Beazer

BEAZER EAST, INC. C/O THREE RIVERS MANAGEMENT, INC.
ONE OXFORD CENTRE, SUITE 3000, PITTSBURGH, PA 15219-6401

February 9, 2006

Ms. Amy McLaughlin
Remedial Project Manager
United States Environmental Protection Agency
Region IV, Superfund North Florida Section
61 Forsyth Street, SW
Atlanta, GA 30303

RE: Supplemental Soil and Sediment Sampling Plan – Additional Data for Risk Assessment
Cabot Carbon/Koppers Superfund Site in Gainesville, Florida

Dear Ms. McLaughlin:

Enclosed please find a *Supplemental Soil and Sediment Sampling Plan – Additional Data for Risk Assessment*, dated February 8, 2006 prepared by AMEC Earth & Environmental on behalf of Beazer East, Inc. (Beazer) for the above referenced Site. The objective of the proposed work is to collect additional soil and sediment data to address identified data needs that will supplement existing data to provide the basis for a human health risk assessment for the Site.

Beazer and AMEC are exploring logistical arrangements for completing the proposed work, and anticipate a field start date sometime in mid- to late March 2006, unless specifically directed otherwise by the USEPA. Beazer will provide at least a ten day notice to USEPA prior to initiating any field activities regarding the proposed work.

Sincerely,

Michael Slenska, P.E.
Environmental Manager

Enclosure

cc: Randall Chaffins, USEPA
Kelsey Helton, FDEP
John Mousa, ACEPD
Brett Goodman, GRU
Jill Blundon
Mitch Brourman
Linda Paul, KI

Writer's Direct Dial: 412/208-8867

Supplemental Soil and Sediment Sampling Plan –
Additional Data for Risk Assessment
Cabot Carbon/Koppers Superfund Site
Gainesville, Florida

Submitted to:
U.S. Environmental Protection Agency, Region 4
Atlanta, Georgia

Submitted by:
Beazer East, Inc.
Pittsburgh, Pennsylvania

Prepared by:
AMEC Earth & Environmental
Westford, Massachusetts
PN: 4-7200-8401

February 8, 2006

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1.0 INTRODUCTION

On behalf of Beazer East, Inc., AMEC has prepared this work plan for supplemental soil and sediment sampling at the Koppers Portion of the Cabot Carbon/Koppers Superfund Site in Gainesville, Florida (hereafter referred to as the Site). This additional sampling will support a human health risk assessment that will be incorporated into a revised Feasibility Study that will be prepared for the Site. Supplemental sampling locations were selected based on a review of existing Site data.

1.1 Objective

The objective of the work proposed in this work plan is to collect additional data to address the data needs identified as a result of AMEC's evaluation of existing Site data. Once collected, these additional data will be combined with representative historical data to provide the basis for a human health risk assessment for the Site.

1.2 Site Background

The location of the Site is shown in Figure 1. The Site is an active wood treatment facility. The former Cabot Carbon Site, located immediately to the east of the Koppers property, has also impacted soil and ground water due to historical charcoal, pine oil and pine tar manufacturing operations there. These two portions of the Cabot Carbon/Koppers Superfund Site have been undergoing remedial investigation, remedial planning and remedial action under the oversight of the U.S. Environmental Protection Agency (EPA) since the late-1980s. A detailed discussion of the history of Site investigations and remedial actions is presented in the Workplan for Additional Characterization of the Hawthorn Group Formation (TRC, January 2002).

1.3 Data Evaluation

At the request of Beazer East, Inc., AMEC evaluated existing on-Site soil and sediment data to determine if additional data are necessary to complete the human health risk assessment that will be incorporated in the Feasibility Study. This analysis included evaluating the existing data to identify whether: 1) historical sampling efforts were complete in terms of the areas sampled and the constituents analyzed; 2) the depths of sampling were representative of the depths that will need to be evaluated in the risk assessment for the Site; and 3) the quality of the data, in terms of the analytical methods and detection limits used, was adequate.

General findings of the evaluation of existing data are summarized below.

1. Previous sampling efforts provided data for volatile organic compounds (VOCs), semivolatile organic compounds (SVOC), metals, and polychlorinated dioxins and furans (PCDD/Fs). In some areas and depth increments, however, the numbers of samples that included analysis of this full suite of chemical constituents were limited.

2. Additional data are required from portions of the Site that have not been characterized in previous investigations.

3. Additional soil data are necessary to characterize current site conditions. In addition, the analysis of new samples with more current analytical methods and their associated detection limits, will improve characterization of constituent concentrations in the samples.

4. Limited sampling has been conducted of the drainage ditch that traverses the Site. Consequently, additional sediment samples will be collected from the ditch.

2.0 SAMPLING PLAN

In order to address the data needs identified above, a soil investigation consisting of 88 surface soil locations and 34 subsurface soil locations is proposed. Proposed soil sampling locations are presented in Figure 2 and analytical parameters for each location are summarized in Table 1. In addition, a screening sediment investigation, consisting of four surface sediment samples, is proposed for the drainage ditch that traverses the Site.

2.1 Soil Investigation – Sampling Rationale

The soil sampling locations proposed in this work plan have been selected to address the data needs summarized in Section 1.2. Soil sampling locations SS-01 through SS-53 have been selected to provide comprehensive spatial coverage of the Site as a whole. These sample locations are situated at the nodes of a 300-ft. x 300-ft. square grid superimposed over the entire site and include locations from which samples have not been collected previously as well as locations in the vicinity of samples that have been collected previously. This sample distribution ensures that the resulting data set will provide an adequate representation of soil conditions throughout the Site.

In addition to the need for greater geographic coverage over the Site as a whole provided by samples SS-01 through SS-53, more focused sampling in some portions of the Site was also judged to be necessary. These focused samples are represented by sampling locations SS-54 through SS-93. These focused locations were selected to provide additional delineation (both horizontal and vertical) of chemical constituents in the vicinity of potential or suspected source areas as well as portions of the Site boundary.

The data generated during this investigation will ultimately be used to evaluate potential risks associated with direct exposure to current and future potential receptors that may potentially be exposed to constituents in soils. Sample depths have been selected accordingly. Surface soil samples (0 to 0.5 foot depth increment) will be used to evaluate potential risks associated with potential contact with chemical constituents in surface soils. Subsurface soils (collected from 0.5 to 6 feet below ground surface (ft bgs)), will be used to evaluate potential risks associated with potential contact with chemical constituents in subsurface soils. A maximum sample depth of 6 ft bgs has been selected because this is the likely maximum depth of any potential future subsurface work at the Site (e.g., utility installation and/or repair).

2.2 Sediment Investigation – Sampling Rationale

Four sediment sample locations have been proposed. As described above, this ditch presents a potential route of transport of chemical constituents through the Site and/or into off-Site areas and limited sampling has been completed to date. Sediment samples are proposed for the locations where the ditch crosses the northern and southern boundaries of the Site. Two additional sample locations are proposed for central portions of the ditch. Analytical parameters include the chemical constituents as well as total organic carbon (TOC) and grain size.

2.3 General Approach

Samples will be collected using either hand augers or Geoprobe® (or other direct push technology) sampling techniques in accordance with the procedures outlined in Section 3.0. Subsurface soil samples will be collected using Geoprobe® or other direct push techniques where possible. At locations where access by mechanized equipment is not feasible or at locations where only a surface soil or sediment sample is to be collected, soil samples will be collected with a hand auger or similar stainless steel hand sampling instrument. At subsurface sampling locations, soil samples will be collected continuously from the ground surface to six feet below the ground surface, presuming a shallow water table (i.e., less than six feet below ground surface), access constraints, physical plant conditions, and/or investigation health and safety concerns do not preclude such efforts. Surface soil samples will be collected for 0-0.5 ft bgs and where specified, a subsurface soil sample will be collected from 0.5 to 6 ft bgs:

Except where otherwise noted, every soil and sediment sample will be submitted to an EPA-approved laboratory and analyzed for the parameters presented in Table 1. All samples will be submitted for the analysis of VOCs by EPA Method 8260, semivolatile organic compounds (SVOCs) by EPA Method 8270C (with selective ion monitoring for PAH), and RCRA 8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver). Mercury will be analyzed by EPA Method 7471; all other metals will be analyzed by EPA Method 6010. Selected soil samples will be submitted for the analysis of 2-3-7-8-substituted PCDD/Fs using EPA Method 1613B. Sediment samples will also be analyzed for TOC (EPA Method 9060 Modified) and grain size (ASTM Method D 422).

3.0 SOIL INVESTIGATION PROCEDURES

3.1 Health and Safety Plan

The work proposed in this work plan will be conducted in accordance with the health and safety procedures outlined in the site-specific Health and Safety Plan included as Appendix A.

3.2 Utility Clearance

Prior to initiating field activities, the sampling contractor will mark out proposed soil sampling activities and review locations with on-site personnel to determine whether any of these locations are associated with the presence of underground utilities. Information to be taken into account in marking out the final proposed sampling locations will include any available as-built plans depicting the location of utilities, interviews with Site personnel familiar with the location of utilities at the facility, and any pertinent observations made during a Site visit. If deemed necessary, a subcontractor specializing in locating subsurface utilities will be mobilized to the site.

3.3 Soil Sampling Techniques

Soil samples will be collected using a stainless steel hand auger (or equivalent hand-sampling device) or Geoprobe® (or equivalent direct push device). At locations where only a surface soil sample will be collected, samples will be collected using a hand auger (or equivalent hand-sampling device). Wherever access to mechanized equipment is possible, sampling will be conducted using a Geoprobe® (or equivalent direct push device) at locations where a subsurface soil sample is to be collected. Wherever access to mechanized equipment is not possible, subsurface sampling will be collected using a hand auger (or equivalent hand-sampling device).

Where a hand auger is necessary, the hand auger will be advanced by 6-inch depth increments. At the conclusion of each interval, the hand auger will then be withdrawn and the soil carefully removed and placed into a stainless steel bowl. The soil will be screened in the field for total VOC using a photo ionization detector (PID). If a Geoprobe® is used, either two or four foot length samples will be collected. Upon retrieval of the sampling device, the liner will be opened or the soil removed from the hand auger, and screened in the field for total VOC using a PID.

After screening the sample for the presence of VOCs with a PID, a geologist will classify each soil interval in accordance with the Unified Soil Classification System (USCS). In addition, each sample will be evaluated in the field for visual evidence of impacts (e.g., staining). PID readings for each boring will be recorded in a field notebook and on a soil boring log form for each location. The PID will be calibrated each day according to manufacturer specifications, and the results recorded in the field log book. Sample locations will be identified and recorded using a hand-held global positioning system (GPS) meter.

In order to reduce the potential for cross-contamination between borings, sampling locations located in areas that are anticipated to be less contaminated will be sampled first. Available Site data and knowledge regarding current and historical Site operations will be used to make a determination as to which areas are anticipated to be cleaner.

Samples for VOC analysis and headspace-screening will be collected first, as soon as possible after opening the acetate liner or removing the soil from the hand auger, followed by SVOCs, PCDD/Fs (if required) and metals, in that order. Discrete VOC soil samples will be collected using either an EnCore sampling device (or equivalent) or will be preserved in the field to avoid potential loss of VOC during handling. Non-VOC samples from each of the required depth intervals (i.e. 0.0-0.5 ft, 0.5 to 6.0 ft) will be placed in separate stainless steel sample bowls and homogenized. The samples will then be transferred into the proper sample containers, placed in a cooler with ice, and shipped to a qualified and EPA-approved laboratory for analysis. Sample containers, preservatives, volumes, hold times, and shipping requirements are summarized in Table 2.

Upon completion, each boring will be filled with either bentonite grout or bentonite hydrated pellets to approximately one foot below ground level.

All Site work will be conducted in accordance with the procedures of the task-specific Quality Assurance Project Plan included as Appendix B.

3.4 Sediment Sampling Techniques

Four composite sediment samples will be collected by hand using a stainless steel sampling instrument. At each of the four sediment sampling locations, grab samples will be collected from the 0.0-0.5 ft depth interval from five distinct sampling locations within a 20-ft long stretch of the drainage ditch, if possible. These five grab samples will be composited into a single sample for submittal to the laboratory. If the thickness of accumulated sediments at a particular sampling location is not sufficient to collect a sample from 0.0 - 0.5 ft, shallower samples may be collected, and noted in the field notebook. Upon collection, the sample will be screened in the field for total VOCs using PID headspace screening procedures. Each sample will also be evaluated in the field for visual evidence of impact (e.g., staining). PID readings for each sample will be recorded in a field notebook. The PID will be calibrated each day according to manufacturer specifications, and the results recorded in the field logbook.

Discrete VOC soil samples will be collected using either an EnCore sampling device (or equivalent) or will be preserved in the field to avoid potential loss of VOC during handling. The remaining sample volume will be composited and used to collect a sample for SVOCs, dioxins/furans and metals, in that order. The samples will be transferred into the proper sample containers, placed in a cooler with ice, and shipped to a qualified laboratory for analysis. Sample containers, preservatives, volumes, hold times, and shipping requirements are summarized in Table 2.

All Site work will be conducted in accordance with the procedures of the task-specific Quality Assurance Project Plan included as Appendix B.

3.5 Equipment Decontamination

Down-hole drilling equipment shall be decontaminated prior to initial use and between each borehole. Non-dedicated soil sampling devices (i.e. stainless steel spoons, bowls, etc.) shall be decontaminated prior to initial use and between collection of each sample to prevent the possible introduction of contaminants into successive samples. Equipment can be decontaminated at the sample location, or at a pre-designated, controlled location. All equipment must be decontaminated before leaving the Site.

Types of equipment requiring decontamination include, but are not limited to, direct push samplers, trowels, shovels, and stainless steel spoons and bowls. At a minimum, items will be cleaned following the procedure outlined below:

1) wash with a non-phosphate detergent (alconox, liquinox, or other suitable detergent) and potable water solution;
2) rinse with potable water;
3) spray with isopropyl alcohol, and
4) rinse with deionized or distilled water.

Where possible, equipment shall be disassembled prior to cleaning. If heavily soiled equipment is present, a second wash with an aqueous non-phosphate detergent solution will be added at the beginning of the process. In addition, heavily soiled items may require steam cleaning using a portable, high pressure steam cleaner equipped with a pressure hose and fittings.

3.6 Sample Identification

Site-specific sample identification numbers will be assigned prior to sample collection. Each sample will be identified in the field notebook and field sampling form by a unique six digit alpha-numeric code following the identification scheme outlined below. The site-specific sample number will consist of the following:

- Sample Matrix Code: The sample matrix code describes the matrix (e.g. “SS” for soil; SD for sediment).
- Location Code: The sample location code follows the sample matrix code, and consists of a two -digit code that indicates the sample location (e.g. SS01, SS85). Location codes lower than 10 will be preceded by a zero, e.g. “01,” “02,” etc.
- Depth Code: Soil samples will indicate the sample depth within the sample ID. Surface soil samples (e.g. 0.0-0.5) will be designated as “A” and subsurface soil samples will be designated as “B”.
- Sample Type: The last letter of the sample identification will be (A) for regular samples, (B) for duplicates, (C) for MS/MSD and (D) for equipment blanks.

Examples of sample identifications:

- SS02AA: Surface soil sample from location SS-02, regular environmental sample;
- SS43BB: Subsurface soil sample from location SS-43, duplicate sample; and
- SD01AA: Surface sediment location from location SD-01; regular environmental sample.

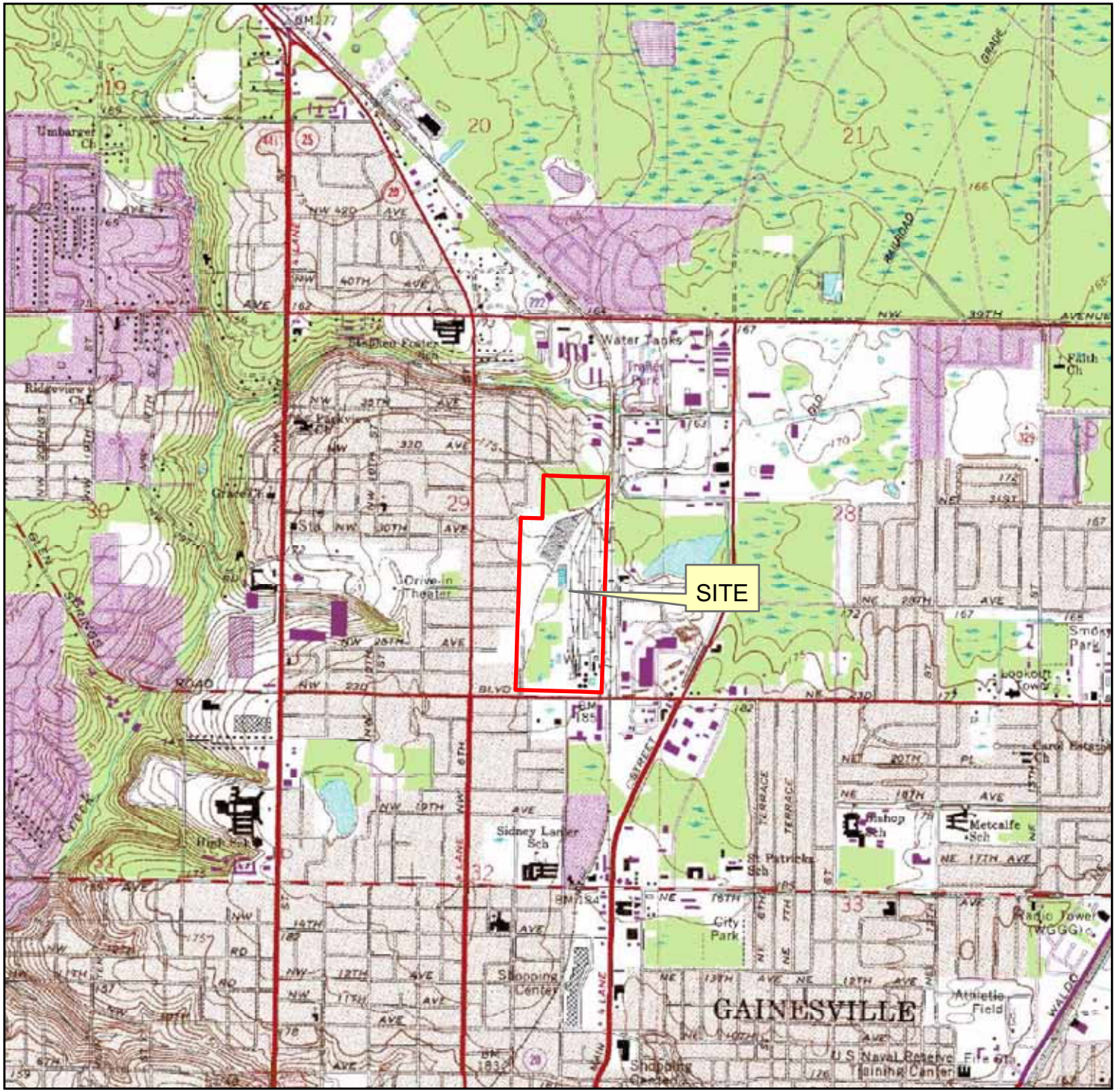
3.7 Sample Packaging and Shipment Procedures

The soil and sediment samples will be placed into a cooler with ice immediately after the samples have been placed in the sample containers. Prior to shipment to the laboratory, the soil and sediment samples will be carefully repacked to avoid breakage during shipment.

All samples will be transported using chain-of-custody procedures as detailed in the Quality Assurance Project Plan (Appendix B). The chain-of-custody form will be placed into the cooler with the samples and custody seals will be placed on the cooler. The samples will be shipped via overnight courier to the laboratory, and the airbill will be maintained as part of the chain-of-custody record.

3.8 Field QC Sample Collection/Preparation Procedures

Field QC samples that will be prepared and submitted to the laboratory for analyses during this soil investigation will consist of equipment blanks, duplicate samples, and matrix spike/matrix spike duplicate samples (MS/MSDs). One equipment blank will be collected for each sampling technique (i.e., one from a hand auger, one from the Geoprobe® equipment, one from the sediment sampling equipment). Field duplicates will be collected for each parameter at a rate of one duplicate per ten samples per matrix. MS/MSDs will be collected at a rate of one MS/MSD per twenty samples per matrix. The frequency and method of collection of field QC samples are described in the Quality Assurance Project Plan (Appendix B).



SITE LOCATION MAP

Gainesville, Florida

Beazer East, Inc.
Pittsburgh, Pennsylvania
Koppers Industries, Inc. Facility

Location of Site

FIGURE 1

N

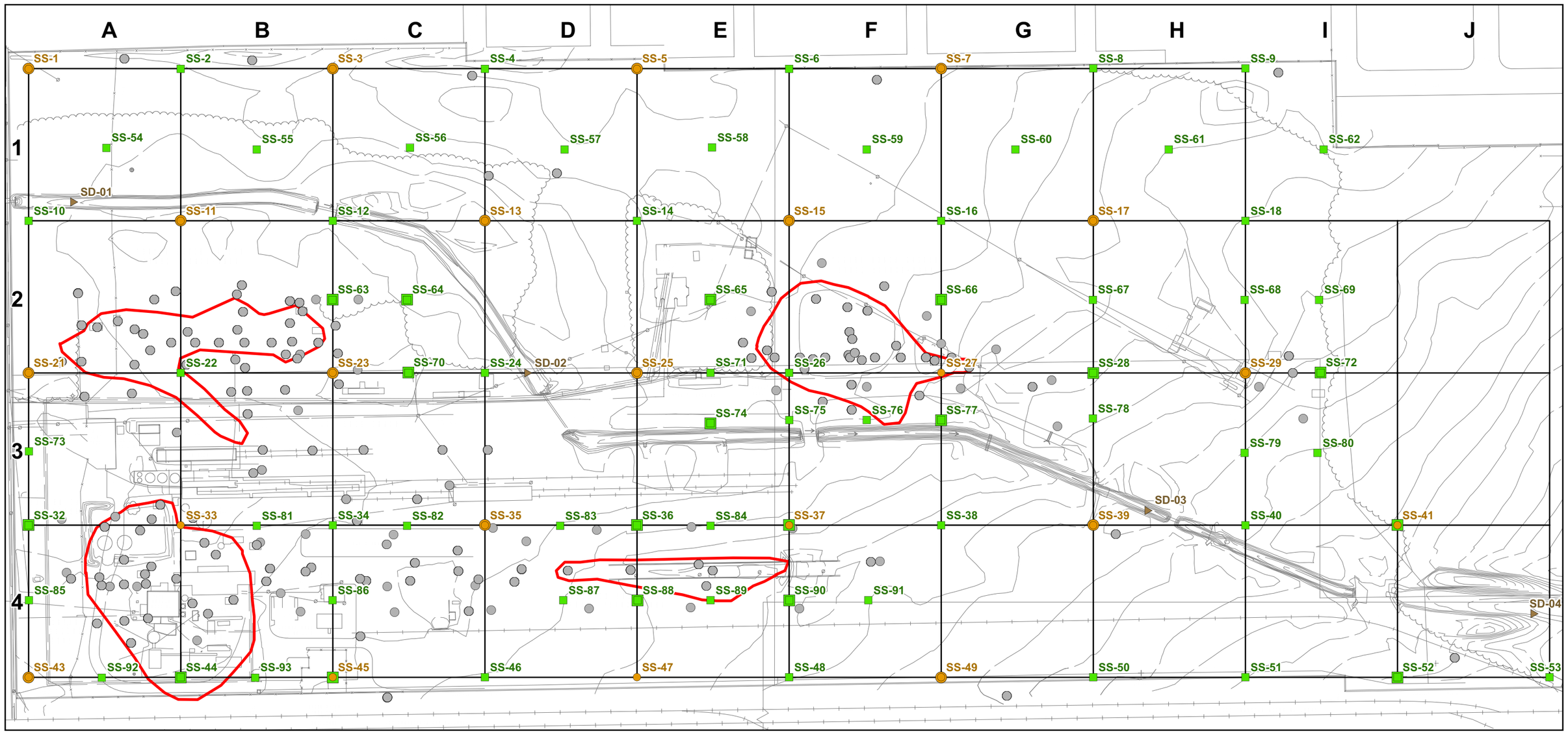
0 2,000
Feet

amec

AMEC Earth & Environmental, Inc.
239 Littleton Road, Suite 1B
Westford, MA 01886
(978) 692-9090

H:\Beazer\Gainsville\Task1\MXD\SiteLocus.mxd H:\Beazer\Gainsville\Task1\Export\SiteLocus.pdf February 2006 AP

Base Map Data from USGS 7 1/2 minute Topographic Maps, 1993. Source: USGS



LEGEND	TITLE	LOCATION MAP	NOTES & SOURCES
Proposed Surface Soil Sample (0 - 0.5 ft) VOCs, SVOCs, and Metals VOCs, SVOCs, Metals and Dioxins/Furans **Proposed Subsurface Soil Sample (0.5 - 6 ft)** VOCs, SVOCs, and Metals VOCs, SVOCs, Metals and Dioxins/Furans 300 ft Grid Line Source Area Sediment Sample Location Historic Soil Samples	**Figure 2** **Proposed Surface and Subsurface Sampling Locations** Beazer East, Inc. Pittsburgh, Pennsylvania Koppers Industries, Inc. Facility Gainesville, Florida		CAD & Data Source: GeoTrans, Inc. N 0 250 Feet AMEC Earth & Environmental, Inc. Westford, Massachusetts H:\Beazer\Gainsville\Task1\MXD\FieldMap.mxd H:\Beazer\Gainsville\Task1\Export\FieldMap.pdf January 27, 2006 DWN: AP CHKD: AM

