:30	1059
Benzo(g,h,i)perylene	38	ug/kg	33		1	12/12/17	12/13/17 22:30	1059
Benzo(k)fluoranthene	60	ug/kg	33		1	12/12/17	12/13/17 22:30	1059
Chrysene	62	ug/kg	33		1	12/12/17	12/13/17 22:30	1059
Dibenz(a,h)Anthracene	ND	ug/kg	33		1	12/12/17	12/13/17 22:30	1059
Fluoranthene	78	ug/kg	33		1	12/12/17	12/13/17 22:30	1059
Fluorene	ND	ug/kg	33		1	12/12/17	12/13/17 22:30	1059
Indeno(1,2,3-c,d)Pyrene	50	ug/kg	33		1	12/12/17	12/13/17 22:30	1059
2-Methylnaphthalene	ND	ug/kg	33		1	12/12/17	12/13/17 22:30	1059
Naphthalene	62	ug/kg	33		1	12/12/17	12/13/17 22:30	1059
Phenanthrene	ND	ug/kg	33		1	12/12/17	12/13/17 22:30	1059
Pyrene	68	ug/kg	33		1	12/12/17	12/13/17 22:30	1059

Sample ID: G 9-13.5	Date/Time Sampled: 12/07/2017 14:20	PSS Sample ID: 17120714-007
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	7.8	SU			1	12/08/17	12/08/17 11:55	1061

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120714

Hillis Carnes Engineering Associates, Annapolis Junction, MD

December 14, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: G 13.5-18	Date/Time Sampled: 12/07/2017 14:30	PSS Sample ID: 17120714-008
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	% Solids: 73

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	2.8		1	12/11/17	12/11/17 23:55	1064
Arsenic	18	mg/kg	0.56		1	12/11/17	12/11/17 23:55	1064
Beryllium	ND	mg/kg	2.8		1	12/11/17	12/11/17 23:55	1064
Cadmium	ND	mg/kg	2.8		1	12/11/17	12/11/17 23:55	1064
Calcium	35,000	mg/kg	5,600		100	12/11/17	12/12/17 18:54	1064
Chromium	190	mg/kg	2.8		1	12/11/17	12/11/17 23:55	1064
Copper	160	mg/kg	2.8		1	12/11/17	12/11/17 23:55	1064
Lead	290	mg/kg	2.8		1	12/11/17	12/11/17 23:55	1064
Manganese	6,400	mg/kg	280		100	12/11/17	12/12/17 18:54	1064
Mercury	0.25	mg/kg	0.11		1	12/11/17	12/11/17 23:55	1064
Nickel	34	mg/kg	2.8		1	12/11/17	12/11/17 23:55	1064
Selenium	ND	mg/kg	2.8		1	12/11/17	12/11/17 23:55	1064
Silver	ND	mg/kg	2.8		1	12/11/17	12/11/17 23:55	1064
Thallium	ND	mg/kg	2.2		1	12/11/17	12/11/17 23:55	1064
Zinc	590	mg/kg	11		1	12/11/17	12/11/17 23:55	1064

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C

Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.069		1	12/08/17	12/11/17 15:05	1029
PCB-1221	ND	mg/kg	0.069		1	12/08/17	12/11/17 15:05	1029
PCB-1232	ND	mg/kg	0.069		1	12/08/17	12/11/17 15:05	1029
PCB-1242	ND	mg/kg	0.069		1	12/08/17	12/11/17 15:05	1029
PCB-1248	ND	mg/kg	0.069		1	12/08/17	12/11/17 15:05	1029
PCB-1254	ND	mg/kg	0.069		1	12/08/17	12/11/17 15:05	1029
PCB-1260	ND	mg/kg	0.069		1	12/08/17	12/11/17 15:05	1029

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120714

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 14, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: G 13.5-18	Date/Time Sampled: 12/07/2017 14:30	PSS Sample ID: 17120714-008
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	% Solids: 73

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	40	ug/kg	23		1	12/12/17	12/14/17 00:15	1059
Acenaphthylene	27	ug/kg	23		1	12/12/17	12/14/17 00:15	1059
Anthracene	75	ug/kg	23		1	12/12/17	12/14/17 00:15	1059
Benzo(a)anthracene	210	ug/kg	23		1	12/12/17	12/14/17 00:15	1059
Benzo(a)pyrene	300	ug/kg	23		1	12/12/17	12/14/17 00:15	1059
Benzo(b)fluoranthene	260	ug/kg	23		1	12/12/17	12/14/17 00:15	1059
Benzo(g,h,i)perylene	190	ug/kg	23		1	12/12/17	12/14/17 00:15	1059
Benzo(k)fluoranthene	230	ug/kg	23		1	12/12/17	12/14/17 00:15	1059
Chrysene	210	ug/kg	23		1	12/12/17	12/14/17 00:15	1059
Dibenz(a,h)Anthracene	53	ug/kg	23		1	12/12/17	12/14/17 00:15	1059
Fluoranthene	300	ug/kg	23		1	12/12/17	12/14/17 00:15	1059
Fluorene	49	ug/kg	23		1	12/12/17	12/14/17 00:15	1059
Indeno(1,2,3-c,d)Pyrene	250	ug/kg	23		1	12/12/17	12/14/17 00:15	1059
2-Methylnaphthalene	36	ug/kg	23		1	12/12/17	12/14/17 00:15	1059
Naphthalene	600	ug/kg	23		1	12/12/17	12/14/17 00:15	1059
Phenanthrene	200	ug/kg	23		1	12/12/17	12/14/17 00:15	1059
Pyrene	290	ug/kg	23		1	12/12/17	12/14/17 00:15	1059

Sample ID: G 13.5-18	Date/Time Sampled: 12/07/2017 14:30	PSS Sample ID: 17120714-008
Matrix: SOIL	Date/Time Received: 12/07/2017 15:35	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	9.9	SU			1	12/08/17	12/08/17 11:55	1061



Case Narrative Summary

Client Name: Hillis Carnes Engineering Associates

Project Name: SPT-DMCF

Work Order Number(s): 17120714

Project ID: 17675A

Any holding time exceedances, deviations from the method specifications, regulatory requirements or variations to the procedures outlined in the PSS Quality Assurance Manual are outlined below.

The analyses of chlorine, pH, dissolved oxygen, temperature and sulfite for drinking water and non-potable samples tested for compliance have a maximum holding time of 15 minutes. As such, all laboratory analyses for these analytes exceed holding times.

Matrix spike and matrix spike duplicate analyses may not be performed due to insufficient sample quantity. In these instances, a laboratory control sample and laboratory control sample duplicate are analyzed unless otherwise noted or specified in the method.

Sample Receipt:

Sample(s) received at 0 degrees but no samples were frozen.

NELAP accreditation was held for all analyses performed unless noted below. See www.phaseonline.com for complete PSS scope of accreditation.



Analytical Data Package Information Summary

Work Order(s): 17120714

Report Prepared For: Hillis Carnes Engineering Associates, Annapo

Project Name: SPT-DMCF

Project Manager: Keith Progin

Method	Client Sample Id	Analysis Type	Lab Sample Id	Analyst	Mtx	Prep Batch	Analytical Batch	Sampled	Prepared	Analyzed
SM2540G	F 0-4.5	Initial	17120714-001	1067	S	148695	148695	12/07/2017	12/08/2017 15:13	12/08/2017 15:13
	F 4.5-9	Initial	17120714-002	1067	S	148695	148695	12/07/2017	12/08/2017 15:13	12/08/2017 15:13
	F 9-13.5	Initial	17120714-003	1067	S	148695	148695	12/07/2017	12/08/2017 15:13	12/08/2017 15:13
	F 13.5-18	Initial	17120714-004	1067	S	148695	148695	12/07/2017	12/08/2017 15:13	12/08/2017 15:13
	G 0-4.5	Initial	17120714-005	1067	S	148695	148695	12/07/2017	12/08/2017 15:13	12/08/2017 15:13
	G 4.5-9	Initial	17120714-006	1067	S	148695	148695	12/07/2017	12/08/2017 15:13	12/08/2017 15:13
	G 9-13.5	Initial	17120714-007	1067	S	148695	148695	12/07/2017	12/08/2017 15:13	12/08/2017 15:13
	G 13.5-18	Initial	17120714-008	1067	S	148695	148695	12/07/2017	12/08/2017 15:13	12/08/2017 15:13
SW-846 6020 A	F 0-4.5	Initial	17120714-001	1064	S	69097	148768	12/07/2017	12/11/2017 10:37	12/11/2017 23:28
	F 4.5-9	Initial	17120714-002	1064	S	69097	148768	12/07/2017	12/11/2017 10:37	12/11/2017 23:32
	F 9-13.5	Initial	17120714-003	1064	S	69097	148768	12/07/2017	12/11/2017 10:37	12/11/2017 23:36
	F 13.5-18	Initial	17120714-004	1064	S	69097	148768	12/07/2017	12/11/2017 10:37	12/11/2017 23:40
	G 0-4.5	Initial	17120714-005	1064	S	69097	148768	12/07/2017	12/11/2017 10:37	12/11/2017 23:44
	G 4.5-9	Initial	17120714-006	1064	S	69097	148768	12/07/2017	12/11/2017 10:37	12/11/2017 23:48
	G 9-13.5	Initial	17120714-007	1064	S	69097	148768	12/07/2017	12/11/2017 10:37	12/11/2017 23:51
	G 13.5-18	Initial	17120714-008	1064	S	69097	148768	12/07/2017	12/11/2017 10:37	12/11/2017 23:55
	69097-1-BKS	BKS	69097-1-BKS	1064	S	69097	148768	-----	12/11/2017 10:37	12/11/2017 21:59
	69097-1-BLK	BLK	69097-1-BLK	1064	S	69097	148768	-----	12/11/2017 10:37	12/11/2017 21:55
	GTA-1 (0-1) S	MS	17120707-001 S	1064	S	69097	148768	12/05/2017	12/11/2017 10:37	12/11/2017 22:26
	GTA-1 (0-1) SD	MSD	17120707-001 SD	1064	S	69097	148768	12/05/2017	12/11/2017 10:37	12/11/2017 22:30
	G 4.5-9	Reanalysis	17120714-006	1064	S	69097	148834	12/07/2017	12/11/2017 10:37	12/12/2017 17:52
	F 0-4.5	Reanalysis	17120714-001	1064	S	69097	148834	12/07/2017	12/11/2017 10:37	12/12/2017 18:07
	F 4.5-9	Reanalysis	17120714-002	1064	S	69097	148834	12/07/2017	12/11/2017 10:37	12/12/2017 18:11
	F 9-13.5	Reanalysis	17120714-003	1064	S	69097	148834	12/07/2017	12/11/2017 10:37	12/12/2017 18:15
	F 13.5-18	Reanalysis	17120714-004	1064	S	69097	148834	12/07/2017	12/11/2017 10:37	12/12/2017 18:38
	G 0-4.5	Reanalysis	17120714-005	1064	S	69097	148834	12/07/2017	12/11/2017 10:37	12/12/2017 18:42
	G 4.5-9	Reanalysis	17120714-006	1064	S	69097	148834	12/07/2017	12/11/2017 10:37	12/12/2017 18:46
	G 9-13.5	Reanalysis	17120714-007	1064	S	69097	148834	12/07/2017	12/11/2017 10:37	12/12/2017 18:50
G 13.5-18	Reanalysis	17120714-008	1064	S	69097	148834	12/07/2017	12/11/2017 10:37	12/12/2017 18:54	



Analytical Data Package Information Summary

Work Order(s): 17120714

Report Prepared For: Hillis Carnes Engineering Associates, Annapo

Project Name: SPT-DMCF

Project Manager: Keith Progin

Method	Client Sample Id	Analysis Type	Lab Sample Id	Analyst	Mtx	Prep Batch	Analytical Batch	Sampled	Prepared	Analyzed
SW-846 6020 A	F 13.5-18	Reanalysis	17120714-004	1064	S	69097	148842	12/07/2017	12/11/2017 10:37	12/14/2017 01:44
SW-846 8015 C	SB-4 (1'-2') S	MS	17120713-004 S	1045	S	69072	148724	12/06/2017	12/08/2017 08:26	12/10/2017 19:27
	SB-4 (1'-2') SD	MSD	17120713-004 SD	1045	S	69072	148724	12/06/2017	12/08/2017 08:26	12/10/2017 19:52
	F 13.5-18	Initial	17120714-004	1045	S	69072	148725	12/07/2017	12/08/2017 08:26	12/10/2017 23:10
	69072-1-BKS	BKS	69072-1-BKS	1045	S	69072	148725	-----	12/08/2017 08:26	12/10/2017 19:27
	69072-1-BLK	BLK	69072-1-BLK	1045	S	69072	148725	-----	12/08/2017 08:26	12/10/2017 19:03
	69072-1-BSD	BSD	69072-1-BSD	1045	S	69072	148725	-----	12/08/2017 08:26	12/10/2017 19:52
	G 4.5-9	Initial	17120714-006	1045	S	69072	148760	12/07/2017	12/08/2017 08:26	12/11/2017 15:51
SW-846 8082 A	F 0-4.5	Initial	17120714-001	1029	S	69083	148815	12/07/2017	12/08/2017 11:50	12/11/2017 11:42
	F 4.5-9	Initial	17120714-002	1029	S	69083	148815	12/07/2017	12/08/2017 11:50	12/11/2017 12:16
	F 9-13.5	Initial	17120714-003	1029	S	69083	148815	12/07/2017	12/08/2017 11:50	12/11/2017 12:44
	F 13.5-18	Initial	17120714-004	1029	S	69083	148815	12/07/2017	12/08/2017 11:50	12/11/2017 13:12
	G 0-4.5	Initial	17120714-005	1029	S	69083	148815	12/07/2017	12/08/2017 11:50	12/11/2017 13:41
	G 4.5-9	Initial	17120714-006	1029	S	69083	148815	12/07/2017	12/08/2017 11:50	12/11/2017 14:08
	G 9-13.5	Initial	17120714-007	1029	S	69083	148815	12/07/2017	12/08/2017 11:50	12/11/2017 14:37
	G 13.5-18	Initial	17120714-008	1029	S	69083	148815	12/07/2017	12/08/2017 11:50	12/11/2017 15:05
	69083-1-BKS	BKS	69083-1-BKS	1029	S	69083	148815	-----	12/08/2017 11:50	12/11/2017 09:49
	69083-1-BLK	BLK	69083-1-BLK	1029	S	69083	148815	-----	12/08/2017 11:50	12/11/2017 09:20
	69083-1-BSD	BSD	69083-1-BSD	1029	S	69083	148815	-----	12/08/2017 11:50	12/11/2017 10:17
	120617-OP-W4835 S	MS	17120807-001 S	1029	S	69083	148815	12/06/2017	12/08/2017 11:50	12/11/2017 10:46
	120617-OP-W4835 SD	MSD	17120807-001 SD	1029	S	69083	148815	12/06/2017	12/08/2017 11:50	12/11/2017 11:13
SW-846 8270 C	F 0-4.5	Initial	17120714-001	1059	S	69114	148870	12/07/2017	12/12/2017 09:16	12/13/2017 23:22
	F 4.5-9	Initial	17120714-002	1059	S	69114	148870	12/07/2017	12/12/2017 09:16	12/13/2017 21:38
	F 9-13.5	Initial	17120714-003	1059	S	69114	148870	12/07/2017	12/12/2017 09:16	12/13/2017 22:56
	F 13.5-18	Initial	17120714-004	1059	S	69114	148870	12/07/2017	12/12/2017 09:16	12/13/2017 23:49
	G 0-4.5	Initial	17120714-005	1059	S	69114	148870	12/07/2017	12/12/2017 09:16	12/13/2017 22:04
	G 4.5-9	Initial	17120714-006	1059	S	69114	148870	12/07/2017	12/12/2017 09:16	12/13/2017 21:12
	G 9-13.5	Initial	17120714-007	1059	S	69114	148870	12/07/2017	12/12/2017 09:16	12/13/2017 22:30



Analytical Data Package Information Summary

Work Order(s): 17120714

Report Prepared For: Hillis Carnes Engineering Associates, Annapo

Project Name: SPT-DMCF

Project Manager: Keith Progin

Method	Client Sample Id	Analysis Type	Lab Sample Id	Analyst	Mtx	Prep Batch	Analytical Batch	Sampled	Prepared	Analyzed
SW-846 8270 C	G 13.5-18	Initial	17120714-008	1059	S	69114	148870	12/07/2017	12/12/2017 09:16	12/14/2017 00:15
	69114-1-BKS	BKS	69114-1-BKS	1059	S	69114	148870	-----	12/12/2017 09:16	12/13/2017 18:08
	69114-1-BLK	BLK	69114-1-BLK	1059	S	69114	148870	-----	12/12/2017 09:16	12/13/2017 17:42
	69114-1-BSD	BSD	69114-1-BSD	1059	S	69114	148870	-----	12/12/2017 09:16	12/13/2017 18:34
	GTA-1 (4-5) S	MS	17120707-002 S	1059	S	69114	148870	12/05/2017	12/12/2017 09:16	12/13/2017 19:00
	GTA-1 (4-5) SD	MSD	17120707-002 SD	1059	S	69114	148870	12/05/2017	12/12/2017 09:16	12/13/2017 19:27
SW-846 9045 D	F 0-4.5	Initial	17120714-001	1061	S	148673	148673	12/07/2017	12/08/2017 11:55	12/08/2017 11:55
	F 4.5-9	Initial	17120714-002	1061	S	148673	148673	12/07/2017	12/08/2017 11:55	12/08/2017 11:55
	F 9-13.5	Initial	17120714-003	1061	S	148673	148673	12/07/2017	12/08/2017 11:55	12/08/2017 11:55
	F 13.5-18	Initial	17120714-004	1061	S	148673	148673	12/07/2017	12/08/2017 11:55	12/08/2017 11:55
	G 0-4.5	Initial	17120714-005	1061	S	148673	148673	12/07/2017	12/08/2017 11:55	12/08/2017 11:55
	G 4.5-9	Initial	17120714-006	1061	S	148673	148673	12/07/2017	12/08/2017 11:55	12/08/2017 11:55
	G 9-13.5	Initial	17120714-007	1061	S	148673	148673	12/07/2017	12/08/2017 11:55	12/08/2017 11:55
	G 13.5-18	Initial	17120714-008	1061	S	148673	148673	12/07/2017	12/08/2017 11:55	12/08/2017 11:55
	F 0-4.5 D	MD	17120714-001 D	1061	S	148673	148673	12/07/2017	12/08/2017 11:55	12/08/2017 11:55
	4340-02-V-03-Comp D	MD	17120716-003 D	1061	S	148673	148673	12/07/2017	12/08/2017 11:55	12/08/2017 11:55

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120714

Hillis Carnes Engineering Associates SPT-DMCF

Analytical Method: SW-846 8082 A

Seq Number: 148815
PSS Sample ID: 17120714-001

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	97		61-150	%	12/11/17 11:42
Tetrachloro-m-xylene	82		42-142	%	12/11/17 11:42

Analytical Method: SW-846 8270 C

Seq Number: 148870
PSS Sample ID: 17120714-001

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/12/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	81		32-107	%	12/13/17 23:22
2-Fluorophenol	77		34-113	%	12/13/17 23:22
Nitrobenzene-d5	82		35-123	%	12/13/17 23:22
Phenol-d6	82		34-120	%	12/13/17 23:22
Terphenyl-D14	91		46-154	%	12/13/17 23:22
2,4,6-Tribromophenol	82		31-113	%	12/13/17 23:22

Analytical Method: SW-846 8082 A

Seq Number: 148815
PSS Sample ID: 17120714-002

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	94		61-150	%	12/11/17 12:16
Tetrachloro-m-xylene	87		42-142	%	12/11/17 12:16

Analytical Method: SW-846 8270 C

Seq Number: 148870
PSS Sample ID: 17120714-002

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/12/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	67		32-107	%	12/13/17 21:38
2-Fluorophenol	63		34-113	%	12/13/17 21:38
Nitrobenzene-d5	66		35-123	%	12/13/17 21:38
Phenol-d6	67		34-120	%	12/13/17 21:38
Terphenyl-D14	90		46-154	%	12/13/17 21:38
2,4,6-Tribromophenol	81		31-113	%	12/13/17 21:38

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120714

Hillis Carnes Engineering Associates SPT-DMCF

Analytical Method: SW-846 8082 A

Seq Number: 148815
PSS Sample ID: 17120714-003

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	96		61-150	%	12/11/17 12:44
Tetrachloro-m-xylene	88		42-142	%	12/11/17 12:44

Analytical Method: SW-846 8270 C

Seq Number: 148870
PSS Sample ID: 17120714-003

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/12/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	79		32-107	%	12/13/17 22:56
2-Fluorophenol	77		34-113	%	12/13/17 22:56
Nitrobenzene-d5	81		35-123	%	12/13/17 22:56
Phenol-d6	82		34-120	%	12/13/17 22:56
Terphenyl-D14	97		46-154	%	12/13/17 22:56
2,4,6-Tribromophenol	85		31-113	%	12/13/17 22:56

Analytical Method: SW-846 8082 A

Seq Number: 148815
PSS Sample ID: 17120714-004

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	94		61-150	%	12/11/17 13:12
Tetrachloro-m-xylene	79		42-142	%	12/11/17 13:12

Analytical Method: SW-846 8015 C

Seq Number: 148725
PSS Sample ID: 17120714-004

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
o-Terphenyl	95		34-133	%	12/10/17 23:10

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120714

Hillis Carnes Engineering Associates SPT-DMCF

Analytical Method: SW-846 8270 C

Seq Number: 148870
PSS Sample ID: 17120714-004

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/12/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	87		32-107	%	12/13/17 23:49
2-Fluorophenol	79		34-113	%	12/13/17 23:49
Nitrobenzene-d5	87		35-123	%	12/13/17 23:49
Phenol-d6	85		34-120	%	12/13/17 23:49
Terphenyl-D14	94		46-154	%	12/13/17 23:49
2,4,6-Tribromophenol	81		31-113	%	12/13/17 23:49

Analytical Method: SW-846 8082 A

Seq Number: 148815
PSS Sample ID: 17120714-005

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	97		61-150	%	12/11/17 13:41
Tetrachloro-m-xylene	80		42-142	%	12/11/17 13:41

Analytical Method: SW-846 8270 C

Seq Number: 148870
PSS Sample ID: 17120714-005

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/12/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	83		32-107	%	12/13/17 22:04
2-Fluorophenol	80		34-113	%	12/13/17 22:04
Nitrobenzene-d5	84		35-123	%	12/13/17 22:04
Phenol-d6	85		34-120	%	12/13/17 22:04
Terphenyl-D14	90		46-154	%	12/13/17 22:04
2,4,6-Tribromophenol	82		31-113	%	12/13/17 22:04

