HEALTH AND SAFETY PLAN

TO SUPPORT THE FOLLOWING TASKS/INVESTIGATIONS:

- **2006 SUPPLEMENTAL SITE INVESTIGATION AND SLAG REMOVAL WORK PLAN**
- **2006/2007 SUPPLEMENTAL SLAG REMOVAL ACTION ACTIVITIES**
- **JANUARY 2008 TANK CLOSURE ACTIVITIES**
- **SOIL VAPOR INVESTIGATION (Fall 2007 and Spring 2008)**
- **INSTALLATION OF AN ACTIVE SOIL DEPRESSURIZATION SYSTEM (Fall 2008)**
- **GROUNDWATER INVESTIGATION ACTIVITIES (2008-2009)**
- **Surface Water and Sediment Sampling from a Boat (2011)**
- **Phase I Soil Capping: Parcel D (June 2012)**
- **Phase II Area – Mashapaug Inner Cove, Phase III Area-Northeast Upland, and Parcel C Remediation and Capping**

FORMER GORHAM MANUFACTURING SITE
333 ADELAIDE AVENUE
PROVIDENCE, RHODE ISLAND

Prepared for:

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Prepared by:

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MAY 2006
Revised: January 29, 2007
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Revision #5: December 9, 2011
Revision #6: June 13, 2012
Revision #7: February 20, 2015

Projects: 3650050041, 3650110213.01, and 3652140032

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Attachments

LIST OF ACRONYMS AND ABBREVIATIONS

Amec Foster Wheeler	Amec Foster Wheeler Environment & Infrastructure, Inc.
Amec Foster Wheeler	Amec Foster Wheeler Environment & Infrastructure, Inc.
ASD	Active Soil Depressurization
CFR	Code of Federal Regulations
COCs	Contaminants of Concern
CPR	Cardiopulmonary Resuscitation
FOL	Field Operations Leader
GC	Gas Chromatographer
HASP	Health and Safety Plan
HSM	ES&H Manager
HSO	Health and Safety Officer
IDLH	Immediately Dangerous to Life or Health
JHA	Job Hazard Analysis
LEL	Lower Explosive Limit
LHSR	Local Health and Safety Representative
MACTEC	MACTEC Engineering and Consulting, Inc.
mg/m^3	Milligrams per Cubic Meter
MCE	Mixed Cellulose Ester
MSDS	Material Safety Data Sheet
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PAH	Polynuclear Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PCE	Tetrachloroethylene
PELs	Personal Exposure Limits
PFD	Personal Flotation Device
PID	Photoionization Detector
PM	Project Manager
PPE	Personal Protective Equipment
PPM	Parts per Million
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RHSM	Regional Health and Safety Manager
RIDEM	Rhode Island Department of Environmental Management
SSI	Supplemental Site Investigation

TCE	Trichloroethene
USEPA	U.S. Environmental Protection Agency
USTs	Underground Storage Tanks
VC	Vinyl Chloride
VOC	Volatile Organic Compounds
XRF	X-Ray Fluorescence

RECORD OF HEALTH AND SAFETY PLAN REVISION

Revision #	Date	Changes Made
1	January 2007	• Addition of Record of Health and Safety Plan Revision. • Addition of dioxins and furans to Table 4-1. • Revision of Task E description to include excavation of soil. • Revision of Task G description to include loading of material into trucks. • Addition of Task K *Excavation of Soil along Perimeter of Former Slag Pile Removal Area*. • Addition of a Site Safety Orientation training form. • Addition of Record of Site Safety Meeting form. • Addition of JHA for surface soil sampling using pick to get through the frozen soil.
2	January 2008	• Addition of Task N: Tank Closure Activities
3	September 2008	• Addition of Tasks O Soil Vapor Investigation, and Task P Installation of an Active Soil Depressurization System.
4	December 2008 & October 2009	• Addition of Task Q Groundwater Investigation Activities.
5	December 2011	• Addition of Task R Sampling Activities (Surface Water and Sediment) from a General Contractor's Barge
6	June 2012	• Addition of Task S – Observing contractor clearing and grubbing; excavation and trenching; haul road improvements; and installing/repairing monitoring wells. Note: All of the activities associated with Task S have been conducted at the site previously.
7	February 2015	• Addition of Task T – Observing contractor conducting Phase I – Inner Cove sediment remediation; Phase III Area and Parcel C capping. Activities include clearing and grubbing; construction access roads; dewater and excavating sediment; placement of sediment on land and capping land; installing monitoring wells. Amec Foster Wheeler activities also include sampling groundwater and surface water.

HASP Approval Signatures*

Revision #7 June 2015

		**
Project Manager Date	Local HSE Coordinator Date	DES&H Date *for Cindy Sundquist with permission*

General Supervisor (field) Date Site Safety and Health Officer Date Other Date

** = signatures for the original HASP issuance and previous revisions are maintained on file.*
*** = review not required; activities for current task have already been addressed in previous revisions. The current revision merely brings the activities into one JHA and reflects the changes from MACTEC to Amec Foster Wheeler, and from Amec Foster Wheeler to Amec Foster Wheeler.*

1.0 INTRODUCTION

This Health and Safety Plan (HASP) was prepared originally to govern Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler, formerly Amec Environment & Infrastructure, Inc..) field tasks planned for Spring 2006 at the Former Gorham Manufacturing Site (Site), 333 Adelaide Avenue, Providence, Rhode Island as described in the Supplemental Site Investigation (SSI) Work Plan (Amec Foster Wheeler, May 2006), and the Slag Removal Work Plan (Amec Foster Wheeler, May 2006). Based on results of the SSI and removal action completed in July 2006, the Rhode Island Department of Environmental Management (RIDEM) requested additional removal activities. This HASP has been updated to reflect these additional removal activities of the slag excavation area be conducted, which are described in the *Former Slag Pile Area Supplemental Removal Action Work Plan*, submitted by Amec Foster Wheeler to RIDEM on January 16, 2007. Any provision of this HASP that applies only to the original excavation activities that were conducted in July 2006 are identified with a (2006). Based on results of previous investigations, and discussions with RIDEM, additional characterization of the Site were/will be conducted as described in Section 1.1 of this HASP.