Table 1
Sampling Plan Summary
Cabot Carbon/Koppers Superfund Site
Gainesville, Florida

Sampling Location	Surface Soil (0 - 0.5 ft bgs)		Subsurface Soil (0.5 - 6 ft bgs)	
	VOC, SVOC, Metals	PCDD/F	VOC, SVOC, Metals	PCDD/F
SOIL SAMPLES				
SS-1	x	x	x	x
SS-2	x			
SS-3	x	x	x	x
SS-4	x			
SS-5	x	x	x	x
SS-6	x			
SS-7	x	x	x	x
SS-8	x			
SS-9	x			
SS-10	x			
SS-11	x	x	x	x
SS-12	x			
SS-13	x	x	x	x
SS-14	x			
SS-15	x	x	x	x
SS-16	x			
SS-17	x	x	x	x
SS-18	x			
SS-21	x	x	x	x
SS-22	x			
SS-23	x	x	x	x
SS-24	x			
SS-25	x	x	x	x
SS-26	x			
SS-27	x	x		
SS-28	x		x	
SS-29	x	x	x	x
SS-32	x		x	
SS-33	x	x		
SS-34	x			
SS-35	x	x	x	x
SS-36	x		x	
SS-37	x	x	x	
SS-38	x			
SS-39	x	x	x	x
SS-40	x			
SS-41	x	x	x	
SS-43	x	x	x	x
SS-44	x		x	
SS-45	x	x	x	
SS-46	x			
SS-47	x	x		
SS-48	x			
SS-49	x	x	x	x
SS-50	x			
SS-51	x			
SS-52	x		x	
SS-53	x			
SS-54	x			
SS-55	x			
SS-56	x			
SS-57	x			
SS-58	x			
SS-59	x			
SS-60	x			
SS-61	x			
SS-62	x			
SS-63	x		x	
SS-64	x		x	
SS-65	x		x	
SS-66	x		x	
SS-67	x			
SS-68	x			
SS-69	x			
SS-70	x		x	
SS-71	x			
SS-72	x		x	
SS-73	x			
SS-74	x			
SS-75	x		x	
SS-76	x			
SS-77	x		x	
SS-78	x			
SS-79	x			
SS-80	x			
SS-81	x			
SS-82	x			
SS-83	x			
SS-84	x			
SS-85	x			
SS-86	x			
SS-87	x			
SS-88	x		x	
SS-89	x			
SS-90	x		x	
SS-91	x			
SS-92	x			
SS-93	x			
Total	**88**	**22**	**34**	**16**
SEDIMENT SAMPLES				
SD-1	x	x		
SD-2	x	x		
SD-3	x	x		
SD-4	x	x		
Total	**4**	**4**	**0**	**0**

Notes:

ft bgs = feet below ground surface

VOC = Volatile Organic Compounds (EPA Method 8260)

SVOC = Semi-volatile Organic Compounds (EPA Method 8270C)

Metals = RCRA 8 metals (Method 6010B for all but mercury; Method 7471A for mercury

PCDD/F (2,3,7.8-substituted PCDD/F) - EPA Method 1613B

Table 2
Sample Preservation and Holding Times
Cabot Carbon/Koppers Superfund Site
Gainesville, Florida

Parameter	Method	Container	Preservation	Holding Time
PCDD/Fs	1613B	Two 4-oz amber glass jars	Cool to 4^{o} C	30 days until extraction; 45 days from extraction until analysis
Metals	SW-846 6010B SW-846-7471A (mercury)	Two 4-oz amber glass jars	Cool to 4^{o} C	All metals except mercury, 6 months from collection to analysis Mercury 28 days from collection to analysis
SVOCs	SW-846 8270C*	Two 4-oz amber glass jars	Cool to 4^{o} C	14 days to extraction, 40 days from extraction to analysis
VOCS	SW-846-8260B	SW-846-5035: Encore sampler or pre-weighed vial with $NaHSO_4$ (low-level, Total VOC < 200ppb) or methanol (high-level, Total VOC > 200ppb)	Cool to 4^{o} C	Encore sample: 48 hours to preservation in $NaHSO_4$; 14 days to analysis Preservation with $NaHSO_4$ or methanol: 14 days to analysis
TOC	SW-846-9060 Modified	8-oz glass jar	Cool to 4^{o} C	28 days from collection
Grain Size	ASTM D 422	8-oz glass jar	-	-

EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846), (U.S. EPA Third Edition, Final Update III, December 1996).
Metals will include RCRA 8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver).
ASTM = American Society for Testing and Methods
*Selected Ion Monitoring for PAH

Supplemental Soil and Sediment Sampling Plan – Additional Data for Risk Assessment

Appendix A

Health and Safety Plan

Cabot Carbon/Koppers Superfund Site
Gainesville, Florida

Submitted to:
U.S. Environmental Protection Agency, Region 4
Atlanta, Georgia

Submitted by:
Beazer East, Inc.
Pittsburgh, Pennsylvania

Prepared by:
AMEC Earth & Environmental
Westford, Massachusetts
PN: 4-7200-8401

February 2006

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APPENDICES

1.0 INTRODUCTION

On behalf of Beazer East, Inc., AMEC has prepared this Health and Safety Plan in conjunction with a work plan for supplemental soil and sediment sampling at the Koppers Portion (hereafter referred to as the Site) of the Cabot/Koppers Superfund Site in Gainesville, Florida. This additional sampling is being conducted to support a human health risk assessment that will be incorporated into the Feasibility Study being prepared by Key Environmental for the Site.

1.1 General Information

Client: Beazer East, Inc.
One Oxford Centre, Suite 3000
Pittsburgh, PA 15219-6400
Telephone: 412-208-8867
Fax: 412-208-8869

Client Contact: Mike Slenska

Site Name & Location: Cabot/Koppers Superfund Site, Gainesville, Florida

Field Manager: To be determined

Project Manager: To be determined

(See also Emergency Call List)

1.2 Site Description

The location of the Site is shown in Figure 1. The Site is an active wood treatment facility at which historical operations have affected soil and ground water. The former Cabot Carbon Site, located immediately to the east of the Koppers property, has also impacted soil and ground water due to historical charcoal, pine oil and pine tar manufacturing operations at that facility. The U.S. Environmental Protection Agency (EPA) manages the two facilities together as one Superfund Site. These two portions of the Cabot/Koppers Superfund Site have been undergoing remedial investigation, remedial planning and remedial action under the oversight of the EPA since the late-1980s. A detailed discussion of the history of Site investigations and remedial actions is presented in the Workplan for Additional Characterization of the Hawthorn Group Formation (TRC, January 2002).

1.3 Scope of Work/Planned Site Activities

The Scope of Work will consist of collecting soil and sediment samples as detailed in the January 2006 work plan entitled " Supplemental Soil and Sediment Sampling Plan – Additional Data for Risk Assessment" (Work Plan). Surface soil samples will be collected at 88 sample locations. At 34 of these locations, subsurface soil samples will also be collected. Surface soil samples will be collected using a hand auger or similar sampling device. Subsurface samples will be collected using a Geoprobe or similar direct push drilling device, where possible. Where site access restricts the use of a Geoprobe, subsurface soil samples will be collected using a

hand auger or similar sampling device. Proposed soil sampling locations are presented in Figure 2 of the Work Plan.

In addition to the soil sampling activities, composite sediment samples will be collected from four locations within the drainage ditch which traverses the Site. Proposed soil sampling locations are presented in Figure 2 of the Work Plan. Four composite sediment samples (each comprising five grab samples) will be collected by hand using a stainless steel sampling instrument from the 0.0-0.5 ft depth interval.

1.4 Scheduled On-Site Personnel

Scheduled on-site personnel will be determined prior to commencing work. Any substitutions will be made with similarly qualified personnel.

1.5 Personnel Responsibilities

Site Health and Safety Coordinator (SHSC): Reports jointly to the Corporate Health and Safety Director (CHSD) and the Field Manager (FM) for all aspects of the project and is the primary contact for health and safety during all field activities. Establishes work zones, evacuation routes, and assembly areas. Makes the day-to-day decision to modify levels of protection provided in the Health and Safety Plan (HSP) based on site conditions or monitoring data. Provides necessary support to the Emergency Coordinator (EC) (see Project or Field Manager below). Has the authority to stop all work if conditions are judged to be hazardous to on-site personnel or the public, and reports and investigates accidents and near-misses. Other specific responsibilities are detailed within the sampling contractor's Corporate Health and Safety Manual (CHSM).

The SHSC or designee must carefully document the implementation of this HSP by maintaining the project health and safety files.

Corporate Health and Safety Director (CHSD): Responsible for the review and approval of the HSP and for coordinating the implementation of health and safety procedures through supervision/direction of the SHSC. Responsible for approval of all changes made to this HSP.

Project Manager or Field Manager (PM or FM): The project or field manager (PM or FM) is responsible for all field activities, for enforcing safe work practices, and for ensuring that daily tailgate meetings are conducted (either by the PM or FM, SHSC, or a rotation of field team members and subcontractor team members). Serves as the EC in emergency situations. The PM or FM assumes (or assigns to a qualified person) the SHSC duties and responsibilities when the SHSC is not on the site.

Technical Staff: All on-site contractors undertaking activities assocated with the work plan, including subcontracting personnel, are responsible for compliance with this HSP in its entirety. They are responsible for taking all reasonable precautions to prevent injury to themselves and to their fellow employees and for being alert to potentially harmful situations. Technical staff members are expected to perform only those tasks that they believe can be done safely and to

immediately report any accidents, near misses, and/or unsafe conditions to the SHSC or the FM.

Subcontractors: Responsible for the conduct of their personnel while on the site and ensuring that personnel comply with this HSP, notifying the SHSC of any special medical conditions that could be affected by site conditions (e.g., allergies, diabetes, etc.), and correcting any unsafe acts/conditions that are identified by the PM, FM, or SHSC.

1.6 Required On-Site Signage and Postings

The following information is required to be located both in the on-site field vehicle:

Hospital Route Map
Emergency Call List
Material Safety Data Sheet (MSDS) Availability

2.0 HAZARD EVALUATION

Chemical, physical, energy, biological, and operational safety hazards anticipated during this project are evaluated in this section. The tables provide details that support the task-specific hazard analyses. Table 1 provides a site characterization overview of the contaminants of concern; Table 2 provides chemical properties and exposure assessment data; and Table 3 summarizes the physical and operational safety hazards and control measures identified for this project. A complete hazard analysis of each site work task and the list of protective measures completes this section of hazard evaluation. Further details of specific control measures for these hazards are presented in Section 3.0, Personnel Protection.

2.1 Chemical Exposure

The primary entry routes of potential contaminants and hazardous materials on the site include skin contact with contaminated materials, and ingestion of materials from hand-to-mouth contact due to inadequate personal hygiene. To minimize these exposure pathways, all required personal protective equipment (PPE) as specified in Section 2.4, Hazard Analysis of Each Site Work Task, will be worn, and personal hygiene will be carefully monitored.

The following categories of constituents of concern under investigation may be present at the site:

- Arsenic
- Pentachlorophenol
- Polycyclic aromatic hydrocarbons (PAHs)
- Dioxins/Furans

TABLE 1

SITE CHARACTERIZATION

ANTICIPATED PHYSICAL STATE OF CONTAMINANT(S):

( ) Liquid ( ) Sludge ( ) Unknown
(**X**) Solid ( ) Gas/Vapors ( ) Other _____

Notes: Contaminants may be present in soil and sediment samples

MATRIX:

(**X**) Surface soils () Surface water ( ) Free product
(**X**) Soils at depth ( ) Groundwater (**X**) Other Sediment

Notes:

POTENTIAL HAZARDOUS PROPERTIES:

( ) Corrosive ( ) Flammable/Combust. ( ) Radioactive
(**X**) Toxic (**)** Volatile ( ) Reactive
( ) Inert (**X**) Carcinogenic ( ) Unknown
( ) Asphyxiant ( ) Compressed gas ( ) Other _____

Notes:

CONTAINER/STORAGE SYSTEM INFORMATION:

( ) Tanks _____ ( ) Landfills/Dumps ( ) Subsurface
( ) Drums _____ ( ) Impoundments (**X**) Uncontainerized
( ) Pipes _____ ( ) Size/capacity _____ ( ) In-Service
( ) Quantity _____ ( ) Surface ( ) Other _____

Notes:

CONDITION OF CONTAINER/STORAGE SYSTEM(S):

( ) Sound/Undamaged ( ) Confirmed leaks (**X**) N/A
( ) Deteriorated/Unsound ( ) Suspected leaks ( ) Unknown
( ) Other _____

Notes:

TABLE 1 (Continued)

SITE CHARACTERIZATION

ORIGIN OR INDUSTRIAL APPLICATION OF CHEMICALS OF CONCERN:

Industrial Process

( ) Manufacturing
( ) Maintenance/Repair
( ) Painting/Coating
( ) Power Generation
( ) Prev. Use
( ) Storage
(**X**) Other Wood Treatment
( ) N/A

Notes:

Chemicals Used or Identified

( ) Acids
( ) Caustics
( ) Halogen
(**X**) Metals
( ) Pesticides
( ) PCBs
( ) Phenols
( ) Paints
( ) Solvents
(**X**) Other: Creosote, Polynuclear Aromatic Hydrocarbons, Pentachlorophenol, Dioxins/furans

Notes:

Oils/Fuels

( ) Fuel Oil
( ) Waste Oil
( ) Hydraulic Oil
( ) AVGAS
( ) MOGAS
( ) Jet Fuel
( ) Gasoline
( ) Leaded
( ) Other

Notes:

Sludges

( ) Metal sludges
( ) Oily sludges
( ) Septic sludges
( ) Other:

Notes:

Solids

( ) Asbestos
( ) Sandblast grit
( ) Landfill refuse
( ) Other:

Notes:

GENERAL NOTES:

TABLE 2
Chemical Hazard Properties and Exposure Information

CHEMICAL NAME/ SYNONYM	ACGIH TLV TWA	Notations	TLV Basis	OSHA PEL	STEL or CEILING	IDLH	IP (eV)	LEL/ UEL	ROUTE	SYSTEMS** Symptoms
Metals										
Arsenic	0.02 mg/m^3	Potential occupational carcinogen	Liver, kidney, skin, lung, lymphatic	0.010 mg/m^3	None listed	5 mg/m^3	NA	NA	Inh Abs Ing Con	Ulceration of nasal septum, derm, gi disturbances, peri neur, resp irrit, hyperpig of skin [carc]
Semi-Volatile Organic Compounds										
Pentachlorophenol	0.5 mg/m^3	Confirmed Animal Carcinogen	Skin	0.5 mg/m^3	None listed	2.5 mg/m^3	NA	NA	Inh Abs Ing Con	Irrit eyes, nose, throat; sneez, couphg, weak, anor, low-wgt; sweat; head, dizz; nau, vomit; dysp, chest pain; high fever; derm
Creosote and PAHs (as coal tar pitch volatiles)	0.2 mg/m^3	Human carcinogen	Cancer	0.2 mg/m^3	None listed	80 mg/m^3	NA	NA	Inh Con	Derm, bron, [carc]
Naphthalene	10 ppm	Skin	Irritation; ocular; blood	10 ppm	15 ppm	250 ppm	8.12	0.9%/ 5.9%	Inh Abs Ing Con	Irrit eyes; head, conf, excitement, mal; nau, vomit, abdom pain; irrit bladder; profuse sweat; jaun; hema, hemog, renal shutdown; derm; optical neuritis, corn damage
Dioxins/Furans										
Dioxins/Furans (as 2,3,7,8-Tetrachloro-dibenzo-p-dioxin)	NA	Potential occupational carcinogen		Ca	-	Ca	NA	NA	Inh Abs Ing Con	Irrit eyes; allergic derm, chloracne, porphyria, GI dist, possible repro, terato effects; in animals: liver, kidney damage, hemorr [carc]

ACGIH	American Conference of Governmental Industrial Hygienists	NA	Not applicable	ppm	Parts per million
Ca	Potential occupational carcinogen; no protective thresholds identified	NIOSH	National Institute of Occupational Safety and Health	STEL	Short-term exposure limit
IDLH	Immediately dangerous to life and health	OSHA	Occupational Safety and Health Administration	TLV	ACGIH Threshold Limit Values
IP	Ionization potential	PAH	Polyaromatic hydrocarbon	TWA	Time weighted average
LEL	Lower explosive limit	PEL	Permissible Exposure Limit	UEL	Upper explosive limit
mg/m^3	Milligrams per cubic meter				

Sources: The above information was derived from NIOSH Pocket Guide to Chemical Hazards, (Jan 2006). ACGIH TLV (2001).

****ROUTE/SYSTEMS ABBREVIATIONS**

abdom = abdominal	derm =dermatitis	hemorr = hemorrhage	nau =nausea
Abs =skin absorption	dist = disturbance	hyperpig = hyperpigmentation	peri neur = peripheral neuropathy
anor=anorexia	dizz=dizziness	Ing=ingestion	repro = reproductive
bron=bronchitis	dysp=dyspnea	Inh=inhalation	resp=respiratory
[carc]=carcinogen	GI=gastrointestinal	irrit=irritant	sneez=sneezing
Con=contact	head=headache	jaun=jaundice	sweat=sweating
conf=confusion	hema=hematuria (blood in the urine)	low-wgt=weight loss	terato = teratogenic
corn=corneal	hemog=hemoglobinuria	mal=malaise (vague feeling of discom	vomit=vomiting

- ACGIH TLVs and OSHA PELs are TWA concentrations that must not be exceeded during any 8-hour shift or a 40-hour workweek.
- Ceiling concentrations must not be exceeded during any part of the workday; if instantaneous monitoring is not feasible, the ceiling must be assessed as a 15-minute TWA exposure.
- IDLH represents the maximum concentration from which, in the event of respiratory failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing (e.g., severe irritation) or irreversible health effects.
- "Ppm" is parts per million by volume and is not equivalent to a ppm by weight in soil value, e.g., mg/kg.
- IPs (given in electron volt [eV] units) are presented for photoionization (PID) usefulness evaluation. The PID lamp should have an eV value greater than the analyte it is detecting.

2.2 Hazard Communication

In addition to the constituents of concern, the following hazardous substances are anticipated to be brought on the site to supplement investigation activities:

- Methanol
- Isopropanol
- Liquinox

These hazardous materials are subject to the Hazard Communication Standard (29 CFR 1910.1200); required MSDSs are presented at the end of this document in Appendix A. The hazardous materials must also be properly labeled with the identity of the hazardous chemical(s) contained therein and the appropriate hazardous warning information. The above list must be updated by the SHSC and MSDSs must be obtained and filed for any additional hazardous substances brought on-site.

The SHSC must give all site employees a hazard communication orientation about hazardous chemicals brought on-site. This briefing will include health and physical hazards, precautionary measures to be taken during normal operations and foreseeable emergencies, labeling practices, and location of MSDSs.

The FM shall ask the client for copies of MSDSs for any hazardous materials in use by the client's employers at the site. The SHSC shall orient sampling contractor employees/subcontractors as described above.

2.3 Physical or Operating Hazards and Control Measures

Physical or operating hazards identified or reasonably anticipated to be associated with site work tasks are provided in Table 3, along with a summary of specific control measures. More detailed discussions are provided in the Health, Safety, and Emergency Response SOPs in the sampling contractor's Corporate Health and Safety Manual (CHSM). All of these reference documents will remain on the site in the custody of the SHSC.

TABLE 3
PHYSICAL AND OPERATING HAZARDS

Hazards	Preventative measures
Back injuries due to improper lifting	Use proper lifting techniques. Lift with the legs, not the back. Keep loads close to the body and avoid twisting. Loads heavier than 50 pounds (lbs) require a second person or mechanical device for lifting. Use mechanical devices such as drum dollies, hand trucks, and tool hoists (for lifting augers) to lift or move heavy loads whenever possible.
Biological agents	Project work will not expose workers to infectious agents or wastes; however, responders to first aid incidents could contact bloodborne pathogens. Follow the Bloodborne Pathogen Control Plan in this Health and Safety Plan (HSP). Identify personnel who are highly sensitive or allergic to insect bites or stings during the "kickoff" meeting so that the appropriate emergency treatment can be made available on-site. Never try to capture wild or semi-wild animals—they may bite you or infect you with parasites. <u>Poison Ivy, Oak, and Sumac</u> • Review the Poison Ivy, Oak, and Sumac Field Guide during daily tailgate safety meetings. Worker must be familiar with the appearance of these poisonous plants. • If there is accidental contact, carefully remove affected clothing and wash skin with soap and warm water as soon as possible. <u>Ticks</u> • Tick parasites are commonly encountered in thick vegetation. • Check yourself and coworkers regularly for feeding ticks. • If a tick is located, remove it with tweezers and place in a vial. • If irritation is felt or observed at the bite site, seek medical attention. Bring in removed tick, if possible. • Tick bites can lead to local infections at the bite site or result in potentially severe illnesses, such as Lyme Disease.
Drill rigs and other heavy equipment operation	Owner/operator shall inspect equipment daily and keep daily logs. Correct all discrepancies before placing equipment in service. Keep blades, buckets, and other heavy equipment fully lowered when not in use. Parking brakes must be engaged. After working hours, bucket may be elevated if the locking pin is in place. Never leave drill rods or core barrels balancing, leaning, or otherwise unsecured on the rig. Chock or block the wheels of equipment parked on inclines. Set the parking brake. Never use equipment on unstable or unsafe inclines. Use hand signals, radios (as appropriate), and line-of-sight confirmation to communicate effectively with operators.

Table 3 (Continued)
PHYSICAL AND OPERATING HAZARDS

Hazards	Preventative measures
Ergonomic Stress	Lift carefully with load close to body with the legs taking most of the weight. Get help with lifts greater than 40 lbs. When working with a heavy tool or object, keep legs under the load and do not overreach or twist to the side. Reposition body to be more square to the load and work. Push loads, rather than pull, whenever feasible. Do not persist with lifting when the load is too heavy. Use a mechanical lifting aid or have a coworker assist with the lift. Rotate repetitive tasks to avoid soft-tissue fatigue.
Heat stress	When workers are wearing impervious or protective clothing, follow the National Institute for Occupational Safety and Health/OSHA/U.S. Coast Guard/U.S. Environmental Protection Agency protocol for the prevention of heat stress. Monitor for heat stress at temperatures greater than 70°F. Train workers to recognize the signs and symptoms of heat illnesses: • Heat cramps—muscle spasms during or after work shift • Heat exhaustion—fatigue, clammy skin, nausea, profuse sweating • Heat stroke—confusion, hot and dry skin, absence of sweating (life threatening) First Aid • Perform emergency decontamination. • Remove victim to cool area. • Give cool fluids (only if conscious). • Immediately reduce body temperature. • Seek medical attention. Prevention • Provide shelter or shaded area for work tasks (as feasible) and break areas. • Adjust work schedules by rotation of personnel or alternate job functions to minimize heat stress or overexertion at one task. • Work during cooler hours of the day (or night), as feasible. • To maintain normal body fluid levels, drink 16 ounces (oz) (2 cups) of water before each shift and about 8 oz (1 cup) every 15 to 20 minutes. Drink 2 gallons of water during an 8-hour period. • Wear nonbinding cotton clothing (e.g., medical scrubs and cotton undergarments) under personal protective equipment (PPE) to absorb moisture and to help prevent heat rash. • Where feasible, set up field “showers” or hose-down areas to cool down body.

Table 3 (Continued)
PHYSICAL AND OPERATING HAZARDS

Hazards	Preventative measures
Heavy equipment and vehicles	Heavy equipment operators are to be continuously aware of workers on foot. Workers on foot must wear hard hats and safety vests. Always lower the bucket/blade to the ground when the operator leaves the equipment. Backup lights and alarms must be functional. Obey all site traffic signs and speed limits. Seat belts must be functional and in use during operation of the equipment and any site vehicles (including rentals). Operator shall regularly inspect the equipment for defective parts, such as brakes, controls, motor, chassis, drives, hydraulic mechanisms. If stopped on an incline (>50%) with the engine running, the parking brake must be set.
Inclement weather, shut-down conditions	Poor visibility. Precipitation severe enough to impair safe movement or travel. Lightning in the immediate area. Steady winds in excess of 40 mph. Other conditions as determined by the SHSC, FM, or Corporate Health and Safety Director (CHSD). Imminent threat of severe tropical storm or hurricane. (Also see Emergency Response section of this HSP) Work will resume when the conditions are deemed safe by the SHSC.
Noise	Wear hearing protection when speech becomes difficult to understand at a distance of 10 ft and while standing within 20 to 25 ft from heavy equipment, pneumatic power tools, steam cleaners, and other equipment in operation that can generate more than 85 decibels (A-weighted scale) (dBA). Label equipment as a noise hazard if it generates, or is capable of generating, more than 85 dBA.

Slips, trips, and falls	Clear work area of obstructions and debris before setting up. Alter work areas as necessary to provide a safe, reasonably level area. All walking and working surfaces shall continually be inspected and maintained to be free of slip, trip, and fall hazards. Keep drill platforms, stairs, and immediate work areas clear. Do not allow oil, grease, or excessive mud to accumulate in these areas. Channel the discharge of drilling fluids and foam away from the work area to prevent ponding or slippery conditions. Backfill open boreholes immediately, or cap and flag them. Barricade open excavations or cover them with steel traffic plates. Eliminate slip, trip, and fall hazards or identify them clearly with caution tape, barricades, or equivalent means. Store loose or light material and debris in designated areas or containers. Secure tools, materials, and equipment subject to displacement or falling. Wear life jacket while on boat.