Analytical Method: SW-846 8082 A

Seq Number: 148815
PSS Sample ID: 17120714-006

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	97		61-150	%	12/11/17 14:08
Tetrachloro-m-xylene	90		42-142	%	12/11/17 14:08

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120714

Hillis Carnes Engineering Associates SPT-DMCF

Analytical Method: SW-846 8015 C

Seq Number: 148760
PSS Sample ID: 17120714-006

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
o-Terphenyl	81		34-133	%	12/11/17 15:51

Analytical Method: SW-846 8270 C

Seq Number: 148870
PSS Sample ID: 17120714-006

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/12/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	85		32-107	%	12/13/17 21:12
2-Fluorophenol	79		34-113	%	12/13/17 21:12
Nitrobenzene-d5	84		35-123	%	12/13/17 21:12
Phenol-d6	84		34-120	%	12/13/17 21:12
Terphenyl-D14	92		46-154	%	12/13/17 21:12
2,4,6-Tribromophenol	86		31-113	%	12/13/17 21:12

Analytical Method: SW-846 8082 A

Seq Number: 148815
PSS Sample ID: 17120714-007

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	98		61-150	%	12/11/17 14:37
Tetrachloro-m-xylene	83		42-142	%	12/11/17 14:37

Analytical Method: SW-846 8270 C

Seq Number: 148870
PSS Sample ID: 17120714-007

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/12/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	83		32-107	%	12/13/17 22:30
2-Fluorophenol	77		34-113	%	12/13/17 22:30
Nitrobenzene-d5	84		35-123	%	12/13/17 22:30
Phenol-d6	83		34-120	%	12/13/17 22:30
Terphenyl-D14	88		46-154	%	12/13/17 22:30
2,4,6-Tribromophenol	78		31-113	%	12/13/17 22:30

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120714

Hillis Carnes Engineering Associates SPT-DMCF

Analytical Method: SW-846 8082 A

Seq Number: 148815
PSS Sample ID: 17120714-008

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	98		61-150	%	12/11/17 15:05
Tetrachloro-m-xylene	81		42-142	%	12/11/17 15:05

Analytical Method: SW-846 8270 C

Seq Number: 148870
PSS Sample ID: 17120714-008

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/12/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	83		32-107	%	12/14/17 00:15
2-Fluorophenol	76		34-113	%	12/14/17 00:15
Nitrobenzene-d5	83		35-123	%	12/14/17 00:15
Phenol-d6	82		34-120	%	12/14/17 00:15
Terphenyl-D14	90		46-154	%	12/14/17 00:15
2,4,6-Tribromophenol	84		31-113	%	12/14/17 00:15

F = RPD exceeded the laboratory control limits

X = Recovery of MS, MSD or both outside of QC Criteria

H= Recovery of BS,BSD or both exceeded the laboratory control limits

L = Recovery of BS,BSD or both below the laboratory control limits

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120714

Hillis Carnes Engineering Associates
SPT-DMCF

Analytical Method: SW-846 9045 D

Seq Number: 148673

Parent Sample Id: 17120714-001

Matrix: Soil

MD Sample Id: 17120714-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
pH	4.076	4.069	0	10	SU	12/08/17 11:55	

Analytical Method: SW-846 6020 A

Seq Number: 148768

MB Sample Id: 69097-1-BLK

Matrix: Solid

LCS Sample Id: 69097-1-BKS

Prep Method: SW3050B

Date Prep: 12/11/17

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
Antimony	<1.998	15.99	17.00	106	80-120	mg/kg	12/11/17 21:59	
Arsenic	<0.3997	15.99	17.04	107	80-120	mg/kg	12/11/17 21:59	
Beryllium	<1.998	15.99	16.64	104	80-120	mg/kg	12/11/17 21:59	
Cadmium	<1.998	15.99	15.75	98	80-120	mg/kg	12/11/17 21:59	
Calcium	<39.97	159.9	164	103	80-120	mg/kg	12/11/17 21:59	
Chromium	<1.998	15.99	16.18	101	80-120	mg/kg	12/11/17 21:59	
Copper	<1.998	15.99	16.22	101	80-120	mg/kg	12/11/17 21:59	
Lead	<1.998	15.99	15.72	98	80-120	mg/kg	12/11/17 21:59	
Manganese	<1.998	15.99	16.75	105	80-120	mg/kg	12/11/17 21:59	
Mercury	<0.07994	0.3997	0.4045	101	80-120	mg/kg	12/11/17 21:59	
Nickel	<1.998	15.99	16.37	102	80-120	mg/kg	12/11/17 21:59	
Selenium	<1.998	15.99	16.44	103	80-120	mg/kg	12/11/17 21:59	
Silver	<1.998	15.99	15.61	98	80-120	mg/kg	12/11/17 21:59	
Thallium	<1.599	15.99	13.85	87	80-120	mg/kg	12/11/17 21:59	
Zinc	<7.994	79.94	76.90	96	80-120	mg/kg	12/11/17 21:59	

Analytical Method: SW-846 8082 A

Seq Number: 148815

MB Sample Id: 69083-1-BLK

Matrix: Solid

LCS Sample Id: 69083-1-BKS

Prep Method: SW3550C

Date Prep: 12/08/17

LCSD Sample Id: 69083-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
PCB-1016	<0.04946	0.4946	0.3954	80	0.3749	77	60-110	5	25	mg/kg	12/11/17 09:49	
PCB-1260	<0.04946	0.4946	0.4209	85	0.4044	83	60-98	4	25	mg/kg	12/11/17 09:49	

Surrogate	MB %Rec	MB Flag	LCS Result	LCS Flag	LCSD Result	LCSD Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	92		95		92		61-150	%	12/11/17 09:49
Tetrachloro-m-xylene	75		83		79		42-142	%	12/11/17 09:49

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120714

Hillis Carnes Engineering Associates
SPT-DMCF

Analytical Method: SW-846 8015 C

Seq Number: 148725

MB Sample Id: 69072-1-BLK

Matrix: Solid

LCS Sample Id: 69072-1-BKS

Prep Method: SW3550C

Date Prep: 12/08/17

LCSD Sample Id: 69072-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
TPH-DRO (Diesel Range Organics)	<9.963	33.21	35.35	106	27.83	84	54-123	24	25	mg/kg	12/10/17 19:27	
Surrogate	MB %Rec	MB Flag	LCS Result	LCS Flag	LCSD Result	LCSD Flag	Limits	Units	Analysis Date	Flag		
o-Terphenyl	64		88		70		34-133	%	12/10/17 19:27			

Analytical Method: SW-846 8270 C

Seq Number: 148870

MB Sample Id: 69114-1-BLK

Matrix: Solid

LCS Sample Id: 69114-1-BKS

Prep Method: SW3550C

Date Prep: 12/12/17

LCSD Sample Id: 69114-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Acenaphthene	<16.66	1333	1150	86	1174	88	60-116	2	25	ug/kg	12/13/17 18:08	
Acenaphthylene	<16.66	1333	1215	91	1246	94	61-112	3	25	ug/kg	12/13/17 18:08	
Anthracene	<16.66	1333	1203	90	1227	92	66-115	2	25	ug/kg	12/13/17 18:08	
Benzo(a)anthracene	<16.66	1333	1256	94	1268	95	71-113	1	25	ug/kg	12/13/17 18:08	
Benzo(a)pyrene	<16.66	1333	1354	102	1388	104	69-118	2	25	ug/kg	12/13/17 18:08	
Benzo(b)fluoranthene	<16.66	1333	1333	100	1320	99	65-126	1	25	ug/kg	12/13/17 18:08	
Benzo(g,h,i)perylene	<16.66	1333	1325	99	1345	101	69-112	1	25	ug/kg	12/13/17 18:08	
Benzo(k)fluoranthene	<16.66	1333	1234	93	1318	99	57-129	7	25	ug/kg	12/13/17 18:08	
Chrysene	<16.66	1333	1203	90	1211	91	72-114	1	25	ug/kg	12/13/17 18:08	
Dibenz(a,h)Anthracene	<16.66	1333	1410	106	1443	108	72-110	2	25	ug/kg	12/13/17 18:08	
Fluoranthene	<16.66	1333	1190	89	1215	91	69-119	2	25	ug/kg	12/13/17 18:08	
Fluorene	<16.66	1333	1204	90	1234	93	65-115	2	25	ug/kg	12/13/17 18:08	
Indeno(1,2,3-c,d)Pyrene	<16.66	1333	1257	94	1303	98	60-127	4	25	ug/kg	12/13/17 18:08	
2-Methylnaphthalene	<16.66	1333	1222	92	1230	92	70-109	1	25	ug/kg	12/13/17 18:08	
Naphthalene	<16.66	1333	1093	82	1109	83	59-108	1	25	ug/kg	12/13/17 18:08	
Phenanthrene	<16.66	1333	1175	88	1195	90	67-117	2	25	ug/kg	12/13/17 18:08	
Pyrene	<16.66	1333	1241	93	1283	96	77-111	3	25	ug/kg	12/13/17 18:08	
Surrogate	MB %Rec	MB Flag	LCS Result	LCS Flag	LCSD Result	LCSD Flag	Limits	Units	Analysis Date	Flag		
2-Fluorobiphenyl	90		90		91		32-107	%	12/13/17 18:08			
2-Fluorophenol	98		89		90		34-113	%	12/13/17 18:08			
Nitrobenzene-d5	95		91		92		35-123	%	12/13/17 18:08			
Phenol-d6	97		90		90		34-120	%	12/13/17 18:08			
Terphenyl-D14	91		89		91		46-154	%	12/13/17 18:08			
2,4,6-Tribromophenol	81		96		99		31-113	%	12/13/17 18:08			

F = RPD exceeded the laboratory control limits
X = Recovery of MS, MSD or both outside of QC Criteria
H= Recovery of BS,BSD or both exceeded the laboratory control limits
L = Recovery of BS,BSD or both below the laboratory control limits



SAMPLE CHAIN OF CUSTODY/AGREEMENT FORM

www.phaseonline.com
email: info@phaseonline.com

PHASE SEPARATION SCIENCE, INC.

1 *CLIENT: <u>Hill's Carwash (HCF)</u> *OFFICE LOC. <u>AJ</u>		PSS Work Order #: <u>17120714</u> PAGE _____ OF _____		
*PROJECT MGR: <u>Keith Progin</u> *PHONE NO.: <u>(410) 880-41788</u>		Matrix Codes: SW=Surface Wtr DW=Drinking Wtr GW=Ground Wtr WW=Waste Wtr O=Oil S=Soil L=Liquid SDL=Solid A=Air WI=Wipe		
EMAIL: <u>Progin@hsc.com</u> FAX NO.: ()		Preservatives Used: _____		
*PROJECT NAME: <u>SJT-DMLF</u> PROJECT NO.: <u>17675A</u>		Analysis Method Required: 3 *		
SITE LOCATION: _____ P.O. NO.: <u>POK110028</u>		Sample Type: C=COMP G=GRAB		
SAMPLER(S): <u>Sentblers</u> DW CERT NO.: _____		CONTAINERS		
LAB NO.	*SAMPLE IDENTIFICATION	*DATE (SAMPLED)	*TIME (SAMPLED)	MATRIX (See Codes)
1	F 0-4.5	12/7/17	10:00	S
2	F 4.5-9		10:10	
3	F 9-13.5		10:20	
4	F 13.5-18		10:30	
5	G 0-4.5		2:00	
6	G 0-4.5 4.5-9		2:10	
7	G 9-13.5		2:20	
8	G 13.5-18		2:30	

5 Relinquished By: (1) <u>[Signature]</u>	Date	12/7/17	Time	1535	Received By: <u>[Signature]</u>
Relinquished By: (2)	Date		Time		Received By:
Relinquished By: (3)	Date		Time		Received By:
Relinquished By: (4)	Date		Time		Received By:

* Requested TAT (One TAT per COC) <input checked="" type="checkbox"/> 5-Day <input type="checkbox"/> 3-Day <input type="checkbox"/> 2-Day <input type="checkbox"/> Other <input type="checkbox"/> Next Day <input type="checkbox"/> Emergency <input type="checkbox"/> Other	# of Coolers: <u>1</u>
Data Deliverables Required: COA <input type="checkbox"/> QC <input type="checkbox"/> SUMM <input type="checkbox"/> CLP LIKE <input type="checkbox"/> OTHER <input type="checkbox"/>	Custody Seal: <u>ABS</u>
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Ice Present: <u>YES</u> Temp: <u>0-12</u>
Special Instructions:	Shipping Carrier: <u>Clint</u>

DW COMPLIANCE? YES <input type="checkbox"/> NO <input type="checkbox"/>	EDD FORMAT TYPE _____	STATE RESULTS REPORTED TO: MD <input type="checkbox"/> DE <input type="checkbox"/> PA <input type="checkbox"/> VA <input type="checkbox"/> WV <input type="checkbox"/> OTHER <input type="checkbox"/>
---	-----------------------	--

6630 Baltimore National Pike • Route 40 West • Baltimore, Maryland 21228 • (410) 747-8770 • (410) 932-9047 • Fax (410) 788-8723
 The client (Client Name), by signing, or having client's agent sign, this "Sample Chain of Custody/Agreement Form", agrees to pay for the above requested services per the latest version of the Service Brochure or PSS-provided quotation including any and all attorney's or other reasonable fees if collection becomes necessary. * = REQUIRED



Phase Separation Science, Inc

Sample Receipt Checklist

Work Order # 17120714 **Received By** Thomas Wingate
Client Name Hillis Carnes Engineering Associates **Date Received** 12/07/2017 03:35:00 PM
Project Name SPT-DMCF **Delivered By** Client
Project Number 17675A **Tracking No** Not Applicable
Disposal Date 01/11/2018 **Logged In By** Thomas Wingate
Shipping Container(s)
No. of Coolers 1

		Ice	Present
Custody Seal(s) Intact?	N/A	Temp (deg C)	1
Seal(s) Signed / Dated?	N/A	Temp Blank Present	No

Documentation

COC agrees with sample labels?	Yes
Chain of Custody	Yes

Sampler Name Sean Harkins
MD DW Cert. No. N/A

Sample Container

Appropriate for Specified Analysis?	Yes
Intact?	Yes
Labeled and Labels Legible?	Yes

Custody Seal(s) Intact?	Not Applicable
Seal(s) Signed / Dated	Not Applicable

Total No. of Samples Received 8

Total No. of Containers Received 23

Preservation

Total Metals	(pH<2)	N/A
Dissolved Metals, filtered within 15 minutes of collection	(pH<2)	N/A
Orthophosphorus, filtered within 15 minutes of collection		N/A
Cyanides	(pH>12)	N/A
Sulfide	(pH>9)	N/A
TOC, DOC (field filtered), COD, Phenols	(pH<2)	N/A
TOX, TKN, NH3, Total Phos	(pH<2)	N/A
VOC, BTEX (VOA Vials Rcvd Preserved)	(pH<2)	N/A
Do VOA vials have zero headspace?		N/A
624 VOC (Rcvd at least one unpreserved VOA vial)		N/A
524 VOC (Rcvd with trip blanks)	(pH<2)	N/A

Comments: (Any "No" response must be detailed in the comments section below.)

For any improper preservation conditions, list sample ID, preservative added (reagent ID number) below as well as documentation of any client notification as well as client instructions. Samples for pH, chlorine and dissolved oxygen should be analyzed as soon as possible, preferably in the field at the time of sampling. Samples which require thermal preservation shall be considered acceptable when received at a temperature above freezing to 6°C. Samples that are hand delivered on the day that they are collected may not meet these criteria but shall be considered acceptable if there is evidence that the chilling process has begun such as arrival on ice.

Sample(s) received at 0 degrees but no samples were frozen.

Samples Inspected/Checklist Completed By:

Thomas Wingate

Date: 12/07/2017

PM Review and Approval:

Amber Confer

Date: 12/08/2017

Analytical Report for
Hillis Carnes Engineering Associates
Certificate of Analysis No.: 17120806

Project Manager: Keith Progin

Project Name : SPT-DMCF

Project ID : 17675A



December 15, 2017
Phase Separation Science, Inc.
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Baltimore, MD 21228
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PHASE SEPARATION SCIENCE, INC.



December 15, 2017

Keith Progin
Hillis Carnes Engineering Associates
10975 Guilford Road, Ste. A
Annapolis Junction, MD 20701

Reference: PSS Work Order(s) No: **17120806**
Project Name: SPT-DMCF

Project ID.: 17675A

Dear Keith Progin :

This report includes the analytical results from the analyses performed on the samples received under the project name referenced above and identified with the Phase Separation Science (PSS) Work Order(s) numbered **17120806**.

All work reported herein has been performed in accordance with current NELAP standards, referenced methodologies, PSS Standard Operating Procedures and the PSS Quality Assurance Manual unless otherwise noted in the Case Narrative Summary. PSS is limited in liability to the actual cost of the sample analysis done.

PSS reserves the right to return any unused samples, extracts or related solutions. Otherwise, the samples are scheduled for disposal, without any further notice, on January 12, 2018, with the exception of air canisters which are cleaned immediately following analysis. This includes any samples that were received with a request to be held but lacked a specific hold period. It is your responsibility to provide a written request defining a specific disposal date if additional storage is required. Upon receipt, the request will be acknowledged by PSS, thus extending the storage period.

This report shall not be reproduced except in full, without the written approval of an authorized PSS representative. A copy of this report will be retained by PSS for at least 5 years, after which time it will be disposed of without further notice, unless prior arrangements have been made.

We thank you for selecting Phase Separation Science, Inc. to serve your analytical needs. If you have any questions concerning this report, do not hesitate to contact us at 410-747-8770 or info@phaseonline.com.

Sincerely,

Dan Prucnal

Laboratory Manager



Sample Summary

Client Name: Hillis Carnes Engineering Associates
Project Name: SPT-DMCF

Work Order Number(s): 17120806

Project ID: 17675A

The following samples were received under chain of custody by Phase Separation Science (PSS) on 12/08/2017 at 11:45 am

Lab Sample Id	Sample Id	Matrix	Date/Time Collected
17120806-001	E 0-4.5	SOIL	12/08/17 10:20
17120806-002	E 4.5-9	SOIL	12/08/17 10:30
17120806-003	E 9-13.5	SOIL	12/08/17 10:40
17120806-004	E 13.5-18	SOIL	12/08/17 10:50

Please reference the Chain of Custody and Sample Receipt Checklist for specific container counts and preservatives. Any sample conditions not in compliance with sample acceptance criteria are described in Case Narrative Summary.

Notes:

1. The presence of a common laboratory contaminant such as methylene chloride may be considered a possible laboratory artifact. Where observed, appropriate consideration of data should be taken.
2. Unless otherwise noted in the case narrative, results are reported on a dry weight basis with the exception of pH, flashpoint, moisture, and paint filter test.
3. Drinking water samples collected for the purpose of compliance with SDWA may not be suitable for their intended use unless collected by a certified sampler [COMAR 26.08.05.07.C.2].
4. The analyses of 1,2-dibromo-3-chloropropane (DBCP) and 1,2-dibromoethane (EDB) by EPA 524.2 and calcium, magnesium, sodium and iron by EPA 200.8 are not currently promulgated for use in testing to meet the Safe Drinking Water Act and as such cannot be used for compliance purposes. The listings of the current promulgated methods for testing in compliance with the Safe Drinking Water Act can be found in the 40 CFR part 141.1, for the primary drinking water contaminants, and part 141.3, for the secondary drinking water contaminants.
5. Sample prepared under EPA 3550C with concentrations greater than 20 mg/Kg should employ the microtip extraction procedure if required to meet data quality objectives.
6. The analysis of acrolein by EPA 624 must be analyzed within three days of sampling unless pH is adjusted to 4-5 units [40 CFR part 136.3(e)].
7. Method 180.1, The Determination of Turbidity by Nephelometry, recommends samples over 40 NTU be diluted until the turbidity falls below 40 units. Routine samples over 40 NTU may not be diluted as long as the data quality objectives are not affected.
8. Alkalinity results analyzed by EPA 310.2 that are reported by dilution are estimated and are not in compliance with method requirements.

Standard Flags/Abbreviations:

- B A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
- C Results Pending Final Confirmation.
- E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
- Fail The result exceeds the regulatory level for Toxicity Characteristic (TCLP) as cited in 40 CFR 261.24 Table 1.
- J The target analyte was positively identified below the reporting limit but greater than the MDL.
- MDL This is the Laboratory Method Detection Limit which is equivalent to the Limit of Detection (LOD). The LOD is an estimate of the minimum amount of a substance that an analytical process can reliably detect. This value will remain constant across multiple similar instrumentation and among different analysts. An LOD is analyte and matrix specific.
- ND Not Detected at or above the reporting limit.
- RL PSS Reporting Limit.
- U Not detected.