In subsequent years, this HASP has been updated to reflect characterization activities conducted at the Site in preparation for Site remediation, and to reflect the final remediation of the Site as described in Revisions #6 and #7. See the Record of Health and Safety Plan Revision on Page v of this HASP for details of each revision.

The Site is a 37-acre property that was used historically for the manufacture of silverware. All structures relating to the former facility have been demolished and the property has been partially redeveloped. Refer to Remedial Action Work Plan (AMEC, 2015) for a description and layout of the Site. Amec Foster Wheeler will conduct investigation and remediation activities on other areas of the Site and therefore will update/revise this HASP accordingly to cover those activities as described in Section 1.1 below.

This HASP has been prepared in conformance with the Amec Foster Wheeler (formerly AMEC E&I) Health and Safety Program and is intended to meet the requirements of 29 Code of Federal Regulations (CFR) 1910.120. As such, the HASP addresses those activities associated with field operations for this project. Compliance with this HASP is required for all Amec Foster Wheeler personnel engaged in field tasks.

1.1 SITE INVESTIGATION ACTIVITIES

1.1.1 January 2008 Tank Closure Activities

In December 2007, Amec Foster Wheeler conducted an assessment of the former Building N two underground storage tanks (UST's), which contain water, for closure purposes. Due to the structural concerns of nearby utility poles, the USTs must be closed in place. Amec Foster Wheeler will observe Clean Harbors conduct tank closure activities for the two tanks. Clean Harbors will remove and dispose of the water from the tanks, remove the fill, gauge, pump, and/or vent lines, and once empty, fill the USTs with a slurry concrete or flowable fill. Clean Harbors will also backfill over the tank and disturbed area. No entry into the tanks will be conducted. The excavation will be opened so that normal access to the tanks is permitted without the requirement of confined space entry procedures. A Job Hazard Analysis (JHA) for the observation of these activities is included in Attachment B.

1.1.2 Fall 2007 and Spring 2008 Soil Vapor and Indoor Air Investigation of the Existing Retail Complex and Groundwater Investigation

In August, September, and November 2007, Amec Foster Wheeler conducted soil vapor, indoor air, and groundwater investigations at the Site. In addition, a 'communication' test was conducted within the sub-slab soils of the former Stop & Shop retail space to evaluate the potential radius of influence of a single sub-slab soil vapor extraction point. Activities included collection of soil vapor samples within the retail complex, installation of temporary monitoring wells, and vacuum testing within the soil immediately beneath the concrete slab of the retail complex. Soil vapor sampling points and groundwater monitoring points were installed and samples collected using the direct push method.

The general contractor drilled through concrete (for indoor samples) and concrete and/or pavement to collect the samples outside of the retail complex buildings.

1.1.3 Fall 2008 Installation of a Active Soil Depressurization System at the Existing Retail Complex

Amec Foster Wheeler will observe Clean Harbors installing a separate Active Soil Depressurization (ASD) system for each retail space within the retail complex, which may include the installation of 2- or 3-inch diameter ASD extraction wells inside the buildings, above grade extraction well pipe inside the buildings hung from the existing building structure, and below slab extraction well piping. Clean Harbors will also provide and install complete ASD

blower systems within an enclosure, and the associated above grade ASD discharge pipe from each of the ASD systems to exhaust treated discharge above the building. They will also install a power (electric) supply and telephone to the blower systems.

Following system 'prove-out' Clean Harbors will also be operating the ASD systems for at least six (6) months. This HASP will be updated if Amec Foster Wheeler employees are required to operate any part of the ASD systems.

1.1.4 Groundwater Investigation Activities

Amec Foster Wheeler will observe a general contractor conducting vertical profiling of groundwater contamination and installing groundwater monitoring wells using standard direct-push methods at the Site. Vertical profile groundwater samples will be collected by the general contractor and analyzed on a field gas chromatographer (GC). Amec Foster Wheeler will develop and sample the monitoring wells using standard low flow techniques. Amec Foster Wheeler will also manually install and retrieve diffusion samplers along the shore line of the Inner Cover in accordance with the Site Groundwater Investigation Work Plans.

1.1.5 December 2011 Mashapaug Cove Supplemental Site Investigation

Amec Foster Wheeler and its general contractor (TG&B) will use a barge-mounted vibracore rig to collect surface water and sediment samples in the cove and pond as described in the Mashapaug Cove SSI work plan dated November 18, 2011. One Amec Foster Wheeler field person will be stationed on the barge with TG&B staff. Amec Foster Wheeler personnel will collect the surface water samples using a peristaltic pump and sample containers. TG&B personnel will operate the vibracore rig to obtain the sediment cores. Amec Foster Wheeler personnel will photograph, log, and then collect samples of the sediment core. These activities are planned for December 12 through December 21, 2011. This HASP has been updated to include this task.

The HASP has also been revised to reflect the new company name (Amec Foster Wheeler), and any changes to H&S procedures.

1.1.6 June 2012 Remedial Action Work Plan Phase I Soil Capping: Parcel C-1

As described in the Remedial Action Work Plan (RAWP) – Phase I Soil Capping: Parcel C-1 (Amec Foster Wheeler, 2012), work on the Phase I soil cap includes the portion of Parcel C-1

along Mashapaug Pond and Cove west and north of the Alvarez High School (Parcel B) and the proposed open space/fields (Parcel C). Work will proceed from west to east going away from the school. This HASP update does not include tasks for Phases II & III, which will be addressed under separate RAWPs. These activities are planned for July 2012 through November 2012. This HASP has been updated to include this task.