Table 3 (Continued)
PHYSICAL AND OPERATING HAZARDS

Hazards	Preventative measures
Ultraviolet Exposure	Wear appropriate clothing (long pants, shirt or tee shirt) and a hat to protect skin from prolonged sun exposure. Apply sunscreen (Sun Protection Factor [SPF]>15) prior to working outdoors in the sun and periodically thereafter. Wear polycarbonate safety glasses to protect eyes from ultraviolet exposure. Use lip balm with SPF 15 or greater. Reduce sun exposure from 10 AM to 4 PM. Utilize shade protection especially during these hours.

2.4 Hazard Analysis of Each Site Work Task

TASK NAME: SOIL SAMPLING

Potential Hazards:

( ) Rotating machinery
(**X**) Heat stress
( ) Work over water (lagoons, streambeds, ravines, bay, ocean)
(**X**) Slips, trips, falls
( ) Cold stress
(**X**) Heavy equipment
(**X**) Intrusive activ's‡ (underline)
- Excavating
- Sampling
- Vibracoring

( ) Projectiles
(**X**) Physical exertion
( ) Uneven terrain
( ) Trench/excavation collapse
(**X**) Noise (>85 dBA)
( ) Vehicle traffic
( ) Fire/explosion (underline)
- Flam. materials
- Low-lying areas
- Fuel lines

( ) Confined space
(**X**) Biological (plants, rodent viruses, marine species, soil- or waterborne fungi/bacteria, insects, arachnids, snakes, wild animals)†
( ) Electrical (utilities)
(**X**) Chemical exposure
( ) Explosive ordnance
( ) Other (list)
_____
_____
_____

‡ Determine if underground utilities are present by using all relevant maps and building plans. Call Underground Service Alert (USA) 1-800-422-4133.

* If sampling for the purpose of determining the presence or absence of hazardous materials, a site-specific HSP in accordance with 29 CFR 1910.120 is required by law. Consult the SHE Coordinator.

† Insects such as bees and wasps. Arachnids such as ticks, scorpions, and spiders. Marine species may include jellyfish, stingrays, sea urchins, rock fish, stone fish, sharks, and coral. Consult with the Corporate SHE Director or regional SHE Manager for protective measures against viruses or fungi.

Control or Protective Measures: (*Check all that apply*)

(**X**) Tailgate meetings
(**X**) Operator training
(**X**) PPE
(**X**) Site control
(**X**) Safe work practices
( ) Engineering controls: _____
(**X**) SOPs: _____
( ) Other: _____

Personal Protective Equipment: (*Check all that apply*)

Initial levels of protection have been assigned per work task. Levels may be upgraded or downgraded depending on site conditions, as determined by the SHSC.

RESPIRATOR: ( ) Air-purifying Respirator (medical monitoring required) ( ) Other _____
PROTECTIVE CLOTHING: ( ) Tyvek® ( ) PE Tyvek® ( ) Wetsuit ( ) Drysuit ( ) Other _____
HEAD/EYE/EAR: (**X**) Hard Hat (**X**) Safety Glasses ( ) Goggles (**X**) Earplugs/Muffs ( ) Other _____
GLOVES: (**X**) Leather Work Gloves ( ) Neoprene ( ) PVC ( ) Vinyl (**X**) Other Nitrile _____
FOOTWEAR: (**X**) Safety-toe Leather ( ) Safety-toe Rubber ( ) Overboots ( ) Snakeguards ( ) Other_____
Modifications Permitted: _____

TASK NAME: SEDIMENT SAMPLING

Potential Hazards:

( ) Rotating machinery
(**X**) Heat stress
(**X**) Work over water (lagoons, streambeds, ravines, bay, ocean)
(**X**) Slips, trips, falls
( ) Cold stress
( ) Heavy equipment
(**X**) Intrusive activ's‡ (underline)
- Excavating
- Sampling
- Vibracoring

( ) Projectiles
(**X**) Physical exertion
( ) Uneven terrain
( ) Trench/excavation collapse
( ) Noise (>85 dBA)
( ) Vehicle traffic
( ) Fire/explosion (underline)
- Flam. materials
- Low-lying areas
- Fuel lines

( ) Confined space
(**X**) Biological (plants, rodent viruses, marine species, soil- or waterborne fungi/bacteria, insects, arachnids, snakes, wild animals)†
( ) Electrical (utilities)
(**X**) Chemical exposure
( ) Explosive ordnance
( ) Other (list)
_____
_____
_____

‡ Determine if underground utilities are present by using all relevant maps and building plans. Call Underground Service Alert (USA) 1-800-422-4133.

* If sampling for the purpose of determining the presence or absence of hazardous materials, a site-specific HSP in accordance with 29 CFR 1910.120 is required by law. Consult the SHE Coordinator.

† Insects such as bees and wasps. Arachnids such as ticks, scorpions, and spiders. Marine species may include jellyfish, stingrays, sea urchins, rock fish, stone fish, sharks, and coral. Consult with the Corporate SHE Director or regional SHE Manager for protective measures against viruses or fungi.

Control or Protective Measures: (*Check all that apply*)

(**X**) Tailgate meetings
(**X**) Operator training
(**X**) PPE
(**X**) Site control
(**X**) Safe work practices
( ) Engineering controls: _____
( ) SOPs: _____
(**X**) Other: Rotate tasks to avoid repetitive fatigue (ergonomic). Avoid contact with plants (poison ivy and sumac are still toxic when dormant (biological)

Personal Protective Equipment: (*Check all that apply*)

Initial levels of protection have been assigned per work task. Levels may be upgraded or downgraded depending on site conditions, as determined by the SHSC.

RESPIRATOR: ( ) Air-purifying Respirator (medical monitoring required) ( ) Other _____

PROTECTIVE CLOTHING: ( ) Tyvek® ( ) PE Tyvek® ( ) Wetsuit ( ) Drysuit ( ) Other _____

HEAD/EYE/EAR: (**X**) Hard Hat (**X**) Safety Glasses ( ) Goggles (**X**) Earplugs/Muffs ( ) Other _____

GLOVES: (**X**) Leather Work Gloves ( ) Neoprene ( ) PVC ( ) Vinyl (**X**) Other Nitrile _____

FOOTWEAR: (**X**) Safety-toe Leather ( ) Safety-toe Rubber ( ) Overboots ( ) Snakeguards ( ) Other_____

Modifications Permitted: _____

3.0 PERSONNEL PROTECTION

The prescribed methods and procedures used to protect personnel (site workers and adjacent community) from overexposure to hazardous materials and hazardous conditions posed by site operations are grouped into three primary categories: Administrative Controls, Engineering Controls, and PPE.

3.1 Administrative Controls

3.1.1 Medical Surveillance

Periodic Comprehensive Exam:

All personnel requiring access to controlled work areas will have completed a preassignment medical examination and a periodic (usually annual) update examination prior to assignment, in accordance with OSHA 29 CFR 1910.120(f). The exam must be performed by an Occupational Health Physician, who will provide written clearance for hazardous waste site work and for respirator usage. Protocols for the baseline, periodic, and exit exams must be at least as stringent as those defined in the sampling contractor's CHSM.

Emergency Medical Treatment:

Personnel who exhibit signs and symptoms of chemical or heat overexposure, or have been injured on the job, might also seek medical services. See also the Medical Emergency Response section (Section 8.3) for specific information regarding emergency services and logs, reports, and record keeping, and Section 3.1.5 for required report submittals. Subcontractors should provide internal Workers' Compensation information to the SHSC during the prework meeting, for emergency use.

Medical Clearance Record Keeping:

Medical clearance documents are on file at the sampling contractor's home office or with the sampling contractor's Corporate Health and Safety Department. To ensure confidentiality, results of the medical exams or treatment records are maintained at the Medical Care Provider's clinical offices.

3.1.2 Training

Comprehensive:

All routine on-site general site workers performing intrusive activity or having the potential to receive exposures exceeding permissible limits will have completed the OSHA 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Training. Three days

of on-site supervised training must be completed upon initial assignment. Appropriate annual refresher (within 12 months) updates must be completed by all HAZWOPER personnel. Supervisors will have completed the above and an additional 8 hours of OSHA Management and Supervisory Training.

Occasional site workers who are not expected to receive exposures exceeding permissible exposure limits (e.g., geophysical and land surveyors) require only 24 hours of OSHA HAZWOPER Training and 1 day of on-site training and supervision.

First Aid/CPR Instruction:

All sampling contractor staff will have completed training in first aid/cardiopulmonary resuscitation (CPR) and fire extinguisher usage.

Specialized:

Prior to initiation of site activities, the SHSC and PM/FM will conduct a health and safety "kickoff" meeting. At this meeting, pertinent SOPs and the site-specific HSP will be discussed in detail with special attention given to site chemical and physical hazards, PPE, emergency procedures, etc. Upon completion of this briefing, all routine field personnel, including subcontractors, will be required to read and sign the acceptance sheet of this HSP.

Daily:

"Tailgate" safety meetings will be conducted each morning by the PM/FM, SHSC, or their designee with the subcontractor team members for all phases of work. Topics of discussion will include work tasks and designated PPE, emergency procedures, evacuation routes, instruction in use of safety equipment (as required), prior safety problems, recognition of signs and symptoms of overexposure, importance of proper decontamination, and personal hygiene, etc. These meetings must be documented.

Fire Extinguisher Usage:

In accordance with 29 CFR 1910.157, all field personnel who are provided portable fire extinguishers for use will be familiar with general principles of use and the hazards of incipient (early stage) firefighting.

DOT Hazardous Materials Shipment/Receipt (HM 126F):

In accordance with 49 CFR 172, Department of Transportation (DOT) HM126F training is required for all employees who handle, transport, or prepare to transport hazardous materials.

3.1.3 Accident Prevention

The SHSC as well as all site employees will inspect the work site daily to identify and correct any unsafe conditions. Adherence to the Safe Work Practices (to follow) and procedures outlined in this HSP will assist with accident prevention.

3.1.4 Safe Work Practices:

Personal Conduct

- Unauthorized personnel are not allowed on-site, particularly in the Exclusion Zone (EZ).
- Work groups will always consist of at least two team members.
- A high standard of personal hygiene will be observed. Smoking, eating, drinking, chewing gum or tobacco, taking medication, and applying cosmetics will not be permitted within any restricted area or EZ.
- Wearing of contact lenses in contaminated atmospheres is prohibited unless a full-face respirator is worn.
- Personnel under the obvious influence of alcohol or controlled substances are not allowed on-site; those taking medications must notify the SHSC.
- All site personnel will familiarize themselves with these practices and the emergency procedures during daily tailgate and prework safety meetings.
- Workers who are passengers or drivers of vehicles (both off-site and on-site) will wear their seat belts any time the vehicle is in motion.

Personal Protection

- Personnel will avoid skin contact with contaminated or potentially contaminated media. If such contact occurs, the affected areas should be washed thoroughly with soap and water.
- Personnel will discard and replace any damaged or heavily soiled protective clothing. Discarded PPE will be drummed at the end of each day.
- Personnel should notify the SHSC of any defective monitoring, emergency, or other protective/safety equipment.
- A supply of potable water, electrolyte replacement solutions, shaded break area, and sufficient lighting will be maintained on-site; sanitary facilities will be accessible to personnel.

Equipment and Activities

- Open flames are not allowed anywhere on-site without a hot-work permit.
- Owners/operators of heavy equipment will ensure that the equipment is in good working order by performing daily inspections and routine maintenance. Deficiencies affecting health and safety shall be corrected prior to equipment use.
- All unsafe conditions shall be made safe immediately. All unsafe conditions not in the scope of the project shall be reported to the PM/FM and the condition corrected.
- Loose-fitting clothing and loose long hair are prohibited near moving machinery.
- All internal combustion engines must have spark arrestors that meet the requirements for hazardous atmospheres if they are to be used in such areas.

- Do not fuel engines while vehicle is running.
- Install adequate on-site roads, signs, lights, and devices.
- Where portable electric tools and appliances can be used (where there is no potential for flammable or explosive conditions), they will be equipped only with 3-wire grounded power and extension cords to prevent electrical shock.
- Store tools in clean, secure areas so they will not be damaged, lost, or stolen.
- When exiting a vehicle, shift into park, set the parking brake, and shut off the engine. Never leave a running vehicle UNATTENDED.

3.1.5 Logs, Reports, and Record Keeping

Submittal of Certifications:

Proof of health and safety training and medical certifications must be submitted to the PM or FM and SHSC by the subcontractor prior to mobilization of field crews. The SHSC will maintain a copy of the certifications (and all ROCs for revisions of personnel additions and substitutions) certifying that all sampling contractor and subcontracted personnel have satisfied the minimum training and medical requirements listed above. Supporting documentation and certificates will remain on file with the HSC in the home office. Field projects will not be allowed to take place in the absence of adequate documentation.

Site Monitoring, Reports, and Records:

The health and safety field files maintained by the SHSC, or his/her designee, will be the primary form of record keeping and documentation of site health and safety activities. These documents will be completed in sufficient detail to document the work performed; any unusual or significant circumstances under which the work was performed; any unanticipated/unplanned action taken to mitigate or to otherwise cope with unexpected field conditions; and pertinent comments about site-specific conditions that could have a bearing on the work performed. Documentation is required for all phases of work. See also the SHSC duties listed under Section 1.6, Personnel Responsibilities. Record keeping practices will follow 29 CFR 1910.20.

3.2 Engineering Controls

3.2.1 Barriers

Work zones will be delineated by the use of cones, caution tape, stakes, barricades or similar equipment to prevent non-workers from straying into the work zone.

3.2.2 Ventilation

Ventilation is not required for this project.

3.2.3 Dust Suppression

Dust suppression is not necessary for this project.

3.2.4 Rinsate Collection/Containment

A system for collection of rinsate from decontamination operations (sampling equipment and personnel decontamination) will be required. The system will be as complex or simple as necessary to collect and contain spent decontamination fluids. Construction of temporary stations for personnel and other sampling equipment will be the responsibility of the SHSC and FM. Decontamination buckets should be placed in large, plastic bins to contain splash. All

spent fluids will be containerized in accordance with procedures/guidelines referenced in this HSP (see Section 6.0, Decontamination Procedures).

3.2.5 Noise Reduction

It is not anticipated that noise levels will exceed the OSHA Action Level of 85 decibels (A-weighted scale) (dBA) in an 8-hour time-weighted average (TWA) during the duration of this project.

3.3 Personal Protective Equipment (PPE)

3.3.1 Levels of Protection

Initial levels of protection for this site may vary depending on the task. All personnel entering controlled work zones will initially be required to wear the U.S. Environmental Protection Agency (EPA)/OSHA Level of Protection as specified in Section 2.4, Hazard Analysis of Each Site Work Task, and summarized in Table 4 below.

Table 4
INITIAL ASSIGNMENTS OF PROTECTION LEVELS, TRAINING, AND MEDICAL SURVEILLANCE FOR SITE WORK TASKS

Task Name ***List in same order as in Section 2.4, Hazard Analysis of Each Site Work Task***	**Level of Protection ***	**HAZWOPER**		
		40-hour Classroom Training	**24-hour Classroom Training**	**Medical Surveillance**
Soil Sampling	D	X		X
Sediment Sampling	D	X		X

* Initial assignments may be modified by the SHSC as additional data are received from monitoring data and compared to action levels (Table 5), or as warranted by site conditions. Any changes will be noted in this HSP and/or documented

Refer to pertinent Personal Protective Equipment SOP in the sampling contractor's Corporate Health and Safety Manual (CHSM) for levels of protection definitions and examples.

Protection may be upgraded or downgraded depending on monitoring data (compared with action levels) and site conditions, as determined by the SHSC. All changes must be noted in this HSP and documented. The following outlines the minimum requirements for each level of protection that is assigned or potentially assigned.

<u>Level D PPE</u>:

Work shirt and full-length cotton pants or coveralls
American National Standards Institute (ANSI) standard safety-toe work boots

ANSI standard hard hat (when working around heavy equipment or overhead "bump" hazards)
ANSI standard safety glasses
EPA-approved hearing protectors (when working in high noise areas, e.g., steam cleaners and heavy equipment)

Modified Level D PPE:

Level D equipment
Tyvek® coverall or equivalent (upgrade to polyethylene [PE] or Saranex-coated Tyvek® as needed)
Outer chemical-resistant gloves and inner nitrile gloves
Boot covers or chemical-resistant boots

Level C PPE:

Modified Level D equipment, with taping of coverall to boots and gloves, as necessary
National Institute of Occupational Safety and Health (NIOSH)-approved, half-face or full-face air-purifying respirator with organic vapor/acid gas cartridges and particulate prefilters.

Level B PPE:

Modified Level D equipment, use of chemical-resistant coverall, taped to boots and gloves
NIOSH-approved, pressure-demand, full-facepiece self-contained breathing apparatus (SCBA) or pressure-demand supplied-air respirator with escape-SCBA (additional employee training is required for Level B operations)

Level A PPE:

Level B equipment, use of fully encapsulating suit

3.3.2 Chemical Cartridge Change Out Schedule

Air purifying respirators will not be needed for this project.

3.3.3 PPE Donning/Doffing Procedure

The following procedures are given as a guide; failure to adhere to these procedures may result in the PPE being ineffective against contaminants. These procedures may be altered by the SHSC if improvements can be made and these changes are warranted in the field. Also, some articles of PPE may not be necessary for all site tasks.

PPE Donning Procedure (for Mod. Level D and greater):

Inspect all protective gear before donning.

Don Tyvek® coverall or equivalent, inner gloves and outer gloves, secure with tape, as required, leave pull tab. If coverall is loose secure with tape to avoid capture in moving or rotating equipment.
Don respirator. If not in Level C, maintain respirator in a sealed plastic bag on-site in case of an upgrade.

PPE Doffing Procedure:

Wash/rinse (if necessary) excess mud or other debris from outer boots, gloves, and clothing.
Remove tape using pull tab and remove outer clothing in the order of boots, outer gloves, and coverall suits. Place disposable and reusable PPE in designated (separate) containers.
Remove respirator (if applicable). Decontaminate and fit-check prior to reuse.
Remove inner gloves.
Wash face, neck and hands.
Enter the Support Zone (SZ).

3.3.4 PPE Failure/Chemical Exposure

In the event of PPE failure, worker and buddy will cease work, perform personal decontamination procedures, and exit to the SZ. Refer to the MSDS and Section 9.0, Emergency Actions, if emergency medical response is needed. If chemicals contact the eyes, irrigate for 15 minutes and consult a physician.

3.3.5 PPE Inspection, Storage, and Maintenance

Reusable PPE will be decontaminated, inspected, and maintained, as necessary, after each use. Personal equipment (e.g., respirators, leather safety-toe boots) shall be properly stored by the employee/subcontractor.

The SHSC will periodically inventory the disposable and reusable PPE on-site and will replenish stocks in a timely manner.

4.0 SITE CONTROL

4.1 Site Security

Access will be limited to all controlled areas via the prescribed administrative (certifications) and engineering (barricades) controls. All equipment, tools, and property shall be secured at the end of each day.

4.2 Visitor Access

All site visitors (except OSHA inspectors) must receive prior approval from the FM, PM, and client, and may do so only for the purposes of observing site conditions or operations. All visitors, regardless of their rank or professional level, will not be allowed into controlled work areas unless training and medical requirements have been met and documented.

4.3 Work Zones

As the work is going to be conducted along a creek, there will be no formally marked support zone (SZ), contamination reduction zone (CRZ), transition zone (TZ), or exclusion zone (EZ). The adjacent on-shore area will be used as a staging area containing vehicles, emergency equipment, supplemental decontamination materials, and any nonessential personnel. The adjacent on-shore area will be used as a staging area containing vehicles, emergency equipment, supplemental decontamination materials, and any nonessential personnel.

4.4 Communications

The “buddy system” will be enforced for field activities involving potential exposure to hazardous or toxic materials. Each person will observe his/her buddy for symptoms of chemical or heat overexposure and will provide first aid or emergency assistance when warranted. A mobile phone will be maintained on-site for emergency use.

The following emergency hand signals will be used:

Thumbs up	=	OK; understand
Thumbs down	=	No; negative
Grasping buddy’s wrist	=	Leave site now
Hands on top of head	=	Need assistance
Horn - one long blast	=	Evacuate site
Horn - two short blasts	=	All clear, return to site

5.0 AIR SURVEILLANCE

Due to the nature of the work being conducted (i.e., soil and sediment sampling) and low likelihood of VOC emissions from the samples, air monitoring and/or sampling is not required during the work to be performed on this site.

6.0 DECONTAMINATION PROCEDURES

Procedures for the decontamination of sampling tools and other related equipment are specified in the sampling plan. Note that separate areas should be established for personnel and sampling decontamination.

6.1 Personnel Decontamination

EQUIPMENT	DECONTAMINATION SOLUTION	PROCEDURES	
		Intermediate	**Final**
Long-handled, soft-bristled brushes Galvanized wash tubs or equivalent Pump-activated sprayer Garbage cans with plastic liners and drums with liners Paper towels Duct tape	Liquinox Tap water for rinsing	Dispose of or wash outer boot and glove with Liquinox solution. Rinse outer boot and glove. Remove outer glove and store for later use. Enter Transition Zone for sample management. Return to Exclusion Zone wearing new or cleaned outer gloves.	Segregate equipment drop (for instruments and equipment requiring special decontamination; see SAP). Dispose of or wash outer boot and glove with Alconox solution. Rinse outer boot and glove. Remove and dispose of outer boots. Remove and dispose of outer gloves (if not cleaned to "like new" condition). Remove and dispose of coverall. Remove and dispose of inner gloves in designated receptacle. Field wash for personal hygiene. Exit to Support Zone.
Note: Intermediate decontamination is for periodic exits from the Exclusion Zone during sample transport and management, or for short breaks. Final decontamination is performed before lunch, when taking cool down breaks, and when exiting the site.			

6.2 Equipment Decontamination

All equipment that will potentially contact samples will be decontaminated prior to, and following, sampling events according to procedures specified in the sampling plan and field procedures.

Temporary decontamination stations (bucket wash) will be located near work areas and will be positioned upwind or crosswind of operations.

6.3 Emergency Decontamination

In the event of an accident or incident where work must cease and staff must exit the site, emergency decontamination should be performed to the greatest extent feasible. In an emergency, the primary concern is to prevent the loss of life or severe injury. If immediate medical attention is required to save a life, decontamination should be delayed until the victim is stabilized. If the decontamination can be performed without interfering with essential life-saving techniques or first aid, or if a worker has been contaminated with an extremely toxic or corrosive material that could cause severe illness or loss of life, decontamination must be performed immediately. If an emergency due to a heat-related illness develops, protective equipment should be removed carefully from the victim as soon as possible.

Any time emergency decontamination methods must be used, an Incident Report or Supervisor's Report of Injury or Illness must be completed by the SHSC and submitted to the CHSD.

6.4 Disposal Procedures

All discarded materials that accumulate from on-site activities (PPE, decontamination fluids, supplies, etc.) will be segregated by matrix, placed in appropriate trash receptacles, and disposed of properly. Analytical results will be evaluated prior to disposal. All IDW will be handled, labeled, stored, inventoried, and disposed of in accordance with the client's procedures.

7.0 SANITATION AND ILLUMINATION

7.1 Sanitation

Potable drinking water shall be supplied in tightly closed containers and shall be clearly marked for its intended use. If vehicles are available for use by field crews, restrooms and a field washing area with potable water will be available within a reasonable distance from the site. If such facilities are not located within a reasonable distance, portable facilities will be installed for use by field employees. If the nature of the project is mobile and of a duration less than 6 months, permanent on-site shower/change facility will not be provided.

7.2 Illumination

It is anticipated that all site work will be conducted during daylight hours. If circumstances arise in which field work is to be conducted before or after daylight, or sunlight is obstructed, illumination within all general site areas will be maintained at or above 5 foot-candles for general site areas.

8.0 EMERGENCY ACTIONS

8.1 Preplanning and General Procedures

General Emergency Information: Site personnel should be constantly alert to recognize potentially unsafe work practices, hazardous work environments, and IDLH conditions, and they should be routinely reminded of signs and symptoms of chemical and heat overexposure. Emergency response procedures (this section) should be reviewed daily and updated, as necessary, following incidents. Prearrange access for emergency crews when necessary.

In the event of a large-scale spill, fire/explosion, or major emergency, the FM is expected to notify the PM; the PM notifies the client, evacuates the area, and lets appropriately trained emergency staff respond to the situation. The safety and well-being of site personnel, visitors, and the adjacent community will be of utmost importance in determining the appropriate response to a given emergency. An Employee Emergency Action and Fire Prevention Plan will have been prepared in accordance with OSHA 29 CFR 1910.38 and will be incorporated in the CHSM; annual training is required for all sampling contractor personnel.

Emergency Coordinator (EC): The PM or FM will serve as the EC during an actual emergency response situation. The PM or FM will serve as the primary EC at all times; first aid and rescue duties are shared between the first aid/CPR trained team members. All foreseeable first aid and rescue equipment should be stored on-site in an accessible area. The EC will contact off-site emergency response agencies and will serve as the main spokesperson when the responders arrive on-site.