Certifications:

NELAP Certifications: PA 68-03330, VA 460156
State Certifications: MD 179, WV 303
Regulated Soil Permit: P330-12-00268
NSWC USCG Accepted Laboratory
LDBE MWAA LD1997-0041-2015

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120806

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 15, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: E 0-4.5	Date/Time Sampled: 12/08/2017 10:20	PSS Sample ID: 17120806-001
Matrix: SOIL	Date/Time Received: 12/08/2017 11:45	% Solids: 64

PP Metals plus Calcium and Manganese Analytical Method: SW-846 6020 A Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	2.6		1	12/11/17	12/12/17 00:22	1064
Arsenic	20	mg/kg	0.52		1	12/11/17	12/12/17 00:22	1064
Beryllium	ND	mg/kg	2.6		1	12/11/17	12/12/17 00:22	1064
Cadmium	ND	mg/kg	2.6		1	12/11/17	12/12/17 00:22	1064
Calcium	600	mg/kg	52		1	12/11/17	12/12/17 00:22	1064
Chromium	110	mg/kg	2.6		1	12/11/17	12/12/17 00:22	1064
Copper	65	mg/kg	2.6		1	12/11/17	12/12/17 00:22	1064
Lead	110	mg/kg	2.6		1	12/11/17	12/12/17 00:22	1064
Manganese	840	mg/kg	26		10	12/11/17	12/12/17 18:57	1064
Mercury	0.25	mg/kg	0.10		1	12/11/17	12/12/17 00:22	1064
Nickel	32	mg/kg	2.6		1	12/11/17	12/12/17 00:22	1064
Selenium	ND	mg/kg	2.6		1	12/11/17	12/12/17 00:22	1064
Silver	ND	mg/kg	2.6		1	12/11/17	12/12/17 00:22	1064
Thallium	ND	mg/kg	2.1		1	12/11/17	12/12/17 00:22	1064
Zinc	210	mg/kg	10		1	12/11/17	12/12/17 00:22	1064

Total Petroleum Hydrocarbons - DRO Analytical Method: SW-846 8015 C Preparation Method: SW3550C

HF - Heavier fuel/oil pattern observed in sample.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
TPH-DRO (Diesel Range Organics)	39	mg/kg	15	HF	1	12/11/17	12/11/17 18:43	1045

Polychlorinated Biphenyls Analytical Method: SW-846 8082 A Preparation Method: SW3550C
 Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.078		1	12/08/17	12/11/17 19:17	1029
PCB-1221	ND	mg/kg	0.078		1	12/08/17	12/11/17 19:17	1029
PCB-1232	ND	mg/kg	0.078		1	12/08/17	12/11/17 19:17	1029
PCB-1242	ND	mg/kg	0.078		1	12/08/17	12/11/17 19:17	1029
PCB-1248	ND	mg/kg	0.078		1	12/08/17	12/11/17 19:17	1029
PCB-1254	ND	mg/kg	0.078		1	12/08/17	12/11/17 19:17	1029
PCB-1260	ND	mg/kg	0.078		1	12/08/17	12/11/17 19:17	1029

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120806

Hillis Carnes Engineering Associates, Annapolis Junction, MD

December 15, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: E 0-4.5	Date/Time Sampled: 12/08/2017 10:20	PSS Sample ID: 17120806-001
Matrix: SOIL	Date/Time Received: 12/08/2017 11:45	% Solids: 64

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	26		1	12/13/17	12/14/17 15:41	1055
Acenaphthylene	ND	ug/kg	26		1	12/13/17	12/14/17 15:41	1055
Anthracene	34	ug/kg	26		1	12/13/17	12/14/17 15:41	1055
Benzo(a)anthracene	150	ug/kg	26		1	12/13/17	12/14/17 15:41	1055
Benzo(a)pyrene	200	ug/kg	26		1	12/13/17	12/14/17 15:41	1055
Benzo(b)fluoranthene	200	ug/kg	26		1	12/13/17	12/14/17 15:41	1055
Benzo(g,h,i)perylene	130	ug/kg	26		1	12/13/17	12/14/17 15:41	1055
Benzo(k)fluoranthene	180	ug/kg	26		1	12/13/17	12/14/17 15:41	1055
Chrysene	180	ug/kg	26		1	12/13/17	12/14/17 15:41	1055
Dibenz(a,h)Anthracene	38	ug/kg	26		1	12/13/17	12/14/17 15:41	1055
Fluoranthene	190	ug/kg	26		1	12/13/17	12/14/17 15:41	1055
Fluorene	ND	ug/kg	26		1	12/13/17	12/14/17 15:41	1055
Indeno(1,2,3-c,d)Pyrene	150	ug/kg	26		1	12/13/17	12/14/17 15:41	1055
2-Methylnaphthalene	33	ug/kg	26		1	12/13/17	12/14/17 15:41	1055
Naphthalene	300	ug/kg	26		1	12/13/17	12/14/17 15:41	1055
Phenanthrene	84	ug/kg	26		1	12/13/17	12/14/17 15:41	1055
Pyrene	180	ug/kg	26		1	12/13/17	12/14/17 15:41	1055

Sample ID: E 0-4.5	Date/Time Sampled: 12/08/2017 10:20	PSS Sample ID: 17120806-001
Matrix: SOIL	Date/Time Received: 12/08/2017 11:45	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	4.1	SU			1	12/11/17	12/11/17 13:19	1061

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120806

Hillis Carnes Engineering Associates, Annapolis Junction, MD

December 15, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: E 4.5-9	Date/Time Sampled: 12/08/2017 10:30	PSS Sample ID: 17120806-002
Matrix: SOIL	Date/Time Received: 12/08/2017 11:45	% Solids: 57

PP Metals plus Calcium and Manganese

Analytical Method: SW-846 6020 A

Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	3.1		1	12/11/17	12/12/17 00:26	1064
Arsenic	24	mg/kg	0.62		1	12/11/17	12/12/17 00:26	1064
Beryllium	ND	mg/kg	3.1		1	12/11/17	12/12/17 00:26	1064
Cadmium	ND	mg/kg	3.1		1	12/11/17	12/12/17 00:26	1064
Calcium	1,400	mg/kg	62		1	12/11/17	12/12/17 00:26	1064
Chromium	140	mg/kg	3.1		1	12/11/17	12/12/17 00:26	1064
Copper	91	mg/kg	3.1		1	12/11/17	12/12/17 00:26	1064
Lead	140	mg/kg	3.1		1	12/11/17	12/12/17 00:26	1064
Manganese	2,100	mg/kg	31		10	12/11/17	12/12/17 19:01	1064
Mercury	0.32	mg/kg	0.12		1	12/11/17	12/12/17 00:26	1064
Nickel	49	mg/kg	3.1		1	12/11/17	12/12/17 00:26	1064
Selenium	ND	mg/kg	3.1		1	12/11/17	12/12/17 00:26	1064
Silver	ND	mg/kg	3.1		1	12/11/17	12/12/17 00:26	1064
Thallium	ND	mg/kg	2.5		1	12/11/17	12/12/17 00:26	1064
Zinc	510	mg/kg	12		1	12/11/17	12/12/17 00:26	1064

Polychlorinated Biphenyls

Analytical Method: SW-846 8082 A

Preparation Method: SW3550C

Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.085		1	12/08/17	12/11/17 19:45	1029
PCB-1221	ND	mg/kg	0.085		1	12/08/17	12/11/17 19:45	1029
PCB-1232	ND	mg/kg	0.085		1	12/08/17	12/11/17 19:45	1029
PCB-1242	ND	mg/kg	0.085		1	12/08/17	12/11/17 19:45	1029
PCB-1248	ND	mg/kg	0.085		1	12/08/17	12/11/17 19:45	1029
PCB-1254	ND	mg/kg	0.085		1	12/08/17	12/11/17 19:45	1029
PCB-1260	ND	mg/kg	0.085		1	12/08/17	12/11/17 19:45	1029

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120806

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 15, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: E 4.5-9	Date/Time Sampled: 12/08/2017 10:30	PSS Sample ID: 17120806-002
Matrix: SOIL	Date/Time Received: 12/08/2017 11:45	% Solids: 57

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	ND	ug/kg	29		1	12/13/17	12/14/17 14:48	1055
Acenaphthylene	38	ug/kg	29		1	12/13/17	12/14/17 14:48	1055
Anthracene	50	ug/kg	29		1	12/13/17	12/14/17 14:48	1055
Benzo(a)anthracene	210	ug/kg	29		1	12/13/17	12/14/17 14:48	1055
Benzo(a)pyrene	310	ug/kg	29		1	12/13/17	12/14/17 14:48	1055
Benzo(b)fluoranthene	310	ug/kg	29		1	12/13/17	12/14/17 14:48	1055
Benzo(g,h,i)perylene	170	ug/kg	29		1	12/13/17	12/14/17 14:48	1055
Benzo(k)fluoranthene	250	ug/kg	29		1	12/13/17	12/14/17 14:48	1055
Chrysene	240	ug/kg	29		1	12/13/17	12/14/17 14:48	1055
Dibenz(a,h)Anthracene	55	ug/kg	29		1	12/13/17	12/14/17 14:48	1055
Fluoranthene	280	ug/kg	29		1	12/13/17	12/14/17 14:48	1055
Fluorene	ND	ug/kg	29		1	12/13/17	12/14/17 14:48	1055
Indeno(1,2,3-c,d)Pyrene	230	ug/kg	29		1	12/13/17	12/14/17 14:48	1055
2-Methylnaphthalene	37	ug/kg	29		1	12/13/17	12/14/17 14:48	1055
Naphthalene	500	ug/kg	29		1	12/13/17	12/14/17 14:48	1055
Phenanthrene	100	ug/kg	29		1	12/13/17	12/14/17 14:48	1055
Pyrene	290	ug/kg	29		1	12/13/17	12/14/17 14:48	1055

Sample ID: E 4.5-9	Date/Time Sampled: 12/08/2017 10:30	PSS Sample ID: 17120806-002
Matrix: SOIL	Date/Time Received: 12/08/2017 11:45	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	5.5	SU			1	12/11/17	12/11/17 13:19	1061

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120806

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 15, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: E 9-13.5	Date/Time Sampled: 12/08/2017 10:40	PSS Sample ID: 17120806-003
Matrix: SOIL	Date/Time Received: 12/08/2017 11:45	% Solids: 65

PP Metals plus Calcium and Manganese Analytical Method: SW-846 6020 A Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	2.6		1	12/11/17	12/12/17 00:30	1064
Arsenic	15	mg/kg	0.52		1	12/11/17	12/12/17 00:30	1064
Beryllium	ND	mg/kg	2.6		1	12/11/17	12/12/17 00:30	1064
Cadmium	ND	mg/kg	2.6		1	12/11/17	12/12/17 00:30	1064
Calcium	36,000	mg/kg	5,200		100	12/11/17	12/12/17 19:05	1064
Chromium	210	mg/kg	2.6		1	12/11/17	12/12/17 00:30	1064
Copper	94	mg/kg	2.6		1	12/11/17	12/12/17 00:30	1064
Lead	130	mg/kg	2.6		1	12/11/17	12/12/17 00:30	1064
Manganese	5,300	mg/kg	260		100	12/11/17	12/12/17 19:05	1064
Mercury	0.35	mg/kg	0.10		1	12/11/17	12/12/17 00:30	1064
Nickel	50	mg/kg	2.6		1	12/11/17	12/12/17 00:30	1064
Selenium	ND	mg/kg	2.6		1	12/11/17	12/12/17 00:30	1064
Silver	ND	mg/kg	2.6		1	12/11/17	12/12/17 00:30	1064
Thallium	ND	mg/kg	2.1		1	12/11/17	12/12/17 00:30	1064
Zinc	540	mg/kg	10		1	12/11/17	12/12/17 00:30	1064

Total Petroleum Hydrocarbons - DRO Analytical Method: SW-846 8015 C Preparation Method: SW3550C

DF/HF - No. 2/diesel fuel and heavier fuel/oil patterns observed in sample.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
TPH-DRO (Diesel Range Organics)	1,700	mg/kg	300	DF	20	12/11/17	12/12/17 10:22	1045

Polychlorinated Biphenyls Analytical Method: SW-846 8082 A Preparation Method: SW3550C
 Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.075		1	12/08/17	12/11/17 20:13	1029
PCB-1221	ND	mg/kg	0.075		1	12/08/17	12/11/17 20:13	1029
PCB-1232	ND	mg/kg	0.075		1	12/08/17	12/11/17 20:13	1029
PCB-1242	ND	mg/kg	0.075		1	12/08/17	12/11/17 20:13	1029
PCB-1248	ND	mg/kg	0.075		1	12/08/17	12/11/17 20:13	1029
PCB-1254	ND	mg/kg	0.075		1	12/08/17	12/11/17 20:13	1029
PCB-1260	ND	mg/kg	0.075		1	12/08/17	12/11/17 20:13	1029

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120806

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 15, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: E 9-13.5	Date/Time Sampled: 12/08/2017 10:40	PSS Sample ID: 17120806-003
Matrix: SOIL	Date/Time Received: 12/08/2017 11:45	% Solids: 65

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	7,200	ug/kg	130		5	12/13/17	12/14/17 17:25	1055
Acenaphthylene	2,300	ug/kg	130		5	12/13/17	12/14/17 17:25	1055
Anthracene	15,000	ug/kg	130		5	12/13/17	12/14/17 17:25	1055
Benzo(a)anthracene	8,600	ug/kg	130		5	12/13/17	12/14/17 17:25	1055
Benzo(a)pyrene	4,700	ug/kg	130		5	12/13/17	12/14/17 17:25	1055
Benzo(b)fluoranthene	3,900	ug/kg	130		5	12/13/17	12/14/17 17:25	1055
Benzo(g,h,i)perylene	1,900	ug/kg	130		5	12/13/17	12/14/17 17:25	1055
Benzo(k)fluoranthene	3,000	ug/kg	130		5	12/13/17	12/14/17 17:25	1055
Chrysene	10,000	ug/kg	130		5	12/13/17	12/14/17 17:25	1055
Dibenz(a,h)Anthracene	550	ug/kg	130		5	12/13/17	12/14/17 17:25	1055
Fluoranthene	20,000	ug/kg	130		5	12/13/17	12/14/17 17:25	1055
Fluorene	13,000	ug/kg	130		5	12/13/17	12/14/17 17:25	1055
Indeno(1,2,3-c,d)Pyrene	2,000	ug/kg	130		5	12/13/17	12/14/17 17:25	1055
2-Methylnaphthalene	9,000	ug/kg	130		5	12/13/17	12/14/17 17:25	1055
Naphthalene	37,000	ug/kg	640		25	12/13/17	12/14/17 18:17	1055
Phenanthrene	69,000	ug/kg	640		25	12/13/17	12/14/17 18:17	1055
Pyrene	30,000	ug/kg	640		25	12/13/17	12/14/17 18:17	1055

Sample ID: E 9-13.5	Date/Time Sampled: 12/08/2017 10:40	PSS Sample ID: 17120806-003
Matrix: SOIL	Date/Time Received: 12/08/2017 11:45	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	8.7	SU			1	12/11/17	12/11/17 13:19	1061

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120806

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 15, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: E 13.5-18	Date/Time Sampled: 12/08/2017 10:50	PSS Sample ID: 17120806-004
Matrix: SOIL	Date/Time Received: 12/08/2017 11:45	% Solids: 65

PP Metals plus Calcium and Manganese Analytical Method: SW-846 6020 A Preparation Method: 3050B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Antimony	ND	mg/kg	2.9		1	12/11/17	12/12/17 00:34	1064
Arsenic	20	mg/kg	0.57		1	12/11/17	12/12/17 00:34	1064
Beryllium	ND	mg/kg	2.9		1	12/11/17	12/12/17 00:34	1064
Cadmium	ND	mg/kg	2.9		1	12/11/17	12/12/17 00:34	1064
Calcium	29,000	mg/kg	5,700		100	12/11/17	12/12/17 19:09	1064
Chromium	240	mg/kg	2.9		1	12/11/17	12/12/17 00:34	1064
Copper	220	mg/kg	2.9		1	12/11/17	12/12/17 00:34	1064
Lead	170	mg/kg	2.9		1	12/11/17	12/12/17 00:34	1064
Manganese	4,400	mg/kg	290		100	12/11/17	12/12/17 19:09	1064
Mercury	1.8	mg/kg	0.11		1	12/11/17	12/12/17 00:34	1064
Nickel	48	mg/kg	2.9		1	12/11/17	12/12/17 00:34	1064
Selenium	ND	mg/kg	2.9		1	12/11/17	12/12/17 00:34	1064
Silver	ND	mg/kg	2.9		1	12/11/17	12/12/17 00:34	1064
Thallium	ND	mg/kg	2.3		1	12/11/17	12/12/17 00:34	1064
Zinc	450	mg/kg	11		1	12/11/17	12/12/17 00:34	1064

Total Petroleum Hydrocarbons - DRO Analytical Method: SW-846 8015 C Preparation Method: SW3550C

HF - Heavier fuel/oil pattern observed in sample.

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
TPH-DRO (Diesel Range Organics)	2,300	mg/kg	1,600	HF	100	12/11/17	12/12/17 12:01	1045

Polychlorinated Biphenyls Analytical Method: SW-846 8082 A Preparation Method: SW3550C
 Clean up Method: SW846 3665A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
PCB-1016	ND	mg/kg	0.079		1	12/08/17	12/11/17 20:41	1029
PCB-1221	ND	mg/kg	0.079		1	12/08/17	12/11/17 20:41	1029
PCB-1232	ND	mg/kg	0.079		1	12/08/17	12/11/17 20:41	1029
PCB-1242	ND	mg/kg	0.079		1	12/08/17	12/11/17 20:41	1029
PCB-1248	0.14	mg/kg	0.079		1	12/08/17	12/11/17 20:41	1029
PCB-1254	ND	mg/kg	0.079		1	12/08/17	12/11/17 20:41	1029
PCB-1260	ND	mg/kg	0.079		1	12/08/17	12/11/17 20:41	1029

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 17120806

Hillis Carnes Engineering Associates, Annapolis Junction, MD
 December 15, 2017

Project Name: SPT-DMCF

Project ID: 17675A

Sample ID: E 13.5-18	Date/Time Sampled: 12/08/2017 10:50	PSS Sample ID: 17120806-004
Matrix: SOIL	Date/Time Received: 12/08/2017 11:45	% Solids: 65

Polyaromatic Hydrocarbons (PAHs)

Analytical Method: SW-846 8270 C

Preparation Method: SW3550C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acenaphthene	470	ug/kg	26		1	12/13/17	12/14/17 16:59	1055
Acenaphthylene	1,500	ug/kg	26		1	12/13/17	12/14/17 16:59	1055
Anthracene	980	ug/kg	26		1	12/13/17	12/14/17 16:59	1055
Benzo(a)anthracene	1,100	ug/kg	26		1	12/13/17	12/14/17 16:59	1055
Benzo(a)pyrene	1,600	ug/kg	26		1	12/13/17	12/14/17 16:59	1055
Benzo(b)fluoranthene	1,400	ug/kg	26		1	12/13/17	12/14/17 16:59	1055
Benzo(g,h,i)perylene	900	ug/kg	26		1	12/13/17	12/14/17 16:59	1055
Benzo(k)fluoranthene	1,200	ug/kg	26		1	12/13/17	12/14/17 16:59	1055
Chrysene	1,400	ug/kg	26		1	12/13/17	12/14/17 16:59	1055
Dibenz(a,h)Anthracene	210	ug/kg	26		1	12/13/17	12/14/17 16:59	1055
Fluoranthene	3,300	ug/kg	26		1	12/13/17	12/14/17 16:59	1055
Fluorene	1,300	ug/kg	26		1	12/13/17	12/14/17 16:59	1055
Indeno(1,2,3-c,d)Pyrene	1,000	ug/kg	26		1	12/13/17	12/14/17 16:59	1055
2-Methylnaphthalene	1,800	ug/kg	26		1	12/13/17	12/14/17 16:59	1055
Naphthalene	41,000	ug/kg	260		10	12/13/17	12/14/17 19:09	1055
Phenanthrene	4,500	ug/kg	260		10	12/13/17	12/14/17 19:09	1055
Pyrene	2,400	ug/kg	26		1	12/13/17	12/14/17 16:59	1055

Sample ID: E 13.5-18	Date/Time Sampled: 12/08/2017 10:50	PSS Sample ID: 17120806-004
Matrix: SOIL	Date/Time Received: 12/08/2017 11:45	

pH in Non-Aqueous Matrixes

Analytical Method: SW-846 9045 D

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
pH	9.7	SU			1	12/11/17	12/11/17 13:19	1061



Case Narrative Summary

Client Name: Hillis Carnes Engineering Associates

Project Name: SPT-DMCF

Work Order Number(s): 17120806

Project ID: 17675A

Any holding time exceedances, deviations from the method specifications, regulatory requirements or variations to the procedures outlined in the PSS Quality Assurance Manual are outlined below.

The analyses of chlorine, pH, dissolved oxygen, temperature and sulfite for drinking water and non-potable samples tested for compliance have a maximum holding time of 15 minutes. As such, all laboratory analyses for these analytes exceed holding times.

Matrix spike and matrix spike duplicate analyses may not be performed due to insufficient sample quantity. In these instances, a laboratory control sample and laboratory control sample duplicate are analyzed unless otherwise noted or specified in the method.

Sample Receipt:

All sample receipt conditions were acceptable.

Analytical:

Total Petroleum Hydrocarbons - DRO

Batch: 148790

Surrogate recoveries affected by sample dilution.

Polyaromatic Hydrocarbons (PAHs)

Batch: 148886

Internal Standard recovery fell below 50% due to sample matrix for sample 17120806-004 (Phenanthrene-d10).

Sample 17120806-003 required 5X dilution due to extracts being viscous and dark in color.

NELAP accreditation was held for all analyses performed unless noted below. See www.phaseonline.com for complete PSS scope of accreditation.