1.1.7 Spring/Summer 2015 Remedial Action Work Plan Phase II – Mashapaug Cove, Phase III – Northeast Upland, and Parcel C Remediation and Capping

As described in the Remedial Action Work Plan (RAWP) – Phase II – Mashapaug Inner Cove, Phase III – Northeast Upland, and Parcel C (Amec Foster Wheeler, 2015), the selected final remedy for these areas include capping Parcel C, removing approximately two feet of sediment from the Inner Cove (Phase II Area), and then placing and capping the dewatered sediment within a defined location of the Phase III Area Northeast Upland. The Inner Cove and the delineated wetlands located along the downgradient edge of the Phase I and Phase III Areas will then be restored as described in the RAWP. The placed sediment and the soils in the Phase III Area will be capped as detailed in the RAWP. These activities are planned for May 2015 through November 2015. This HASP has been updated to include this task.

2.0 ORGANIZATION AND RESPONSIBILITIES

2.1 PROJECT PERSONNEL

2.1.1 Project Manager

The project manager (PM) is the individual with overall project management responsibilities. Those responsibilities as they relate to health and safety include provision for the development of this site-specific HASP; the necessary resources to meet requirements of this HASP; the coordination of staff assignments to ensure that personnel assigned to the project meet medical and training requirements; and the means and materials necessary to resolve any health and safety issues that are identified or that developed on the project.

2.1.2 Field Operations Leader

The Site General Supervisor (also known as the Field Operations Leader [FOL]) is the PM's designee who is on-site directing the performance of the field scope of work. The FOL will direct daily operations and is vested with the authority to stop work and expel general contractor or other workers or visitors due to unsafe working conditions (e.g., weather hazards, safety hazards, health hazards, equipment hazards, etc.).

2.1.3 Site Health and Safety Officer

The Site Health and Safety Officer (HSO) will work in concert with the FOL to implement the HASP, maintain safe working conditions, conduct safety inspections and briefings, and investigate accidents and incidents. The HSO will have at least an indirect line of reporting to the Division ES&H Manager (HSM) for the duration of his/her assignment as project HSO. The HSO is responsible for developing and implementing this site-specific HASP in accordance with the Amec Foster Wheeler Health and Safety Program. The HSO will investigate all accidents, illnesses, and incidents occurring on-site. The HSO will also conduct safety briefings and site-specific training for on-site personnel. As necessary, the HSO will accompany all U.S. Environmental Protection Agency (USEPA), Occupational Safety and Health Administration (OSHA), or other governmental agency personnel visiting an Amec Foster Wheeler site in response to health and safety issues. The HSO, in consultation with the HSM, is responsible for updating and modifying this HASP as site or environmental conditions change.

2.1.4 Assignments

The following is a list of key personnel who will be involved in this project:

Name	Responsibilities
David Heislein	Project Manager
To be determined	Field Operations Leader/Health & Safety Officer*
To be determined	Field Operations Leader/Health & Safety Officer*
Mark Maggiore	Field Team Member
To be determined	Field Team Member
Cynthia Sundquist	Regional HSE Manager

* = the Field Operations Leader/ Site Health and Safety Officer is typically the Amec Foster Wheeler employee who has the most experience and who has been with the company the longest. The employee may fill both roles if needed.

2.2 TRAINING

Training is defined under the Amec Foster Wheeler Health and Safety Program, and all personnel entering potentially contaminated areas of this site must meet the requirements of 29 CFR 1910.120. Personnel without the required training **will not be permitted** in any area with potential for exposure to toxic substances or harmful physical agents (i.e., downrange).

At least one field team member must be certified in first aid and Cardiopulmonary Resuscitation (CPR).

Prior to commencement of site activities and daily thereafter, site-specific training will be provided by the HSO or FOL and will include an overview of HASP requirements. Daily safety meetings will cover anticipated tasks for the day and the potenital hazards and mitigation and/or controls of those hazards. A Daily Safety Meeting Checklist included as part of this HASP may be used to document this training.

In addition, all workers with a potential for exposure to lead at any level must receive the following training:

1. Lead exposures according to the requirements of the Hazard Communication Standard in Construction (29 CFR 1926.56), including warning signs and labels, Material Safety Data Sheets (MSDSs), and employee information and training.

All workers with a potential exposure to lead at or above the action limit of 0.03 milligrams per cubic

meter (mg/m^3) (involved in the excavation of the slag material) must receive the following training:

1. The contents of the standard (29 CFR 1926.62/1910.1025) and its appendices.
2. The specific nature of the operations that could result in exposure to lead above the action limits.
3. The purpose of the medical surveillance program in regards to monitoring for lead. Information must include the adverse health effects associated with excessive exposure to lead (especially reproductive effects).
4. The engineering controls (if any) and work practices (e.g., wetting soil to control dust) to be used at the site.
5. Instructions that chelating agents should not be used to remove lead from their bodies except under the direction of a licensed physician. (NOTE: Chelating agents remove metals from the body by binding to the metal; making is soluble so that it can be excreted in the urine. The problem with them is that they are indiscriminate and remove essential metals from the body as well. Chelation is a last resort to be used only when extremely high lead levels are found in the blood.)
6. Inform workers that copies of the standard and its appendices are available to them if interested.
7. The contents of any compliance plan.
8. The employees right of access to records under 29 CFR 1910.1020.

2.3 MEDICAL SURVEILLANCE

All personnel entering potentially contaminated areas of this site will be medically qualified for site assignment through a medical surveillance program outlined in the Amec Foster Wheeler Health and Safety Program. Personnel who have not received medical clearance **will not be permitted** in any area with potential for exposure to toxic substances or harmful physical agents (i.e., downrange).