Site Maps: An updated site map (Figure 2 of the Work Plan) that is used during daily tailgate meetings will be used to inform the staff of hazardous areas, zone boundaries, site terrain, evacuation routes, work crew locations, and any site changes. In the unlikely event that an emergency occurs, the problem areas will be pinpointed on the site map, and pertinent information, such as weather and wind direction, temperature, and forecast, will be added as obtained. This map will be provided to the responding agencies.

Emergency Decontamination: For first aid of non-life-threatening injuries, evacuate to decontamination line and decontaminate as much as possible or practical; contaminated clothing should be removed. For life-threatening injuries/exposures, field decontaminate as much as possible for the person's own safety, wrap in a blanket or polyethylene sheeting, and immediately transport to the designated medical facility. Also, phone ahead and bring this HSP for informational purposes and MSDS access by medical staff.

Safe Refuge Area: To be determined; this will be discussed in the tailgate meetings by the ECs daily, once on-site. It will be set up in the SZ or at an off-site location in the event of a sitewide evacuation. This area will be upwind, and the location and escape routes will be designated on site control maps. It will contain emergency equipment, escape route maps, communications,

and the Emergency Reference (call) List. This is required for all phases of work. In an emergency, the EC (PM or FM) will take a "head count" against the Employee/Visitor Daily Roster, initiate search/account for missing persons, notify the emergency crews (as applicable), and limit access into the hazardous emergency area to necessary rescue and response personnel in order to prevent additional injuries and possible exposures.

Emergency Equipment: Emergency equipment will be maintained in field vehicle (V), in the Support Zone (SZ). All items must be checked and maintained by the SHSC at least weekly and after each use.

(**X**) First Aid Kit, V/FT	(**X**) Fire Extinguisher, V/EZ	( ) Field Showers, FT or V
( ) SCBA, V/FT	( ) Escape Packs	( ) Alarms, V/EZ
( ) Spill Equipment, V	(**X**) Mobile or Cellular Phone, V/FT	( ) Fire Blanket, V/EZ
( ) Other	(**X**) Hospital Route Map, V/FT	

Evacuation Procedures: Expeditious evacuation routes to the Safe Refuge Area(s) will be established daily for all work area locations, with respect to the wind direction. Evacuation notification will be a continuous blast on a canned siren, vehicle horn, or direct verbal communication. Emergency drills should be performed periodically. Any additions to evacuation procedures require an update to this HSP.

In the unlikely event that an evacuation is necessary, all personnel will immediately proceed to the predetermined Safe Refuge Area, decontaminating to the extent possible for personal safety, based on the emergency. The EC should then begin the site security and control measures.

8.2 Site-Specific Response Scenarios

8.2.1 Weather-related Emergencies

All work will cease should any of the following weather conditions arise:

- Poor visibility
- Precipitation severe enough to impair safe movement/travel
- Lightning in the immediate area
- Winds in excess of 40 miles per hour
- Flooding
- Other conditions as determined by the SHSC, or PM or FM

8.2.2 Spill and/or Discharge of Hazardous Materials

Training: Responses to incidental releases or spills of hazardous substances that can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the

immediate release area are not considered to be emergency responses under 29 CFR 1910.120(l) and do not require additional specialized training.

Spill Control and Response: There is a low potential for incidental spillage/leakage of hazardous materials (fuels, grouts, detergents) that are brought on-site to implement project activities. Store these materials properly and maintain the appropriate spill response equipment in or easily accessible to the area where the materials are used/stored. In case of incidental spills or leaks, follow these steps:

- Notify the SHSC and FM.
- Select appropriate PPE and response equipment.
- Contain the spill to the extent possible.
- Neutralize or solidify the liquid per the MSDS.
- Transfer to an IDW container.
- Document with an Incident Report.
- Notify the Client.

Discharge Control and Response: In the event of an uncontrollable discharge of hazardous material from an existing client structure (impoundment, tank, etc.) the EC will immediately contact the client to coordinate implementation of the client's Emergency Response Plan. If safe to do so, shut off affected lines and activate the alarm system at locations predetermined by the client. Other than to take diligent measures to prevent further discharge, sampling contractor personnel shall not assist in emergency response activities but will evacuate to the prearranged Safe Refuge Area(s) and implement the site security and control measures.

8.2.3 Fire or Explosion

Sound the emergency alarm (continuous blast on a canned siren, vehicle horn, or direct oral communication) to summon the EC, who will then decide whether to call the Fire Department for outside assistance (see Section 9.1, Preplanning and General Procedures). Small-scale fires (less than one-half of the responder's height) should be extinguished with an accessible ABC fire extinguisher by any team member who has received training. Calls to the fire department should not be delayed pending results of successful extinguishment of fire. Trained emergency crews will be summoned to control any large-scale or potentially unmanageable incident. Any off-site responding agencies will be given the Site Map (Figure 2 of the Work Plan) and briefed about site-specific hazards so they can be optimally helpful in an emergency situation. The EC will evacuate all nonresponse personnel and visitors to the Safe Refuge Area; will notify the PM, as applicable, the client, and the CHSD (see call list); and will complete the appropriate reports.

8.3 Medical Emergency Response

8.3.1 Hospital

In the event of a serious injury or an accident that occurs after hours, transport the victim to the hospital emergency room listed below.

HOSPITAL NAME:	**HOSPITAL ADDRESS:**
Alachua General Hospital	801 SW 2nd Ave
HOSPITAL TELEPHONE:	**DIRECTIONS:**
(352) 338-2111	*E on FL 120/NW 23rd Ave* *R onto FL 329 S / N. Main St.* *R onto FL 24 / FL 26 / W. University Ave.* *L onto SW 8th St.*

Hospital Route: See Figure 2

Site Personnel Response Actions: Summon the EC who will assess the situation, taking first necessary precautions for personal safety (e.g., PPE) if needed. The EC will determine whether to transport the injured party to Alachua General Hospital or summon an ambulance by phoning 911. These numbers should be obtained from the phone book and verified for accuracy. Provide first aid to the extent possible while awaiting medical attention. The SHSC will complete a Medical Treatment Authorization form to be submitted to the facility for treatment of the injured worker. The FM will conduct an investigation and complete the Supervisor's Report of Injury or Illness and the First Aid Incident Report forms and make appropriate company and client notifications. The First Aid Incident Report (Appendix B) will also be completed by the FM.

8.3.2 Bloodborne Pathogen Exposure Control Plan

The Bloodborne Pathogen Exposure Control Plan for Field Operations, located in the sampling contractor's CHSM, provides detailed procedures for controlling exposure to bloodborne pathogens. Procedures are summarized herein.

Exposure Determination:

First aid responders have the potential to be exposed to bloodborne pathogens. The potential for exposure to bloodborne pathogens outside of emergency response is not anticipated.

Universal Precautions:

Use the Center for Disease Control "Universal Precautions" as an approach to infection control, which assumes that all human blood and certain human body fluids are treated as if known to be infectious for Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), and other bloodborne pathogens.

Personal Protection Equipment:

While rendering first aid where exposure to blood may occur, responders will don, at a minimum, latex or blue nitrile gloves. Gloves will be available in the field first aid kit in a packet. Other items included in the packet that are to be used to control the "spill" are absorbent beads,

a plastic scooper, a biohazard bag for waste, and surface disinfecting and hand-cleaning towelettes. Other suggested PPE in the event of a serious blood-producing injury includes safety glasses, Tyvek® coveralls, boot covers, and nitrile outer gloves – all of which should be available on-site. In addition, a disposable, one-way CPR mask to prevent direct contact between the rescuer and recipient will also be available in the first aid kit should the need arise.

Personal Hygiene:

A hand-washing facility must be present in the event of bloodborne pathogen exposure. Basins, water, soap, and towels are available at all sites for this purpose.

Hepatitis B Vaccination:

First aid providers to job site injuries do not need to receive a preexposure Hepatitis B vaccine but are encouraged to do so. All first aid providers assisting in any exposure incident must be offered the full Hepatitis B immunization series no later than 24 hours after an incident.

Exposure Incident Evaluation:

All first aid incidents involving exposures must be reported to the CHSD before the end of the work shift in which the incident occurs. A First Aid Incident Report must be completed describing the circumstances of the accident and response in addition to the Supervisor's Report of Injury or Illness. Following a report of an exposure incident, the sampling contractor shall provide to the exposed employee monitoring for HIV or HBV antibodies and medical counseling in cases of positive tests for HIV or HBV.

Waste Disposal:

Should biohazardous waste be generated as a result of a field-related injury, the "contaminated" waste and area will be cleaned to the extent possible with items provided in the packet, and arrangements for the pickup and final disposal of the waste will be made by calling the appropriate waste hauler.

HBV Vaccination Declination:

For whatever reason (religious, personal, or otherwise), employees may decline or refuse the HBV vaccination by contacting the CHSD. In instances where the vaccination is required, the employee will be required to sign a Hepatitis B (HBV) Vaccination Declination waiver indicating he/she has chosen at that time to refuse the vaccination, but may elect to receive it in the future at no expense to him/her.

8.4 Accident Reporting and Record Keeping

The SHSC will contact the CHSD and conduct an investigation jointly with the PM or FM. The FM or PM will complete the Supervisor's Report of Injury or Illness and the First Aid Incident Report. These completed reports must be transmitted to the CHSD within 24 hours of an

occurrence; a fax is acceptable. The CHSD will submit the appropriate reports to the sampling contractor's Human Resources department (for Workers' Compensation), and OSHA (as applicable).

The foreman or field supervisor of subcontracting crews will investigate and complete an injury/illness report (similar in content to the sampling contractor's report) in accordance with their internal company policy. This report must be transmitted to the CHSD within 24 hours.

In case of environmental incidents, property damage, power disruption, or mandated work "shutdowns," an Incident Report will be prepared by the FM or PM. Any damage, loss, or theft of the sampling contractor's property (items/tools/equipment) will be reported to the PM or FM.

Any release of information in these reports to unauthorized persons or agencies is prohibited unless it is first approved by the client. Certain agencies or persons, such as OSHA or OSHA inspectors, can request this information and its release will be permitted. Review the Emergency Call List for additional contact names and phone numbers.

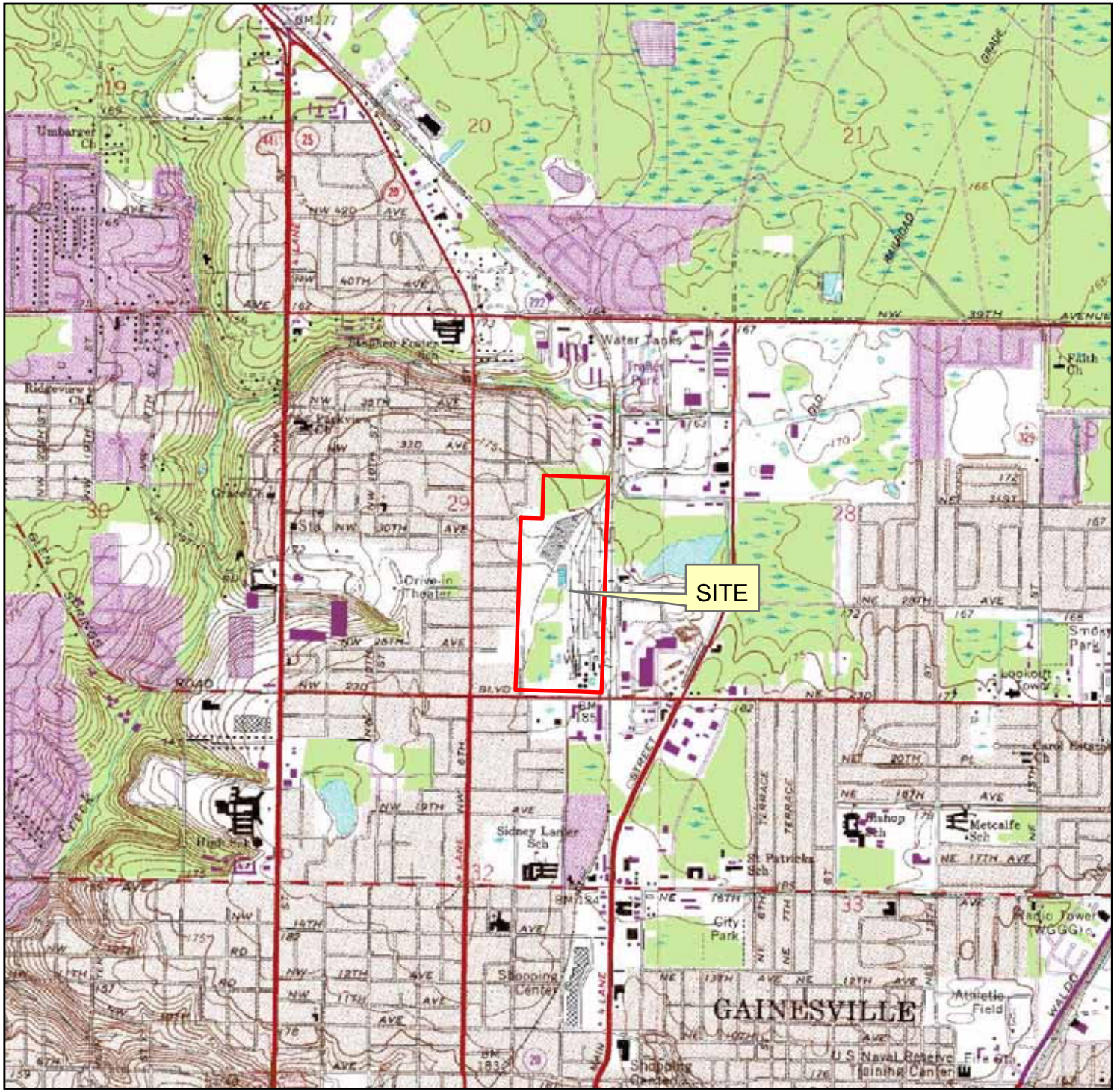
8.5 Emergency Reference List

(Keep posted in vehicles and near communication system.)

RESPONDING EMERGENCY AGENCIES

SERVICE	NAME	TELEPHONE NUMBER
Ambulance		**911**
Fire Department		**911**
Police Department		**911**
Poison Control Center		**(800) 222-1222**
Hospital	Alachua General Hospital	**(352) 338-2111**

TITLE	NAME	TELEPHONE NUMBER
Corporate Health and Safety Director	To be determined	
Project Manager	To be determined	
Site HSC	To be determined	
Client	Mike Slenska, Beazer East	(412) 208-8867
State/Federal OSHA		(904) 232-2895
Workers' Compensation	To be determined	



SITE LOCATION MAP

Gainesville, Florida

Beazer East, Inc.
Pittsburgh, Pennsylvania
Koppers Industries, Inc. Facility

Location of Site

FIGURE 1

N

0 2,000
Feet

amec

AMEC Earth & Environmental, Inc.
239 Littleton Road, Suite 1B
Westford, MA 01886
(978) 692-9090

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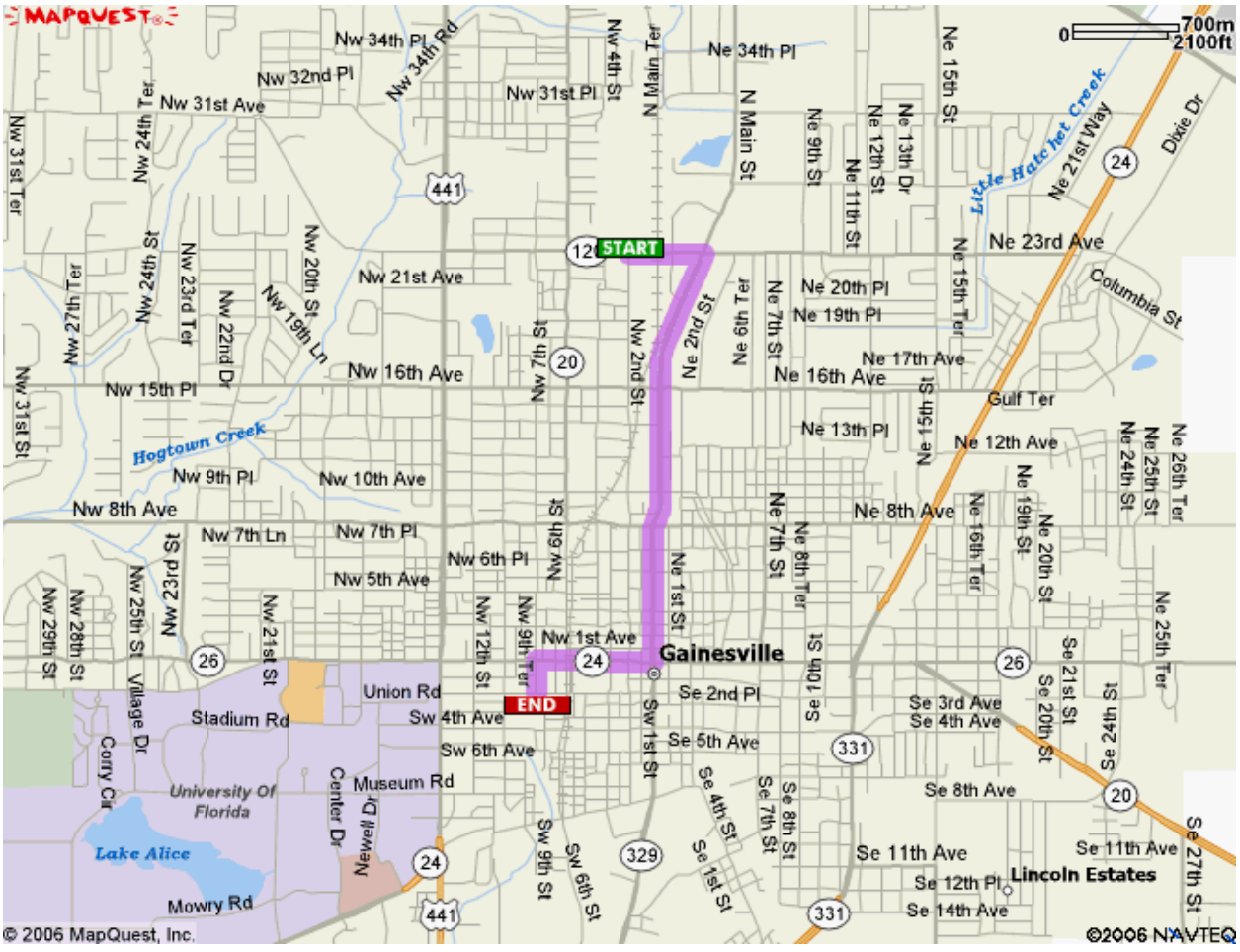
Base Map Data from USGS 7 1/2 minute Topographic Maps, 1993. Source: USGS

Figure 2 Hospital Route Map

1:	Start out going EAST on FL-120 / NW 23RD AVE toward NE 1ST BLVD.	0.3 miles
2:	Turn RIGHT onto FL-329 S / N MAIN ST.	1.5 miles
3:	Turn RIGHT onto FL-24 / FL-26 / W UNIVERSITY AVE.	0.4 miles
4:	Turn LEFT onto SW 8TH ST.	0.1 miles

End at **801 Sw 2nd Ave,** Gainesville, FL 32601-6210, US

Total Est. Time: 5 minutes **Total Est. Distance:** 2.47 miles



9.0 HEALTH AND SAFETY PLAN ACCEPTANCE

I have had the opportunity to read and ask questions about this HSP. My signature certifies that I understand the procedures, equipment, and restrictions of this plan and agree to abide by them.

SIGNATURE*	PRINTED NAME	COMPANY	DATE

APPENDIX A

MATERIAL SAFETY DATA SHEETS

Material Safety Data Sheet

Section 1. Product and Company Identification

Product Name Methanol, ACS

Product Code ACS531

Manufacturer EMD Chemicals Inc.
P.O. Box 70
480 Democrat Road
Gibbstown, NJ 08027
Prior to January 1, 2003 EMD Chemicals Inc. was EM Industries, Inc. or EM Science, Division of EM Industries, Inc.

Effective Date **6/16/2005**

For More Information Call
856-423-6300 Technical Service
Monday-Friday: 8:00 AM - 5:00 PM

In Case of Emergency Call
800-424-9300 CHEMTREC (USA)
613-996-6666 CANUTEC (Canada)
24 Hours/Day: 7 Days/Week

Synonym Methyl Alcohol
Material Uses Analytical reagent.
Chemical Family Alcohol.

Section 2. Composition and Information on Ingredients

Component	CAS #	% by Weight
Methanol	67-56-1	100

Section 3. Hazards Identification

Physical State and Appearance Liquid. (Colorless.)

Emergency Overview
DANGER!
POISON!
FLAMMABLE LIQUID AND VAPOR.
VAPOR MAY CAUSE FLASH FIRE.
MAY BE FATAL IF SWALLOWED.
MAY CAUSE BLINDNESS IF SWALLOWED.
CANNOT BE MADE NON-POISONOUS.
VAPOR HARMFUL.
HARMFUL IF INHALED OR ABSORBED THROUGH SKIN.
CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION.
CONTAINS MATERIAL WHICH CAUSES DAMAGE TO THE FOLLOWING ORGANS: GASTROINTESTINAL TRACT, RESPIRATORY TRACT, SKIN, CENTRAL NERVOUS SYSTEM, EYE, LENS OR CORNEA.

Routes of Entry Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Potential Acute Health Effects

Eyes Hazardous in case of eye contact (irritant). Inflammation of the eye is characterized by redness, watering, and itching.

Skin Hazardous in case of skin contact (permeator, irritant). Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Inhalation Hazardous in case of inhalation (lung irritant).

Ingestion Extremely hazardous in case of ingestion. May be fatal or cause blindness if swallowed.

Potential Chronic Health Effects

Carcinogenic Effects This material is not known to cause cancer in animals or humans.

Additional information See Toxicological Information (section 11)

Medical Conditions Aggravated by Overexposure: Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4. First Aid Measures

Eye Contact Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Inhalation If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Ingestion If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Section 5. Fire Fighting Measures

Flammability of the Product Product will burn.

Auto-ignition Temperature 464.05°C (867.3°F)

Flash Points Open cup: 15.9°C (60.6°F).

Flammable Limits LOWER: 6% UPPER: 36.5%

Products of Combustion These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances Highly flammable in presence of open flames, sparks and static discharge, of heat, of oxidizing materials.

Explosion Hazards in Presence of Various Substances

Risks of explosion of the product in presence of static discharge:
Highly flammable in presence of open flames, sparks and static discharge.
Highly explosive in presence of open flames, sparks and static discharge.

Risks of explosion of the product in presence of mechanical impact: No.

Fire Fighting Media and Instructions
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Protective Clothing (Fire) Be sure to use an approved/certified respirator or equivalent.

Special Remarks on Fire Hazards Dangerous fire and explosion risk. Container explosion may occur under fire conditions or when heated.
Vapor may travel considerable distance to source of ignition and flash back.

Special Remarks on Explosion Hazards Not available.

Section 6. Accidental Release Measures

Small Spill and Leak Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill and Leak Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Spill Kit Information The following EMD Chemicals Inc. SpillSolv ® absorbent is recommended for this product: SX1330 Solvent Treatment Kit

Section 7. Handling and Storage

Handling Keep away from heat, sparks and flame. Keep container closed. Avoid breathing vapors or spray mists. Do not get in eyes, on skin, or on clothing. Do not ingest.

Storage Keep container in a cool, well-ventilated area.

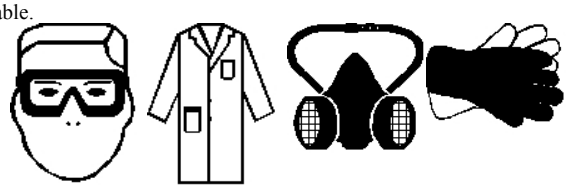
Section 8. Exposure Controls/Personal Protection

Engineering Controls Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective occupational exposure limits. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection

Eyes Splash goggles.
Body Lab coat.
Respiratory Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Hands Gloves.
Feet Not applicable.

Protective Clothing (Pictograms)



Personal Protection in Case of a Large Spill Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self-contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Product Name **Exposure Limits**

Methanol	**ACGIH (United States, 1994). Skin** TWA: 262 mg/m3 STEL: 328 mg/m3 **OSHA (United States, 1989). Skin** TWA: 260 mg/m3 STEL: 325 mg/m3 **ACGIH (United States, 1994). Skin** STEL: 328 mg/m3 15 minute(s). STEL: 250 ppm 15 minute(s). TWA: 262 mg/m3 8 hour(s). TWA: 200 ppm 8 hour(s). **NIOSH REL (United States, 1994). Skin** STEL: 325 mg/m3 15 minute(s). STEL: 250 ppm 15 minute(s). TWA: 260 mg/m3 10 hour(s). TWA: 200 ppm 10 hour(s). **OSHA Final Rule (United States, 1989). Skin** STEL: 325 mg/m3 15 minute(s). STEL: 250 ppm 15 minute(s). TWA: 260 mg/m3 8 hour(s). TWA: 200 ppm 8 hour(s).