Analytical Data Package Information Summary

Work Order(s): 17120806

Report Prepared For: Hillis Carnes Engineering Associates, Annapo

Project Name: SPT-DMCF

Project Manager: Keith Progin

Method	Client Sample Id	Analysis Type	Lab Sample Id	Analyst	Mtx	Prep Batch	Analytical Batch	Sampled	Prepared	Analyzed
SM2540G	E 0-4.5	Initial	17120806-001	1067	S	148728	148728	12/08/2017	12/11/2017 15:50	12/11/2017 15:50
	E 4.5-9	Initial	17120806-002	1067	S	148728	148728	12/08/2017	12/11/2017 15:50	12/11/2017 15:50
	E 9-13.5	Initial	17120806-003	1067	S	148728	148728	12/08/2017	12/11/2017 15:50	12/11/2017 15:50
	E 13.5-18	Initial	17120806-004	1067	S	148728	148728	12/08/2017	12/11/2017 15:50	12/11/2017 15:50
SW-846 6020 A	E 0-4.5	Initial	17120806-001	1064	S	69097	148768	12/08/2017	12/11/2017 10:37	12/12/2017 00:22
	E 4.5-9	Initial	17120806-002	1064	S	69097	148768	12/08/2017	12/11/2017 10:37	12/12/2017 00:26
	E 9-13.5	Initial	17120806-003	1064	S	69097	148768	12/08/2017	12/11/2017 10:37	12/12/2017 00:30
	E 13.5-18	Initial	17120806-004	1064	S	69097	148768	12/08/2017	12/11/2017 10:37	12/12/2017 00:34
	69097-1-BKS	BKS	69097-1-BKS	1064	S	69097	148768	-----	12/11/2017 10:37	12/11/2017 21:59
	69097-1-BLK	BLK	69097-1-BLK	1064	S	69097	148768	-----	12/11/2017 10:37	12/11/2017 21:55
	GTA-1 (0-1) S	MS	17120707-001 S	1064	S	69097	148768	12/05/2017	12/11/2017 10:37	12/11/2017 22:26
	GTA-1 (0-1) SD	MSD	17120707-001 SD	1064	S	69097	148768	12/05/2017	12/11/2017 10:37	12/11/2017 22:30
	E 0-4.5	Reanalysis	17120806-001	1064	S	69097	148834	12/08/2017	12/11/2017 10:37	12/12/2017 18:57
	E 4.5-9	Reanalysis	17120806-002	1064	S	69097	148834	12/08/2017	12/11/2017 10:37	12/12/2017 19:01
	E 9-13.5	Reanalysis	17120806-003	1064	S	69097	148834	12/08/2017	12/11/2017 10:37	12/12/2017 19:05
	E 13.5-18	Reanalysis	17120806-004	1064	S	69097	148834	12/08/2017	12/11/2017 10:37	12/12/2017 19:09
	SW-846 8015 C	GP4-20' S	MS	17120825-002 S	1045	S	69092	148762	12/08/2017	12/11/2017 08:41
GP4-20' SD		MSD	17120825-002 SD	1045	S	69092	148762	12/08/2017	12/11/2017 08:41	12/11/2017 18:19
E 0-4.5		Initial	17120806-001	1045	S	69092	148763	12/08/2017	12/11/2017 08:41	12/11/2017 18:43
69092-1-BKS		BKS	69092-1-BKS	1045	S	69092	148763	-----	12/11/2017 08:41	12/11/2017 17:54
69092-1-BLK		BLK	69092-1-BLK	1045	S	69092	148763	-----	12/11/2017 08:41	12/11/2017 17:30
69092-1-BSD		BSD	69092-1-BSD	1045	S	69092	148763	-----	12/11/2017 08:41	12/11/2017 18:19
E 9-13.5		Initial	17120806-003	1045	S	69092	148790	12/08/2017	12/11/2017 08:41	12/12/2017 10:22
E 13.5-18		Initial	17120806-004	1045	S	69092	148790	12/08/2017	12/11/2017 08:41	12/12/2017 12:01
SW-846 8082 A	E 0-4.5	Initial	17120806-001	1029	S	69083	148815	12/08/2017	12/08/2017 11:50	12/11/2017 19:17
	E 4.5-9	Initial	17120806-002	1029	S	69083	148815	12/08/2017	12/08/2017 11:50	12/11/2017 19:45
	E 9-13.5	Initial	17120806-003	1029	S	69083	148815	12/08/2017	12/08/2017 11:50	12/11/2017 20:13
	E 13.5-18	Initial	17120806-004	1029	S	69083	148815	12/08/2017	12/08/2017 11:50	12/11/2017 20:41



Analytical Data Package Information Summary

Work Order(s): 17120806

Report Prepared For: Hillis Carnes Engineering Associates, Annapo

Project Name: SPT-DMCF

Project Manager: Keith Progin

Method	Client Sample Id	Analysis Type	Lab Sample Id	Analyst	Mtx	Prep Batch	Analytical Batch	Sampled	Prepared	Analyzed
SW-846 8082 A	69083-1-BKS	BKS	69083-1-BKS	1029	S	69083	148815	-----	12/08/2017 11:50	12/11/2017 09:49
	69083-1-BLK	BLK	69083-1-BLK	1029	S	69083	148815	-----	12/08/2017 11:50	12/11/2017 09:20
	69083-1-BSD	BSD	69083-1-BSD	1029	S	69083	148815	-----	12/08/2017 11:50	12/11/2017 10:17
	120617-OP-W4835 S	MS	17120807-001 S	1029	S	69083	148815	12/06/2017	12/08/2017 11:50	12/11/2017 10:46
	120617-OP-W4835 SD	MSD	17120807-001 SD	1029	S	69083	148815	12/06/2017	12/08/2017 11:50	12/11/2017 11:13
SW-846 8270 C	E 0-4.5	Initial	17120806-001	1055	S	69143	148886	12/08/2017	12/13/2017 10:55	12/14/2017 15:41
	E 4.5-9	Initial	17120806-002	1055	S	69143	148886	12/08/2017	12/13/2017 10:55	12/14/2017 14:48
	E 9-13.5	Initial	17120806-003	1055	S	69143	148886	12/08/2017	12/13/2017 10:55	12/14/2017 17:25
	E 13.5-18	Initial	17120806-004	1055	S	69143	148886	12/08/2017	12/13/2017 10:55	12/14/2017 16:59
	69143-1-BKS	BKS	69143-1-BKS	1055	S	69143	148886	-----	12/13/2017 10:55	12/14/2017 12:10
	69143-1-BLK	BLK	69143-1-BLK	1055	S	69143	148886	-----	12/13/2017 10:55	12/14/2017 11:44
	69143-1-BSD	BSD	69143-1-BSD	1055	S	69143	148886	-----	12/13/2017 10:55	12/14/2017 12:37
	GTA-Garage W (10-25) S	MS	17120810-004 S	1055	S	69143	148886	12/07/2017	12/13/2017 10:55	12/14/2017 13:03
	GTA-Garage W (10-25) SD	MSD	17120810-004 SD	1055	S	69143	148886	12/07/2017	12/13/2017 10:55	12/14/2017 13:29
	E 9-13.5	Reanalysis	17120806-003	1055	S	69143	148886	12/08/2017	12/13/2017 10:55	12/14/2017 18:17
E 13.5-18	Reanalysis	17120806-004	1055	S	69143	148886	12/08/2017	12/13/2017 10:55	12/14/2017 19:09	
SW-846 9045 D	E 0-4.5	Initial	17120806-001	1061	S	148796	148796	12/08/2017	12/11/2017 13:19	12/11/2017 13:19
	E 4.5-9	Initial	17120806-002	1061	S	148796	148796	12/08/2017	12/11/2017 13:19	12/11/2017 13:19
	E 9-13.5	Initial	17120806-003	1061	S	148796	148796	12/08/2017	12/11/2017 13:19	12/11/2017 13:19
	E 13.5-18	Initial	17120806-004	1061	S	148796	148796	12/08/2017	12/11/2017 13:19	12/11/2017 13:19
	E 0-4.5 D	MD	17120806-001 D	1061	S	148796	148796	12/08/2017	12/11/2017 13:19	12/11/2017 13:19

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120806

Hillis Carnes Engineering Associates SPT-DMCF

Analytical Method: SW-846 8082 ASeq Number: 148815
PSS Sample ID: 17120806-001

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	88		61-150	%	12/11/17 19:17
Tetrachloro-m-xylene	73		42-142	%	12/11/17 19:17

Analytical Method: SW-846 8015 CSeq Number: 148763
PSS Sample ID: 17120806-001

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/11/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
o-Terphenyl	72		34-133	%	12/11/17 18:43

Analytical Method: SW-846 8270 CSeq Number: 148886
PSS Sample ID: 17120806-001

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/13/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	71		32-107	%	12/14/17 15:41
2-Fluorophenol	65		34-113	%	12/14/17 15:41
Nitrobenzene-d5	68		35-123	%	12/14/17 15:41
Phenol-d6	66		34-120	%	12/14/17 15:41
Terphenyl-D14	83		46-154	%	12/14/17 15:41
2,4,6-Tribromophenol	80		31-113	%	12/14/17 15:41

Analytical Method: SW-846 8082 ASeq Number: 148815
PSS Sample ID: 17120806-002

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	93		61-150	%	12/11/17 19:45
Tetrachloro-m-xylene	76		42-142	%	12/11/17 19:45

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120806

Hillis Carnes Engineering Associates SPT-DMCF

Analytical Method: SW-846 8270 CSeq Number: 148886
PSS Sample ID: 17120806-002

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/13/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	77		32-107	%	12/14/17 14:48
2-Fluorophenol	68		34-113	%	12/14/17 14:48
Nitrobenzene-d5	73		35-123	%	12/14/17 14:48
Phenol-d6	69		34-120	%	12/14/17 14:48
Terphenyl-D14	91		46-154	%	12/14/17 14:48
2,4,6-Tribromophenol	82		31-113	%	12/14/17 14:48

Analytical Method: SW-846 8082 ASeq Number: 148815
PSS Sample ID: 17120806-003

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	85		61-150	%	12/11/17 20:13
Tetrachloro-m-xylene	72		42-142	%	12/11/17 20:13

Analytical Method: SW-846 8015 CSeq Number: 148790
PSS Sample ID: 17120806-003

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/11/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
o-Terphenyl	153	*	34-133	%	12/12/17 10:22

Analytical Method: SW-846 8270 CSeq Number: 148886
PSS Sample ID: 17120806-003

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/13/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	79		32-107	%	12/14/17 17:25
2-Fluorophenol	55		34-113	%	12/14/17 17:25
Nitrobenzene-d5	68		35-123	%	12/14/17 17:25
Phenol-d6	65		34-120	%	12/14/17 17:25
Terphenyl-D14	80		46-154	%	12/14/17 17:25
2,4,6-Tribromophenol	70		31-113	%	12/14/17 17:25

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120806

Hillis Carnes Engineering Associates SPT-DMCF

Analytical Method: SW-846 8082 A

Seq Number: 148815
PSS Sample ID: 17120806-004

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/08/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	77		61-150	%	12/11/17 20:41
Tetrachloro-m-xylene	64		42-142	%	12/11/17 20:41

Analytical Method: SW-846 8015 C

Seq Number: 148790
PSS Sample ID: 17120806-004

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/11/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
o-Terphenyl	98		34-133	%	12/12/17 12:01

Analytical Method: SW-846 8270 C

Seq Number: 148886
PSS Sample ID: 17120806-004

Matrix: Soil

Prep Method: SW3550C
Date Prep: 12/13/2017

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
2-Fluorobiphenyl	83		32-107	%	12/14/17 16:59
2-Fluorophenol	51		34-113	%	12/14/17 16:59
Nitrobenzene-d5	88		35-123	%	12/14/17 16:59
Phenol-d6	63		34-120	%	12/14/17 16:59
Terphenyl-D14	66		46-154	%	12/14/17 16:59
2,4,6-Tribromophenol	61		31-113	%	12/14/17 16:59

F = RPD exceeded the laboratory control limits

X = Recovery of MS, MSD or both outside of QC Criteria

H= Recovery of BS,BSD or both exceeded the laboratory control limits

L = Recovery of BS,BSD or both below the laboratory control limits

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120806

Hillis Carnes Engineering Associates

SPT-DMCF

Analytical Method: SW-846 9045 D

Seq Number: 148796

Matrix: Soil

Parent Sample Id: 17120806-001

MD Sample Id: 17120806-001 D

Parameter	Parent Result	MD Result	%RPD	RPD Limit	Units	Analysis Date	Flag
pH	4.059	4.062	0	10	SU	12/11/17 13:19	

Analytical Method: SW-846 6020 A

Seq Number: 148768

Matrix: Solid

Prep Method: SW3050B

Date Prep: 12/11/17

MB Sample Id: 69097-1-BLK

LCS Sample Id: 69097-1-BKS

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
Antimony	<1.998	15.99	17.00	106	80-120	mg/kg	12/11/17 21:59	
Arsenic	<0.3997	15.99	17.04	107	80-120	mg/kg	12/11/17 21:59	
Beryllium	<1.998	15.99	16.64	104	80-120	mg/kg	12/11/17 21:59	
Cadmium	<1.998	15.99	15.75	98	80-120	mg/kg	12/11/17 21:59	
Calcium	<39.97	159.9	164	103	80-120	mg/kg	12/11/17 21:59	
Chromium	<1.998	15.99	16.18	101	80-120	mg/kg	12/11/17 21:59	
Copper	<1.998	15.99	16.22	101	80-120	mg/kg	12/11/17 21:59	
Lead	<1.998	15.99	15.72	98	80-120	mg/kg	12/11/17 21:59	
Manganese	<1.998	15.99	16.75	105	80-120	mg/kg	12/11/17 21:59	
Mercury	<0.07994	0.3997	0.4045	101	80-120	mg/kg	12/11/17 21:59	
Nickel	<1.998	15.99	16.37	102	80-120	mg/kg	12/11/17 21:59	
Selenium	<1.998	15.99	16.44	103	80-120	mg/kg	12/11/17 21:59	
Silver	<1.998	15.99	15.61	98	80-120	mg/kg	12/11/17 21:59	
Thallium	<1.599	15.99	13.85	87	80-120	mg/kg	12/11/17 21:59	
Zinc	<7.994	79.94	76.90	96	80-120	mg/kg	12/11/17 21:59	

Analytical Method: SW-846 8082 A

Seq Number: 148815

Matrix: Solid

Prep Method: SW3550C

Date Prep: 12/08/17

MB Sample Id: 69083-1-BLK

LCS Sample Id: 69083-1-BKS

LCSD Sample Id: 69083-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
PCB-1016	<0.04946	0.4946	0.3954	80	0.3749	77	60-110	5	25	mg/kg	12/11/17 09:49	
PCB-1260	<0.04946	0.4946	0.4209	85	0.4044	83	60-98	4	25	mg/kg	12/11/17 09:49	

Surrogate	MB %Rec	MB Flag	LCS Result	LCS Flag	LCSD Result	LCSD Flag	Limits	Units	Analysis Date
Decachlorobiphenyl	92		95		92		61-150	%	12/11/17 09:49
Tetrachloro-m-xylene	75		83		79		42-142	%	12/11/17 09:49

PHASE SEPARATION SCIENCE, INC.

QC Summary 17120806

Hillis Carnes Engineering Associates
SPT-DMCF

Analytical Method: SW-846 8015 C

Seq Number: 148763

MB Sample Id: 69092-1-BLK

Matrix: Solid

LCS Sample Id: 69092-1-BKS

Prep Method: SW3550C

Date Prep: 12/11/17

LCSD Sample Id: 69092-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
TPH-DRO (Diesel Range Organics)	<10.04	33.46	25.63	77	26.15	79	54-123	2	25	mg/kg	12/11/17 17:54	
Surrogate	MB %Rec	MB Flag	LCS Result	LCS Flag	LCSD Result	LCSD Flag	Limits	Units	Analysis Date			
o-Terphenyl	85		70		71		34-133	%	12/11/17 17:54			

Analytical Method: SW-846 8270 C

Seq Number: 148886

MB Sample Id: 69143-1-BLK

Matrix: Solid

LCS Sample Id: 69143-1-BKS

Prep Method: SW3550C

Date Prep: 12/13/17

LCSD Sample Id: 69143-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Acenaphthene	<16.63	1331	1115	84	1069	80	60-116	4	25	ug/kg	12/14/17 12:10	
Acenaphthylene	<16.63	1331	1171	88	1125	85	61-112	4	25	ug/kg	12/14/17 12:10	
Anthracene	<16.63	1331	1184	89	1148	86	66-115	3	25	ug/kg	12/14/17 12:10	
Benzo(a)anthracene	<16.63	1331	1175	88	1137	85	71-113	3	25	ug/kg	12/14/17 12:10	
Benzo(a)pyrene	<16.63	1331	1280	96	1252	94	69-118	2	25	ug/kg	12/14/17 12:10	
Benzo(b)fluoranthene	<16.63	1331	1308	98	1258	95	65-126	4	25	ug/kg	12/14/17 12:10	
Benzo(g,h,i)perylene	<16.63	1331	1081	81	1080	81	69-112	0	25	ug/kg	12/14/17 12:10	
Benzo(k)fluoranthene	<16.63	1331	1243	93	1214	91	57-129	2	25	ug/kg	12/14/17 12:10	
Chrysene	<16.63	1331	1156	87	1130	85	72-114	2	25	ug/kg	12/14/17 12:10	
Dibenz(a,h)Anthracene	<16.63	1331	1211	91	1201	90	72-110	1	25	ug/kg	12/14/17 12:10	
Fluoranthene	<16.63	1331	1071	80	1054	79	69-119	2	25	ug/kg	12/14/17 12:10	
Fluorene	<16.63	1331	1172	88	1132	85	65-115	3	25	ug/kg	12/14/17 12:10	
Indeno(1,2,3-c,d)Pyrene	<16.63	1331	1046	79	1064	80	60-127	2	25	ug/kg	12/14/17 12:10	
2-Methylnaphthalene	<16.63	1331	1143	86	1125	85	70-109	2	25	ug/kg	12/14/17 12:10	
Naphthalene	<16.63	1331	1054	79	1045	79	59-108	1	25	ug/kg	12/14/17 12:10	
Phenanthrene	<16.63	1331	1116	84	1088	82	67-117	3	25	ug/kg	12/14/17 12:10	
Pyrene	<16.63	1331	1294	97	1246	94	77-111	4	25	ug/kg	12/14/17 12:10	
Surrogate	MB %Rec	MB Flag	LCS Result	LCS Flag	LCSD Result	LCSD Flag	Limits	Units	Analysis Date			
2-Fluorobiphenyl	90		92		89		32-107	%	12/14/17 12:10			
2-Fluorophenol	94		90		90		34-113	%	12/14/17 12:10			
Nitrobenzene-d5	88		91		91		35-123	%	12/14/17 12:10			
Phenol-d6	92		90		89		34-120	%	12/14/17 12:10			
Terphenyl-D14	87		96		94		46-154	%	12/14/17 12:10			
2,4,6-Tribromophenol	77		93		90		31-113	%	12/14/17 12:10			

F = RPD exceeded the laboratory control limits
X = Recovery of MS, MSD or both outside of QC Criteria
H= Recovery of BS,BSD or both exceeded the laboratory control limits
L = Recovery of BS,BSD or both below the laboratory control limits



Phase Separation Science, Inc

Sample Receipt Checklist

Work Order # 17120806 **Received By** Thomas Wingate
Client Name Hillis Carnes Engineering Associates **Date Received** 12/08/2017 11:45:00 AM
Project Name SPT-DMCF **Delivered By** Client
Project Number 17675A **Tracking No** Not Applicable
Disposal Date 01/12/2018 **Logged In By** Thomas Wingate
Shipping Container(s)
No. of Coolers 1

Ice Present
Custody Seal(s) Intact? N/A Temp (deg C) 3
Seal(s) Signed / Dated? N/A Temp Blank Present No

Documentation

COC agrees with sample labels? Yes
Chain of Custody Yes

Sampler Name Sean Harkins
MD DW Cert. No. N/A

Sample Container

Appropriate for Specified Analysis? Yes
Intact? Yes
Labeled and Labels Legible? Yes

Custody Seal(s) Intact? Not Applicable
Seal(s) Signed / Dated Not Applicable

Total No. of Samples Received 4

Total No. of Containers Received 12

Preservation

Total Metals (pH<2) N/A
Dissolved Metals, filtered within 15 minutes of collection (pH<2) N/A
Orthophosphorus, filtered within 15 minutes of collection N/A
Cyanides (pH>12) N/A
Sulfide (pH>9) N/A
TOC, DOC (field filtered), COD, Phenols (pH<2) N/A
TOX, TKN, NH3, Total Phos (pH<2) N/A
VOC, BTEX (VOA Vials Rcvd Preserved) (pH<2) N/A
Do VOA vials have zero headspace? N/A
624 VOC (Rcvd at least one unpreserved VOA vial) N/A
524 VOC (Rcvd with trip blanks) (pH<2) N/A

Comments: (Any "No" response must be detailed in the comments section below.)

For any improper preservation conditions, list sample ID, preservative added (reagent ID number) below as well as documentation of any client notification as well as client instructions. Samples for pH, chlorine and dissolved oxygen should be analyzed as soon as possible, preferably in the field at the time of sampling. Samples which require thermal preservation shall be considered acceptable when received at a temperature above freezing to 6°C. Samples that are hand delivered on the day that they are collected may not meet these criteria but shall be considered acceptable if there is evidence that the chilling process has begun such as arrival on ice.

Samples Inspected/Checklist Completed By:

Thomas Wingate

Date: 12/08/2017

PM Review and Approval:

Amber Confer

Date: 12/11/2017

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APPENDIX B

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Parcel B11 Site Visit Photograph Log
Former Sparrows Point Steel Mill
Sparrows Point, Maryland



111218-1: View of the berm surrounding the Dredge Material Containment Facility in the northwestern portion of Parcel B11 from the north facing west.



111218-2: View of the berm surrounding the Dredge Material Containment Facility in the northwest portion of Parcel B11 from the north facing east.

Parcel B11 Site Visit Photograph Log
Former Sparrows Point Steel Mill
Sparrows Point, Maryland



111218-3: View of the Dredge Material Containment Facility (light brown phragmites in the distance) in the northwestern portion of Parcel B11 from the top of a ramp on the Coke Point Landfill in the south facing north.



111218-4: View of the phragmites in the Dredge Material Containment Facility located in the northwest portion of Parcel B11 facing south.

**Parcel B11 Site Visit Photograph Log
Former Sparrows Point Steel Mill
Sparrows Point, Maryland**



111218-5: View of stockpiles located in the northern portion of Parcel B11 from the south facing north.



111218-6: View of stockpiles located in the northern portion of Parcel B11 from the west facing east.

**Parcel B11 Site Visit Photograph Log
Former Sparrows Point Steel Mill
Sparrows Point, Maryland**



111218-7: View of stockpiles located in the central portion of Parcel B11 from the north facing south.



111218-8: View of stockpiles and slag reclamation machinery located in the central portion of Parcel B11 from the south facing north.

Parcel B11 Site Visit Photograph Log
Former Sparrows Point Steel Mill
Sparrows Point, Maryland



111218-9: View of stockpiles located in the southeastern portion of Parcel B11 from the south facing north.



111218-10: View of stockpiles located in the central portion of Parcel B11 from the east facing west.

Parcel B11 Site Visit Photograph Log
Former Sparrows Point Steel Mill
Sparrows Point, Maryland



111218-11: View of test pit and stockpiles located in the southern portion of Parcel B11 from the north facing south.



111218-12: View of stockpiles located adjacent to the test pits in the southern portion of Parcel B11 from the south facing north.

Parcel B11 Site Visit Photograph Log
Former Sparrows Point Steel Mill
Sparrows Point, Maryland



111218-13: View of test pit and stockpiles located in the southern portion of Parcel B11 from the west facing east.



111218-14: View of slag reclamation machinery in the central portion of Parcel B11 from the east facing south.

**Parcel B11 Site Visit Photograph Log
Former Sparrows Point Steel Mill
Sparrows Point, Maryland**



111218-15: View of the berm along the shoreline on the southern portion of Parcel B11.



111218-16: View of the berm along the shoreline on the southern portion of Parcel B11.