In addition, those workers involved in the Excavation of the Slag Material will receive blood lead analysis (lead and zinc protoporphyrin levels) prior to the startup of this task (2006). All workers will be notified, in writing, of the results of the biological monitoring within 5 working days. (NOTE: Blood levels in excess of 30 mg/100 g of whole blood require removal from work involving lead exposures.)

Based on the results of the air monitoring and blood lead analysis, medical monitoring for lead levels of employees new to the site and conducting the tasks associated with the Phase I Soil Capping: Parcel C-1 is not required. Historic dust monitoring and metals air sampling data as described in the Slag Removal Action Summary Report (MACTEC, 2006) indicate that exposure to metals, including

lead, in airborne dust and to nuisance dust are not expected to cause an exposure issue. However, dust monitoring and dust mitigation measures as described in the RAWP for the Phase I Soil Capping: Parcel C-1 (Amec Foster Wheeler, 2012) will be implemented during these activities.

3.0 SCOPE OF WORK

This HASP was prepared and updated to govern Amec Foster Wheeler field tasks as described in the following:

- SSI Work Plan (Amec Foster Wheeler May, 2006);
- Slag Removal Work Plan (Amec Foster Wheeler May, 2006);
- Former Slag Pile Area Supplemental Removal Action Work Plan (October, 2006);
- Tank Closure Activities (January, 2008);
- Soil Vapor and Indoor Air Investigation (Fall 2007 and Spring 2008);
- Scope of Work ASD System (August, 2008); and
- Groundwater Investigation Activities Work Plans (December 2008 & October 2009).
- Mashapaug Cove SSI (December 2011)
- Phase I Soil Capping: Parcel C-1 (Amec Foster Wheeler, June 2012)
- Phase II – Mashapaug Inner Cove, Phase III – Northeast Upland, and Parcel C remediation and capping (Amec Foster Wheeler, 2015)

The major activities described in these plans consist of:

Slag Pile Removal Work Plan Tasks:

- Erosion Controls and Chain Link Fence
- Tree and Shrub Removal
- Temporary Access Road Grading and Loading Pad
- Reconstruction or Decommissioning of Monitoring Well GZA-5
- Excavation of Slag Material
- Metal Debris Removal
- Transport Off-site
- Site Restoration
- Field Screening via Soil Sampling

Supplemental Site Investigation Work Plan:

- Surface Soil Sampling
- Geophysical Survey of Mashapaug Cove
- Surface Water Sampling

- Sediment Sampling

Former Slag Pile Area Supplemental Removal Action Work Plan Tasks:

- Maintaining Erosion Controls and Chain Link Fence
- Maintaining the Temporary Access Road Grading and Creation of a Loading Pad
- Relocation of Existing Stone Backfill Pile
- Excavation of Soil and Residual Slag Material
- Loading Trucks with Soil Material for Transport Off-site
- Restoration of Chain Link Fence
- Field Screening via Soil Sampling (X-Ray Fluorescence [XRF])

Tank Closure Activities (Near former Building N):

For this field task, Amec Foster Wheeler will observe the Contractor (Clean Harbors):

- Excavating to uncover the tanks' access port for sampling and pumping of liquid from the tanks for disposal.
- Removing the tanks' fittings including vent pipe, fill pipe, etc.
- Filling the two tanks with slurry concrete.
- Backfilling the excavated areas.

Soil Vapor and Indoor Air Investigation (Existing Retail Complex and Residential Properties)

For this field task, Amec Foster Wheeler will conduct soil vapor, indoor air, and groundwater investigations at the Site. Activities included collection of soil vapor samples within the retail complex and residential areas, installation of temporary monitoring wells, and vacuum testing within the soil immediately beneath the concrete slab of the retail complex. Soil vapor sampling points and groundwater monitoring points will be installed and samples collected using the direct push method. The general contractor will drill through concrete (for indoor samples) and concrete and/or pavement to collect the samples outside of the retail complex buildings and residential properties.

Groundwater Investigation Activities

For these activities, Amec Foster Wheeler will conduct install, develop, and sample groundwater

monitoring wells, install diffusion samplers along the shore line of the Inner Cove, and oversee a general contractor perform vertical profiling of the groundwater contamination at the Site to develop and refine the conceptual Site model. Standard direct push methods and manual placement of the diffusion samplers will be used to accomplish the activities.

Active Soil Depressurization System:

For this field task, Amec Foster Wheeler will observe the Contractor (Clean Harbors):

- Installing a separate ASD system for each retail space within the retail complex, which may include the installation of 2- or 3-inch diameter ASD extraction wells inside the buildings, above grade extraction well pipe inside the buildings hung from the existing building structure, and below slab extraction well piping.
- Installing complete ASD blower systems within an enclosure, and the associated above grade ASD discharge pipe from each of the ASD systems to exhaust treated discharge above the building. This installation task will also require Clean Harbors to install a power (electric) supply and telephone to the blower systems.

Following the successful installation and testing, Clean Harbors will operate the ASD systems for at least six (6) months. In the event that Amec Foster Wheeler employees are required to operate any part of the ASD system, this HASP will be updated.

Amec Foster Wheeler will oversee general contractor(s) (2006) and contractors (2007) and provide health and safety oversight for the majority of the Slag Removal (2006) and Supplemental Removal Action (2007) work tasks. For the supplemental removal activities (2007), the contactor (Clean Harbors) is responsible for the excavation and must fulfill the Competent Person duties in accordance with OSHA requirements. For the Tank Closure Activities (2008), Amec Foster Wheeler personnel will observe the contactor (Clean Harbors) conducting the tank closure activities. Amec Foster Wheeler personnel will also observe Clean Harbors installing the ASD systems (2008).