Section 9. Physical and Chemical Properties

Odor	Characteristic. Alcohol like.
Color	Not available.
Physical State and Appearance	Liquid. (Colorless.)
Molecular Weight	32.05 g/mole
Molecular Formula	CH4O
pH	Not available.
Boiling/Condensation Point	64.55°C (148.2°F)
Melting/Freezing Point	-97.72°C (-143.9°F)
Specific Gravity	0.792 (Water = 1)
Vapor Pressure	12.9 kPa (97 mmHg) (@ 20°C)
Vapor Density	1.11 (Air = 1)
Volatility	99.9% (v/v).
Odor Threshold	100 ppm
Evaporation Rate	5.91 compared to (n-BUTYL ACETATE=1)
VOC	100 (%)
LogKow	Not available.
Dispersion Properties	See solubility in water.
Solubility	Soluble in water.

Section 10. Stability and Reactivity

Stability and Reactivity	The product is stable.
Conditions of Instability	Not available.
Incompatibility with Various Substances	Highly reactive with oxidizing agents. Reactive with metals, acids.
Rem/Incompatibility	Not available.
Hazardous Decomposition Products	carbon oxides (CO, CO2)
Hazardous Polymerization	Will not occur.

Section 11. Toxicological Information

RTECS Number:

Methanol	PC1400000

Toxicity	Acute oral toxicity (LD50): 5628 mg/kg [Rat]. Acute dermal toxicity (LD50): 15800 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 64000 ppm 4 hour(s) [Rat].
Chronic Effects on Humans	Not available.
Acute Effects on Humans	Hazardous in case of eye contact (irritant). Inflammation of the eye is characterized by redness, watering, and itching. Hazardous in case of skin contact (permeator, irritant). Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering. Hazardous in case of inhalation (lung irritant). Extremely hazardous in case of ingestion. May be fatal if swallowed.
Synergetic Products (Toxicologically)	Not available.
Irritancy	Draize Test (Rabbit): Skin: 20mg/24h. Reaction: Moderate. Eye: 100 mg/24h moderate

Sensitization	Not available.
Carcinogenic Effects	This material is not known to cause cancer in animals or humans.
Toxicity to Reproductive System	Tests on laboratory animals for reproductive effects are cited in Registry of Toxic Effects on Chemical Substances (RTECS).
Teratogenic Effects	Not available.
Mutagenic Effects	Tests on laboratory animals for mutagenic effects are cited in Registry of Toxic Effects of Chemical Substances (RTECS).

Section 12. Ecological Information

Ecotoxicity	Not available.
BOD5 and COD	Not available.
Toxicity of the Products of Biodegradation	The products of degradation are less toxic than the product itself.

Section 13. Disposal Considerations

EPA Waste Number	U154 D001
Treatment	Incineration, fuels blending or recycle. Contact your local permitted waste disposal site (TSD) for permissible treatment sites. Always contact a permitted waste disposal (TSD) to assure compliance with all current local, state, and Federal Regulations.

Section 14. Transport Information

DOT Classification	Not available.
TDG Classification	Not available.
IMO/IMDG Classification	Not available.
ICAO/IATA Classification	Not available.

Section 15. Regulatory Information

U.S. Federal Regulations

TSCA 8(b) inventory: Methanol
SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: Methanol
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Methanol: Fire Hazard, Immediate (Acute) Health Hazard, Delayed (Chronic) Health Hazard
SARA 313 toxic chemical notification and release reporting: Methanol
Clean Water Act (CWA) 307: No products were found.
Clean Water Act (CWA) 311: No products were found.
Clean air act (CAA) 112 accidental release prevention: No products were found.
Clean air act (CAA) 112 regulated flammable substances: No products were found.
Clean air act (CAA) 112 regulated toxic substances: No products were found.

WHMIS (Canada)

WHMIS Class B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
WHMIS Class D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).
WHMIS Class D-2B: Material causing other toxic effects (TOXIC).
CEPA DSL: Methanol
This product has been classifed in accordance with the hazard criteria of the Controlled Product Regulations and the MSDS contains all required information.

International Regulations

EINECS

Methanol 200-659-6

DSCL (EEC)

R11- Highly flammable.
R37/38- Irritating to respiratory system and skin.
R41- Risk of serious damage to eyes.

International Lists

Australia (NICNAS): Methanol

Japan (MITI): Methanol

Korea (TCCL): Methanol

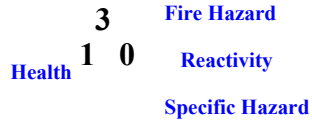
Philippines (RA6969): Methanol
China: No products were found.

State Regulations

Pennsylvania RTK: Methanol: (environmental hazard, generic environmental hazard)
Massachusetts RTK: Methanol
New Jersey: Methanol
California prop. 65: No products were found.

Section 16. Other Information

National Fire Protection Association (U.S.A.)



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Notice to Reader

The statements contained herein are based upon technical data that EMD Chemicals Inc. believes to be reliable, are offered for information purposes only and as a guide to the appropriate precautionary and emergency handling of the material by a properly trained person having the necessary technical skills. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use, storage and disposal of these materials and the safety and health of employees and customers and the protection of the environment. EMD CHEMICALS INC. MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE, WITH RESPECT TO THE INFORMATION HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS.

Material Safety Data Sheet

Section 1. Product and Company Identification

Product Name **Isopropanol Alcohol**

Product Code PX1830

Manufacturer EMD Chemicals Inc.
P.O. Box 70
480 Democrat Road
Gibbstown, N.J. 08027
Prior to January 1, 2003 EMD Chemicals was
EM Science, a Division of EM Industries, Inc.

Effective Date **10/29/2001**

For More Information Call
856-423-6300 Technical Service
Monday-Friday: 8:00 AM - 5:00 PM

In Case of Emergency Call
800-424-9300 CHEMTREC (USA)
613-996-6666 CANUTEC (Canada)
24 Hours/Day: 7 Days/Week

Synonym ISOPROPANOL; 2-PROPANOL

Material Uses Analytical reagent.

Chemical Family Alcohol. (Solvent.)

Section 2. Composition and Information on Ingredients

Component	CAS #	% by Weight
ISOPROPYL ALCOHOL	67-63-0	100

Section 3. Hazards Identification

Physical State and Appearance Liquid. (Colorless.)

Emergency Overview
WARNING!
FLAMMABLE LIQUID AND VAPOR.
VAPOR MAY CAUSE FLASH FIRE.
HARMFUL IF INHALED OR SWALLOWED.
CAUSES SEVERE EYE IRRITATION.
CAUSES DAMAGE TO THE FOLLOWING ORGANS: RESPIRATORY TRACT, SKIN, CENTRAL NERVOUS SYSTEM, EYE, LENS OR CORNEA.
MAY CAUSE SKIN IRRITATION.

Routes of Entry Absorbed through skin. Eye contact. Inhalation. Ingestion.

Potential Acute Health Effects

Eyes Extremely hazardous in case of eye contact (irritant). Inflammation of the eye is characterized by redness, watering, and itching.

Skin May be hazardous in case of skin contact (irritant). Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering. Non-permeator by skin.

Inhalation Hazardous in case of inhalation.

Ingestion Hazardous in case of ingestion.

Potential Chronic Health Effects

Carcinogenic Effects This material is not known to cause cancer in animals or humans.
Additional information See Toxicological Information (section 11)

Medical Conditions Aggravated by Overexposure: Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4. First Aid Measures

Eye Contact Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention immediately.

Skin Contact	In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.
Inhalation	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Ingestion	If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Section 5. Fire Fighting Measures

Flammability of the Product	Product will burn.
Auto-ignition Temperature	399.05°C (750.3°F)
Flash Points	OPEN CUP: 11.9°C (53.4°F).
Flammable Limits	Not available.
Products of Combustion	These products are carbon oxides (CO, CO2).
Fire Hazards in Presence of Various Substances	Highly flammable in presence of open flames, sparks and static discharge, of shocks, of heat, of oxidizing materials.
Explosion Hazards in Presence of Various Substances	**Risks of explosion of the product in presence of static discharge:** Highly flammable in presence of open flames, sparks and static discharge. Highly explosive in presence of open flames, sparks and static discharge. **Risks of explosion of the product in presence of mechanical impact:** Highly flammable in presence of shocks. Highly explosive in presence of shocks.
Fire Fighting Media and Instructions	Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.
Protective Clothing (Fire)	Be sure to use an approved/certified respirator or equivalent.
Special Remarks on Fire Hazards	Vapor may travel considerable distance to source of ignition and flash back.
Special Remarks on Explosion Hazards	Not available.

Section 6. Accidental Release Measures

Small Spill and Leak	Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.
Large Spill and Leak	Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.
Spill Kit Information	The following EMD Chemicals Inc. SpillSolv (TM) absorbent is recommended for this product: SX1330 Solvent Treatment Kit

Section 7. Handling and Storage

Handling	Keep away from heat, sparks and flame. Keep container closed. Do not get in eyes, on skin, or on clothing. Do not ingest. Do not breathe gas/fumes/ vapor/spray.

Storage	Keep container in a cool, well-ventilated area.

Section 8. Exposure Controls/Personal Protection

Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.
Personal Protection	
Eyes	Splash goggles.
Body	Lab coat.
Respiratory	Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Hands	Gloves.
Feet	Not applicable.
Personal Protection in Case of a Large Spill	Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self-contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Product Name	Exposure Limits
ISOPROPYL ALCOHOL	**EH40-OES (United Kingdom (UK), 1997).** STEL: 1250 mg/m3 STEL: 500 ppm MEL: 999 mg/m3 MEL: 400 ppm **ACGIH (United States, 1994).** STEL: 1230 mg/m3 STEL: 500 ppm TWA: 983 mg/m3 TWA: 400 ppm **NIOSH REL (United States, 1994).** STEL: 1225 mg/m3 STEL: 500 ppm TWA: 980 mg/m3 Period: 10 hour(s). TWA: 400 ppm Period: 10 hour(s). **OSHA Final Rule (United States, 1989).** STEL: 1225 mg/m3 STEL: 500 ppm TWA: 980 mg/m3 TWA: 400 ppm

Section 9. Physical and Chemical Properties

Odor	Characteristic.
Color	Colorless.
Physical State and Appearance	Liquid. (Colorless.)
Molecular Weight	60.11 g/mole
Molecular Formula	C3-H8-O
pH	Not available.
Boiling/Condensation Point	82.55°C (180.6°F)
Melting/Freezing Point	-88.83°C (-127.9°F)
Specific Gravity	0.785 (Water = 1)
Vapor Pressure	Not available.
Vapor Density	2.07 (Air = 1)
Odor Threshold	Not available.
Evaporation Rate	1.7 compared to (n-BUTYL ACETATE=1)
LogKow	Not available.
Solubility	Soluble in water.

Section 10. Stability and Reactivity

Stability and Reactivity	The product is stable.
Conditions of Instability	Not available.
Incompatibility with Various Substances	Highly reactive with oxidizing agents.
Rem/Incompatibility	Not available.
Hazardous Decomposition Products	Not available.
Hazardous Polymerization	Will not occur.

Section 11. Toxicological Information

iso-Propyl Alcohol NT8050000

RTECS Number:	
Toxicity	Acute oral toxicity (LD50): 3600 mg/kg [Mouse]. Acute dermal toxicity (LD50): 12800 mg/kg [Rabbit].
Chronic Effects on Humans	Not available.
Acute Effects on Humans	Extremely hazardous in case of eye contact (irritant). Inflammation of the eye is characterized by redness, watering, and itching. May be hazardous in case of skin contact (irritant). Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering. Non-permeator by skin. Hazardous in case of inhalation. Hazardous in case of ingestion.
Synergetic Products (Toxicologically)	Not available.
Irritancy	Draize Test (Rabbit): Eyes: 100 mg/24h. Reaction: Moderate.
Sensitization	Not available.
Carcinogenic Effects	This material is not known to cause cancer in animals or humans.
Toxicity to Reproductive System	Tests on laboratory animals for reproductive effects are cited in Registry of Toxic Effects on Chemical Substances (RTECS).
Teratogenic Effects	Not available.
Mutagenic Effects	Tests on laboratory animals for mutagenic effects are cited in Registry of Toxic Effects of Chemical Substances (RTECS).

Section 12. Ecological Information

Ecotoxicity	Not available.
BOD5 and COD	Not available.
Toxicity of the Products of Biodegradation	The products of degradation are less toxic than the product itself.

Section 13. Disposal Considerations

EPA Waste Number	D001
Treatment	Incineration, fuels blending or recycle. Contact your local permitted waste disposal site (TSD) for permissible treatment sites. Always contact a permitted waste disposal (TSD) to assure compliance with all current local, state, and Federal Regulations.

Section 14. Transport Information

DOT Classification	Not available.
TDG Classification	Not available.
IMO/IMDG Classification	Not available.
ICAO/IATA Classification	Not available.

Section 15. Regulatory Information

U.S. Federal Regulations

TSCA 4(a) final test rules: ISOPROPYL ALCOHOL
TSCA 8(b) inventory: ISOPROPYL ALCOHOL
TSCA 8(d) H and S data reporting: ISOPROPYL ALCOHOL: 1986
TSCA 12(b) one time export: ISOPROPYL ALCOHOL
SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: ISOPROPYL ALCOHOL
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: ISOPROPYL ALCOHOL: Fire Hazard, Immediate (Acute) Health Hazard, Delayed (Chronic) Health Hazard
SARA 313 toxic chemical notification and release reporting: ISOPROPYL ALCOHOL
Clean Water Act (CWA) 307: No products were found.
Clean Water Act (CWA) 311: No products were found.
Clean air act (CAA) 112 accidental release prevention: No products were found.
Clean air act (CAA) 112 regulated flammable substances: No products were found.
Clean air act (CAA) 112 regulated toxic substances: No products were found.

WHMIS (Canada)

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
Class D-2B: Material causing other toxic effects (TOXIC).
CEPA DSL: ISOPROPYL ALCOHOL

International Regulations

EINECS

ISOPROPYL ALCOHOL 200-661-7

DSCL (EEC)

R11- Highly flammable.
R36/37- Irritating to eyes and respiratory system.

International Lists

Australia (NICNAS): ISOPROPYL ALCOHOL

Japan (MITI): ISOPROPYL ALCOHOL

Japan (MOL): ISOPROPYL ALCOHOL

Korea (TCCL): ISOPROPYL ALCOHOL

Philippines (RA6969): ISOPROPYL ALCOHOL
China: No products were found.

State Regulations

Pennsylvania RTK: ISOPROPYL ALCOHOL: (environmental hazard, generic environmental hazard)
Massachusetts RTK: ISOPROPYL ALCOHOL
New Jersey: ISOPROPYL ALCOHOL
California prop. 65: No products were found.

Section 16. Other Information

National Fire Protection Association (U.S.A.)

Changed Since Last Revision +

Notice to Reader

The statements contained herein are based upon technical data that EMD Chemicals Inc. believes to be reliable, are offered for information purposes only and as a guide to the appropriate precautionary and emergency handling of the material by a properly trained person having the necessary technical skills. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use, storage and disposal of these materials and the safety and health of employees and customers and the protection of the environment. EMD CHEMICALS INC. MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE, WITH RESPECT TO THE INFORMATION HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS.

FLINN SCIENTIFIC INC.

"Your Safer Source for Science Supplies"

Material Safety Data Sheet (MSDS)

MSDS #: 249.00
Revision Date: November 25, 2002

Section 1 — Chemical Product and Company Identification

Liquinox, Laboratory Cleaner

Flinn Scientific, Inc. P.O. Box 219 Batavia, IL 60510 (800) 452-1261

CHEMTREC Emergency Phone Number: (800) 424-9300

Section 2 — Composition, Information on Ingredients

Proprietary mixture manufactured by Alconox, Inc.

CAS#: None Established

Section 3 — Hazards Identification

Yellow liquid. Practically odorless.
Irritating to eyes. May be irritating to mucous membranes.

FLINN AT-A-GLANCE
Health-0
Flammability-0
Reactivity-0
Exposure-1
Storage-0

0 is low hazard, 3 is high hazard

Section 4 — First Aid Measures

Call a physician, seek medical attention for further treatment, observation and support after first aid.
Inhalation: Remove to fresh air at once. If breathing has stopped give artificial respiration immediately.
Eye: Immediately flush with fresh water for 15 minutes.
External: Wash continuously with fresh water for 15 minutes.
Internal: Rinse out mouth, give 1 to 2 cups of water or milk, induce vomiting. Call a physician or poison control at once.

Section 5 — Fire Fighting Measures

Non flammable, non combustible liquid.
When heated to decomposition, emits toxic fumes of CO, CO2, SO2.
Fire Fighting Instructions: Use triclass, dry chemical fire extinguisher. Firefighters should wear PPE and SCBA with full facepiece operated in positive pressure mode.

NFPA CODE
None Established

Section 6 — Accidental Release Measures

Material foams profusely. Cleaner is biodegradable. Restrict unprotected personnel from area and ventilate area. Contain spill with sand or absorbent material; deposit in sealed bag or container. See Sections 8 and 13 for further information.

Section 7 — Handling and Storage

Flinn Suggested Chemical Storage Pattern: Inorganic Miscellaneous, or near washing area.

Section 8 — Exposure Controls , Personal Protection

Avoid contact with eyes, skin and clothing. Wear chemical splash goggles, chemical-resistant gloves and chemical-resistant apron.

Section 9 — Physical and Chemical Properties

Yellow liquid. Practically odorless.
Liqui-Nox is a trade name. An anionic detergent.
Solubility: Completely soluble in water.

Specific Gravity: 1.065
Boiling Point: 210 C

Section 10 — Stability and Reactivity

Avoid contact with strong oxidizing agents.
Shelf life: Good.

Section 11 — Toxicological Information

Acute effects: Irritant
Chronic effects: N.A.
Target organs: N.A.

ORL-RAT LD50: N.A.
IHL-RAT LC50: N.A.
SKN-RBT LD50: N.A.

N.A. = Not available, not all health aspects of this substance have been fully investigated.

Section 12 — Ecological Information

Data not yet available.

Section 13 — Disposal Considerations

Please consult with state and local regulations.
Flinn Suggested Disposal Method #26b is one option.

Section 14 — Transport Information

Shipping Name: Not regulated
Hazard Class: N/A
UN Number: N/A

N/A = Not applicable

Section 15 — Regulatory Information

Not listed.

Section 16 — Other Information

Consult your copy of the Flinn Scientific Catalog/Reference Manual for additional information about laboratory chemicals. This Material Safety Data Sheet (MSDS) is for guidance and is based upon information and tests believed to be reliable. Flinn Scientific Inc. makes no guarantee of the accuracy or completeness of the data and shall not be liable for any damages relating thereto. The data is offered solely for your consideration, investigation, and verification. Flinn Scientific Inc. assumes no legal responsibility for use or reliance upon this data.

flinn@flinnsci.com www.flinnsci.com
P.O. Box 219 Batavia IL 60510
(800) 452-1261 Fax (866) 452-1436

APPENDIX B

HEALTH AND SAFETY FORMS

AMEC Earth & Environmental, Inc.
Tailgate Safety Meeting Report

Check One:

❑ Initial Kickoff Safety Meeting ❑ Regular/Daily Tailgate Safety Meeting ❑ Unscheduled Tailgate Safety Meeting

Date: _____ Site: _____

Field Manager: _____ Site Health and Safety Coordinator: _____
(print) *(print)*

Order of Business

Topics Discussed (check all that apply):

❑ Site History/Site Layout
❑ Scope of Work
❑ Personnel Responsibilities
❑ Medical Surveillance Requirements
❑ Training Requirements
❑ Safe Work Practices
❑ Logs, Reports, Recordkeeping
❑ Sanitation and Illumination
❑ Air Surveillance Type and Frequency
❑ Monitoring Instruments and Personal Monitoring
❑ Action Levels
❑ Accident Reporting Procedures
❑ Site Control (visitor access, buddy system, work zones, security, communications)
❑ Discussion of previous "near misses" including work crew suggestions to correct work practices to avoid similar occurrences
❑ Engineering Controls
❑ PPE Required/PPE Used
❑ Define PPE Levels, Donning, Doffing Procedures
❑ Physical Hazards and Controls (e.g., overhead utility lines)
❑ Decontamination Procedures for Personnel and Equipment
❑ General Emergency Procedures (e.g., locations of air horns and what 1 or 2 blasts indicate)
❑ Site/Regional Emergency Procedures (e.g., earthquake response, typhoon response, etc.)
❑ Medical Emergency Response Procedures (e.g., exposure control precautions, location of first aid kit, etc.)
❑ Hazardous Materials Spill Procedures
❑ Applicable SOPs (e.g., Hearing Conservation Program, Safe Driving, etc.)
❑ Injury/Illness Reporting Procedures
❑ Route to Hospital and Medical Care Provider Visit Guidelines
❑ Hazard Analysis of Work Tasks (chemical, physical, biological and energy health hazards and effects)

Safety suggestions by site workers: _____

_____

_____

Action taken on previous suggestions: _____

_____

_____

Injuries/accidents/personnel changes since previous meeting: _____

_____

_____

AMEC Earth & Environmental, Inc.
Tailgate Safety Meeting Report *(continued)*

Observations of unsafe work practices/conditions that have developed since previous meeting: _____

_____

_____

Location of (or changes in the locations of) evacuation routes/safe refuge areas: _____

_____

_____

Additional comments: _____

_____

_____

Attendee signatures below indicate acknowledgment of the information and willingness to abide by the procedures discussed during this safety meeting.

Name (print)	Company	Signature

Meeting conducted by: _____ Title: _____
(print)

Signature: _____ Time: _____

First Aid Incident Report

Date of Report: _____ Report Completed by: _____

Date of Injury/Incident: _____

Description of the Injury/Incident: (time, location, event, description of injuries) _____

Name of Injured Person: _____ Employer: _____

Name of First Aid Provider(s): _____

Social Security Number: _____

Bloodborne Pathogen Exposure Incident Evaluation: _____

1. Was the First Aid Responder exposed to blood or other potenially infectious materials? _____

- ☐ Exposure Occurred (see question 2)
- ☐ No Exposure

2. Exposure occurred by contact with the following (check all that apply):

- ☐ Eye
- ☐ Mouth
- ☐ Other Mucous Membrane
- ☐ Broken Skin (cuts, abrasions)
- ☐ Needlestick
- ☐ Human Bite

Exposure Control Precautions Taken (check all that apply):

- ☐ None (contact SHE Coordinator or Corporate SHE Director)
- ☐ Glove
- ☐ Face Mask
- ☐ One-way CPR Valve
- ☐ Eye Protection
- ☐ Immediate Personal Hygiene
- ☐ Previous HBV Immunization
- ☐ Recommended for HBV Immunization
- ☐ Other _____

Please attach this completed form with the Supervisor's Report of Injury or Illness, and the Accident/First Aid Incident Summary Log, and forward to Human Resources, your SHE Coordinator, and the Corporate SHE Director.

APPENDIX B

Quality Assurance Project Plan for the Supplemental Soil and Sediment Sampling Plan – Additional Data for Risk Assessment

Cabot Carbon/Koppers Superfund Site
Gainesville, Florida

Submitted to:
U.S. Environmental Protection Agency, Region 4
Atlanta, Georgia

Submitted by:
Beazer East, Inc.
Pittsburgh, Pennsylvania

Prepared by:
AMEC Earth & Environmental
Westford, Massachusetts
PN: 4-7200-8401

February 2006

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LIST OF ACRONYMS

Acronym	Definition
AA	Atomic Absorption
AMEC	AMEC Earth & Environmental, Inc.
ASTM	American Society for Testing and Materials
COC	Chain of Custody
DQO	Data Quality Objective
GC/MS	Gas chromatography/mass spectrometry
HAZWOPER	Hazardous Waste Operations
HRGC/HRMS	High Resolution Gas Chromatography/High Resolution Mass Spectrometry
ICPES	Inductively Coupled Plasma Emission Spectroscopy
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NCR	Nonconformance Report
NELAC	National Environmental Laboratory Accreditation Conference
OSHA	Occupational Safety and Health Administration
PCDD/F	Polychlorinated dibenzo-p-dioxins and dibenzofurans
PAH	Polynuclear aromatic compounds
PID	Photoionization Detector
PQL	Practical Quantitation Limit
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RL	Reporting Limit
RPD	Relative Percent Difference
RSD	Relative Standard Deviation
SHSO	Site Health and Safety Officer
SOP	Standard Operating Procedure
SVOCs	Semivolatile Organic Compounds
TOC	Total Organic Carbon
USACE	US Army Corps of Engineers
USEPA	Environmental Protection Agency
VOCs	Volatile Organic Compounds

1.0 PROJECT DESCRIPTION

On behalf of Beazer East, Inc., AMEC Earth and Environmental (AMEC) has prepared this Quality Assurance Project Plan (QAPP) to support generation of data under activities specified in the January 2006 *Supplemental Soil and Sediment Sampling Plan – Additional Data for Risk Assessment* (hereafter referred to as the Work Plan) at the Koppers Portion of the Cabot Carbon/Koppers Superfund Site in Gainesville, Florida (hereafter referred to as the Site). This additional sampling is being conducted to support a human health risk assessment that will be incorporated into the Feasibility Study being prepared for the Site.

This QAPP presents the organization, planned activities and specific quality assurance and quality control (QA/QC) procedures to support the investigation. Specific protocols for sampling, sample handling and storage, chain of custody and laboratory and field analyses will be described. All QA/QC procedures will be structured in accordance with applicable technical standards including U.S. Environmental Protection Agency (EPA) requirements, regulations, guidance and technical standards.