APPENDIX C

**Parcel B11 Sampling Plan Summary
Former Sparrows Point Steel Mill
Sparrows Point, Maryland**

Table 1 - Soil Sampling Summary

Source Area/ Description	REC & Finding/ SWMU/ AOC	Figure or Drawing of Reference	Rationale	Number of Locations	Sample Locations	Boring Depth	Sample Depth	Analytical Parameters: Soil Samples
Transformer Pad	N/A	Drawing 5102	Investigate potential impacts related to transformer pad (potential leaks or releases).	2	B11-001 and B11-002	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC [^] , SVOC, Metals, DRO/GRO, O&G, PCBs (0-1')
Scrap Reclaiming Pit	N/A	Drawing 5002, Drawing 5102, and Drawing 5502	Investigate potential impacts related to historical scrap reclamation activities.	5	B11-003 through B11-007	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC [^] , SVOC, Metals, DRO/GRO, O&G, PCBs (0-1')
Scrap Screening Station	N/A	Drawing 5002, Drawing 5102, and Drawing 5502	Investigate potential impacts related to historical scrap screening activities.	2	B11-008 and B11-009	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC [^] , SVOC, Metals, DRO/GRO, O&G, PCBs (0-1')
Site-Wide/ Material Stockpiles	N/A	Aerial Imagery and Site Visit	Investigate potential impacts related to current material stockpiling activities.	16	B11-010 through B11-025	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC [^] , SVOC, Metals, DRO/GRO, O&G, PCBs (0-1')
Site-Wide/ Dredge Material Containment Facility Perimeter	N/A	Drawing 5002, Drawing 5102, Drawing 5502, and Aerial Imagery	Investigate potential impacts related to historical mud/dredge disposal activities.	8	B11-026 through B11-033	Total depth of 20 feet or groundwater.	0-1', 4-5', 9-10' bgs. 4-5' interval may be adjusted in the field based on observations or field screening.	VOC [^] , SVOC, Metals, DRO/GRO, O&G, PCBs (0-1')
			Total:	33				

Soil Borings Sampling Density Requirements (from **Worksheet 17 - Sampling Design and Rationale**)

No Engineered Barrier (41-70 acres): 1 boring per 2 acres with no less than 27 borings.

Mud Storage Impoundment: 27.9 acres (excluded from sampling density calculations)

Engineered Barrier (N/A)

No Engineered Barrier (64.2 acres) = **33 borings required, 33 proposed**

VOCs - Volatile Organic Compounds (Target Compound List)

[^]VOCs are only collected if the PID reading exceeds 10 ppm

SVOCs - Semivolatile Organic Compounds (Target Compound List)

Metals - (Target Analyte List plus Hexavalent Chromium and Cyanide)

O&G - Oil and Grease

DRO/GRO - Diesel Range Organics/Gasoline Range Organics

PCBs - Polychlorinated Biphenyls

bgs - Below Ground Surface

APPENDIX D

HEALTH AND SAFETY PLAN

SPARROWS POINT TERMINAL SPARROWS POINT, MARYLAND

Prepared by:



Environmental Engineers

January 2015

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ATTACHMENTS

Attachment A – EAG Acknowledgment Form

Attachment B – MSDSs

1.0 INTRODUCTION

1.1 Background

The Sparrows Point Terminal site has historically been a steel making facility. It is located in Baltimore County, Maryland in the southeast corner of the Baltimore metropolitan area (approximately 9 miles from the downtown area), on the Sparrows Point Peninsula in the Chesapeake Bay watershed. The facility occupies the entire peninsula and is bounded to the west by Bear Creek; to the south by Patapsco River; and to the east by Jones Creek, Old Road Bay and residential areas of the City of Edgemere. The facility is bounded to the north by the Sparrows Point Country Club. The site is approximately 3,100 acres in size.

Pennsylvania Steel built the furnace at Sparrows Point in 1887 and the first iron was cast in 1889. Bethlehem Steel Corporation (BSC) purchased the facility in 1916 and enlarged it by building additional and plating facilities. BSC filed for bankruptcy in 2001. A series of entities has owned the site between then and now: the International Steel Group (ISG), Mittal Steel, ISG Sparrows Point, LLC, Severstal Sparrows Holding LLC, which was renamed to Severstal Sparrows Point, LLC, RG Steel Sparrows Point, LLC, and then a joint venture to Sparrows Point LLC (SP) and HRE Sparrows Point LLC. Most recently, in 2014, the property and assets were sold to Sparrows Point Terminal LLC (SPT). Environmental liability was retained by SP and work is currently being conducted by EnviroAnalytics Group, LLC (EAG) on behalf of SP.

- In addition to the current environmental investigation and remediation being conducted onsite by EAG and their consultants, there are other entities conducting work on the facility. Demolition of the remaining structures is currently ongoing at the site, and those contractors are being managed by SPT.
- The purpose of this document is to provide an overall health and safety plan (HASP) for EAG personnel and EAG directed contractors who are engaging in environmental investigation and remediation activities onsite. EAG directed contractors will also be expected to have their own Health and Safety Program, and they may opt to draft their own site specific HASP, provided it meets the requirements in this HASP.

1.2 Historic Operations

Steel manufacturing involves handling vast amounts of raw material including coke, iron ore, limestone and scrap steel, as well as recovering byproducts and managing waste materials. The operations listed below either were or are currently performed at the Sparrows Point Facility.

- Iron and steel production
- Coal chemical recovery system
- Other byproducts recovery systems
- Wastewater treatment systems
- Solid waste management
- Air pollution control

A number of site-specific environmental and hydrogeologic investigations have been prepared for the Sparrows Point facility. For the purposes of this HASP, information was obtained from the “Special Study Area Release Site Characterization” completed in 2001 by CH2MHill, as well as additional documents submitted since that time. There are five separate Special Study Areas as put forth in the Consent Decree:

- Humphrey Impoundment,
- Tin Mill Canal/Finishing Mills Areas,
- Coke Oven Area,
- Coke Point Landfill, and
- Greys Landfill.

Contaminated soils and groundwater may be present at the site. This plan was prepared based on an assessment of hazards expected to be present and a review of data from the previous site investigations and groundwater sampling events.

During the current investigations and remedial efforts, all related work will be performed in accordance with the requirements of this HASP and Occupational Safety and Health Administration (OSHA) regulations as defined in 29 Code of Federal Regulations (CFR) 1910.120 and 1926.65.

2.0 PURPOSE, SCOPE AND ORGANIZATION

This section describes the purpose, scope and organization of this HASP and the health and safety responsibilities of EAG, their employees, and their subcontractors involved in the field investigation and remediation activities at the Sparrows Point facility.

2.1 Scope

Field investigation and remediation activities for this project may include, but are not limited to:

- Groundwater sampling and monitoring,
- Groundwater and remediation well installation,
- Groundwater and remediation well repairs,
- Groundwater and remediation well closure and abandonment,
- Surface water sampling,
- Sediment sampling,
- Soil boring and subsurface soil sampling,
- Soil excavations for remedial purposes,
- Installation and operation of remediation systems for soil, soil vapor, and groundwater,
- Decommissioning and closure of remediation systems,
- Soil excavations for remedial purposes,
- Insitu soil mixing/soil stabilization,
- Exsitu soil mixing/soil stabilization,
- Dredging operations along Tin Mill Canal,
- Insitu chemical and/or biological injections, and
- Recovery of non-aqueous phase liquids (NAPL)

When EAG personnel are providing oversight of subcontractors, they will attend the safety and health briefings held by the contractor. EAG personnel will follow the requirements of this HASP, as well as any potentially more stringent requirements of the contractor’s health and safety plan.

When EAG personnel are conducting tasks on their own, with or without subcontractors, they will follow the requirements of this HASP. EAG contractors, such as drillers, will also be required to follow the requirements of this HASP, as well as any more stringent requirements of the contractor’s health and safety plan.

All EAG field personnel, including subcontractors to EAG, will be required to read and understand this HASP and agree to implement its provisions. All site personnel will sign the Acknowledgement Form included in **Attachment A** stating that they have read, understood, and agree to abide by the guidelines and requirements set forth in this plan.

2.2 Organization of Document

This HASP includes health and safety procedures for all generally anticipated project field activities. This plan also meets the OSHA requirements contained in the CFR, specifically 29 CFR 1910.120 and 29 CFR 1926, by including the following items:

- A description of staff organization, qualifications and responsibilities (Section 2.3),
- Hazard analysis (Section 3.0),
- Health hazard information (Section 4.0),
- Personal protective equipment (PPE), including available first aid, emergency, and safety equipment (Section 5.0),
- Employee and subcontractor training and standard safety procedures (section 6.0),
- Exposure monitoring plan (Section 7.0),
- Medical surveillance (Section 8.0),
- Site control measures and decontamination procedures for personnel and equipment (Section 9.0),
- Emergency response and contingency procedures (section 10.0), and
- Material Safety Data Sheets (MSDSs) for chemicals used on-site (**Attachment B**).

2.3 EAG Health and Safety Personnel

Personnel responsible for implementing this HASP include:

EAG Contacts for Sparrows Point Project Work	
VP Remediation, Russ Becker	(314) 686-5611
Senior Project Manager, James Calenda	(314) 620-3056
Senior Project Engineer, Elizabeth Schlaeger	(314) 307-1732
Josh Burke – Field Operations Manager	(314) 686-5623
Project Field Team Members, Jeff Wilson and Bill Trentzsch	(314) 620-3135, (314) 686-5598

3.0 HAZARD ANALYSIS

This section outlines the potential hazards related to the field activities listed in Section 2.1.

3.1 Hazard Analysis

The field activities planned for this project pose potential health and safety hazards for field team members. This section describes the hazards associated with the above-listed field activities. Detailed chemical, physical, and biological hazards information is provided in Section 4.0 (Health Hazard Information).

Hazards to which employees and subcontractors may be exposed to as a result of the above-listed activities include potential chemical exposures, lacerations, excessive noise, thermal stress, lifting of excessive weight or bulk, hand tools and heavy equipment, drilling and slips, trips and falls.

3.1.1 Chemical Hazards

Potential exposures to chemicals in the soil or groundwater include the possibility of dermal exposure (contact and/or absorption), inhalation of chemical contamination that may be encountered during sampling or during equipment decontamination activities, or ingestion of contaminants if good personal hygiene practices are not followed.

Benzene, naphthalene, and various metals are the major contaminants that have been identified in groundwater during previous investigations at the site. In addition, light NAPL (LNAPL – benzene, in particular) and dense NAPL (DNAPL – naphthalene, in particular) have also been identified or are heavily suspected in various locations in the Coke Oven Area. Dissolved metals the chemicals of concern primarily located in the area of Tin Mill Canal and the Rod and Wire Mill Area. Treatment chemicals, such as sulfuric acid, are currently being used in remediation systems. All appropriate MSDS sheets will be reviewed that apply to the investigation or remedial tasks being conducted. MSDS sheets are located in **Attachment B**. It should be noted that this is a dynamic document: should any additional chemicals be introduced or discovered, the MSDS sheets will be added to **Attachment B**, as necessary.

3.1.2 Physical Hazards

The potential physical hazards associated with field activities include:

- Excessive lifting
- Slips, trips, and falls
- Working at heights
- Exposure to extreme outside temperatures and weather
- Equipment hazards
- Drilling Hazards
- Noise
- Dust and fumes
- Injury from tools, equipment, rotating parts
- Electrical hazards
- Buried and overhead hazards
- Work over water
- Driving to, from, and around the site (including working in trafficked areas)

Additional hazards may be encountered based on the various task at hand. It will be the responsibility of the site manager, with the help of field staff, to identify and address any additional hazards on a “per task or job” basis. A Job Safety Analyses (JSA) may need to be conducted prior to the start of various tasks. Safety meetings will be conducted with all staff in attendance, before the start of any new task or when any significant personnel or other changes (such as a swift change in weather, for example) occur. Updated information relating to physical hazards will be presented during these meetings in an effort to familiarize the crew with potential hazards, discuss new situations, and determine how the associated risks can be reduced. Further, good housekeeping practices will be enforced to preclude other risks resulting from clutter and inattention to detail. In addition, internal field audits will be randomly conducted to ensure adherence to all procedures are being followed.

3.1.3 Biological Hazards

Biological hazards that may be encountered when conducting field activities include the following:

- Poisonous snakes and spiders
- Ticks and tick-borne diseases
- Stinging insects such as chiggers, bees, wasps, etc.
- Various viruses and diseases spread via animal to human contact such as West Nile virus or rabies
- Various viruses and diseases spread via human to human contact such as colds or the flu
- Dermal contact with poison ivy, oak, and/or sumac
- Bloodborne pathogens when administering first aid

First aid kits will be available on-site. It is crucial to note that any site personnel who has significant allergies should communicate that information to the field team they are working with, along with the location of their auto-injector pen (such as an Epi-Pen) for use in case of going into anaphylactic shock from something that would cause such a reaction (like a bee sting, for example). Personnel who suffer from such allergies are responsible for providing their own auto-injector devices as those are typically prescription based as well as specific to their particular allergy.

4.0 HEALTH HAZARD INFORMATION

This section provides chemical hazard information for those potentially hazardous materials expected to be present at the facility. Potential physical and biological hazards are also discussed in this section.

4.1 Chemical Hazards

Exposure to chemicals through inhalation, ingestion, or skin contact may result in health hazards to field workers. Hazards associated with exposure will be evaluated using OSHA Permissible Exposure Limits (PELs) and the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs). Each of these values are 8-hour, time-weighted averaged (TWAs) above which an employee cannot be exposed. EAG may also use the National Institute of Occupational Safety and Health (NIOSH) Recommended Exposure Limits (RELs) where applicable. Although the OSHA PELs are the only exposure limits enforceable by law, the most stringent of exposure limits will be used as the EAG-enforced exposure criteria during field activities.

The following is a summary of the potential hazards created by the compounds that may be encountered during field activities. Data from sampling of groundwater wells was reviewed to identify potential contaminants at the site. Contaminants of concern may include benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), phenols, metals and water treatment chemicals. Table 4-1 contains chemical information and exposure limits for various chemicals that may be expected to be present in the investigation and remediation efforts. During the recovery of NAPL, the major contaminants of concern are benzene and naphthalene. It is possible that carbon monoxide may also be encountered from the use of various internal combustion engines (vehicular or otherwise); however, it is anticipated that since any such engine will be used outdoors, it is not expected that concentrations of concern will accumulate. With the use of any such engine, the engine should be positioned such that site personnel are upwind of the engine exhaust.

If any chemicals are brought on-site, MSDS must be made available and added to **Attachment B**. Personnel must be trained in the hazards and use of chemicals.

**Table 4-1
Chemical Contaminants of Potential Concern**

Chemical Name Synonyms (trade name)	Exposure Limits	Characteristics	Route of Exposure	Symptoms of Exposure
Benzene	PEL: 1PPM REL: 0.1 CA TLV: 0.5PPM STEL: 1PPM (NIOSH) Skin: YES	Colorless to light-yellow liquid with aromatic odor. LEL: 1.2% UEL: 7.8% VP: 75mm Fl.P: 12°F	INH ABS ING CON	Irritation of eyes, skin, nose, respiratory system, giddiness, headache, nausea, fatigue, anorexia, dermatitis, bone marrow depression
Ethylbenzene	PEL: 100PPM REL: 100PPM TLV: 100PPM STEL: 125PPM IDLH: 800PPM Skin: NO	Colorless liquid with an aromatic odor. LEL: 0.85 UEL: 6.7% IP: 8.76EV VP: 7mm Fl.P: 55°F	INH ING CON	Irritation of eyes, skin, mucous membranes; headache; dermatitis
1,1 dichloroethane	PEL: 100PPM REL: 100PPM TLV: 100PPM STEL: NA IDLH: 3000PPM Skin: NO	Colorless, oily liquid with a chloroform-like odor. LEL: 6.2% UEL: 16% IP: 11.05EV Vp: 64mm Fl.P: 56°F	INH ING CON	Irritation of eyes, CNS depression, liver, kidney, lung damage
Phenol	PEL: 5PPM REL: 5PPM, 15.6PPM (C) TLV: 5PPM STEL: NA IDLH 250PPM Skin: YES	Colorless to light pink crystalline solid with a sweet, acrid odor. LEL: 1.8% UEL: 5.9% IP: 8.12EV Vp: 0.08mm Fl.P: 175°F	INH ING CON ABS	Irritated eyes, nose, throat, anorexia, weakness, muscular ache, pain, dark urine, cyanosis, liver, kidney damage, skin burns, dermatitis, tremor, convulsions, twitch
Naphthalene	PEL: 10PPM REL: 10PPM TLV: 10PPM STEL: 15PPM IDLH: 250PPM Skin: YES	Colorless to brown solid with an odor of mothballs LEL: 0.9% UEL: 5.9% IP: 8.12EV Vp: 0.08mm Fl.P: 174°F	INH ABS ING CON	Irritation of eyes, headache, confusion, excitement, malaise, nausea, vomiting, abdominal pain, irritated bladder, profuse sweating, jaundice, hematuria, renal shutdown, dermatitis, optical neuritis, corneal damage
Toluene	PEL: 200PPM, 300PPM (C) REL: 100PPM TLV: 20PPM STEL: 150PPM IDLH: 500PPM Skin: YES	Colorless liquid with a sweet, pungent benzene-like odor. LEL: 1.1% UEL: 7.1% IP: 8.82EV VP: 21MM Fl.P: 40°F	INH ABS ING CON	Irritation of eyes, nose, fatigue, weakness, confusion, euphoria, dizziness, headache, dilated pupils, lacrimation, nervousness, muscle fatigue, insomnia, dermatitis, liver, kidney damage
Xylenes	PEL: 100PPM REL: 100PPM TLV: 100PPM STEL: 150PPM IDLH: 900PPM Skin: NO	Colorless liquid with an aromatic odor. LEL: 0.9% UEL: 6.7% IP: 8.40EV VP: 5MM Fl.P: 88°F	INH ABS ING CON	Irritated eyes, nose, respiratory system, headache, fatigue, dizziness, confusion, malaise, drowsiness, incoherence, staggering gait, corneal vacuolization, anorexia, nausea, vomiting, abdominal pain, dermatitis

Chemical Name Synonyms (trade name)	Exposure Limits	Characteristics	Route of Exposure	Symptoms of Exposure
Styrene	PEL: 100PPM, 200PPM (C) REL: 50PPM TLV: 20PPM STEL: 40PPM IDLH: 700PPM Skin: NO	Colorless to yellow, oily liquid with a sweet, floral odor. LEL: 0.9% UEL: 6.8% IP: 8.40eV VP: 5MM F.I.P: 88°F	INH ABS ING CON	Irritated eyes, nose, respiratory system, headache, fatigue, dizziness, confusion, malaise, drowsiness, weakness, narcosis, dermatitis
Chlorodiphenyl (54% chlorine) (11097-69-1)	PEL: 0.5mg/m ³ REL: 0.001mg/m ³ TLV: 0.5mg/m ³ STEL: N/A IDLH: 5mg/m ³ (CA) Skin: YES	Colorless to pale yellow viscous liquid with a mild hydrocarbon odor. LEL: NA UEL: NA IP: UNKNOWN VP: 0.00006MM F.I.P: NA	INH ABS ING CON	Irritated eyes, chloracne, liver damage, reproductive effects (carcinogen)
Polynuclear aromatic hydrocarbons (PAHs) (coal tar pitch volatiles) (65996-93-2)	PEL: 0.2mg/m ³ REL: 0.1mg/m ³ TLV: 0.2 mg/m ³ STEL: N/A IDLH: 80mg/m ³ (CA) Skin: NO	The pitch of coal tar is black or dark brown amorphous residue that remains after the redistillation process. LEL: N/A UEL: N/A IP: VARIES VP: VARIES F.I.P: VARIES	INH CON	Direct contact or exposure to vapors may be irritating to the eyes. Direct contact can be highly irritating to the skin and produce dermatitis. Exposure to vapors may cause nausea and vomiting. A potential human carcinogen.
Arsenic (inorganic)	PEL: 0.01mg/m ³ REL: NONE TLV: 0.5 mg/m ³ STEL: N/A IDLH: 5mg/m ³ (CA) Skin: NO	Silver-gray or tin-white brittle odorless solid. Air odor threshold: N/D.	INH ABS CON ING	Symptoms include ulceration of nasal septum, gastrointestinal disturbances, respiratory irritation and peripheral neuropathy. Potential occupational carcinogen.
Barium	PEL: 0.5mg/m ³ REL: 0.5mg/m ³ TLV: 0.5mg/m ³ STEL: N/A IDLH: 50mg/m ³ Skin: NO	White, odorless solid. Air odor threshold: N/D.	INH ING CON	Irritated eyes, skin, upper respiratory system, skin burns, gastroenteritis, muscle spasm, slow pulse, cardiac arrhythmia
Cadmium (elemental)	PEL: 0.005mg/m ³ REL: CA TLV: 0.01mg/m ³ STEL: N/A IDLH: 9mg/m ³ (CA) Skin: NO	Silver-white, blue-tinged lustrous, odorless solid. Air odor threshold: N/D.	INH ING	Symptoms include pulmonary edema, cough, tight chest, head pain, chills, muscle aches, vomiting and diarrhea. Potential occupational carcinogen.
Chromium (Metal)	PEL: 1.0mg/m ³ REL: 0.5mg/m ³ TLV: 0.5mg/m ³ STEL: N/A IDLH: 250mg/m ³ Skin: NO	Blue-white to steel-gray lustrous, brittle, hard odorless solid. Air odor threshold: N/D.	INH ING CON	Symptoms may include irritated eyes and skin, lung fibrosis.
Chromium (Chromium III inorganic compounds)	PEL: 0.5mg/m ³ REL: 0.5mg/m ³ TLV: 0.5mg/m ³ STEL: N/A IDLH: 25mg/m ³ Skin: NO	Varies depending on specific compound.	INH ING CON	Irritation of eyes, sensitivity dermatitis