For the SSI, Amec Foster Wheeler personnel will perform the surface soil sampling and will use a general contractor for work tasks performed on Mashapaug Pond. Amec Foster Wheeler personnel will remain on shore and will handle samples once they are brought to shore by the general contractor. The general contractor shall execute work under their own corporate health and safety program and shall be expected to comply with this Site HASP and Amec Foster Wheeler's safety and Health program. Amec Foster Wheeler will provide copies of Amec Foster Wheeler applicable boating safety programs including:

- Safe Boating Checklist
- Trailering Checklist
- Inland Special Circumstances
- Float Plan
- Aquatic Nuisance Plants

Sampling Activities from a General Contractor's Barge:

For the Mashapaug Cove SSI (December 2011), Amec Foster Wheeler personnel will perform the surface water and sediment sampling activities from the general contractor's barge. One Amec Foster Wheeler person will be stationed on the barge to collect the samples as described in the work plan, and one Amec Foster Wheeler person will be stationed on shore. The general contractor will execute the operation of the vibracore rig in compliance with their own corporate health and safety program and will be expected to comply with this Site HASP as applicable.

Phase I Soil Capping: Parcel C-1

For the Phase I Soil Capping: Parcel C-1 (Amec Foster Wheeler, 2012), Amec Foster Wheeler will be observing and documenting the general contractor performing the following activities unless otherwise noted:

- Limited clearing and grubbing.
- Excavating and removing soil and slag materials.
- Collecting confirmatory samples from the excavations (Amec Foster Wheeler collecting samples from excavator bucket).
- Replacing the exit chain-link fence to run along the Parcel C-1 boundary extending from the southwest corner near Adelaide Avenue along Parcel C and connecting to the existing fence at the top of slope behind the high school.
- Improving the conditions of the existing haul road.
- Grading of the site fill material and covering it with a fabric or liner and a soil cover.
- Restoring vegetation.
- Restoring, installing, and sampling groundwater monitoring wells (Amec Foster Wheeler collecting groundwater samples).

Phase II – Mashapaug Inner Cove Sediment Remediation and Capping, and the Phase III – Northeast Upland and Parcel C Soil Capping

For the Phase II, Phase III, and Parcel C remediation and capping (Amec Foster Wheeler, 2015),

Amec Foster Wheeler will be observing and documenting the general contractor performing the following activities unless otherwise noted:

- Limited tree clearing and grubbing.
- Construction of temporary access roads into the Inner Cove.
- Dewatering of the Inner Cove.
- Excavating and removing impacted sediment from the Inner Cove via an excavator.
- Transportation and placement of removed impacted Inner Cove sediment to the Phase III Northeast Upland Area impacted Inner Cove sediment.
- Spreading and grading construction debris pile.
- Replication of the perimeter wetlands and restoring vegetation.
- Grading of the site fill material and covering it with a fabric or liner and a soil cover.
- Installing groundwater monitoring wells to support a groundwater monitoring plan that will be developed in coordination with RIDEM following the completion of the remedial construction activities.

Amec Foster Wheeler personnel will conduct the following activities associated with the remediation activities:

- Sampling of groundwater discharged to the Cove from the dewatering process.
- Post-construction sampling of surface water.
- Sampling of groundwater from monitoring wells installed for the post-construction/remediation groundwater monitoring plan (Western Plume).

Amec Foster Wheeler's HASP is meant to describe the site hazards in general and provide site information to the general contractor. This HASP is not designed to cover the general contractor personnel or their general contractors performing their activities. The general contractor is responsible for conducting the activities above in accordance with their own corporate health and safety program and JHAs, but is expected to comply with this Site HASP as applicable under OSHA regulations. Prior to initiation of Site work, Amec Foster Wheeler shall provide a copy of the HASP to the general contractor.

4.0 HAZARD EVALUATION AND TASK ANALYSIS

Job hazards include health hazards such as exposure to chemical contaminants and safety hazards such as injuries from equipment or physical conditions.

4.1 HEALTH HAZARDS

Contaminants of Concern (COCs) that could be potential health hazards are listed in Table 4-1. The COCs listed have been detected in soil, sediment, and groundwater during previous investigations. The table includes the maximum concentrations detected historically across the entire Site in soils and in those samples from the portion of the Site where activities are planned (the Park Parcel). The maximum concentrations from sediment samples collected by RIDEM from Mashapaug Cove in 2005 are also shown. Established exposure limits, where applicable are shown in the table. Remedial measures have been implemented across some areas of the Site that would limit contact with COCs in surface soils. A soil cap has been constructed to isolate soils in the developed southeastern parcel. Portions of the Park Parcel, where soil sampling is planned during the SSI, will also be capped as part of planned remedial action.

The primary COCs at the facility are metals such as arsenic, copper, and lead, chlorinated solvents such as trichloroethene (TCE) and tetrachloroethylene (PCE) and their degradation byproducts, polynuclear aromatic hydrocarbons (PAHs) and petroleum fuel hydrocarbons. PCE, TCE and the degradation product vinyl chloride (VC) are treated as potential human carcinogens by the National Institute for Occupational Safety and Health (NIOSH). Health hazards to workers from COCs are principally related to the inhalation of dust with inorganic COCs such as lead and other metals, exposure to chlorinated solvents and PAHs via inhalation or dermal contact, and exposure to dioxin via inhalation.

Most activities that utilize heavy equipment have the potential to produce excessive noise. Exposure to noise over the OSHA action level (85 decibels) can cause temporary hearing impairment. Noise can also impair voice communication, increasing the risk of accidents.

Mashapaug Pond water is known to contain dioxins, furans and polychlorinated biphenyls (PCBs) that create a health hazard from ingestion. Some of the pond sediment and soil samples collected indicate that dioxins, furans, and PCBs are present in Site media. Although these contaminants can create a health hazard from ingestion, the health and safety procedures (e.g., washing hands,

work zones, etc.) outlined in this HASP will be implemented to reduce or eliminate exposure via this route. Airborne particles onto which contaminants have been adsorbed could be released from contaminated soil during activities that disturb the material. However, engineering controls (dust suppression) as described in this HASP will be implemented and followed during field activities to reduce or eliminate exposure via this route.