This QAPP incorporates guidance of the USEPA Requirement for Quality Assurance Project Plans; USEPA QA/R-5, March 2001; Guidance for the Data Quality Objectives Process; U.S. EPA QA/G4, August 2000, and Test Methods for the Evaluation of Solid Waste: Physical/Chemical Methods, 3rd Edition (EPA SW-846, 1986). It is intended to be used only in conjunction with the Supplemental Soil and Sediment Sampling Plan.

1.1 Objective

The objective of the work proposed in the Work Plan is to collect additional data to address the data needs identified as a result of AMEC's evaluation of existing Site data. Once collected, these additional data will be combined with representative historical data to provide the basis for a human health risk assessment for the Site.

1.2 Site/Facility Description

The Site is an active wood treatment facility. The former Cabot Carbon Site, located immediately to the east of the Koppers property, has also impacted soil and ground water due to historical charcoal, pine oil and pine tar manufacturing operations at that facility. These two portions of the Cabot Carbon/Koppers Superfund Site have been undergoing remedial investigation, remedial planning and remedial action under the oversight of the EPA since the late 1980s. A detailed discussion of the history of Site investigations and remedial actions is presented in the Workplan for Additional Characterization of the Hawthorn Group Formation (TRC, January 2002).

1.3 Scope of Work

The Scope of Work described in the Work Plan has been designed to allow collection of sufficient samples to meet program objectives. The field investigation will include the following activities:

- Collection of surface soil samples from 88 locations;
- Collection of subsurface soil samples from 34 locations;
- Collection of 4 composite sediment samples from the on-Site drainage ditch; and
- Analyses of soils and sediment samples for selected metals and organics.

Sampling locations and the rationale for each are provided in Section 2.0 of the Work Plan. Locations are depicted on Figure 2 of the Work Plan. Table 1 of the Work Plan lists the locations and target analytes.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

The responsibilities of key project personnel in conjunction with the Supplemental Soil and Sediment Sampling Work Plan at the Cabot Carbon/Koppers Superfund Site in Gainesville, Florida are defined below. Specific personnel will be assigned to the roles described below once the Sampling Contractor and Laboratory have been selected by Beazer.

2.1 Project Organization Chart

Figure 2-1 presents the lines of authority specific to this investigation.

2.2 Management Responsibilities

The U.S. EPA Project Manager has regulatory authority and responsibility under CERCLA for this site investigation at the Site. Beazer will mobilize a Sampling Contractor to conduct the field investigation, evaluate the data, and prepare summary reports. The responsibilities of key project personnel are presented below.

Beazer Project Manager. Mike Slenska, the Beazer project manager, is responsible for implementing the project and he has the authority to commit the resources necessary to meet project objectives and requirements. His primary function is to ensure that technical, financial and scheduling objectives are achieved successfully. Mr. Slenska will review the work performed on each task to ensure its quality, responsiveness and timeliness. Mr. Slenska is ultimately responsible for the preparation and quality of interim and final reports and he will approve all reports before submission to EPA. He will represent the company and project team at agency meetings and public hearings.

Sampling Contractor Program Manager. The Sampling Contractor Program Manager will report to Mr. Slenska and is responsible for all activities completed on behalf of Beazer in accordance with the Supplemental Soil and Sampling Plan. The Sampling Contractor Program Manager will act as the direct line of communication between the Sampling Contractor and Beazer.

Project quality, accountability, and leadership responsibility throughout all phases of the project will be vested in the Sampling Contractor Program Manager. The Sampling Contractor Program Manager is the primary focal point for control of the project activities and will be supported by QA personnel, who will provide reviews, guidance, and technical advice on project execution issues. The project team, consisting of supervisory, health and safety, and technical personnel, will support the Sampling Contractor Program Manager to ensure that the project meets professional standards, is safely executed, and is in compliance with applicable laws, regulations, statutes, and industry codes. Individuals of the project team are responsible for fulfilling appropriate portions of the project QA program, in accordance with assignments made by Sampling Contractor Program Manager. Sampling Contractor Program Manager is responsible for satisfactory completion of the project QA program. He may assign specific responsibilities to other members of the project staff. The Sampling Contractor Program

Manager will notify Beazer of any long-term changes in core personnel and will provide regular updates to Beazer on progress and findings from the investigation. He will direct the preparation of interim and final reports.

Sampling Contractor Project Manager. The Sampling Contractor Project Manager will report directly to the Sampling Contractor Program Manager and will assume the responsibilities of program management in his absence. The Sampling Contractor Project Manager will provide the overall day-to-day programmatic guidance to support staff and will ensure that all documents, procedures, and project activities meet the standards for quality described in this QAPP. He will assist in developing detailed work schedules and will monitor field activities.

2.3 Quality Assurance Responsibilities

Sampling Contractor QA Manager: The Sampling Contractor QA Manager reports directly to the Sampling Contractor Project Manager and is responsible for ensuring that all procedures for this project are being followed. The Sampling Contractor QA Manager will provide direction and oversight for the laboratory program and will be responsible for data validation and data quality assessment. If required, the Sampling Contractor QA Manager will consult with the EPA Region IV Quality Assurance Coordinator to ensure that program procedures are consistent with EPA requirements.

2.4 Laboratory Responsibilities

Laboratory Project Manager: The Laboratory Project Manager will be responsible for validating or assigning a designee who is independent of the analyst and the project to validate the data packages using review methods described in Section 9.0. Laboratory Project Manager will conduct a final review of the data package to ensure data is transcribed correctly and a complete and correct data package is reported to the user.

Laboratory Quality Assurance Manager: The Laboratory Quality Assurance (QA) Manager is responsible for laboratory audits and monitoring adherence to the laboratory QA objectives. The Laboratory QA Manager acts independently of the personnel performing analyses. His responsibilities include:

- Writing, maintenance, and implementation of laboratory analysis Standard Operating Procedures (SOPs).
- Review of site specific QAPP for laboratory analytical requirements.
- Conducting laboratory performance and system audits on a monthly and quarterly basis, respectively.
- Initiating system corrective actions and review whether corrective action taken appropriately resolved the problem.

Laboratory Quality Assurance Director: The Laboratory Director is ultimately responsible for all aspects of the analytical services provided for this project including the production of analytical reports and the scheduling and maintenance of an ample working staff and equipment to perform the laboratories duties for this project in a timely and cost efficient manner. Responsibilities of the Laboratory Director include:

- Collaborating with the project management in establishing analytical programs.

- Serving as liaison between the laboratory and other project personnel.
- Serving as the "collection point" for reporting of nonconformances and changes in laboratory activities, which are then reported to project management.
- Maintaining and releasing laboratory testing data and results.
- Responsibility for laboratory and data activities by the analytical services staff.

2.5 Field Responsibilities

Field Team Leader: The Field Team Leader will be responsible for field activities and data evaluation, including items as follows:

- Supervising the collection of the samples and providing for their proper documentation, handling and shipment.
- Maintaining a completion log for each monitoring well installed as well as general maintenance of the field investigation logbook(s).
- Monitoring the drilling and sampling operations to verify that the drilling subcontractor and sampling team members adhere to the QAPP and/or the field sampling SOPs, as required.
- Coordinating field related activities with the Project Manager.
- Preparing and reporting the field investigation data for evaluation procedures.

Site Health and Safety Officer: The Site Health and Safety Officer (SHSO) will be responsible for verifying that project personnel adhere to the site safety requirements. These responsibilities include:

- Conducting the health and safety training for project personnel and subcontractors, as appropriate.
- Modifying health and safety equipment or procedure requirements based on data gathered during the site work.
- Determining and posting locations and routes to medical facilities, including poison control centers, and arranging for emergency transportation to medical facilities.
- Notifying local public emergency officers, i.e., police and fire departments, of the nature of the field operation and posting their telephone numbers.
- Observing work party members for symptoms of exposure or stress.
- Providing first aid if necessary onsite.
- Performing site audits to verify adherence to the requirements of the project Health and Safety Plan.

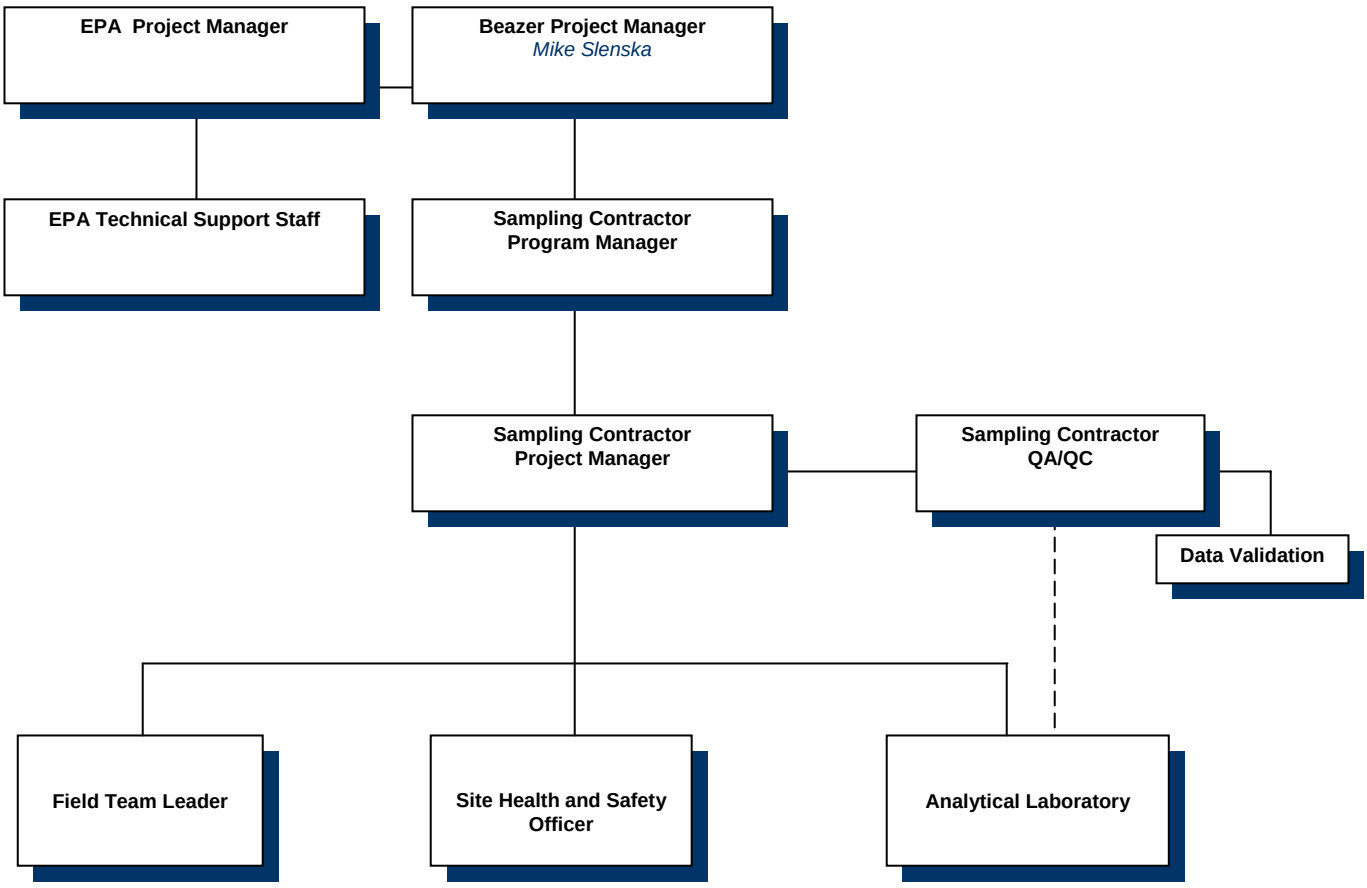
The SHSO has the authority to stop any operation that threatens the health or safety of the team or surrounding populace. The daily health and safety activities may be conducted by the SHSO or his designee.

2.6 Special Training Requirements and Certification

The following records and training certifications for subcontractors will be kept on file:

- All Sampling Contractor and Subcontractors - OSHA - 40 Hour HAZWOPER, 8 hour refreshers and 29 CFR 1910.120 physicals
- Drilling Subcontractor – Florida Drilling License
- Laboratory Subcontractors – USACE, NELAC, and/or USEPA validated or approved

Figure 2-1 Project Organizational Chart



3.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

The overall QA objective for this program is to provide defensible results to characterize site conditions and to support human health and ecological risk assessments and/or potential remediation needs. In order to meet this objective, procedures for field sampling, laboratory analysis, chain-of-custody and reporting have been developed and will be implemented that will result in data of known and acceptable quality. All aspects of the sampling and testing will adhere to rigorous QA/QC procedures.

The parameters that will be used to assess measurement data quality are precision, accuracy, representativeness, comparability, completeness and sensitivity. These parameters are discussed in the following sections. Media-specific evaluation criteria for these parameters may be specified in the analytical method, developed by the laboratory based on their historical performance or contained in EPA guidance for data validation. Table 3-1 summarizes the quality assurance measures that will be used to evaluate measurement data quality. Data quality objectives (DQOs) are established for these on method and matrix specific bases.

Table 3-1 Measurement Data Quality Evaluation Parameters

Data Quality Indicator	QA Parameter
Precision	Field Duplicate Laboratory Duplicate Laboratory Spike Duplicate Matrix Spike Duplicate
Accuracy	Standard Reference Materials Matrix Spike Surrogate Spikes Initial Calibration Standards and Blanks Laboratory Control Samples Trip Blank Field Blank Method Blank
Representativeness	Holding Times and Preservation Chain of Custody Field Blanks Method Blanks
Comparability	Method Detection Limits Method Reporting Limits Sample Collection Methods Laboratory Analytical Methods
Completeness	Sample Collection Records Reported Valid Results vs. Requested Data Data Qualifiers Laboratory Deliverables
Sensitivity	Method Detection and Reporting Limits Compared to Project Toxicity Benchmarks

3.1 Precision

Precision is the measure of the reproducibility among individual measurements of the same property, usually under similar conditions, such as multiple measurements of the same sample. Both sampling and laboratory precision will be evaluated using field duplicates, matrix spike/matrix spike duplicates (MS/MSDs), laboratory duplicates, and Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSDs).

Precision will be assessed by duplicate analyses for all parameters. The precision of measurements in environmental samples can be affected by the nearness of a chemical concentration to the method detection limit, where the percent error (expressed as either percent relative standard deviation (%RSD) or relative percent difference (RPD)) increases or by sample non-homogeneity. Percent RSD is the ratio of the standard deviation and the mean, expressed as a percentage. RPD is the ratio of the difference between two values and the average of the two values, expressed as a percentage. The equations used to express precision are as follows:

$$RPD = \frac{\text{measured value} - \text{measured duplicate value}}{(\text{measured value} + \text{measured duplicate value}) \div 2} \times 100$$

$$\%RSD = (SD/D_{ave}) \times 100$$

where:

$$SD = \sqrt{\left(\frac{\sum (D_n - D_{ave})^2}{(n-1)} \right)}$$

D_n = sample value
D_{ave} = average sample value
n = number of samples

Precision criteria for calibration and laboratory control sample measurements as defined by the respective methods will be applied. Professional judgment will be applied for the evaluation of precision in samples.

3.2 Accuracy

Accuracy is an expression of the degree to which a measured or computed value represents the true value. Accuracy may be expressed as the percent difference between two measured values, as a percentage of the true or reference value, or as a percent recovery in those analyses where reference materials are not available and spiked samples are analyzed. The equations used to express accuracy are as follows:

$$\text{Percent difference} = \frac{\text{measured value} - \text{true value}}{\text{true value}} \times 100$$

For reference materials:

$$\text{Percent of true value} = \frac{\text{measured value}}{\text{true value}} \times 100$$

For spiked samples:

$$\text{Percent recovery} = \frac{\text{spike sample result} - \text{unspiked sample result}}{\text{amount of spike added}} \times 100$$

Accuracy criteria for reference materials and calibration verification are specified in the analytical methods and should meet the laboratory's control limits. Accuracy measurements for spiked samples can be affected by sample non-homogeneity when the compound spiked is already present in the sample as collected. In general, accuracy criteria are not applicable for matrix spikes unless the amount spiked is equal to or greater than 25% of the native concentration of that chemical. Accuracy may also be affected by the presence of target analytes in laboratory or field blanks. Inadvertent contamination of field samples may cause false positives or bias sample results.

3.3 Completeness

Completeness is the measure of the amount of data that is determined to be valid in proportion to the amount of data collected. Completeness will be evaluated for each method, matrix and analyte combination in order to prevent misinterpretation of the data and to meet the needs of the sampling program.

The DQO for completeness for all components of this project is 90%. Data that have been qualified as estimated because the quality control criteria were not met will be considered valid for the purpose of assessing completeness. Data that have been qualified as rejected will not be considered valid for the purpose of assessing completeness.

3.4 Representativeness

Representativeness expresses the degree to which data accurately and precisely represent an environmental condition, characteristic of a population, parameter variations at a sampling point, or a process condition. Consideration of field conditions, sampling locations, numbers of samples and analyses conducted are all required to ensure representativeness. For this project, the parameters selected for analysis have been identified as metals and organics potentially associated with wood treatment.

Representativeness will be ensured by compliance with the plans for both field and laboratory activities. In order to achieve acceptable representativeness, sample results must not be affected by conditions that would lead to false positives or false negatives. Representativeness

will also be evaluated through field and laboratory QA measures, including chain-of-custody records, holding time and preservation, and field and method blanks.

3.5 Comparability

Comparability expresses the confidence with which one data set can be evaluated in relation to another data set. For this investigation, comparability of data will be established through the use of project-defined sampling and analytical methods and reporting limits and formats that are consistent with standard practices and with comparable monitoring programs. The use of common, traceable calibration and reference materials from the National Institute of Standards and Technology or other established sources will ensure comparability of analytical results to those from other studies.

3.6 Sensitivity

A critical component of this investigation is the analytical sensitivity. To the extent feasible, analytical sensitivities as provided in Tables 3-2 through 3-5 are consistent with potential screening criteria for human health, ecological risk and corrective action requirements.

The method detection limit (MDL) is defined as the minimum concentration at which a given target analyte can be measured and reported with 99% confidence that the analyte concentration is greater than zero. Laboratory practical quantitation limits (PQLs) or reporting limits (RLs) are defined as the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. Laboratory MDLs and RLs will be used to evaluate the method sensitivity and/or applicability prior to the acceptance of a method for this program.

The sample-specific MDL and RL will be reported by the laboratory and will take into account any factors relating to the sample analysis that might decrease or increase the reporting limit (e.g., dilution factor, percent moisture, sample volume, sparge volume). In the event that the MDL and RL are elevated for a sample due to matrix interferences and subsequent dilution or reduction in the sample aliquot, the data will be evaluated by Sampling Contractor and the laboratory to determine if an alternative course of action is required or possible.

Table 3-2: Target Sensitivity - Metals

	Soils	
	MDL, mg/kg	RL, mg/kg
Arsenic	0.37	1
Barium	0.072	1
Cadmium	0.058	0.2
Chromium	0.1	1
Lead	0.25	0.5
Selenium	0.45	1
Silver	0.1	0.5
Mercury	0.0061	0.0167

Table 3-3: Target Sensitivity - Semivolatile Organics

	Soils	
	MDL µg/kg	RL µg/kg
2,2-oxybis (1-chloropropane)	26.7	167
2,4,5-Trichlorophenol	73.8	330
2,4,6-Trichlorophenol	67.7	330
2,4-Dichlorophenol	56	330
2,4-Dimethylphenol	78.6	330
2,4-Dinitrophenol	266	670
2,4-Dinitrotoluene	37.6	167
2,6-Dinitrotoluene	25.1	167
2-Chloronaphthalene	21.7	167
2-Chlorophenol	24.9	167
2-Methylnaphthalene	36.8	167
2-Methylphenol (o-cresol)	26.9	167
2-Nitroaniline	33.7	167
2-Nitrophenol	74.9	330
3,3-Dichlorobenzidine	33.4	167
3-Nitroaniline	43.3	330
4,6-Dinitro-2-methylphenol	96.1	330
4-Bromophenyl phenyl ether	19.3	167
4-Chloro-3-methylphenol	54.5	330
4-Chloroaniline	72.2	670
4-Chlorophenyl phenyl ether	33.8	167
4-Methylphenol (m/p-cresol)	32.1	167
4-Nitroaniline	47.2	330
4-Nitrophenol	186	670
Acenaphthene	6.4	33
Acenaphthylene	6.5	33
Anthracene	7.1	33
Benzidine	145	670
Benzo(a)anthracene	6.5	33
Benzo(a)pyrene	3.8	33
Benzo(b)fluoranthene	8.2	33
Benzo(ghi)perylene	8.9	33
Benzo(k)fluoranthene	9.2	33
Benzoic acid	719	1670
Benzyl alcohol	116	330
Bis(2-chloroethoxy)methane	24.8	167
Bis(2-chloroethyl)ether	40.4	167
Bis(2-ethylhexyl)phthalate	70.7	167
Butyl benzyl phthalate	24.1	167
Carbazole	19.4	167
Chrysene	6.7	33

	Soils	
	MDL µg/kg	RL µg/kg
Dibenzo(a,h)anthracene	6.7	33
Dibenzofuran	25.5	167
Diethyl phthalate	35.6	167
Dimethyl phthalate	25.2	167
Di-n-butyl phthalate	19.5	167
Di-n-octyl phthalate	29.6	167
Fluoranthene	6.2	33
Fluorene	6.3	33
Hexachlorobenzene	19.1	67
Hexachlorobutadiene	38.2	167
Hexachlorocyclopentadiene	114	670
Hexachloroethane	27	167
Indeno(1,2,3-cd)pyrene	6.6	33
Isophorone	24.7	167
Naphthalene	6.6	33
Nitrobenzene	9.4	33
n-Nitroso-di-n-propylamine	28.7	167
n-Nitrosodiphenylamine	17	167
Pentachlorophenol	184	670
Phenanthrene	5.3	33
Phenol	25.6	167
Pyrene	7.5	33

Table 3-4: Target Sensitivity - Volatile Organics (VOCs)

	MDL µg/kg	RL µg/kg
1,1,1,2-Tetrachloroethane	0.6	5
1,1,1-Trichloroethane	0.72	5
1,1,2,2-Tetrachloroethane	0.62	5
1,1,2-Trichloroethane	0.82	5
1,1-Dichloroethane	0.59	5
1,1-Dichloroethene	1.3	5
1,1-Dichloropropene	0.72	5
1,2,3-Trichlorobenzene	1.1	5
1,2,3-Trichloropropane	1.2	5
1,2,4-Trichlorobenzene	1.2	5
1,2,4-Trimethylbenzene	0.85	5
1,2-Dibromo-3-chloropropane	1.5	5
1,2-Dibromoethane (EDB)	0.64	5
1,2-Dichlorobenzene	0.72	5
1,2-Dichloroethane	0.55	5
1,2-Dichloropropane	0.55	5
1,3,5-Trimethylbenzene	0.81	5
1,3-Dichlorobenzene	0.72	5
1,3-Dichloropropane	0.61	5
1,4-Dichlorobenzene	0.7	5
2,2-Dichloropropane	1.4	5
2-Butanone (MEK)	2.2	5
2-Chlorotoluene	0.66	5
2-Hexanone	1.2	5
4-Chlorotoluene	0.69	5
4-Methyl-2-pentanone (MIBK)	0.62	5
Acetone	3.2	5
Benzene	0.69	5
Bromobenzene	0.45	5
Bromochloromethane	0.75	5
Bromodichloromethane	0.57	5
Bromoform	0.74	5
Bromomethane	2.7	5
Carbon disulfide	0.69	5
Carbon tetrachloride	0.73	5
Chlorobenzene	0.56	5
Chloroethane	3.1	5
Chloroform	0.68	5
Chloromethane	0.72	5
cis-1,2-Dichloroethene	0.56	5
cis-1,3-Dichloropropene	0.58	5

	MDL µg/kg	RL µg/kg
Dibromochloromethane	0.65	5
Dibromomethane	0.8	5
Dichlorodifluoromethane	0.86	5
Ethylbenzene	0.64	5
Hexachlorobutadiene	2.6	5
Isopropylbenzene	0.68	5
m&p-Xylenes	1.2	10
Methylene chloride	1.6	5
Methyl-tert-butyl-ether (MTBE)	0.55	5
Naphthalene	1	5
n-Butylbenzene	1.1	5
n-Propylbenzene	0.74	5
o-Xylene	0.62	5
p-Isopropyltoluene	0.82	5
sec-Butylbenzene	0.84	5
Styrene	0.62	5
tert-Butylbenzene	0.78	5
Tetrachloroethene	0.9	5
Toluene	1.7	5
trans-1,2-Dichloroethene	0.77	5
trans-1,3-Dichloropropene	0.6	5
Trichloroethene	0.66	5
Trichlorofluoromethane	0.95	5
Vinyl chloride	0.7	5

Table 3-5: Target Sensitivity - PCDD/Fs

	Soils/Sediments PQL ng/kg
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.1
1,2,3,7,8-Pentachlordibenzo-p-dioxin	0.2
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.2
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.2
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.2
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.2
Octachlorodibenzo-p-dioxin	1.0
2,3,7,8-Tetrachlorodibenzofuran	0.20
1,2,3,7,8-Pentachlorodibenzofuran	0.2
2,3,4,7,8-Pentachlorodibenzofuran	0.2
1,2,3,4,7,8-Hexachlorodibenzofuran	0.2
1,2,3,6,7,8-Hexachlorodibenzofuran	0.2
1,2,3,7,8,9-Hexachlorodibenzofuran	0.2
2,3,4,6,7,8-Hexachlorodibenzofuran	0.2
1,2,3,4,6,7,8-Heptachlorodibenzofuran	50.2
1,2,3,4,7,8,9-Hepachlorodibenzofuran	0.2
Octachlorodibenzofuran	0.5

4.0 SAMPLING PROCEDURES

Sampling procedures have been selected to generate data of the requisite quality for this site investigation. Section 3.0 of the Work Plan provides details on the sampling methods, decontamination procedures and documentation requirements. Sampling will be conducted in accordance with these procedures as well as applicable SOPs maintained by the sampling contractor.