Chemical Name Synonyms (trade name)	Exposure Limits	Characteristics	Route of Exposure	Symptoms of Exposure
Copper	PEL: 1mg/m ³ REL: 1mg/m ³ TLV: 1mg/m ³ STEL: N/A IDLH: 100mg/m ³ Skin: NO	Reddish, lustrous, malleable, odorless solid	INH ING CON	Irritation of eyes, nose, pharynx, nasal septum perforations, metallic taste, dermatitis
Lead (Elemental & Inorganic as Pb)	PEL: 0.05mg/m ³ RELO.1mg/m ³ TLV: 0.05mg/m ³ STEL: N/A IDLH: 100mg/m ³ Skin: NO	A heavy, ductile soft gray solid. Air odor threshold: N/D.	INH ING CON	Accumulative poison may cause weakness, insomnia, facial pallor, anorexia, malnutrition, constipation, abdominal pain, anemia, gingival lead line, paralysis of wrists and ankles, hypertension and kidney disease.
Nickel	PEL: 1mg/m ³ REL: 0.015mg/m ³ (Ca) TLV: 0.1mg/m ³ STEL: N/A IDLH: 10mg/m ³ Skin: NO	Lustrous, silvery, odorless solid. Air odor threshold: N/A VP: 0mm	INH CON ING	Sensitivity dermatitis, allergic asthma, pneumonitis
Vanadium pentoxide dust	PEL: 0.5mg/m ³ (C) REL: 0.05mg/m ³ (C) TLV: 0.05mg/m ³ STEL: N/A IDLH: 35mg/m ³ Skin: NO	Yellow-orange powder or dark gray, odorless flakes dispersed in air. VP: 0mm	INH ING CON	Irritated eyes, skin, throat, green tongue, metallic taste, eczema, cough, fine rales, wheezing, bronchitis
Zinc oxide	PEL: 5mg/m ³ REL: 5mg/m ³ TLV: 2mg/m ³ STEL: 10mg/m ³ IDLH: 500mg/m ³ Skin: NO	White, lustrous solid	INH	Metal fume fever, chills, muscular ache, nausea, fever, dry throat, cough, weakness, metallic taste, headache, blurred vision, low back pain, vomiting, fatigue, malaise
Sulfuric Acid (water treatment chemical)	PEL: 1mg/m ³ TLV: 0.2mg/m ³ Skin: YES	Oily, colorless to slightly yellow, clear to turbid liquid	IHN ABS ING CON	Can cause irritation or corrosive burns to the upper respiratory system, lung irritation, pulmonary edema, burns to mouth throat and stomach, erode teeth, skin lesions
Antiscale (water treatment chemical)	PEL: 1mg/m ³ TLV: 0.2mg/m ³ Skin: YES	Liquid, colorless, clear	IHN ABS ING CON	May cause severe skin burns and eye damage, can cause cancer, fatal if inhaled, may damage organs through prolonged exposure
Antifoam (water treatment chemical)	N/E	Liquid emulsion, white, opaque	IHN ABS ING CON	May be harmful to skin, if inhaled and if swallowed
Gases				
Carbon Monoxide	PEL: 50PPM REL: 35PPM TLV: 25PPM STEL: 200PPM (C) IDLH: 1200PPM Skin: NO	Colorless, odorless gas LEL: 12.5% UEL: 74% IP: 14.01eV VP: >35atm FI.P: N/A	INH	Headache, rapid breathing, nausea, tiredness, dizziness, confusion

NOTES:

OSHA PEL	Occupational Safety and Health administration Final Rule Limits, Permissible Exposure Limit for an eight-hour, time-weighted average
ACGIH TLV	American Conference of Governmental Industrial Hygienists, Threshold Limit Value for eight-hour, time-weighted average
STEL	Short-term Exposure Limit for a 15-minute, time-weighted average
NIOSH IDLH	National Institute for Occupational Safety and Health, Immediately Dangerous to Life or Health concentration
PPM	Part of vapor or gas per millions parts of air by volume at 25°Celsius and 760mm Hg mg/m ³ (milligram of substance per cubic meter of air)
CA	NIOSH has identified numerous chemicals that it recommends to be treated as potential or confirmed human carcinogens.
(C)	The (ceiling) concentration that should not be exceed during any part of the working exposure.
Skin	Refers to the potential contribution to the overall exposure by the cutaneous (absorption) route, including mucous membranes and eye, either by airborne or more particularly by direct contact with the substance.
UEL	Upper Explosive Limit – the highest concentration of a material in air that produces an explosion in fire or ignites when it contacts an ignition source.
LEL	Lower Explosive Limit – the lowest concentration of the material in air that can be detonated by spark, shock, fire, etc.
INH	Inhalation
ABS	Skin absorption
ING	Ingestion
CON	Skin and/or eye contact

4.2 Physical Hazards

Field employees and subcontractors may be exposed to a number of physical hazards during this project. Physical hazards that may be encountered include the following:

- Heat and cold stress
- Lifting hazards
- Slips, trips and falls
- Working around heavy equipment
- Drilling hazards
- Noise
- Use of hand and power tools
- Buried hazards
- Electrical hazards
- Underground and overhead utilities
- Working over water
- Travel to and from site

4.2.1 Heat Stress

Local weather conditions may produce an environment that will require restricted work schedules in order to protect employees from heat stress. The Project Manager or the Field Lead Team Member will observe workers for any potential symptoms of heat stress. Adaptation of work schedules and training on recognition of heat stress conditions should help prevent heat-related illnesses from occurring. Heat stress controls will be stated at 70°F for personnel in protective clothing and at 90°F for personnel in regular work clothing. Heat stress prevention controls include:

- Allow workers to become acclimatized to heat (three to six days)
- Provide rest breaks in a shaded or air-conditioned break area
- Provide sun screen to prevent sun burn
- Provide drinking water and electrolyte-replenishing fluids
- Keep ice readily available to rapidly cool field team members

The following Heat Stress Index should be used as a guide to evaluate heat stress situations. If the Heat Stress exceeds 105 degrees Fahrenheit, contact the project manager prior to conducting work for detailed guidance.

Heat Stress Index									
Temp. °F	Relative Humidity								
	10%	20%	30%	40%	50%	60%	70%	80%	90%
105	98	104	110	120	132				
102	97	101	108	117	125				
100	95	99	105	110	120	132			
98	93	97	101	106	110	125			
96	91	95	98	104	108	120	128		
94	89	93	95	100	105	111	122		
92	87	90	92	96	100	106	114	122	
90	85	88	90	92	96	100	106	114	122
88	82	86	87	89	93	95	100	106	115
86	80	84	85	87	90	92	96	100	109
84	78	81	83	85	86	89	91	95	99
82	77	79	80	81	84	86	89	91	95
80	75	77	78	79	81	83	85	86	89
78	72	75	77	78	79	80	81	83	85
76	70	72	75	76	77	77	77	78	79
74	68	70	73	74	75	75	75	76	77

NOTES: Add 10° F when protective clothing is being used; Add 10° F when in direct sunlight

HSI Temp	Category	Injury Threat
Above 130° F	Extreme Danger	No work unless emergency exists. Contact Cardno ATC RSC and Corporate Risk Management Department prior to proceeding. Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged and there is physical activity.
105° to 130° F	Danger	Contact RSC prior to proceeding. Requires strict adherence to ACGIH Heat Stress Guidelines, including use of on-site WBGT equipment. Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged and there is physical activity.
90° to 105° F	Extreme Caution	Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged and there is physical activity.
80° to 90° F	Caution	Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged and there is physical activity.
Below 80° F	Normal Range	Typical conditions for time of year. Little or no danger under normal circumstances. As always, anticipate problems and work safely.

4.2.2 Cold Stress

Frostbite and hypothermia are two types of cold injury that personnel must be protected against during the performance of field duties. The objective is to prevent the deep body temperature from falling below 96.8° F and to prevent cold injury to body extremities. Two factors influence the development of a cold injury the ambient temperature, and wind velocity. Reduced body temperature will very likely result in reduced mental alertness, reduction in rational decision making, and/or loss of consciousness with the threat of death.

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Use appropriate cold weather clothing when temperatures are at or below 40° F as exposed skin surfaces must be protected. These protective items can include facemask, hand wear, and foot wear. Workers handling evaporative solvents during cold stress conditions will take special precautions to avoid soaking gloves and clothing because of the added danger of prolonged skin contact and evaporative cooling. Personnel will wear protective clothing appropriate for the level of cold and planned physical activity. The objective is to protect all parts of the body, with emphasis on the hands and feet. Eye protection against glare and ultraviolet light should be worn in snowy and icy conditions.

The work rate should not be so great as to cause heavy sweating that could result in wet clothing. If heavy work must be done, opportunities for rest breaks will be provided where workers have the opportunity to change into dry clothing. Conversely, plan work activities to minimize time spent sitting or standing still. Rest breaks should be taken in a warm, dry area. Windbreaks can also be used to shield the work area from the cooling effects of wind.

If extreme cold-related weather conditions occur, EAG field personnel and subcontractors will take the following precautions:

- Wear adequate insulated clothing when the air temperature drops below 40°F
- Reduce work periods in extreme conditions to allow adequate rest periods in a warm area
- Change clothes when work clothes become wet
- Avoid caffeine (which has diuretic and circulatory effects)

4.2.3 Lifting Hazards

Field personnel may be exposed to injury caused by lifting heavy objects and various pieces large or unwieldy pieces of equipment. All field team members will be trained in the proper methods for lifting heavy and/or large equipment and are cautioned against lifting objects that are too heavy or too big for one person. Proper lifting techniques include the following:

- Keep feet approximately shoulder width apart
- Bend at the knees
- Tighten abdominal muscles
- Lift with the legs
- Keep the load close to the body
- Keep the back upright
- Use the buddy system for larger or heavy pieces of equipment

All drums will be staged using an approved drum dolly or other appropriate equipment. Proper care will be taken in the use of this equipment. Healthy employees with no medical restrictions may lift and carry a maximum of 50 pounds using proper lifting and carrying techniques. This recommended weight limit may be reduced depending on physical and workplace factors.

4.2.4 Slips, Trips and Falls

The most common hazards that will be encountered during field activities will be slips, trips and falls. Field team members are trained to use common sense to avoid these hazards such as using work boots/safety shoes with nonskid soles. When working on slippery surfaces, tasks will be planned to decrease the risk of slipping via avoiding the slippery areas, if possible, or utilizing engineering controls. Engineering controls may involve the placement of supplemental material such as boards, gravel, or ice melt should be utilized to mitigate slippery conditions. Other engineering controls may involve the use of footgear traction control devices. Employees and subcontractors will avoid slippery surfaces, use engineering controls as appropriate, not hurry, and maintain good housekeeping.

4.2.5 Buried Hazards

Whenever the ground is penetrated, the potential for contacting buried hazards exists. During the planning/mobilization phase, prior to drilling or other excavation activities, EAG personnel and/or their contractors will establish the location of underground utility lines (gas, electrical, telephone, fiber optic cable, etc.) and/or substructures or other potential buried hazardous items. This may be conducted by review of historic utility and substructure maps, private utility locates, ground penetrating radar, or other technologies. If there is any evidence of utilities or subsurface objects/structures, drilling or excavation activities may be offset. If activities cannot be offset, measures will be taken to remove, disconnect, and/or protect the utilities and/or subsurface structures and/or objects. Every reasonable effort will be made to clear the area of intrusive work prior to fieldwork being started.

4.2.6 Electrical Hazards

It may be possible that overhead power lines will be in proximate locations during drilling or excavation activities. At least a 20 foot clearance must be maintained from overhead power lines. No equipment such as drill rigs or dump trucks can be moved while masts or buckets are in the upright position. Field personnel and subcontractors performing electrical work are required to be appropriately trained to work on the electrical systems in question prior to start of work. Authorization from project management personnel is required prior to any electrical work or work near overhead power lines. . When using extension cords, all field workers will ensure that they are in good working condition, are correctly rated for use, and do not contain abrasions such that bare wires could be exposed to the environment. Extension cords will not be used in wet areas without plugging the extension cord into a ground fault circuit interrupter (GFCI). GFCIs will detect a short circuit and cut power.

4.2.7 Heavy Equipment Operations

Heavy equipment must be operated in a safe manner and be properly maintained such that operators and ground personnel are protected.

Requirements for Operators

- Only qualified, trained, and authorized operators are allowed to operate equipment
- Seat belts will be used at all times in all equipment and trucks
- Operators will stop work whenever ground personnel or other equipment enter their work area; work will resume only when the area has been cleared
- No personnel may ride on equipment other than the Authorized Operator
- No personnel may be carried or lifted in the buckets or working “arms” of the equipment
- Spotters will be used when ground personnel are in the vicinity of heavy equipment work areas and/or when an operator is backing equipment near other structures or congested area

Requirements for Ground Personnel

- All ground personnel must wear orange protective vests in work areas with any operating heavy equipment
- Ground personnel will stay outside of the swing zone or work area of any operating equipment
- Ground personnel may only enter the swing or work area of any operating equipment when:
 - They have attracted the operators attention and made eye contact
 - The operator has idled the equipment down and grounded all extensions
 - The operator gives the ground personnel permission to approach
- Ground personnel shall never walk or position themselves between any fixed object and running equipment or between two running pieces of equipment

Equipment

- Maintain operations manuals at the site for each piece of equipment that is present and in use
- Ensure operators are familiar with the manual for the equipment and operate the equipment within the parameters of the manual
- Ensure all equipment is provided with roll-over protection systems
- Verify that seatbelts are present and functional in all equipment
- Prohibit the use of equipment that has cab glass which is broken or missing
- Ensure that backup alarms are functional on all trucks and equipment
- Require all extensions such as buckets, blades, forks, etc. to be grounded when not in use
- Require brakes to be set and wheels chocked (when applicable) when not in use

Daily inspections of equipment are required using a Daily Heavy Equipment Safety Checklist. Equipment deemed to be unsafe as a result of daily inspection will not be used until required repairs or maintenance occurs. During maintenance/repair, ensure that motors are turned off, all extensions are grounded or securely blocked, controls are in a neutral position, and the brakes are set.

4.2.8 Drilling and Excavation Safety

Prior to any intrusive work, as previously mentioned, the location of underground utilities, such as sewer, telephone, gas, water and electric lines must be determined and plainly staked. Necessary arrangements must be made with the utility company or owner for the protection, removal or relocation of the underground utilities. In such circumstances, excavation will be done in a manner that

does not endanger the field personnel engaged in the work or the underground utility. Utilities left in place will be protected by barricading, shoring, suspension or other measures, as necessary.

The use of unsafe or defective equipment is not permitted. Equipment must be inspected regularly. If found to be defective, equipment must be immediately removed from use and either repaired or replaced prior to resuming work with that equipment. Field personnel will be familiar with the location of first-aid kits and fire extinguishers. Telephone numbers for emergency assistance must be prominently posted and kept current.

Good housekeeping conditions will be observed in and around the work areas. Suitable storage places will be provided for all materials and supplies. Pipe, drill rods, etc. must be securely stacked on solid, level sills. Work surfaces, platforms, stairways, walkways, scaffolding, and access ways will be kept free of obstructions. All debris will be collected and stored in piles or containers for removal and disposal.

The area of the site to undergo intrusive activity must be walked over with the drillers and/or heavy equipment operators to identify all work locations, as well as making sure all marked utilities are seen by those doing the intrusive work.

Drilling Specific Concerns:

In areas where utilities have been identified or may be suspected, pre-drilling clearance such as hand-augering, hand excavation (with shovels or post-hole diggers), or air-knifing to a depth of at least 5' below ground surface (BGS) may be required. The Project Manager will provide guidance in those instances on what has been determined as an acceptable means of clearing drilling locations. It should be noted that if the soil lithology changes to gravel within those 5 feet, that may be an indication of a utility trench and extreme caution should be taken OR the drilling location should be offset 5 horizontal feet from the original location. Should 3 consecutive attempts be made without success to offset a particular drilling location, the field personnel should stop and contact the Project Manager for further instruction.

Special precaution must be taken when using a drill rig on a site within the vicinity of electrical power lines and other overhead utilities. Electricity can shock, burn and cause death. When overhead electrical power lines exist at or near a drilling site, all wires will be considered dangerous.

A check will be made for sagging power lines before a site is entered. Power lines will not be lifted to gain entrance. The appropriate utility company will be contacted and a request will be made that it lift or raise cut off power to the lines.

The area around the drill rig will be inspected before the drill rig mast (derrick) is raised at a site in the vicinity of power lines. The minimum distance from any point on the drill rig to the nearest power line will be determined when the mast is raised or is being raised. The mast will not be raised and the drill rig will not be operated if this distance is less than 20 feet, because hoist lines and overhead power lines can be moved toward each other by the wind.

Before the mast is raised, personnel will be cleared from the immediate area, with the exception of the operator and a helper, when necessary. A check will be made to ensure safe clearance from energized power lines or equipment (minimum 20-foot clearance). Unsecured equipment must be removed from the mast and cables, mud lines and catline ropes must be adequately secured to the mast before raising. After it is raised, the mast must be secured to the rig in an upright position with steel pins.

Excavation Specific Concerns:

For excavation work, entry into an excavated area or trench will only be allowed when:

- Shoring, sloping, and spoil pile placement is in conformance with 29 CFR 1926 Subpart P, and
- Personal protection and monitoring, as detailed in this HASP, has been implemented.

All excavation contractors are required to provide an OSHA trained and certified Competent Person. Daily inspections of excavations, the adjacent areas, and protective systems shall be made by the Competent Person for evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the Competent Person prior to the start of work and as needed throughout each shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrence. All inspections made by the Competent Person should be recorded in the field log book. No personnel shall perform work in a trench or excavation that contains accumulated water (any accumulated water will need to be either pumped out until the trench/excavation is dry, or the accumulated water is allowed to disperse naturally). Each employee in an excavation shall be protected from cave-ins by an adequate protective system except when excavations are made entirely in stable rock or the excavation is less than 5 feet in depth and examination by the Competent Person provides no indication of a potential cave-in. Protective systems consist of sloping or benching, use of trench boxes or other shielding mechanisms, or the use of a shoring system in accordance with the regulations.

When mobile equipment is operated adjacent to an excavation and the operators/drivers do not have a clear and direct view of the edge of the excavation, a warning system such as barricades, hand or mechanical signals, or spotters are required.

Adequate protection shall be provided to protect employees from loose rock or soil that could pose a hazard to personnel in the excavation. All temporary spoil piles shall be kept at least 2 feet away from the edge of the excavation. Spoil piles should be placed to channel rainwater or other run-off water away from the excavation.

All excavations deeper than 4 feet deep and which have the potential to have a hazardous atmosphere or oxygen deficient atmospheres (less than 19.5% oxygen) must be tested to ensure safe working conditions, prior to entry.

4.2.9 Use of Hand Tools and Portable Power Tools

Hand tools will be kept in good repair and used only for their designed purposes. Proper protective eyewear will be worn when using hand tools and portable power tools. Unguarded sharp-edged or

pointed tools will not be carried in field personnel's pockets. The use of tools with mushroomed heads, split or defective handles, worn parts, or other defects will not be permitted. Inspect all tools prior to start-up or use to identify any defects. Tools that have become unsafe will be reconditioned before reissue or they will be discarded and replaced. Throwing or dropping of tools from one level to another will not be permitted; rather, containers and hand lines will be used for transporting tools from one level to another if working at heights.

Non-sparking tools will be used in atmospheres where sources of ignition may cause fire or explosion. Electric-powered shop and hand tools will be of the double-insulated, shockproof type, or they will be effectively grounded. Power tools will be operated only by designated personnel who are familiar and trained with their use. When not in use, tools will not be left on scaffolds, ladders or overhead working surfaces.

4.2.10 Noise

Exposure to high levels of noise may occur when working near drill rigs or other heavy equipment. Also, depending upon where the work is being performed, local equipment (e.g., airports, factory machines, etc.) may produce high levels of noise. A good indication of the need for hearing protection is when verbal communication is difficult at a distance of 2-3 feet. Personnel will be provided with ear plugs and/or earmuffs when exposed to noise levels in excess of the 8-hour Permissible Exposure Limit (PEL) of 90 decibels.

4.2.11 Work Zone Traffic Control

Personnel will exercise caution when working near areas of vehicular traffic. Work zones will be identified by the use of delineators (traffic cones, flags, vehicles, DOT approved devices, temporary or permanent fencing, and/or safety barrier tape). Personnel will wear reflective vests when working in these areas. Depending on frequency, proximity, and nature of traffic, a flag person may also be utilized.

4.2.12 Work Over Water

If personnel will be working near, above or immediately adjacent to or within 6 feet of water that is 3 feet or more deep or where water presents a drowning hazard (e.g., fast-moving stream, water body with a soft bottom), employees are required to a U.S. Coast Guard (USCG) approved personal flotation device (PFD). All PFDs must have reflective tape on them to facilitate visibility. Employees must inspect PFDs daily before use for defects. Do not use defective PFDs.

4.2.13 Vehicle Use

Personnel must use caution when driving to, from, and across the site, paying special attention to other site traffic, as well as weather and road conditions. Heavy equipment should be transported during non-rush hour traffic.

4.3 Biological Hazards

Site activities on this Site may expose workers to other hazards such as poisonous plants, insects, animals, and indigenous pathogens. Protective clothing and respiratory protection equipment, and being capable of identifying poisonous plants, animals, and insects, can greatly reduce the chances of exposure. Thoroughly washing any exposed body parts, clothing, and equipment will also protect against infections. Avoiding contact with biological hazards is the best way to prevent potential adverse health effects. Recognition of potential hazards is essential. When avoidance is impractical or impossible, PPE, personal hygiene, good general health and awareness must be used to prevent adverse effects. If working in wooded/grassy areas, use appropriate insect repellants (containing DEET and/or Permethrin) and apply them per the manufacturers' directions. The following is a list of biological hazards that may be encountered while performing field activities at the project site and surrounding areas:

BIOLOGICAL HAZARD and LOCATION	CONTROL MEASURES
<p>Snakes typically are found in underbrush and tall grassy areas.</p>	<p>If you encounter a snake, stay calm and look around; there may be other snakes. Turn around and walk away on the same path you used to approach the area. If a person is bitten by a snake, wash and immobilize the injured area, keeping it lower than the heart if possible. Seek medical attention immediately. DO NOT apply ice, cut the wound or apply a tourniquet. Carry the victim or have him/her walk slowly if the victim must be moved. Try to identify the snake: note color, size, patterns and markings.</p>
<p>Poison ivy, poison oak and poison sumac typically are found in brush or wooded areas. They are more commonly found in moist areas or along the edges of wooded areas.</p>	<p>Become familiar with the identity of these plants. Wear protective clothing that covers exposed skin and clothes. Avoid contact with plants and the outside of protective clothing. If skin contacts a plant, wash the area with soap and water immediately. If the reaction is severe or worsens, seek medical attention.</p>
<p>Exposure to bloodborne pathogens may occur when rendering first aid or CPR, or when coming into contact with medical or other potentially infectious material or when coming into contact with landfill waste or waste streams containing such infectious material.</p>	<p>Training is required before a task involving potential exposure is performed. Exposure controls and personal protective equipment (PPE) area required. Hepatitis B vaccination must be offered before the person participates in a task where exposure is a possibility.</p>
<p>Bees, spiders and other stinging insects may be encountered almost anywhere and may present a serious hazard particularly to people who are allergic.</p>	<p>Watch for and avoid nests. Keep exposed skin to a minimum. Carry a kit if you have had allergic reactions in the past and inform the Project Manager and/or the buddy. If a stinger is present, remove it carefully with tweezers. Watch for allergic reaction; seek medical attention if a reaction develops.</p>
<p>Ticks typically are in wooded areas, bushes, tall grass and brush. Ticks are black, black and red or brown and can be up to one-quarter inch in size.</p>	<p>Avoid tick areas. Wear tightly woven, light-colored clothing with pants tucked into boots or socks. Spray outside of clothing with insect repellent containing permethrin. Check yourself for ticks often. If bitten, carefully remove tick with tweezers. Report the bit to the Project Manager. Look for symptoms of Lyme</p>

	disease that include a rash that looks like a bulls eye and chills, fever, headache, fatigue, stiff neck or bone pain. If symptoms appear, seek medical attention.
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5.0 PERSONAL PROTECTIVE EQUIPMENT

PPE ensembles are used to protect employees and subcontractors from potential contamination hazards while conducting project field activities. Level D is expected to be used for most activities at the site. The following subsections describe the PPE requirements for the field activities.