Various biological hazards may be present at the Site, depending on the season. Poison ivy is known to be present in and around the work area. Although the Site is in an urban setting, ticks should be assumed to be present and could result in exposure to Lyme disease. Flying insects such as mosquitoes, wasps, hornets, and bees may be encountered as well as spiders such as the brown recluse.

4.2 SAFETY HAZARDS

Potential safety hazards include work around operating construction equipment such as excavators and dump trucks.

Surface hazards from working or walking on uneven ground, such as slips, trips, and falls are present.

Heat stress and cold stress are not thought to be likely given the planned work schedule in May and June 2006 and the performance of work activities in Level D personal protective equipment (PPE). However, supplemental tasks (January/February 2007), tank closure activities (January 2008), and ASD installation activities (Fall 2008) are expected to be conducted during the colder months of the year, and therefore cold stress is likely be a safety hazard. Phase I Soil Capping: Parcel C-1 activities are planned during the summer months of 2012; therefore heat stress may be an issue during these activities. Also, if PPE levels are upgraded during the performance of Site tasks, there would be an increased potential for temperature-related stresses.

Some tasks include handling of sharp objects (e.g., the retrieval of waste metal, fence construction, and sediment sampling) and therefore there is the risk of contact with sharp surfaces. Activities conducted by the general contractor such as clearing and grubbing, removing the existing chain link fence and installing a new one, also have the direct potential to cause injury to general contractor personnel from sharp objects. Amec Foster Wheeler personnel will be observing these activities and are not expected to come in contact with sharp surfaces.

The sediment and surface water tasks and excavation near at the pond which include working on and near water have the potential for drowning and accidents related to boating safety. The general contractor must follow appropriate procedures to prevent hazards related to working on or near the water. A copy of Amec Foster Wheeler's water safety procedures are attached to this HASP for Amec Foster Wheeler's reference only. The pond is not generally used for recreational activities by the public due to its industrial setting, known impacts and published health advisories so the potential for interaction with the public while performing tasks on the pond is low.

The JHAs attached (Attachment B) provide extra detail and identify safe working procedures for various tasks described above.

4.3 CONCLUSIONS/HAZARD EVALUATION

A potential respiratory hazard associated with contaminants in soil exists for invasive activities, particularly those activities that will disturb soils using equipment that could generate dust (e.g., road grading, tree clearing/grubbing and excavation of the slag pile (2006, 2012, and 2015) and contaminated soil (2007, 2008, 2012, and 2015). This hazard should be mitigated by the use of engineering controls such as water to suppress visible dust and dust that exceeds 0.5 mg/m^3 in air. Dermal exposure should be suppressed by use of task-specific PPE. Inhalation of volatile organic compounds (VOCs), especially VC (present in sediment), is possible from impacted soil and sediment and should be monitored to prevent respiratory exposure.

During indoor drilling/coring activities (2007 and 2008), the buildup of carbon monoxide and other hazardous gases from using petroleum-powered equipment may result in a hazardous atmosphere; therefore, Amec Foster Wheeler will continuously monitor for oxygen, lower explosive limit (LEL) conditions, and carbon monoxide levels during those activities. In addition, monitoring will be conducted during all activities that have the potential to create a hazardous indoor atmosphere.

During the Phase II, Phase III and Parcel C remediation and capping, the potential for contact with methane gas exists in three locations on Parcel C. Amec Foster Wheeler does not anticipate methane exposure to be an issue since work will be conducted outdoors and not in a confined or enclosed space and methane. The contractor will be required to monitor the work area for lower explosive limit (LEL) using a combustible gas instrument that measures % LEL and % oxygen

and that is calibrated to methane. The %LEL action level is >10% LEL. At this action level, work will cease in the work area and the crew will back off and allow the gas to dissipate. The contractor will recheck the atmosphere while approaching the work area to confirm LEL levels have dropped. If LEL levels continue to exceed the action level, provisions for active ventilation and spark proof/intrinsically safe equipment may be necessary.

Low to moderate health hazards are associated with those activities in which dermal contact with contaminated environmental media can be made. These include sampling or excavation of soils and sediment with organic or inorganic constituents of concern.

A low to moderate degree of safety hazard is associated with expected general and specific site activities. Of particular concern are working on water, working near excavation equipment, working near onsite treatment facilities, collecting metal debris, walking on irregular surfaces and debris, and drilling indoors.

JHA has been performed for the tasks judged to have the highest degree of potential hazard.

4.4 PROTECTIVE MEASURES

4.4.1 Engineering Controls

Due to the nature of tasks to be conducted, engineering controls may be warranted for site activities to suppress dust from the breathing zone. In particular, water will be used to suppress dust during grading and excavation of the slag and contaminated soils. Slag material presents low hazard for dust generation in its present form as rock-size fragments but contains lead and other metals that could be released as dust if the slag is crushed. Levels of dust will be visually monitored and water will be used periodically as necessary to dampen the material and suppress potential dust. Road grading activities (2006 and 2012) that extend onto the Park Parcel may also require dust suppression. Supplemental removal activities (2007) are not expected to require road grading. Tank closure activities (January 2008) are not expected to require dust suppression.

4.4.2 Levels of Protection

All activities will be initiated at Level D, unless otherwise indicated in Table 4-3, with provisions to upgrade to Level C respiratory protection.