Site-specific sample identification numbers will be assigned prior to sample collection. Samples will be assigned unique field identifiers that provide information on the sample location, the sample matrix, the sample depth (for soils) and whether the sample is an investigative or QC sample. The conventions to be used are detailed in Section 3.6 of the Work Plan and are summarized below. The unique specific sample number will consist of the following elements:

- Sample Matrix Code: The sample matrix code describes the matrix (e.g. “SS” for soil; SD for sediment).
- Location Code: The sample location code follows the sample matrix code, and consists of a two -digit code that indicates the sample location (e.g. SS01, SS85). Location codes lower than 10 will be preceded by a zero, e.g. “01,” “02,” etc.
- Depth Code: Soil samples will indicate the sample depth within the sample ID. Surface soil samples (e.g. 0.0-0.5) will be designated as “A” and subsurface soil samples will be designated as “B”.
- Sample Type: The last letter of the sample identification will be (A) for regular samples, (B) for duplicates, (C) for MS/MSD and (D) for equipment blanks.

Examples of sample identifications:

- SS02AA: Surface soil sample from location SS-02, regular environmental sample;
- SS43BB: Subsurface soil sample from location SS-43, duplicate sample; and
- SD01AA: Surface sediment location from location SD-01; regular environmental sample.

Sample containers will be provided by the laboratory and will be certified clean, with traceability to specific certificate(s) from the commercial source. Bottle, preservation requirements and holding times are presented in Table 5-1.

Table 5-1 Sample Containers, Preservatives and Holding Times

Analysis	Matrix	Preservation	Holding Time	Sample Container
SVOCs	Soil	Cool, 4°C	14 days from collection to prep; 40 days from prep to extract analysis	8oz. Glass, wide-mouth, Teflon lined cap
VOCs	Soil	Cool, 4°C, sodium bisulfate or methanol	14 days from sample collection	3 x 40 ml vials, Teflon lined cap
	Soil – Encore Sampler	Cool, 4°C	48 hours to transfer from Encore sampler to vial. 14 days from collection to analysis	Encore sampler or equivalent
Metals	Soil/ Sediment	Cool, 4°C	6 mo. (28 days for Hg)	8 oz. Glass, Teflon cap
PCDD/Fs	Soil/ Sediment	Cool, 4°C	30 days from collection to prep; 45 days from prep to extract analysis	8 oz. Glass, Teflon cap
TOC	Sediment	Cool, 4°C	28 days from sample collection	8 oz. Glass, Teflon cap
Grain Size	Sediment	NA	NA	8 oz. Glass, Teflon cap

Sample Labels

Each sample will have an adhesive plastic or waterproof paper label affixed to the container and will be labeled at the time of collection. The following information will be recorded on the container label with a permanent marker at the time of collection:

- Project name;
- Sample identification;
- Date and time of sample collection;
- Preservative type (if applicable);
- Initials of sampler; and
- Laboratory analysis requested.

Shipment

Samples to be shipped to the laboratory will be properly packaged in individual plastic bags and cushioned with bubble wrap to prevent damage. They will be placed in a cooler with a signed

Chain of Custody (COC) form, ice (double bagged), a temperature blank, and shall be cooled to less than 4 degrees plus or minus 2 degrees Celsius (4° ± 2° C).

Samples may be shipped in coolers using an overnight courier, courier employed by the analytical laboratory, or delivered to the lab by field personnel. The shipping procedures for soil and water samples will include the following steps:

- Place packing material (zonolite, vermiculite, bubble wrap, etc.) in the bottom of a waterproof cooler;
- Seal bottles in clear plastic bags and wrap each sample bottle using bubble wrap; place sample bottles in cooler and introduce packing material around and between bottles to prevent the bottles from touching each other or the sides of the cooler;
- Place a temperature blank in the cooler;
- Double-bag ice plastic bags and pack in the cooler on and around bottles, especially around VOC samples;
- Fill the cooler with packing material;
- Sign and date the COC form and place paperwork in plastic bags and attach with masking tape or duct tape to the inside lid of the cooler;
- Tape the drain shut;
- Close the cooler and secure the lid by taping the cooler completely around with strapping tape at two locations;
- Place the lab address on top of the cooler;
- Put "This Side Up" labels and "Fragile" labels on the cooler;
- Affix custody seals on the front right and back left corners of the cooler, sign and date the seals, cover seals with wide, clear tape; and
- Attach shipping papers to the cooler.

If samples are to be hand-delivered to the laboratory by field personnel, they should be sealed in plastic bags and placed securely in a cooler with double-bagged ice and with packaging material to protect them from breakage. A temperature blank is required. COC paperwork should be completed and dated, but it will not be necessary to affix custody seals or shipping labels on the cooler.

Upon shipment, the laboratory will be notified that a sample shipment is scheduled to arrive. An effort will be made to provide the laboratory with a one-week advance notice of sample shipment.

Each shipping container will be clearly marked with a sticker containing the originator's address. Any coolers that are not hand delivered will be shipped priority for overnight delivery. Coolers that are not hand delivered to the laboratory will have a custody seal affixed to the shipping container so that the shipping container cannot be opened without breaking the custody seal.

Shipments of samples from the field to the laboratory will typically occur within 48 hours of collection. Samples requiring analyses with short holding times will be identified and designated as such on the chain-of-custody forms and will be shipped on the date of collection, if possible.

5.0 CHAIN-OF-CUSTODY PROCEDURES

Adherence to proper documentation and COC procedures is critical for data defensibility and quality. Samples and associated data must be traceable from the point of collection to the final reported laboratory results.

5.1 Field Documentation

Field team members will also keep a daily record of significant events, observations and measurements in bound field logbooks. The sampling documentation will contain information on each sample collected, and will include at a minimum the following information:

- Project name;
- Field personnel on-Site;
- Facility visitors;
- Weather conditions;
- Field observations and any deviations from the Work Plan;
- Maps, listing of photographs taken, and/or drawings;
- Date and time sample collected;
- Sampling method and description of activities;
- Identification or serial numbers of instruments or equipment used;
- Deviations from the QAPP and Work Plan; and
- Conferences associated with field investigation activities.

In general, sufficient information will be recorded during sampling to permit reconstruction of the event without relying on the memory of the field personnel. The books will be permanently bound and durable for adverse field conditions. All pages will be numbered consecutively. All pages will remain intact, and no page will be removed for any reason. Notes will be taken in indelible waterproof, blue or black ink. Errors will be corrected by crossing out with a single line, dating, and initialing. The front and inside of each field logbook will be marked with the project name, number, and logbook number. The field logbooks will be stored in the project files when not in use and upon completion of each sampling event.

Photographs may be taken during the sampling to document field activities. They will serve to verify information entered in the field logbook. When a photograph is taken, the following information will be written in the logbook:

- Time, date, location, and, if appropriate, weather conditions;
- Type of camera;
- Description of the subject photographed (including the photograph direction); and
- Name of person taking the photograph.

5.2 Custody Procedures

Once collected, samples are considered to be in one's custody if they are: (1) in the custodian's possession or view; (2) in a secured location (under lock) with restricted access; or (3) in a container that is secured with an official seal(s) such that the sample cannot be reached without breaking the seal(s).

Chain-of-custody (COC) records are used to document sample collection and shipment to a laboratory for analysis. The COC is an integral component of the sampling process, and represents the permanent record of sample holding and shipment. Forms will be completed and sent with the samples for each shipment. If multiple coolers are sent to a single laboratory on a single day, forms will be completed and sent with each cooler.

The COC record will identify the contents of each shipment and maintain the custodial integrity of the samples. A locked seal will be placed across the front and back of each cooler containing samples when coolers are ready for shipment. All custody seals will be signed and dated. The chain-of-custody form will be crosschecked for errors and signed.

The sampling contractor's field representative will sign the "relinquished by" box and note the date, time, and air bill (if applicable). Until the samples are delivered, the custody of the samples will be the responsibility of the sampling contractor's field representative and will be kept in a secured area that is restricted to authorized personnel. A laboratory representative will check samples with their respective chain-of-custody form(s) into the laboratory, and the form will be signed and dated appropriately. The sampling contractor's field representative or staff member will retain one copy of the signed chain-of-custody form for the project files. The original chain-of-custody form will be returned to the project manager with the analytical results to go into the project files.

5.3 Laboratory Sample Custody

Laboratory Receipt and Log-In

The COC form will be signed on receipt by the laboratory to complete the custody chain. The condition of the samples upon receipt by the laboratory will be documented on a cooler receipt log or sample condition upon receipt form. This form will note sample integrity, preservation, temperature, custody seal condition, and will note any discrepancies between information on the sample labels and that on the chain-of-custody form.

Each sample will be logged into the laboratory system by assigning it a unique sample number. This number and the field sample identification number will be recorded on the laboratory report. Samples will be stored and analyzed according to specified EPA Methods. The original chain-of-custody form will be returned to the sampling contractor PM for permanent storage.

Laboratory Sample Handling

Field samples may be held at the laboratory to form an analytical batch consisting of a maximum of 20 field samples that are of the same matrix or of similar composition, with the

constraint that the method extraction and analysis holding times are not exceeded or jeopardized. Unless prevented by matrix, associated QC samples, including trip blanks, equipment blanks, duplicates, and project specific MS/MSDs, are to be extracted and analyzed with the field samples.

Soil and water samples shall be stored in limited access, temperature controlled areas (refrigerators and coolers 4° ± 2°C, freezers less than 0° C), which are monitored for temperature during business days. All of the cold storage areas shall be monitored by thermometers which have been calibrated with a certified reference standard. (The laboratory QAM may be referenced for details regarding their sample storage policies and procedures).

The sample holding time begins with the date (and time for samples with holding times less than 48 hours) the sample is collected and continues until the date and time the sample analysis is complete. Sample type, sample preservation, container type, volume requirements, analytical methods, and extraction and analysis holding times are summarized on Table 4-1 Samples not preserved or analyzed in accordance with these requirements may necessitate expediting the analysis (in the event the holding time is reduced) or possible resampling and reanalysis. The Laboratory Project Manager shall be responsible for prioritizing work to assure that holding times and project commitments are met. Any discrepancies will be noted on the appropriate form, and the Sampling Contractor Project Manager, or designee, will be immediately notified.

If not entirely consumed during analysis, organic analytical samples shall be stored, at least, until the analysis holding time has expired. All other analytical samples shall be kept for at least 90 days after submittal of the laboratory report. After these dates, the laboratory may dispose of all analytical samples according to local, state, and federal regulations. Unless otherwise notified by the sampling contractor, samples may be disposed 90 days after submittal if the specified laboratory report has been provided to the sampling contractor.

Analytical data records will be retained by the laboratory and in the sampling contractor's central project files. For all analyses, the data reporting requirements will include those items necessary to complete data validation, including copies of all raw data. The hardcopy deliverable requirements are specified in Section 9.3.2 of this QAPP.

All instrument data shall be fully restorable at the laboratory from electronic backup. Laboratories will be required to maintain all records relevant to project analyses for a minimum of 7 years.

5.4 Final Evidence Files

The final evidence file will be the central repository for all documents, which constitute evidence relevant to sampling and analysis activities as described by this QAPP and includes all relevant records, reports, logs, field forms, pictures, and subcontractor reports. The sampling contractor will be responsible for the custody of the evidence files and maintain the contents of the files for the duration of the project. The files will include at a minimum:

- Field logbooks;
- Field data;
- Photographs;

- Drawings;
- Soil boring logs;
- Laboratory data deliverables;
- Data validation reports;
- Data assessment reports;
- Progress reports,. QA reports, interim project reports;
- All original custody documentation (COC forms, airbills, etc.); and
- Copies of all communications with EPA (letters, e-mails, telephone logs).

6.0 ANALYTICAL PROCEDURES

6.1 Field Analytical Procedures

Field measurements will be taken following the manufacturer's instruction manual and in accordance with applicable SOPs maintained by the Sampling Contractor.

6.2 Laboratory Analytical Procedures

Laboratory analytical procedures will be derived from the Methods from the *Test Methods for the Evaluation of Solid Waste: Physical/Chemical Methods,* 3rd Edition (EPA SW-846, 1986 with Updates I- IIIB). In additional, laboratory analysis will be conducted in accordance with the procedures outlined in the Laboratory's QA Plan. Table 6-1 summarizes the methods to be followed.

Table 6-1: Analytical Methods

Analytes	Matrix	Preparation Method	Analytical Methods
VOCs	Soil, Sediment	EPA 5035	EPA 8260B
Semivolatile Organics	Soil, Sediment	EPA 3541	EPA 8270C
Metals	Soil, Sediment	EPA 3050	EPA 6010B
PCDD/Fs	Soil, Sediment	EPA 1613B	EPA 1613B
TOC	Sediment	-	Lloyd Kahn Method
Grain size	Sediment	-	ASTM D 4222

Additional cleanup procedures may be required as deemed necessary if matrix effects are evident in sample QC results such as matrix spike and surrogate recoveries.

Volatile Organics

Volatile (or purgeable) organics (VOC) in soil samples will be analyzed using method SW8260B. This method uses a capillary column gas chromatography/mass spectrometry (GC/MS) technique. Volatile compounds are introduced into the GC by purge and trap (SW5035 for soils). An inert gas is bubbled through a soil-water slurry for soil samples) to transfer the purgeable organic compounds from the liquid to vapor phase. The vapor is then swept through a sorbent trap where the purgeable organics are trapped. The trap is backflushed and heated to desorb the purgeable organics onto a capillary GC column where they are separated and then detected with a mass spectrometer. The internal standard method is used for quantitation of analytes of interest.

Semivolatile Organics

Semivolatile organics (SVOCs), also known as base/neutral and acid extractables, in soil samples will be analyzed using method SW8270C. This technique determines quantitatively the concentration of polynuclear aromatic hydrocarbons (PAH) and phenols as well as selected other organics of limited volatility. Samples are extracted and both base/neutral and acid extracts are then concentrated through evaporation. Compounds of interest are separated and quantified using a capillary column GC/MS. The internal standard method is used for quantitation.

Metals

Soil and sediment samples will be analyzed for trace elements or metals using method SW6010B. Following digestion, the trace elements are determined simultaneously or sequentially using Inductively Coupled Plasma Atomic Emission Spectroscopy (ICPES). This method will provide sufficient sensitivity to distinguish between background levels of the metals and possible impacts from the wastes at the site.

Soil samples will be analyzed for mercury using method SW7471A. This method is based on a cold-vapor, flameless atomic absorption (AA) technique based on the absorption of radiation by mercury vapor. Mercury is reduced to the elemental state and aerated from solution in a closed system. The mercury vapor passes through a cell positioned in the light path of an AA spectrophotometer. Mercury concentration is measured as a function of absorbance.

Polychlorinated Dioxins and Furans (PCDD/Fs)

Polychlorinated dioxins and furans (PCDD/Fs) in soil and sediment samples will be analyzed using Method 1613B. This method relies upon isotope dilution and high resolution gas chromatography/high resolution mass spectrometry (HRGC/HRMS) for the analysis of samples for PCDD/Fs. Samples are spiked with isotopically labeled analogs of the 2,3,7,8-substituted dioxin and furan congeners prior to extraction.

Total Organic Carbon

Total Organic Carbon (TOC) in soil and sediment samples will be analyzed using the Lloyd Kahn Method. Samples are treated with phosphoric acid to separate the organic carbon from carbonates and bicarbonates. The sample is then dried and pyrolyzed, during which the carbon is converted to carbon dioxide. The carbon dioxide is measured using a differential thermal conductivity detector.

Grain Size Analysis

Particle size analysis will be conducted on sediment samples using Method American Standard Testing Method (ASTM) D 422. This method consists of mechanically sieving the soils using standard sieve sizes. The soil retained on each sieve is weighed to determine the particle size distribution.

7.0 CALIBRATION PROCEDURES AND FREQUENCY

7.1 Field Instrument Calibration

Field instruments will be calibrated daily in accordance with the manufacturer's instructions. A log will be kept of the calibration check activities for all field instruments by the field personnel. It will include the date of the calibration check, description of the check standard, the reading obtained, and the initials of the person performing the calibration check. The standards used for calibration will be commercially prepared solutions and gases obtained from reputable vendors. Expiration of solutions and gases will be checked and they will be discarded when expiration dates are reached. All calibrations will be performed by the Sampling Field Team. Table 7-1 details field calibration and quality assurance requirements for this program.

7.2 Laboratory Instrument Calibration

All of the methods cited for this program have specific calibration requirements. In addition, those methods which rely on mass spectrometry (VOCs, SVOCs and PCDD/Fs) define instrument tuning requirements which must be satisfied prior to sample analyses. Tables 7-2 through 7-7 detail the laboratory calibration and quality assurance requirements for each method.

Table 7-1: Calibration and Quality Assurance Requirements for Field Analyses

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]
None	Organic vapor concentration (PID)	3 point calibration	Monthly	correlation coefficient 0.995	Recalibrate; check instrument and replace if necessary
		Calibration verification and check	Daily at beginning and end of day	Response ± 20% of expected value	Correct problem, recalibrate

a. All corrective actions shall be documented, and the records shall be maintained by the Sampling Contractor.

Table 7-2: Analytical Quality Control Requirements for Analyses for Metals by EPA Method 6010B

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]
Initial calibration (minimum 1 standard and a blank)	Daily initial calibration prior to sample analysis	If more than one standard is used, correlation coefficient must be ≥ 0.995	If applicable, correct problem and repeat initial calibration
Initial calibration verification (second source)	Daily after initial calibration	All analytes within ±10% of expected value	Correct problem then repeat initial calibration
Calibration verification (Instrument Check Standard)	After every 10 samples and at the end of the analysis sequence	All analyte(s) within ±10% of expected value and RSD of replicate integrations <5%	Repeat calibration and reanalyze all samples since last successful calibration
Calibration blank	After every calibration verification	No analytes detected ≥ RL	Correct problem then analyze calibration blank and previous 10 samples
Low level calibration check standard (at or below RL)	Once per analytical batch prior to sample analysis unless multi-point (3+) calibration with low std at or below RL is performed	All analyte(s) with ± 50% of expected value	Correct problem then reanalyze
Linear range calibration (high) check standard	Every three months	Analyte within ± 10% of expected value	Correct problem then reanalyze or re-set linear range
Method blank	One per analytical batch	No analytes detected ≥ RL	No corrective action taken if MB > RL if samples are ND or if sample conc. > 10x the MB contaminant level. If any samples have analytes detected at ≤ 10x the blank, correct problem then reprep and analyze method blank and all affected samples processed with the contaminated blank
Interference check solution (ICS)	At the beginning of an analytical run	Within ±20% of expected value	Terminate analysis; correct problem; reanalyze ICS; reanalyze all affected samples
LCS for the analyte	One LCS per analytical batch	QC acceptance criteria, 80%-120% of expected results	Correct problem then reanalyze If still out, reprep and reanalyze the LCS and all samples in the affected batch
Dilution test	Each new sample matrix, at least once per analytical batch (only applicable for analytes with concentrations ≥50X MDL)	Fivefold (1+4) dilution must agree within ±10% of the original determination	Perform post digestion spike addition
Post digestion spike addition	When dilution test fails or if an analyte's concentration for all samples in a batch is less than 50X MDL	Recovery within 75-125% of expected results	Check for instrumental problem then reanalyze post digestion spike addition if appropriate
MS	One MS per every 20 project samples per matrix	QC 75-125% of expected results	none
MDL study	Once per 12 month period	Detection limits established shall be ≤ the RLs	none

a. All corrective actions associated with Beazer project work shall be documented, and all records shall be maintained by the laboratory.

Table 7-3: Analytical Quality Control requirements for Mercury Analyses by EPA Methods 7470A/7471a

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]
Initial multipoint calibration (minimum 5 standards and a blank)	Daily initial calibration prior to sample analysis	Correlation coefficient ≥0.995 for linear regression	Correct problem then repeat initial calibration
Second-source calibration check standard	Once per initial daily multipoint calibration	Analyte within ±10% of expected value	Correct problem then repeat initial calibration
Calibration blank	Once per initial daily multipoint calibration	No analyte detected ≥ RL	Correct problem then reanalyze calibration blank and all samples associated with blank
Calibration verification	After every 10 samples and at the end of the analysis sequence	The analyte within ±20% of expected value	Correct problem then repeat calibration and reanalyze all samples since last successful calibration
Method blank	One per analytical batch	No analytes detected ≥ RL	No corrective action taken if MB > RL if samples are ND or if sample conc. > 10x the MB contaminant level. If any samples have analytes detected at ≤ 10x the blank, correct problem then reprep and analyze method blank and all affected samples processed with the contaminated blank
LCS for the analyte	One LCS per analytical batch	QC acceptance criteria 80-120% of expected results	Correct problem then reanalyze If still out, reprep and reanalyze the LCS and all samples in the affected AFCEE batch
Dilution Test	Each matrix in a analytical batch (only applicable for samples with concentrations ≥25X MDL)	Fivefold (1+4) dilution must agree within ±10% of the original determination	None
MS/MSD	One MS per every 20 project samples per matrix	QC acceptance criteria, 75-125% of expected results	None
MDL study	Once per 12 month period	Detection limits established shall be ≤ the RLs	None

. All corrective actions associated with Beazer project work shall be documented, and all records shall be maintained by the laboratory.

Table 7-4: Analytical Quality Control Requirements for Analyses for Volatile Organics by EPA Method 8260B

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]
Five-point initial calibration for all analytes	Initial calibration prior to sample analysis	SPCCs average RF ≥ 0.30[b] and %RSD for RFs for CCCs ≤ 30% and one option below *option 1 linear-* mean RSD for all analytes ≤15% with no individual analyte RSD >30% *option 2 linear* – linear least squares regression r ≥ 0.995 for each analyte *option 3 non-linear* – COD ≥ 0.990 (6 points shall be used for second order, 7 points shall be used for third order)	Correct problem then repeat initial calibration
Second-source calibration verification	Once per five-point initial calibration	All analytes within ±25% of expected value	Correct problem then repeat initial calibration
Retention time window calculated for each analyte	Each sample	Relative retention time (RRT) of the analyte within ± 0.06 RRT units of the RRT	Correct problem then reanalyze all samples analyzed since the last retention time check
Continuing Calibration verification	Daily, before sample analysis and after every 12 hours of analysis time	SPCCs average RF ≥ 0.30[c]; and CCCs ≤ 20% difference (when using RFs)or drift (when using least squares regression or non-linear calibration) Calibration analytes within ±20% of expected value (2 allowed to be within ±40%)	Correct problem then repeat initial calibration
Internal Standards (ISs)	Each sample	Retention time ±30 seconds from retention time of the IS in the ICAL mid-point std. EICP area within -50% to +100% of area from IS in ICAL mid-point std.	Inspect mass spectrometer and GC for malfunctions; if system was malfunctioning, mandatory reanalysis of associated samples
Method blank	One per analytical batch	No analytes detected ≥ RL	No corrective action taken if MB > RL if samples are ND or if sample conc. > 10x the MB contaminant level. If any samples have analytes detected at ≤ 10x the blank, correct problem then reprep and analyze method blank and all affected samples processed with the contaminated blank. Common lab contaminants (i.e., Acetone, Methylene Chloride) are evaluated on a case by case basis. Generally 2x the RL contamination is considered acceptable.
LCS for all analytes	One LCS per analytical batch	QC acceptance criteria, Table 3-6	Correct problem then reanalyze. If still out, reprep and reanalyze the LCS and all associated samples.
MS/MSD	One MS/MSD per every 20 samples per matrix	QC acceptance criteria, Table 3-6	None
Check of mass spectral ion intensities using BFB	Prior to initial calibration and calibration verification	Refer to criteria listed in the method description (section 7.2.9)	Retune instrument and verify
Surrogate spike	Every sample, spiked sample, standard, blank	QC acceptance criteria, Table 3-6	Reanalyze sample if sufficient volume remains.
MDL study	Once per 12 month period	Detection limits established shall be ≤ the RLs	None

a. All corrective actions associated with Beazer project work shall be documented, and all records shall be maintained by the laboratory.
b. Except > 0.10 for bromoform, and > 0.10 for chloromethane and 1,1-dichloroethane

Table 7-5: Analytical Quality Control Requirements for the Analyses of Semivolatile Organics by EPA Method 8270C

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]
Five-point initial calibration for all analytes	Initial calibration prior to sample analysis	SPCCs average RF ≥ 0.050 and %RSD for RFs for CCCs ≤ 30% and one option below *option 1 linear*- mean RSD for all analytes ≤15% with no individual analyte RSD >30% *option 2 linear* – linear least squares regression r ≥ 0.995 for each analyte *option 3 non-linear* – COD ≥ 0.990 (6 points shall be used for second order, 7 points shall be used for third order)	Correct problem then repeat initial calibration
Second-source calibration verification	Once per five-point initial calibration	All analytes within ±25% of expected value	Correct problem then repeat initial calibration
Retention time window calculated for each analyte	Each sample	Relative retention time (RRT) of the analyte within ± 0.06 RRT units of the RRT	Correct problem then reanalyze all samples analyzed since the last retention time check
Continuing Calibration verification	Daily, before sample analysis and every 12 hours of analysis time	SPCCs average RF ≥ 0.050; and CCCs ≤ 20% difference (when using RFs)or drift (when using least squares regression or non-linear calibration); analytes within ±20% of expected value (2 allowed to be within ±40%)	Correct problem then repeat initial calibration
Internal Standards (ISs)	Each sample	Retention time ±30 seconds from retention time of the IS in the ICAL mid-point std. EICP area within -50% to +100% of area of IS in ICAL mid-point std.	Inspect mass spectrometer and GC for malfunctions; if system was malfunctioning, mandatory reanalysis of associated samples
Method blank	One per analytical batch	No analytes detected ≥ RL	No corrective action if MB > RL if samples are ND or if sample conc. > 10x the MB contaminant level. If any samples have analytes detected at ≤ 10x the blank, reprep and analyze method blank and all affected samples. Common lab contaminants (i.e., phthalates) are evaluated on a case by case basis. Generally 2x the RL contamination is considered acceptable.
LCS for all analytes	One LCS per analytical batch	QC acceptance criteria, Table 3-5	Correct problem then reanalyze If still out, reprep and reanalyze the LCS and all samples in the affected batch
MS/MSD	One MS/MSD per every 20 project samples per matrix	QC acceptance criteria, Table 3-5	None
Check of mass spectral ion intensities using DFTPP	Prior to initial calibration and calibration verification	Refer to criteria listed in the method description (section 7.2.10)	Retune instrument and verify
Surrogate spike	Every sample, spiked sample, standard, and method blank	QC acceptance criteria, Table 3-5	Reanalyze; if sill outn reextract and reanalyze sample if sufficient volume remains
MDL study	Once per 12 month period	Detection limits established shall be ≤ the RLs	None

a. All corrective actions associated with Beazer project work shall be documented, and all records shall be maintained by the laboratory.