5.1 Level D Protection

When the atmosphere contains no known hazards and work functions preclude splashes, immersions or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals, Level D protection may be used. Level D does not provide respiratory protection and only provides minimal dermal protection. The Level D ensemble consists of the following:

- Work clothes that may consist of a short or long-sleeved cotton shirt and cotton pants, cotton overalls, or disposal overalls such as Tyvek™
- Steel-toe/steel-shank work boots
- Safety glasses with side shields
- Hearing protection, as necessary
- Hand protection, as appropriate
- Hard hat when working around overhead equipment such as a drilling rig
- Reflective vests when working around heavy equipment or near roadways
- Body harness and life vests when working on or within 6 feet of bulkheads, at heights, or in 3 feet or more of standing water (such as in Tin Mill Canal)

5.2 Modified Level D Protection

This is the level of protection that may be needed for material handling, sampling operations, and operation of remediation equipment when splash hazards are present. Modified Level D protection consists of the following:

- Disposable overalls such as polyethylene-coated Tyvek™
- Latex, vinyl, or nitrile inner gloves when handling liquids/fluids
- Nitrile outer gloves (taped to outer suit)
- Chemical-protective over-boots (taped to outer suit)
- Steel-toe/steel-shank, high-ankle work boots
- Hard hat with face shield
- Safety glasses with side shields or goggles
-) U
- Hearing protection, as necessary

5.3 Level C Protection

Level C protection will be used when site action levels are exceeded and respiratory protection is required. The Level C ensemble consists of Modified Level D with the following modifications:

- Half or full-face air-purifying respirator (APR) equipped with appropriate cartridges/filters
- Chemical resistant clothing such as poly-coated Tyvek™
- Inner and outer nitrile gloves
- Chemical-resistant safety boots or boot covers to go over safety boots

Upgrading or downgrading the level of protection used by EAG employees and subcontractors is a decision made by EAG based on the air monitoring protocols presented in Section 7.0 for respiratory protection, the potential for inhalation exposure to toxic chemicals, and the need for dermal protection during the activity.

5.4 First Aid, Emergency and Safety Equipment

The following first aid, emergency and safety equipment will be maintained onsite at the work area:

- A portable eye wash
- Appropriate ABC-type fire extinguishers (minimum of 10 pounds; remediation systems to house individual 20 pound extinguishers) carried in every vehicle used during field operations
- Industrial first-aid kit (one 16-unit that complies with American National Standards Institute (ANSI) Z308A for every 25 persons or less)
- Bloodborne pathogen precaution kit with CPR mouth shield
- Instant cold packs
- Soap or waterless hand cleaner and towels
- American Red Cross First Aid and CPR Instruction Manuals

6.0 PERSONNEL TRAINING AND STANDARD SAFETY PROCEDURES

Employees must have received, at the time of project assignment, a minimum of 40 hours of initial OSHA health and safety training for hazardous waste site operations. Personnel who have not met the requirements for the initial training will not be allowed in the Exclusion Zone (EZ) or Contamination Reduction Zone (CRZ) of any active work area. A copy of each subcontractor site worker's 40-hour training certificate must be sent to the Project Manager for review prior to the start of the site work.

The 8-hour refresher training course must be taken at a minimum of once per year. At the time of the job assignment, all site workers must have received 8 hours of refresher training within the past year. This course is required of all field personnel to maintain their qualifications for hazardous waste site work. A copy of each subcontractor site worker's most recent 8-hour refresher training certificate must be sent to the Project Manager for review prior to the start of the site work.

A site-specific safety orientation will be conducted by EAG for all EAG employees and subcontractors engaged in fieldwork.

6.1 Onsite Safety, Health and Emergency Response Training

The OSHA 1910.120 standard requires that site safety and health training be provided by a trained, experienced supervisor. “Trained” is defined to mean an individual that has satisfactorily completed the OSHA 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) course and 8-hour site supervisor training. Training will be offered at the time of the initial task assignment and/or whenever new chemicals are introduced into the workplace. Training will include all applicable regulatory requirements, location of the program, inventory and MSDSs, chemicals used and their hazards (chemical, physical, and health), how to detect the presence or release of chemicals, safe work practices and methods employees can take to protect themselves from hazards, how to read MSDSs and site or project specific information on hazard warnings and labels in use at that location. All training will be documented and training certificates will be kept in the employee’s permanent training file. All applicable training will also require annual refreshers.

EAG qualified personnel must also provide safety meetings.

6.2 Standard Safety Procedures

This section describes the standard safety procedures that EAG requires all onsite personnel to follow during site activities.

6.2.1 General Safety Work Practices

All onsite employees and subcontractors will observe the following general safety work practices:

- Health and safety tailgate briefings will occur to introduce new activities, any new safety issues, and emergency egress routes for work areas; any significant change (added personnel, change in scope, or change in field conditions) will trigger a second (or more) tailgate meeting to address whatever change occurred
- No food, drink, or tobacco products will be allowed in the Exclusion and Contamination Reduction Zones
- Loose clothing, hair, and/or jewelry will not be permitted around moving or rotating equipment
- The “buddy system” will be implemented as necessary whereby a pair of co-workers watches out for each other while in proximity of potential physical work hazards
- Good housekeeping of all work areas will be maintained on an ongoing basis

6.2.2 Hand Safety

This standard is intended to protect employees from activities that may expose them to injury. This standard provides information on recognizing those conditions that require personal protective equipment (PPE) or specific work practices to reduce the risk of hand injury.

Appropriate gloves must be worn when persons work with materials or equipment that presents the potential for hand injury due to sharp edges, corrosives, flammable and irritating materials, extreme temperatures, splinters, etc.

Guidelines for Working With and Around Equipment (Hand Tools, Portable Powered Equipment):

- Employees should be trained in the use of all tools.
- Keep hand and power tools in good repair and use them only for the task for which they were designed.

- Inspect tools before use and remove damaged or defective tools from service.
- Operate tools in accordance with manufacturer's instructions.
- Do not remove or bypass a guarding device for any reason.
- Keep surfaces and handles clean and free of excess oil to prevent slipping.
- Wear proper PPE, including gloves, as necessary.
- Do not carry sharp tools in pockets.
- Clean tools and return to the toolbox or storage area upon completion of a job.
- Before applying pressure, ensure that wrenches have a good bite.
- Brace yourself by placing your body in the proper position so you will not fall if the tool slips.
- Make sure hands and fingers have sufficient clearance in the event the tool slips.
- Always pull on a wrench, never push.
- When working with tools overhead, place tools in a holding receptacle when not in use.
- Do not throw tools from place to place or from person to person, or drop tools from heights.
- Inspect all tools prior to start-up or use to identify any defects.
- Powered hand tools should not be capable of being locked in the ON position.
- Require that all power-fastening devices be equipped with a safety interlock capable of activation only when in contact with the work surface.
- Do not allow loose clothing, long hair, loose jewelry, rings, and chains to be worn while working with power tools.
- Do not use cheater pipes.
- Make provisions to prevent machines from restarting through proper lockout/tagout.

Guidelines for using Cutting Tools:

- Always use the specific tool for the task. Tubing cutters, snips, self-retracting knives, concealed blade cutters, and related tools are task specific and minimize the risk of hand injury. For more information about cutting tools, see Supplemental Information A.
- Fixed open-blade knives (FOBK) are prohibited from use. Examples of fixed open-blade knives include pocket knives, multitools, hunting knives, and standard utility knives.
- When utilizing cutting tools, personnel will observe the following precautions to the fullest extent possible:
 - Use the correct tool and correct size tool for the job.
 - Cut in a direction away from yourself and not toward other workers in the area.
 - Maintain the noncutting hand and arm toward the body and out of the direction of the cutting tool if it were to slip out of the material being cut.
 - Ensure that the tool is sharp and clean; dirty and dull tools typically cause poor cuts and more hazard than a sharp, clean cutting tool.
 - Store these tools correctly with covers in place or blades retracted, as provided by the manufacturer.
 - On tasks where cutting may be very frequent or last all day (e.g., liner samples), consider Kevlar® gloves in the PPE evaluation for the project.
 - Do not remove guards on paper cutters.

6.2.3 Respiratory Protection

Based on air monitoring, an upgrade to Level C protection may be indicated. Half or full-face APRs will be utilized for protection against organic vapors and particulates. All employees required to wear respirators will be need to be medically cleared, in writing to do so by a qualified Occupational Physician.

All respirator users must be trained before they are assigned a respirator, annually thereafter, whenever a new hazard or job is introduces and whenever employees fail to demonstrate proper use or knowledge. Training will include, at a minimum:

- Why the respirator is necessary and what conditions can make the respirator ineffective.
- What limitation and capabilities of the respirators area.
- How to inspect, put on and remove and check the seals of the respirator.
- What respirator maintenance and storage procedures are.
- How to recognize medicals signs and symptoms that may limit or prevent effective use of the respirator.
- The engineering and administrative controls being used and the need for respirators.
- The hazards and consequences of improper respirator use.
- How to recognize and handle emergency situations.

Training will be documented and training certificated will be kept in the employee's permanent training file.

6.2.4 Personal Hygiene Practices

The field team must pay strict attention to sanitation and personal hygiene requirements to avoid personal contamination. The following instructions will be discussed and must be followed:

- During field activities, never put anything in the mouth, including fingers
- All employees must wash their hands, forearms, face, and neck before eating drinking, smoking or using the restroom
- Smoking is prohibited except in designated areas outside the work zone
- At the end of the day, all employees will shower upon returning home or to their hotel

6.2.5 Electrical Safety

All extension cords used onsite must be heavy-duty variety and must be properly grounded. All temporary circuitry must incorporate the use of GFCI devices. Refer to electrical safety in Section 4.2.6, Electrical Hazards.

6.2.6 Fire Safety

All flammable liquids will be used only for their intended purpose and stored and handled only in approved containers. Portable containers must be the approved red safety containers equipped with flame arresters and self-closing lids. All transfers of flammable liquids must be made with the containers grounded or bonded. Also, gasoline containers will be clearly labeled and storage areas (if

applicable) will be posted with “No Smoking” signs. Fire extinguishers will be stalled in all areas that contain flammable liquids.

6.2.7 Illumination

All work is planned for daylight hours. No special requirements are anticipated. However, should any work take place outdoors after daylight hours, suitable lighting will be required. In addition, suitable lighting is to be provided in each remediation system building or enclosure.

6.2.8 Sanitation

Potable water and toilet facilities will be provided in compliance with the OSHA 1926.51 standard. Any container used to distribute drinking water shall be clearly marked and not used for any other purpose. Single drinking cups will be supplied, both a sanitary container for the unused cups and a receptacle for disposed of the used cups will also be provided. Port-a-johns will be provided since there are no sanitary sewers on the job site.

7.0 EXPOSURE MONITORING PLAN

This section describes air and personnel monitoring protocols, sampling methods, and instrumentation to be used, as well as the methods and frequency of sampling instrument calibration and action levels for potential work site hazards. When engaged in air monitoring, EAG personnel and subcontractors must use the forms to record air monitoring data and air monitoring instrument calibration records. All monitoring records/forms are to be maintained in the project file by the EAG Project Manager.

7.1 Air Monitoring

The surveillance program is established to detect changes in the ambient air at the work site and to ensure the continuing safety of the work zones and adequacy of the level of worker protection. During field activities, the designated field team member will monitor the work site for combustible gas concentrations and organic vapors. Calibration of all monitoring equipment will be performed in accordance with the manufacturers’ procedures by trained EAG employees and subcontractors. The Project Manager, Project Field Team Leader or representative will be notified immediately of any contaminant levels that could trigger an upgrade in PPE or cause a suspension of site activities.

- One or more of the following direct-reading instruments may be used to aid in this determination. Photoionization Detectors (PID) and Flame Ionization Detectors (FID) will measure non-specific organic gases and vapors. Combustible Gas Indicators (CGI) will detect explosive atmospheres. Oxygen (O₂) meters will detect fluctuations in oxygen concentrations. These instruments should be calibrated or bump tested daily and whenever the readings may be erratic. All readings should be recorded in the field log books.

Air monitoring results obtained from the breathing zone during field activities will be recorded in field log books. All such records will also include the location, date/time, weather conditions, person monitored, background concentration, and identification of specific contaminant whenever possible. Air monitoring information will be utilized to evaluate personnel exposure and assess the appropriateness of PPE for Site conditions.

7.1.1 Combustible Gas and Oxygen Deficiency/Excess Monitoring

Explosive gas concentrations are not expected to exceed 10% of the lower explosive level (LEL). Should the need be indicated for monitoring, action guidance for the CGI/O2 meter responses is contained in **Table 7-1**.

Table 7-1

CGI/Oxygen Meter Action Levels	
Meter Response	Action
CGI response 0%-10% LEL	Continue normal operations
CGI initial response >10% and <20% LEL	Eliminate all sources of ignition from the work area; temporarily retreat from work area for 15-30 minutes and then monitor area again
CGI response after 15-30 minute retreat >10% and <20% LEL	Retreat from work area; notify Project Manager
CGI response >20%	Discontinue operations; retreat from work area
Oxygen level <19.5%	Retreat from work area; notify Project Manager
Oxygen level >23.5%	Retreat from work area; notify Project Manager

7.1.2 Organic Vapor Concentrations

Real-time monitoring for organic vapor concentrations in the breathing zone and down hole will be conducted during field operations (installation of groundwater monitoring and groundwater sampling by EAG and EAG subcontractor personnel) with a PID equipped with a 10.2- or 11.7-electron volt (eV) probe. The PID will be taken into the field and operated during site activities where contaminated soil and/or groundwater may be present. Air monitoring will be conducted during well installation and when a well is opened for groundwater measurements. Measurements will be made at the well head and personnel breathing zones where activities are being performed. The instrument will be calibrated using ultra-high purity air and isobutylene vapor of known concentration before and after use each day. Air calibration measurements will be documented in writing and kept in the project file. Action guidance for PID responses is contained in **Table 7-2**.

Table 7-2

Action Levels for General Site Work	
Meter Response in Breathing Zone (minimum of 3 minutes)	Action Required
<5ppm above background	Use Level D PPE
>5ppm above background	Level C PPE, including half or full-face APR with organic vapor cartridges/P100 filters
>50ppm above background	Stop work
Action Levels for Handling NAPL	
Meter Response in Breathing Zone (minimum of 3 minutes)	Action Required
<1ppm above background	Use Modified Level D PPE
>1ppm to <10ppm	Level C PPE, including half or full-face APR with organic vapor cartridges
>10ppm above background	Immediately withdraw; monitoring will continue until action levels will allow safe re-entry

If air concentrations of organic vapors are greater than 5 ppm above background in the breathing zone for a 3-minute period, personnel will stop work, retreat from site, and allow time (at least 15 minutes) for vapors to dissipate. If monitoring indicates that concentrations still exceed 5 ppm, workers will upgrade to Level C PPE. If monitoring indicates that concentrations exceed 50 ppm, work will be stopped until site conditions can be re-evaluated.

These action levels are based on the assumption that the major component of free product being recovered will be benzene or naphthalene.

Work involving NAPL recovery from monitoring wells will be conducted in Level C PPE. This level may be downgraded based on air monitoring data and actual field conditions. Downgrading of PPE must be approved by the PM and HSE staff. If ventilation is conducted, additional air monitoring will be performed to the resumption of work to determine the level of PPE required.

7.2 Physical Conditions Monitoring

Site workers will be monitored by the Project Manager for signs of weather-related symptoms from exposure to excessive heat or cold.

Whenever the air temperature exceeds 70°F for personnel wearing chemical protective clothing or 90°F for personnel wearing regular work clothes, the Project Manager will assess conditions that may cause heat stress in site workers.

8.0 MEDICAL SURVEILLANCE

This section discusses the medical surveillance program, how the results are reviewed by a physician and how participation is documented.

8.1 Medical Surveillance Program

All personnel who will be performing any task where potential exposure to hazardous material exists will undergo medical surveillance as outlined in OSHA 29 CFR 1910.120(f). All personnel performing tasks in the Exclusion Zone or Contamination Reduction Zone will be required to have passed the EAG medical surveillance examination (or equivalent), performed by a licensed Occupational Physician. The Project Manager will verify that all EAG and subcontractor personnel meet applicable OSHA medical surveillance requirements.

Applicable field employees will undergo an annual comprehensive medical examination, including a comprehensive health history, blood chemistry with complete blood count and differential, urinalysis, medical history, required chest x-rays, audiogram, pulmonary function testing, testing for heavy metals (as needed), and a physician's interpretation of each employee's medical surveillance examination, including the ability of the employee to wear a respirator. A comprehensive medical examination will be performed if an employee develops signs or symptoms indicating possible overexposure to hazardous substances and/or heat or cold stress.

8.2 Physician Review

All medical surveillance and examination results are reviewed by a licensed physician who is certified in Occupational Medicine by the American Board of Preventive Medicine. EAG employee participation in the medical surveillance program is a part of their permanent medical record maintained in the employee's home office. A copy of the current medical clearance signed by the occupational health physician for all EAG employees must be maintained at the home office.

9.0 SITE CONTROL MEASURES AND DECONTAMINATION

To provide for the protection of public health and safety and minimize the possibility of transferring hazardous substances from the site, contamination control procedures are required. These procedures consist of site control measures (which entail the delineation of work zones, communications, and site security) and decontamination procedures (which are necessary for both personnel and equipment). Contaminants that may be uncovered during sampling operations must not be transferred outside the work zone unless properly containerized, and must be removed from clothing, personnel, and equipment prior to relocation from that zone. This section discusses site control measures and decontamination procedures to be used during the collection of samples, the installation of soil borings and/or groundwater monitoring/remediation wells, excavations, and other intrusive work where contact with impacted soils and groundwater could occur by EAG and/or EAG subcontractor personnel.

9.1 Site Control Measures

Site control can be achieved by effectively delineating the work zone, providing appropriate communication, and establishing site security.

9.1.1 Work Zone Delineation

To minimize the transfer of hazardous substances from the site and to ensure proper protection of employees and subcontractors, work zones will be established by the Field Project Team Leader. Applicable site work and the associated requirement for work zones will be determined by the Project Manager. The work area will be divided into an Exclusion Zone (EZ), a Contamination Reduction Zone (CRZ), and a Support Zone (SZ). A typical work zone delineation setup is shown as **Figure 9-1**, below.

Exclusion Zone (EZ)

Contamination does or could exist in this zone. Only properly authorized and trained individuals (refer to Section 6.0) wearing appropriate PPE will be allowed to enter and work in this zone. All people entering the EZ must wear, at a minimum, Level D protection. An entry and exit point for personnel and equipment will be established at the periphery of the EZ (between the EZ and the CRZ) to regulate the flow of personnel and equipment.

Contamination Reduction Zone (CRZ)

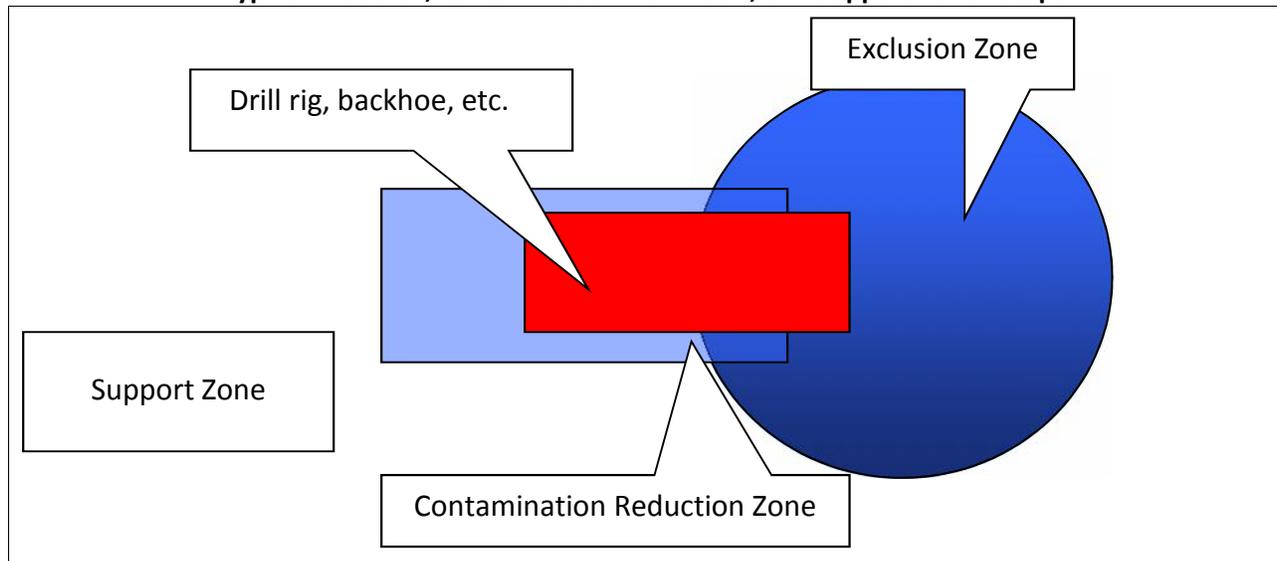
Between the EZ and the SZ will be the CRZ, which will provide a transition between the potentially contaminated EZ and the clean SZ. The CRZ (located upwind of the EZ, if possible) will be a corridor leading from the EZ and will serve as a buffer to further reduce the probability of the SZ becoming contaminated. Exit from the EZ will only be allowed through this CRZ. The CRZ will provide additional assurance that the physical transfer of contaminating substances on people, equipment, and/or in the air will be limited through a combination of decontamination and zone restrictions. Within this zone, employees and subcontractors may perform personal decontamination (e.g., face and hand washing), and certain PPE and small equipment decontamination. Buckets or wash basins for boot

washing and equipment decontamination will be stationed on a sheet of plastic (a minimum of 8 feet by 8 feet), the boundaries of which will constitute the CRZ.

Support Zone (SZ)

The Support Zone will be considered a non-contaminated area. The location of support facilities in the SZ will be upwind of the EZ (where possible) and readily accessible to the nearest road. The field office/support facilities, equipment vehicles, a first aid station and a visitors/personnel entry and exit log for the work site will be located in this zone. Potentially contaminated personal clothing, equipment and samples are not permitted in this zone unless properly containerized.