Table 4-1
Contaminants of Concern

Compound	Maximum in Soils (Site wide Historic Results)[1]	Maximum in Park Parcel Soil[2, 3]	Maximum in Pond Sediment [3]	Maximum in Groundwater[1]	Threshold Limit Values
Arsenic	124	67.8	244	NA	0.01 mg/m^3
Cadmium	14	14.5	7.11	NA	0.005 mg/m^3
Chromium	1,540	1,330	640	NA	0.005 mg/m^3 (TLV) Cr^{+6}
Copper	26,300	8,760	2,670	NA	1 mg/m^3
Dioxins[4] / Furans[5]	-	$3x10^{-5}$	$3x10^{-5}$	-	2 $ng/^{m3}$ (200 pg/m^3)[6]
Lead	22,600	5,580	1120	NA	0.05 mg/m^3
Nickel	5,380	390	853	NA	1 mg/m^3
Silver	472	385	227	NA	0.01 mg/m^3
Zinc	6,850	4,760	1,940	NA	10 mg/m^3 (total dust) 5 mg/m^3 (respirable dust)
Cyanide	4	0.5	ND	NA	5 mg/m^3
1,2-dichloroethylene	<.050	ND	175	0.94	200 ppm
1,1-dichloroethane	NA	ND	7.92	<0.125	100 ppm
ethylbenzene	NA	ND	ND	NA	100 ppm
tetrachloroethene (PCE)	7.6	1.1	27	50	25 ppm
1,1,1-trichloroethane (TCA)	0.041	ND	6.65	3	350 ppm
Trichloroethene	0.195	6.1	88	7.2	10 ppm
Toluene	<0.025	ND	1.92	NA	20 ppm
vinyl chloride (VC)	NA	ND	24.8	<0.025	1 ppm
xylenes	NA	ND	ND	NA	100 ppm
Benzo(a)pyrene	25.3	48.4	7.87	NA	0.2 mg/m^3 (coal tar pitch vol)
Benzo(a)anthracene	25.3	50	15.1	NA	0.2 mg/m^3 (coal tar pitch vol)
Dibenzo(a,h)anthracene	4.8	10.5	1.45	NA	0.2 mg/m^3 (coal tar pitch vol)

Compound	Maximum in Soils (Site wide Historic Results)[1]	Maximum in Park Parcel Soil[2, 3]	Maximum in Pond Sediment [3]	Maximum in Groundwater[1]	Threshold Limit Values
Benzo(b)fluoranthene	21.3	45	14.8	NA	0.2 mg/m^3 (coal tar pitch vol)
Indeno(1,2,3-cd)pyrene	11.7	27.9	2.47	NA	0.2 mg/m^3 (coal tar pitch vol)
Total Petroleum Hydrocarbons	NA	73,800	2600	NA	NA

[1] From Table 4.2, Amec Foster Wheeler Health and Safety Plan 2001

[2] Database Query, April 2004

[3] Supplemental Site Investigation Report, Fuss & O'Neill April 2006

[4] Dioxin is a collective term for more than 200 compounds from the group of polychlorodibenzo-p-dioxins (PCDDs) and polychlorodibenzofurans (PCDFs), which belong to the chlorinated hydrocarbons (CHCs). Synonyms for dioxin include TCDD, TCDBD, dioxin and 2, 3, 7, 8-TCDD (the most toxic version). The maximum concentration is for 2,3,7,8-TCDD.
[5] Furan is the parent compound for a broad class of structurally related compounds.
[6] 1988 proposed exposure limit for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)

NE = Not Established

Table 4-2
Personal Protective Equipment Lists

LEVEL OF PROTECTION	EQUIPMENT
C	Full-face, air-purifying respirator with MSA GMC-H (or equivalent) cartridge (changed daily)
C	Coveralls (TYVEK™, or polycoated disposable coveralls if wet conditions are encountered in subsurface materials)
C	Vinyl Gloves (inner)
C	Nitrile Gloves (outer)
C	Safety Boots (chemical-resistant, steel-toed) or regular safety boots with vinyl boot covers
C	Hardhat (for work near heavy equipment and where overhead hazards exist)
C	Earplugs (for work near heavy equipment and when noise levels exceed 85 dBA)
LEVEL OF PROTECTION	**EQUIPMENT**
D	Coveralls
D	Nitrile Gloves (for activities with direct contact with media; work gloves for activities with no handling of media (e.g., fence construction)
D	Safety Boots (steel-toed, steel shank)
D	Hardhat (for work near heavy equipment and where overhead hazards exist). Hard hat must be worn for Task R (Sampling Activities from a General Contractor's Barge) due to the presence of overhead hazards.
D	Earplugs (for work near heavy equipment and when noise levels exceed 85 dBA)
D	Safety glasses (for potential splash or projectile hazards)
D	Personal flotation device (PFD) for any work on or near the water (within 6 feet of water's edge).
* Modified D	All of the above (except coveralls) and Chemical-Resistant Clothing (coated TYVEK™)

4.5 AIR MONITORING AND ACTION LEVELS

Potential risks from respirable dust exist due to the presence of lead and other metals such as chromium, arsenic, and silver in site soils.

During the slag removal in July 2006, the presence of airborne contaminants was evaluated through the use of direct reading instrumentation. Dust monitoring and exposure sampling was performed on field personnel involved in the actual slag excavation and during times of disturbance to surface soils. The information gathered was used to ensure the adequacy of the levels of protection being used at the site, and was used as the basis for upgrading or downgrading the levels of protection in conformance with action levels provided in this HASP and at the direction of the site HSO. Monitoring of the ambient air in the breathing zone was conducted using a photoionization detector (PID) and a dust meter during work tasks that were invasive such as road grading, tree grubbing, and slag pile and soil excavation.