Table 7-6: Analytical Quality Control Requirements for Analyses for PCDD/F by Method 1613B

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]
Five-point initial calibration for all analytes	Initial calibration prior to sample analysis	SPCCs average RF ≥ 0.050 and %RSD for RFs for CCCs ≤ 30% and one option below *option 1 linear*- mean RSD for all analytes ≤15% with no individual analyte RSD >30%	Correct problem then repeat initial calibration
		option 2 linear – linear least squares regression r ≥ 0.995 for each analyte	
		option 3 non-linear – COD ≥ 0.990 (6 points shall be used for second order, 7 points shall be used for third order)	
Continuing Calibration verification	Every 12 hours of analysis time	SPCCs average RF ≥ 0.050; and CCCs ≤ 20% difference (when using RFs)or drift (when using least squares regression or non-linear calibration); analytes within ±20% of expected value (2 allowed to be within ±40%)	Correct problem then repeat initial calibration
Internal Standards (ISs)	Each sample	Retention time ±30 seconds from retention time of the IS in the ICAL mid-point std. EICP area within -50% to +100% of area of IS in ICAL mid-point std.	Inspect mass spectrometer and GC for malfunctions; if system was malfunctioning, mandatory reanalysis of associated samples
Method blank	One per analytical batch	No analytes detected ≥ RL	No corrective action if MB > RL if samples are ND or if sample conc. > 10x the MB contaminant level. If any samples have analytes detected at ≤ 10x the blank, reprep and analyze method blank and all affected samples. Common lab contaminants (i.e., phthalates) are evaluated on a case by case basis. Generally 2x the RL contamination is considered acceptable.
LCS for all analytes	One LCS per analytical batch	QC acceptance criteria	Correct problem then reanalyze If still out, reprep and reanalyze the LCS and all samples in the affected batch
MS/MSD	One MS/MSD per every 20 project samples per matrix	QC acceptance criteria	None

a. All corrective actions associated with Beazer project work shall be documented, and all records shall be maintained by the laboratory.

Table 7-7: Analytical Quality Control Requirements for the Analyses of TOC by EPA Lloyd Kahn Method

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action[a]
Five-point initial calibration.	Initial calibration prior to sample analysis	linear - mean RSD for all analytes ≤20% linear – least squares regression r ≥ 0.995 for each analyte	Correct problem then repeat initial calibration
Continuing Calibration verification	After every 10 samples and at the end of the analysis sequence	All analytes within ±10% of expected value	Correct problem then repeat calibration and reanalyze all samples since last successful calibration
Column blank	After CCV sample	No analytes detected ≥ RL	Correct problem then reanalyze
Method blank	One per analytical batch	No analytes detected ≥ RL	Correct problem reprep and analyze method blank and all samples processed with the contaminated blank
LCS for the analyte	One LCS per analytical batch	QC acceptance criteria	Correct problem then reanalyze If still out, reprep and reanalyze the LCS and all samples in the affected batch
MS/MSD	One MS/MSD per every 20 project samples per matrix	QC acceptance criteria	none

a. All corrective actions associated with Beazer project work shall be documented, and all records shall be maintained by the laboratory.

8.0 QUALITY CONTROL PROCEDURES

In order to attain data of sufficient quality to support project DQOs, specific procedures are required to allow evaluation of data quality. These procedures and requirements for their evaluation are described in this section.

8.1.1 Field Quality Control

Field quality control samples used to evaluate data quality are described below. The frequency of their collection is summarized in Table 8-1.

Duplicates: Duplicate samples are collected to monitor the precision of the field sampling and analytical process as well as to provide information regarding the homogeneity of the sample matrix. One duplicate sample will be collected for every 10 samples per matrix.

Equipment Blanks: The equipment blank is a sample of reagent grade, analyte free, water poured into, over, or pumped through the sampling equipment, collected in a sample container, and transported to the laboratory for analysis in the same manner as environmental samples. These blanks are used to assess the effectiveness of equipment decontamination procedures and the potential for false positives for target analytes. Equipment blanks are prepared in accordance with ASTM D 5088-90 (Practice for Decontamination of Field Equipment Used at Non-Radioactive Waste Sites) protocol and are used to monitor the effectiveness of the decontamination process. The frequency of collection of equipment rinsate blanks depends on the type of sampling and the equipment used. The equipment rinsate blank shall be analyzed for the same parameters as requested for the environmental samples collected at the sampling location.

Table 8-1: Summary of Field QC Samples

Field QC Sample	Frequency	Comments
Field Duplicate	1 duplicate per 10 field samples of each matrix	2 sample matrices: soil and sediment
Equipment Blank	1 equipment blank per sampling method	Sample types: Subsurface soil sample with Geoprobe® and disposable acetate liners Soil sample with stainless steel hand auger or similar device. Sediment sample stainless steel hand auger or similar device
Matrix Spike/Matrix Spike Duplicates (MS/MSD)	1 MS/MSD per 20 field samples of each matrix	2 sample matrices: soil and sediment
Trip Blank	1 trip blank per cooler with VOC samples	Dependent on cooler/sample size and sampling schedule.

Trip Blank: The trip blank for water samples consists of a sample vial filled in the laboratory with reagent grade, analyte free water, transported to the sampling site in a sample cooler, handled like an environmental sample, and returned to the laboratory for analysis. The trip blank is used to detect any cross-contamination of volatile COCs during the shipment, handling and storage of environmental samples. A trip blank will be shipped in every cooler containing water samples submitted for chloroform analysis.

8.1.2 Laboratory Quality Control

The contracted laboratory shall have written procedures addressing internal QA/QC detailed in the Laboratory Quality Assurance Manuals. The Laboratory QA/QC Manager is required to ensure that all personnel engaged in sampling and analysis tasks have appropriate training.

Specific laboratory quality control measures are required to determine the precision and accuracy of the analyses and to demonstrate the absence of interferences or contamination by glassware or reagents. Laboratory quality control measures will, at a minimum, be consistent with specific method requirements. Requirements for the frequency of laboratory quality control samples, criteria and corrective action requirements are summarized in Tables 7-2 through 7-7.

Method Blank: The method blank is a sample of analyte-free matrix to which all reagents are added in the same volumes or proportions as are used in sample processing. The method blank monitors the presence or absence of contaminants originating from the laboratory and is required for each analysis and/or extraction batch. Method blanks for waters will be prepared from deionized laboratory water and for soils and sediments from clean sand.

Laboratory Control Samples (LCS): The LCS is a sample of analyte-free water spiked with known concentrations of all analytes listed in the QC acceptance criteria tables for each method. Each analyte in the LCS is to be spiked at a level less than or equal to the midpoint of the analyte calibration curve.

For the organic methods, if a matrix spike/matrix spike duplicate is not included in the batch, the LCS is prepared in duplicate (LCSD) and serves as an indicator of both accuracy and precision of the analytical process. The LCS will be carried through the complete sample preparation and analysis procedure along with the project samples in order to evaluate each analytical batch and to determine if the method is in control. The LCS cannot be used as the continuing calibration verification. Accuracy for the LCS must be within method or laboratory control limits for analyses of samples to proceed.

Matrix Spike/Matrix Spike Duplicate (MS/MSD): The MS is an aliquot of an environmental sample spiked with known concentrations of target analytes. The spiking occurs prior to sample preparation and analysis. Each analyte in the MS shall be spiked at a level less than or equal to the midpoint of the analyte calibration curve. MS/MSD sets are prepared for organic analyses to provide measure of analytical precision as well as accuracy. Precision is evaluated for metals analysis by laboratory duplicates, so the MSD is not required. Although the results of the project MS/MSDs are not used to control the analytical process, they are used to evaluate sample bias due to matrix.

Holding Blank/Storage Blank: A holding blank is reagent water that is stored with samples in an analytical batch. It is analyzed after all samples in the batch and is used to monitor for cross contamination of volatiles during storage. Holding blanks will be analyzed for volatile organics only.

Surrogates: Surrogates are organic compounds that are similar to the target analytes in chemical composition and behavior, but that are not normally found in environmental samples. Surrogates shall be added to environmental samples, controls, and blanks, in accordance with the method requirements in order to evaluate accuracy, method performance, and extraction efficiency. The surrogate recovery criteria are based on laboratory performance.

Internal Standards: Internal standards are measured amounts of certain compounds added after sample preparation or extraction. They are used in an internal standard calibration method to correct sample results for analysis efficiency. Internal standards shall be added to environmental samples, blanks, standards and QC samples, in accordance with method requirements.

9.0 DATA REDUCTION, VALIDATION AND REPORTING

9.1 Data Review, Validation and Verification

During the validation process, analytical data will be evaluated for method quality control and laboratory quality control compliance, and its validity and applicability for program purposes will be determined. Based on the findings of the validation process, data validation qualifiers (Table 9-1), may be assigned. The validated project data, including qualifiers and reason codes, will be entered into the database, thus enabling this information to be retained or retrieved, as needed.

Table 9-1 Data Validation Qualifiers

Qualifier	Definition
U	The analyte was analyzed for but not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a “tentative identification”.
NJ	The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents its approximate concentration.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent that actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
EMPC	Estimated possible concentration (PCCD/PCDFs only)

9.2 Validation and Verification Methods

Field and laboratory data review procedures are described in the following paragraphs.

9.2.1 Field Analysis/Measurements

As discussed in Section 4.1, field data shall be checked in the field prior to submittal of the samples to the laboratory. This review is designed to identify field documentation errors prior to sample submittal. Field measurement data will also be verified using procedures that include routine checks during the recording and processing of data, (e.g., looking for errors in identification codes, and looking for outliers that may be the result of transcription errors or field instrumentation breakdown). Obvious mistakes in identifiers or field data will be corrected when possible. Since outliers may indicate a greater degree of spatial or temporal variability than

expected rather than an error, results will be reviewed carefully before a decision to include or exclude a suspect field measurement is made.

9.2.2 Laboratory Data

Prior to submitting analytical data to the Sampling Contractor, the laboratory must verify compliance with the method requirements and any specific requirements of this program. The laboratory will follow their QA Plan, SOPs, and this QAPP for all sample analyses. The laboratory will also be responsible for the oversight of the data quality for all analyses. Any sample integrity issues, discrepancies with the Chain of Custody, or concerns with the analysis will be addressed and resolved through the laboratory QA Officer and the Field Team Leader or QA/QC Coordinator.

All analytical data shall be reviewed by the laboratory and shall include a minimum of two levels of documented review. The first level of review, by the analyst, shall include QC review, method compliance, and documentation accuracy. The second level of review shall be performed by a supervisor, another analyst, or data review specialist. The function of this review is to provide an independent, complete peer review of the analytical data. A third level of review is performed by the laboratory on a percentage of data to ensure system compliance and may or may not include data from the Beazer Sampling Program. For each level, the review process shall be documented, signed, and dated by the reviewer. Each step of this review process shall include the evaluation of data quality based on both the results of the QC data and the professional judgment of those conducting the review.

The laboratory will supply a data deliverable that supports sufficient traceability and QC for legally defensible data. This data package will include all relevant QC sample data, calibration data, method QC data, laboratory case narratives, custody information, standards traceability data, and any information pertaining to the sample analysis including raw instrument data, unless equivalent information is not available in summary form. Inconsistencies or errors contained in the data package will be noted by the Sampling Contractor QA Coordinator and discussed with the Laboratory Project Manager. The Laboratory Project Manager is responsible for resolving any inconsistencies or errors in a timely manner.

The Sampling Contractor will validate program results in accordance with the approach of the U.S. *EPA Guidance in Environmental Data Verification and Data Validation* (EPA QA/G-8, 2004). Analytical data will be validated following guidance from *U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (*EPA 2002) and *Contract Laboratory Program, National Functional guidelines for Inorganic Data Review* (EPA 1998) and U.S. EPA Region 10, *SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data*, (1996). Project-specific guidelines are adapted from these documents to reflect SW-846 method-specific requirements and the objectives of this QAPP. Professional judgment will be exercised throughout the validation effort, particularly for situations that are not addressed or clearly specified in the SOPs or in the guidance documents.

All analytical data will be validated against project objectives for data quality. Data will be verified for completeness against the chain-of-custody forms to ensure that the analyses

requested were performed and reported. Results for all samples and all QA requirements and measurements will be checked and data will be qualified for any deviations from control limits or objectives. This level of review will rely primarily on the COC records and summary report forms provided by the laboratory. A subset of the samples, representing at a minimum 10% of the samples from each matrix and each sampling effort, will be selected for definitive validation that includes review of all sampling, custody, preparation and analysis records including raw instrument data. Sample integrity, analyte identifications and quantitations and all subsequent calculations will be verified. Should this review indicate the potential for errors or non-compliance that may affect other program samples, additional samples will receive definitive validation.

9.3 Reconciliation with Data Quality Objectives

Once the validation process has been completed, the overall data set will be evaluated with respect to the program's data quality objectives and its usability determined. This will be a multi-step-step process, including:

- Review of the sampling program as implemented;
- Determination of the completeness of the data set;
- Evaluation of any potential bias in the data set as indicated by the overall precision and accuracy achieved;
- Determination of the potential impact of qualified, rejected or missing data as identified in validation reports on the overall project objectives; and
- Evaluation of potential outliers.

Data usability may be determined on a sample-specific basis or on a sample set basis.

The decision whether validated data are sufficient (that any gaps and uncertainties identified in the validation process are within the bounds of the program needs) is the responsibility of the Sampling Contractor Project Manager. These decisions should be made only after careful review of the data validation report and recommendations on usability provided.

9.4 Data Reporting

9.4.1 Field Data Reporting

Field data reporting will consist of data tables containing tabulated results of all measurements made in the field.

9.4.2 Laboratory Data Reporting

Laboratory data will be provided to the Sampling Contractor in an electronic format suitable for uploading into the existing database. Laboratory data will undergo a 10 percent check against the laboratory hard copy data. Data will be validated or reviewed manually, and qualifiers, if assigned, will be entered manually. The accuracy of all manually entered data will be verified by a second party.

Data reports submitted to the Sampling Contractor will include at a minimum the following deliverables:

- A case narrative, discussing analytical problems, if any, and referencing or describing the preparation and analytical procedures and instrumentation used. In addition, the samples associated with the deliverable should be listed;
- Chain of Custody forms;
- Cross reference of laboratory IDs to Field IDs
- Sample log-in/receipt records;
- Sample preparation records;
- Tabulated results, including final dilution volume of sample extracts, percent solids for solid samples, concentrations of compounds of interest, sample specific method detection limits and reporting limits;
- All data qualification codes assigned by the laboratory, their description, and explanations for all departures from the analytical protocols;
- Initial and continuing calibration summaries, data and associated calculations
- Method blanks associated with each sample, quantifying all compounds of interest identified in these blanks;
- Recovery assessments and replicate sample summaries, including surrogate and matrix spike recoveries and precision for sample duplicate analyses;
- Internal standard area and retention time summaries;
- GC Retention time summaries
- Laboratory control samples associated with each sample, quantifying all compounds of interest;
- Copies of instrument run logs;
- Labeled chromatograms and integration tables for all samples, standards, blanks and QC analyses; and
- Copies of instrument tunes.

10.0 PERFORMANCE AND SYSTEM AUDITS

System audits and performance audits of field and laboratory activities may be performed to ensure compliance with the sampling and analytical directives. These audits will verify that sampling and analysis activities are performed in accordance with the established procedures. The QA Coordinator will be responsible for these audits.

10.1 Field Audits

10.1.1 Internal Field Audits

At the beginning of the project, the sampling contractor Field Team Leader or Project Manager will conduct a thorough audit of field calibration, sampling, decontamination and documentation procedures to ensure that all staff are compliant with the requirements of the Work Plan, SOPs, and this QAPP.

Field audits shall be performed by sampling contractor field staff on a daily basis by a cross-checking the field logs, the Sample Collection Logs, the chain-of-custody, and the sample containers. Daily cross checking confirms sample identity, sample integrity, and sampling procedures and will be completed by the sampler prior to shipping the samples. Additionally, the field logs and the chain-of-custody will be sent to the sampling contractor QA/QC Manager or Project Manager by facsimile for additional verification.

10.1.2 External Field Audits

External field audits may be conducted by the U.S. EPA Program Manager or his/her designee at any time. These audits may or may not be announced.

10.2 Laboratory Audits

10.2.1 Internal Field Audits

Internal laboratory performance and system audits are conducted regularly by the Laboratory Quality Assurance Manager as specified in the Laboratory Corporate QA Manual. The system audit involves a thorough review of all laboratory methods performed and documentation to confirm that work is performed according to project specifications. Performance audits are conducted Each laboratory analyst is given a performance evaluation sample containing analytes for the parameters which he/she usually performs. These audit samples are used to identify problems in sample preparation or analysis techniques or methodologies which could lead to future analytical problems. Additionally, the laboratory performance audits include verification of each analyst's record keeping, proper use and understanding of procedures, and performance documentation. Corrective action will be taken for any deficiencies noted during the audit.

10.2.2 External Laboratory Audits

An external laboratory audit is not planned for this project since laboratory selection will include consideration of recent regulatory agency audits that have been conducted to establish that the laboratory is able to meet the requirements of this QAPP. If during the program, conditions are noted that indicate potential quality issues with analytical results, an audit may be conducted at the discretion of the Program Manager. This audit shall consist of a general audit and a specific procedure audit. A general audit will be an overview of the whole laboratory from sample receipt to sample disposal. A specific technical audit will be a detailed in depth review of an actual method or procedure.

The findings from any audit conducted will be documented on a laboratory audit record form. Any issues, observations, and findings shall be discussed with the Laboratory Manager. The results of the audit shall be kept on file along with any corrective action taken. If, as a result of the audit, there is uncertainty as to the validity or correctness of a test result, immediate corrective action should be taken and the client notified in writing.

11.0 PREVENTATIVE MAINTENANCE

11.1 Field Instrument Preventative Maintenance

In accordance with the QA program, the Sampling Contractor shall maintain an inventory of field instruments and equipment. The frequency and types of maintenance will be based on the manufacturer's recommendations and/or previous experience with the equipment.

The Sampling Contractor Field Team Leader will be responsible for the preparation, documentation, and implementation of the preventative maintenance program. All maintenance records will be checked according to the schedule on an annual basis and recorded by the responsible individual. The Sampling Contractor Project Manager, or designee, shall be responsible for verifying compliance.

11.2 Laboratory Preventative Maintenance

In accordance with the QA program, the laboratories shall maintain an inventory of instruments and equipment and the frequency of maintenance will be based on the manufacturer's recommendations and/or previous experience with the equipment.

The laboratory preventative maintenance program, as detailed in their QA Plan, is organized to maintain proper instrument and equipment performance, and to prevent instruments and equipment from failing during use. The program considers instrumentation, equipment and parts that are subject to wear, deterioration or other changes in operational characteristics, the availability of spare parts, and the frequency at which maintenance is required. Any equipment that has been overloaded, mishandled, gives suspect results, or has been determined to be defective will be taken out of service, tagged with the discrepancy noted, and stored in a designated area until the equipment has been repaired. After repair, the equipment will be tested to ensure that it is in proper operational condition. The client will be promptly notified in writing if defective equipment casts doubt on the validity of analytical data.

Laboratory Group Supervisors will be responsible for the preparation, documentation, and implementation of the preventative maintenance program. All maintenance records will be checked according to the schedule on an annual basis and recorded by the responsible individual. The Laboratory QA Officer, or designee, shall be responsible for verifying compliance.

12.0 CORRECTIVE ACTION

Any Beazer or Sampling Contractor team member may initiate the field corrective action process. This process consists of identifying a problem, acting to eliminate the problem, documenting the corrective action, monitoring the effectiveness of the corrective action, and verifying that the problem has been eliminated. Although not all inclusive, examples of corrective actions for field measurements may include the following:

- Repetition of a measurement to check the error;
- Check for all proper adjustments for ambient conditions such as temperature;
- Check of batteries;
- Calibration checks;
- Recalibration;
- Replace instruments or measurement devices;
- Stop work (if necessary);
- Revisions to information submitted on chain-of-custody forms; and
- Amendment of sampling procedures or Work Plans.

Technical staff and project personnel will be responsible for reporting all technical or QA non-conformances or suspected deficiencies of any activity or issued document by reporting the situation to the Project Manager and the QA/QC Coordinator on a Nonconformance Report. The QA/QC Coordinator will be responsible for assessing the suspected deficiency based on the potential for the situation to impact the quality of the data.

The Field Team Leader, or a designee, will be responsible for correcting equipment malfunctions throughout the field sampling effort and resolving situations in the field that may result in nonconformance or noncompliance with the QAPP. All corrective measures will be immediately documented in the field logbook.

Additional corrective actions, if necessary, will be determined by the Project Manager. The Project Manager has the authority to initiate stop work orders, if necessary, and is responsible for ensuring that a corrective action for a nonconformance is initiated. If appropriate, the Project Manager will be responsible for ensuring that no additional work that is dependent on the nonconforming activity is performed until the corrective action(s) is completed.

Laboratory

All laboratories are required to comply with the standard operating procedures previously submitted to the Project QA/QC Manager. The laboratory project managers will be responsible for ensuring that appropriate corrective actions are initiated as required for conformance with this QAPP. All laboratory personnel will be responsible for reporting problems that may compromise the quality of the data.

The Project QA/QC Manager will be notified immediately if any QC sample exceeds the project-specified control limits. The analyst will identify and correct the anomaly before continuing with the sample analysis. The Laboratory Project Manager will document the corrective action taken

in a memorandum submitted to the Project QA/QC Manager within five days of the initial notification. A narrative describing the anomaly, the steps taken to identify and correct it, and the treatment of the relevant sample batch (i.e., recalculation, reanalysis, re-extraction) will be submitted with the data package using a corrective action form. Copies of the laboratory's corrective action forms can be found in its QA Manuals.

13.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

This QAPP provides a mechanism for the assurance of quality work performed in conjunction with the Supplemental Soil and Sediment Sampling Plan at the Cabot Carbon/Koppers Superfund site. Quality assurance reports to management include verbal status reports and written reports on field sampling activities, laboratory processes, data validation reports and final project reports. These reports shall be the responsibility of the QA/QC Manager. Audit reports (as described in Section 10) will be provided to management by the Laboratory Director as a means of tracking program performance.

A Field QA report will be prepared by the Field Team Leader following the sampling event. The Project QA/QC Manager will prepare progress reports after the samples have been submitted for analysis, when information is received from the laboratory, and when analysis is complete. The status of the samples and analysis will be indicated with emphasis on any deviations from the QAPP. A data report will be written after validated data are available for each sampling event. These reports will be delivered electronically to the Sampling Contractor and Beazer Project Managers.

14.0 REFERENCES

TRC, January 2002. Workplan for Additional Characterization of the Hawthorn Group Formation

U. S. EPA, 1996. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846), 3rd Edition, Updates I-IIIB December 1996

U.S. EPA Region 10, SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data, (1996).

U. S. EPA, 1998. Contract Laboratory Program National Functional Guidelines for Organic Data Review. EPA 540-R-99/008. October 1999

U. S. EPA, August 2000. Guidance for the Data Quality Objectives (DQO) Process (EPA QA/G-4).

U. S. EPA, March 2001. Requirements for Quality Assurance Project Plans (EPA QA/R-5).

U. S. EPA, 2002. Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. EPA 540-R-01-008. July 2002

U.S. EPA, 2004. Guidance in Environmental Data Verification and Data Validation. EPA QA/G-8.