**Figure 9-1
Typical Exclusion, Contamination Reduction, and Support Zone setups**



9.1.2 Communications

A loud and clear form of communication should be made available for Site personnel entering the work zones. Site communication may be in the form of hand signals, voice, or other communication devices. All forms of communication should be understood by all workers on the Site prior to starting work. Offsite communications may be conducted with mobile phones or walkie-talkies only if the atmosphere has been deemed non-explosive, and the person using the mobile device is in the SZ while placing the call, or inside the cab of a stationary vehicle.

9.1.3 Site Security

The Sparrows Point facility is not open to the public, and there is a strictly monitored main entrance with a security guard on duty at all times who only allows authorized personnel onto the Site. This limited access to the facility should eliminate the need for many requirements for specific site security except those needed to maintain work zone integrity, such as visible barriers around open excavations or EZs and CRZs. No site visitors will be allowed to travel unescorted by EAG or subcontractor personnel around the facility.

Once site visitors arrive at their intended work zone, they must check in with the Field Team Lead. If visitors are authorized to enter the CRZ and/or the EZ, they must have completed OSHA 1910.120 medical surveillance and training requirements (refer to Section 8.0 and Section 6.0). Visitors must wear

appropriate PPE before they will be allowed to enter the CRZ and/or the EZ. They must also be taken through this HASP during a brief tail-gate meeting and sign the Acknowledgement page in the back prior to engaging in any activities inside the CRZ or the EZ. All site visitors must follow the same site control measures and decontamination procedures as EAG personnel and subcontractors. The Project Manager must also be informed of each visitor's name, purpose for their visit, time of entry (and exit), location of tasks they wish to perform, whether they completed their intended task(s), and any other relevant information pertaining to their visit.

9.2 Decontamination Procedures

Decontamination of employees, subcontractors, and equipment leaving the EZ will be performed to minimize human exposure to hazardous substances and to minimize the spread of contamination to surrounding areas. The purpose of the CRZ is to provide a location to perform limited personnel decontamination and certain PPE and small equipment decontamination.

9.2.1 Personnel Decontamination

Persons leaving the EZ must pass through the CRZ and follow decontamination procedures before entering the SZ. Hand tools and other sampling equipment used in the EZ and reusable PPE (boots, safety glasses, etc.) will be appropriately cleaned prior to removal from the site each day. The step-by-step sequence for personnel decontamination is as follows:

- Remove boot covers (if used) at the boot washing station and place them in the disposal container provided
- Wash outer gloves and chemical resistant boots (if used) at the boot washing station
- Remove wrist tape (if used) and outer gloves and place them in the disposal container provided
- Remove ankle tape (if used) and disposable coveralls (if used) and place them in the disposal container provided
- Remove respirators (if used) and place each in designated locations in the CRZ
- Remove inner gloves and discard in the disposal container provided
- Wash hands and face and proceed to the SZ

Respirators must be fully decontaminated after each use by the personnel who previously wore them. All project employees and subcontractors are required to take a thorough soap and water shower in their home or motel room at the end of each workday. If monitoring or a general exposure assessment indicates that an employee has become contaminated, the employee or subcontractor will notify the EAG Project Manager and the Field Team Lead as soon as the contaminated state has been discovered.

9.2.2 Equipment Decontamination

All equipment leaving the EZ must be decontaminated either within the CRZ or at the central decontamination area. Small equipment, such as hand tools, will be thoroughly decontaminated within the CRZ before being placed in the SZ. The field tools may be scrubbed visually clean using a detergent solution (Alconox/Liquinox) with water and a stiff, long-bristled scrub brush. Following the solution scrubbing, the tools may be rinsed with distilled water or isopropyl alcohol. Any vehicle working in an EZ will be decontaminated before leaving the site. The vehicle will be cleaned by sweeping excess soil and debris off the wheels. A high-pressure sprayer will then be used to wash the wheels, if necessary.

Each piece of equipment will be inspected after cleaning for any soil remaining on the tires or elsewhere. All vehicles will be cleaned to the satisfaction of the Field Team Lead or a designated assistant prior to entering the SZ or leaving the site. Employees or subcontractors performing decontamination shall wear the appropriate level of PPE (refer to Section 5.0).

9.2.3 Waste Management

The Project Manager and the Field Team Leads will be responsible for overseeing the containerization and disposal of any field derived wastes. Contaminated or suspected contaminated field derived wastes shall be disposed of in accordance with all local, state, and/or federal regulations. Field derived wastes include decontamination rinse waters and other related decontamination generated wastes.

Soils and groundwater expected to be encountered during any sampling or intrusive work not to be contaminated, based on existing data, may be discharged to the ground surface in the immediate vicinity of the monitoring well. However, any known or suspected to be contaminated soil (in small quantities) or groundwater will be containerized for future removal, likely in 55-gallon drums or other approved storage vessels. Depending on the suspected contaminants, the recovered groundwater may be sent through one of the onsite groundwater treatment units. However, the treatment unit must be designed to address the contaminants of concern in the groundwater being treated. Otherwise, the liquid must be staged onsite for eventual offsite disposal at an approved facility.

Impacted soil, if in drums, will be staged in an area designated by the Project Manager or Field Team Lead for eventual disposal. For large excavations, where excavated soil is stockpiled, it may be necessary to place soils on plastic and cover with plastic to prevent any potential leachable runoff. The Project Manager and/or Field Team Lead will provide the proper guidance necessary for handling bulk soil piles.

Any NAPL recovered via remediation systems or manual recovery efforts will be properly containerized and either disposed of offsite as a recyclable material, if possible, or as a hazardous waste. The receiving facility must be an approved facility.

10.0 EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

The objective of emergency response and contingency procedures is to ensure that effective actions are implemented in a timely manner to minimize or control the effects of adverse events (e.g., potential chemical exposures, personal injuries, fires/explosions, and spills/releases). The following subsections describe the basic emergency responses required should an emergency take place during field investigation or remedial effort activities.

10.1 Emergency Phone Numbers

Emergency telephone numbers are listed in **Table 10-1**.

**Table 10-1
Emergency Telephone Numbers and Agencies**

Agency	Telephone Number
Security (Sparrows Point facility)	(410) 388-7761
Ambulance	911
Fire	911
Occupational Health Clinic	(410) 633-3600
Hospital	(410) 550-0100 (general) (410) 550-0350 (emergency)
National Response Center	(800) 424-8802
Poison Control Center - Maryland	(800) 222-1222
EAG Main Contact	
VP Remediation, Russ Becker	(314) 686-5611
Project Manager, James Calenda	(314) 620-3056

10.2 Injury/Illness Treatment

In the event of illness or injury, the following steps will be taken:

- Evaluate the extent of injuries or seriousness of illness.
- When employees require urgent medical attention, call for emergency assistance. First aid should be administered while awaiting an ambulance or paramedics. All emergency medical treatment, other than first aid, will be administered by the local paramedics. **Table 10-1** lists site emergency telephone numbers. In all cases, critical injuries must be immediately referred for professional medical attention.
- For a non-critical injury/illness, first aid will be administered by onsite personnel. Anyone sustaining a non-critical injury/illness who continues to work will be monitored by the Field Team Lead for any signs of worsening condition, if it is deemed that the person can return to work by the Team Lead and Project Manager. Injured personnel who later suffer any worsening change in status are to immediately notify the Team Lead or the Project Manager.

10.3 Occupational Health Clinic and Hospital Information

Occupational Health Clinic

The Concentra Medical Center, located at 1833 Portal Street, Baltimore, MD, is the closest occupational health clinic, just over 6 miles away. A map to the clinic is included as **Figure 10-1**. The clinic should be used for non-emergency injuries and illnesses.

Directions:

From Sparrow's Point Road, turn left onto Wharf Road;
Turn left onto MD-158 W/Bethlehem Blvd. (0.4 mile);
Turn right onto MD-157 N/Peninsula Expy. (2.7 miles);
Turn slight left onto Merritt Ave. (0.1 mile);
Merritt Ave. becomes Sollers Point Rd. (0.3 mile);
Turn left to stay on Sollers Point Rd (0.6 mile);
Turn left onto Williams Ave. (0.2 mile);
Turn right onto Dundalk Ave. (<0.1 miles);
Turn left onto Chandlery St. (0.1 mile);
Turn left onto Portal St.

Figure 10-1: Health Clinic (Non-Emergency) Map



Hospital

The Johns Hopkins Bayview Hospital is the closest emergency facility, just over 9 miles away. The hospital is located at 4940 Eastern Avenue in Baltimore, MD. **Figure 10-2** is a map to this hospital. Maps are also included in **Attachment E**.

Directions:

From the Sparrows Point Industrial Complex, go north on Route 151 for approximately one mile.

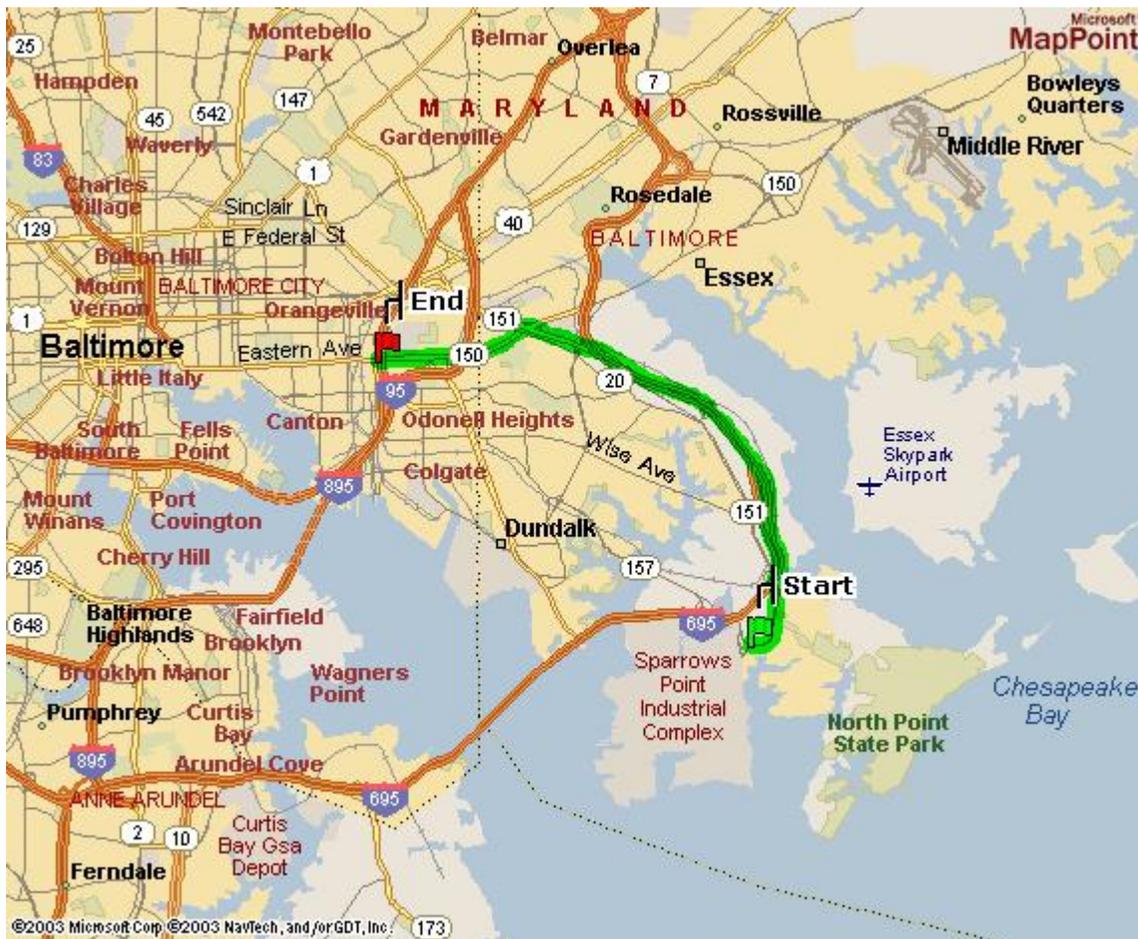
Take ramp (right) onto I-695 towards I-695/Essex.

At exit 40, take ramp (right) onto Route 151/North Point Boulevard North/MD 150;

Take ramp (right) onto Route 150 (Eastern Avenue).

Continue on Eastern Avenue to hospital on right.

Figure 10-2: Hospital Map



Prior to the start of field activities, the Project Field Team Leader will call to verify the telephone numbers and directions for the clinic and hospital, and then distribute location maps and the emergency telephone list to workers and vehicles.

10.4 Accident and Emergency Medical Response

All field team members will be aware of the location of a first aid kit kept onsite. All vehicles used to transport injured persons to an offsite medical facility will be provided with directions and a map to the medical facility.

If treatment beyond first aid is required, emergency response personnel will be contacted for assistance and transport. Before beginning site activities, the Project Field Team Leader will ensure that each field team member knows where the nearest emergency medical facilities are and how to get there. The closest hospital will be used in cases of life-threatening emergencies at the direction of the Project Field Team Leader. The telephone numbers of the local emergency services will be available in the SZ, and the Project Field Team Leader will brief the field team on the procedures for calling for help in an emergency.

Site personnel will inform the Project Manager of any medications, allergies, or other medical information that may be applicable for their medical treatment. The Project Manager will supply this information to emergency response personnel, and will accompany the victim to the hospital, if possible.

10.4.1 Chemical Exposure

In case of accidental overexposure to a hazardous material (groundwater, soil, and/or off-gas materials), guidelines shown in **Table 10-2** will be used.

Table 10-2
Chemical Exposure Guidelines

Type of Overexposure	First Aid Guidelines
Skin Contact	Skin: Wash/rinse the affected area thoroughly with copious amounts of soap and water.
	Eyes: Eyes should be rinsed for at least 15 minutes following chemical contamination.
	Contact emergency response personnel if required, or transport victim to the hospital.
Inhalation	Move the victim to fresh air.
	Contact emergency response personnel if required, or transport victim to the hospital.
Ingestion	Contact Poison Control Center.
	Contact emergency response personnel, or transport victim to the hospital.

10.4.2 Decontamination During a Medical Emergency

For minor medical problems or injuries, regular decontamination procedures will be followed. If emergency, life-saving first aid and/or medical treatment are required, regular decontamination procedures may need to be abbreviated or omitted:

- Do not attempt to wash or rinse an unresponsive victim unless the victim has been contaminated with an extremely toxic or corrosive chemical that may cause injury or loss of life to emergency response personnel.
- Outer garments can be removed if it does not cause a delay, interfere with treatment, or aggravate the problem.

- PPE can be cut away and respiratory protective equipment must always be removed.
- If contaminated clothing cannot be safely removed, then the victim should be wrapped in a blanket or plastic sheeting to prevent contamination to the inside of the ambulance and/or emergency response personnel.

The Project Manager or Field Team Lead will advise the medical staff as to the type of contamination possibly involved.

10.4.3 Small or Incipient Fire

A small fire is defined as a fire that can be extinguished with an available 20 pound type ABC fire extinguisher. An incipient fire is a fire that is small because it has just started. In the event of a small or incipient fire, the following minimum actions will be taken:

- Evacuate nearby personnel from the area, if possible, to an upwind location or to an area not affected by smoke or hazardous decomposition products if an upwind location is not feasible.
- Attempt to extinguish fire using portable fire extinguisher or by smothering.
- Contact emergency response personnel, as needed, for any injuries or exposures to hazardous decomposition products, or if fire cannot be put out.
- After the fire has been extinguished, or emergency response personnel have been contacted, notify the following project personnel:

The Project Manager

10.4.4 Large Fire or Explosion

An explosion, large fire or a small fire which cannot be extinguished is beyond the first line capabilities of EAG personnel. Professional emergency response personnel would be needed to provide emergency assistance for these types of incidents. In the event of a large fire, explosion or a small fire that cannot be extinguished, the following minimum actions will be taken:

- Evacuate all personnel from the site, if possible, to an upwind location, or to an area not affected by smoke or hazardous decomposition products if an upwind location is not feasible
- Perform a quick role call to account for all site personnel
- Contact the fire department
- Contact emergency response personnel, as needed, for any injuries or exposures to hazardous decomposition products
- After emergency response personnel have been contacted, notify the following project personnel:

The Project Manager

10.4.5 Adverse Weather Conditions

In the event of adverse weather conditions, the Project Manager will determine if work can continue without sacrificing the health and safety of site personnel. Threatening weather conditions will be monitored by the Project Manager and possibly the Team Lead via radio, television, internet, and/ or calls to the National Weather Service. Some of the conditions to be considered include:

- Potential for heat or cold stress
- Limited visibility

- Electrical storms
- Treacherous weather-related working conditions (i.e., heavy rainfall, icy conditions causing slippery footing hazards, etc.).

10.4.6 First Aid for Heat Stress/Cold Stress

First aid treatment for **heat cramps** includes shade, rest and fluid replacement. If available, the individual should drink electrolyte replacement fluids (e.g., Gatorade, Squincher or 10-K). The individual should recover within half an hour.

First aid treatment for **heat exhaustion** includes cooling the victim, elevating the feet and fluid replacement. If the individual has not recovered within half an hour, then transport the victim to the hospital for medical attention.

Heat stroke is a medical emergency, requiring the immediate cooling of the victim and transport to the hospital for medical treatment immediately.

First aid treatment for **frost nip** and **frostbite** includes covering the affected area with warmth and retreating to a warm area. If the individual has not recovered within half an hour, then transport the victim to the hospital for medical attention.

Frozen tissue is a medical emergency and the victim must receive medical attention immediately. Contact emergency response personnel immediately or transport the victim to the hospital.

First aid treatment of **mild hypothermia** includes using heat to raise the individual's body temperature. Heat may be applied to the victim in the form of heat packs, hot water bottles and blankets. If the individual has not recovered within half an hour, then transport the victim to the hospital for medical attention.

Severe hypothermia is a medical emergency and the victim must be transported to the hospital immediately. First aid treatment for severe hypothermia includes handling the victim very gently; rough handling may set off of an irregular heartbeat. **DO NOT** attempt to re-warm the severely hypothermic victim; re-warming may cause the development of an irregular heartbeat.

10.4.7 Snake Bites

If bitten, lower the extremity below the heart to reduce the poison's dissemination through the body. Remain calm, try to keep the heart rate reduced and seek medical attention immediately. Do not cut the wound or attempt to suck out the venom. Note any physical features (e.g., shape of head and color or pattern on body) of the snake.

10.4.8 Animal Bites

All bites should be treated as contaminated soft tissue injuries. Bites should be washed immediately with large amounts of soap and water. If soap is not available, flush the wound with water. The severity and onset of any infection is dependent upon the number of organisms (viruses or bacteria) introduced into the wound. Washing saliva out of the wound immediately will reduce the number of bacteria or viruses that can enter the tissue. Medical attention must be sought if rabies is suspected or the individual has not had a recent tetanus booster.

10.4.9 Insect Bites and Stings

Emergency care for insect bites and stings depends on the individual's reaction. To treat a sting that results in a minor reaction, remove the stinger by gently scraping it off the skin. Do not try to grasp the sac or stinger, because this forces the remaining venom into the skin. Once the stinger has been removed, clean the wound and surrounding area. Apply cold packs to slow the absorption of the venom and reduce pain and swelling. The treatment for a severe reaction to insect stings includes the following:

- Confirm with the victim whether they are highly allergic to the insect that stung them
 - If victim has gone into anaphylactic shock, retrieve their epi pen or other auto-injector and administer per the directions as hastily as possible
- Assuming the victim remains conscious, ask them to refrain from moving around, and to lie down
- Immobilize the injured area immediately
- If an extremity is involved, remove any rings or watch
- Keep the affected part low, below the level of the heart
- Apply cold compresses to the affected area
- If possible, try to identify the type of insect that inflicted the sting
- Transport the victim to a medical facility immediately, continuing supportive measures en route.

All employees and subcontractors must report severe reactions to insect stings prior to the beginning of work to both the Project Manager and Field Team Lead.

10.4.10 Poisonous Plants

Decontamination: Wash the skin immediately after contact with the plant. Proper washing may not be practical in the middle of the woods, but a product such as Technu or a small wash-up kit with prepackaged, alcohol-based cleansing tissues can be effective. Employees and subcontractors should not forget to wash contaminated clothing and clean up contaminated equipment prior to re-use.

Treatment: Options are as follows:

- Home treatment: Calamine lotion and an oatmeal bath (one cup to a tub full of water) can help relieve itching. To prevent secondary skin infection, scratching is not helpful and the fingernails should be cut to avoid damage to the skin. Over-the-counter hydrocortisone cream can decrease inflammation and itching; however, the label should be read and the cream used according to directions.
- When to see the doctor: Severe cases may require further treatment. A physician should be seen if the rash appears infected, is on the face or other sensitive body areas, or is too extensive to be easily treated at home.

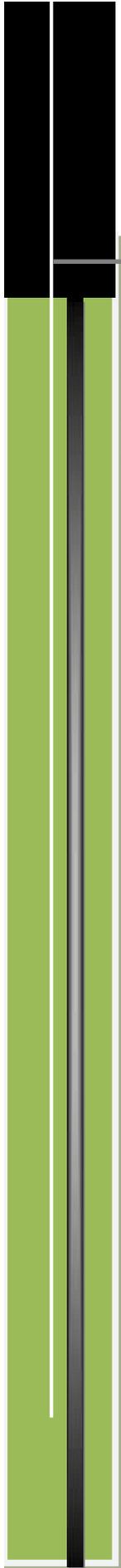
10.4.11 Ticks

To remove an attached tick:

- Use fine-tipped tweezers or a "tick tool" to grasp the tick at the surface of the skin
- If tweezers are not available, use a tissue to protect the fingers (exposure to the tick's body fluid may lead to transmission of disease)
- With a steady motion, pull the tick straight out

Disinfect the bite site and the tweezers. Wash your hands thoroughly with soap and water. Save the tick if you can by placing it in a Ziploc bag in the freezer; this may help with diagnosis in the future.

If flu-like symptoms such as fatigue, headache, neck-stiffness or jaw discomfort begin following a tick bite, seek medical attention.



APPENDICES



Environmental Engineers

ATTACHMENT A
COMPLIANCE AGREEMENT

EAG HEALTH AND SAFETY PLAN

ACKNOWLEDGEMENT FORM

I, _____, have read (or had read to me), EAG's health and safety plan.
(Print Name)

I understand my responsibilities as they are defined in this plan and will abide by these rules and procedures, as well as any regulations or otherwise governing safety. When in doubt concerning safe job performance, I will speak to my immediate supervisor and/or Project Manager.

I understand EAG reserves the right to change or amend the HASP at any time.

I understand any violation to the plan policies or procedures will be cause for disciplinary action up to and including termination.

Employee Signature

Date

EAG Supervisor/Project Manager Signature

Date

ATTACHMENT B

Material Safety Data Sheets (MSDSs)