Perimeter monitoring was also conducted to show that nearby residential populations and retail operations were not impacted by the slag excavation. Dust suppression was performed throughout the removal activities and included the spraying of water over the exposed soils on the dirt roadway and in the slag stockpile. In addition to perimeter monitoring around the excavation area, Amec Foster Wheeler collected personal air samples on Site personnel with the greatest potential to exposure of Site contaminants to measure particulate lead and other Resource Conservation and Recovery Act (RCRA-8) metal concentrations. The Amec Foster Wheeler field engineer, excavator operator, and laborer were fitted with personal air sampling pumps equipped with Mixed Cellulose Ester (MCE) air sampling filters. The samples were submitted for laboratory analysis of lead and RCRA-8 metals. No detections were identified at levels exceeding health criteria. Analytical results were below detection limits for the majority of samples collected. The highest concentration detected at the site was 0.0021 mg/m^3, well below the OSHA personal exposure limits (PELs) of 0.05 mg/m^3 and the OSHA AL of 0.03 mg/m^3. The personal air monitoring and analytical results are summarized in the Slag Removal Summary Report (MACTEC, 2006).

The monitoring requirements for each work task are described in Section 4.6 below. Contaminant specific data regarding permissible exposure levels are shown on Table 4-1. Upgrades levels are summarized in Table 4-3.

For Tasks S (Phase I Soil Capping: Parcel C-1) and T (Phase II, Phase III, and Parcel C remediation and capping), Amec Foster Wheeler will conduct dust monitoring in the work zone and at the work area perimeter during activities that have the potential to disturb soil (grading, excavation, trenching, drilling) using hand held real-time continuous air monitoring instruments.

Work area perimeter dust monitoring will be performed using the MIE DR4000 monitors or equivalent placed in cases weatherproof cases. These instruments measure aerosol dust and will be set to automatically store data (data logging) for subsequent retrieval. One perimeter dust monitor will be placed on each of the four points outside and within 30 feet of the soil capping activities (North, South, East, and West) to confirm that nearby residential populations and retail operations are not impacted by the capping activities. Real-time dust monitoring will continue throughout the capping activities, unless a significant precipitation event occurs, at which time dust monitoring may be suspended per manufacturer specifications and standard industrial hygiene practices. The sustained respirable dust meter action level is 0.29 mg/m^3. Amec Foster Wheeler believes that this action level is protective of worker health under the OSHA lead standard and given the known levels of contaminants in Site soils. If this level is exceeded, Amec Foster Wheeler instructed the contractor to use water to suppress dust as an engineering control. If this action level is sustained, Amec Foster Wheeler will halt work and require upgrade to Level C PPE. It is important to note that the upgrade action level for (upgrading from Level D to Level C) was not exceeded at any time during the Slag Removal Action in July 2006. During Task T (Parcel C-1 Phase II and Phase III, and Parcel C remediation and capping), Amec Foster Wheeler will also conduct LEL and O_2 monitoring when working in the northwest area of Parcel C. The %LEL action level is >10% LEL. At this action level, work will cease in the work area and the crew will back off and allow the gas to dissipate. The contractor will recheck the atmosphere while approaching the work area to confirm LEL levels have dropped. Although not anticipated, if LEL levels continue to exceed the action level, provisions for active ventilation and spark proof/intrinsically safe equipment may be necessary.

Continuous visual monitoring of dust (particulate) levels will also be conducted and recorded in the Site field logbook. If visible dust conditions are sustained for more than one minute within the work zone, dust suppression methods (i.e., water spray) will be implemented to reduce airborne dust levels. Dust suppression will be performed throughout the capping activities as needed and will include spraying of fine mist of water over exposed soils to suppress dust as needed. A portable water tank containing municipal water or a nearby fire hydrant if approved by the city of Providence will be used as the water supply for dust suppression activities. If heavy precipitation (rain or snow) is adequate to suppress dust, additional water spray will not be applied.

The general contractor is responsible for conducting personal exposure monitoring using direct

reading instruments and with the collection of personal air samples. The general contractor will use appropriate sampling pumps and media to collect and document time-weighted average exposures to lead and other metals.

A PID and an XRF instrument will be used at the site for soil sampling, sediment sampling, and excavation tasks as described below on Section 4.6. The XRF will be used to measure the lead content of soil.

The action level for upgrade from Level D to Level C respiratory protection (full face cartridge respirator) during tasks conducted on the Park Parcel is sustained PID readings of 9 parts per million (ppm) in the breathing zone. VC has been reported in one recent sediment sample at levels above 1 mg/kg but has not been detected in Site soils. During the sediment sampling task, a PID will be used to screen the soil tubes upon opening. If a positive response is observed (i.e., >0.5 ppm response above general background), VC will be measured using Dräger tubes. If VC is detected in the breathing zone (at a minimum distance of one foot above the exposed sediment core) work will be halted until the levels subside or personnel will be required to upgrade to Level B respiratory protection.

Monitoring of the work environment will be undertaken for all tasks to ensure that Immediately Dangerous to Life or Health (IDLH) or other dangerous conditions are identified. Due to the nature of tasks to be conducted and the physical conditions of the site, this monitoring will include evaluations for hazardous concentrations of airborne contaminants. The Site upgrade levels are provided in the Table below.

For the tank closure activities (January 2008), Amec Foster Wheeler does not anticipate airborne dust exposure hazards since the soil is frozen or wet, and most areas have some snow cover. In the event that dust is generated, immediate dust suppression methods (water spray) must be implemented to minimize the exposure potential.

For the ASD installation activities (Fall 2008), Amec Foster Wheeler does not anticipate airborne dust exposure hazards. However, in the event that dust is generated, immediate dust suppression methods (water spray) must be implemented to minimize the exposure potential.

Table 4-3
Site Upgrade/Action Levels

	Anticipated LOP		**Upgrade LOP**			
TASK (Describe)	**LOP**	**Sustained Airborne Levels**	**LOP**	**Sustained Airborne Levels**	**LOP**	**Sustained Airborne Levels**
Tasks A, B, F, and H	D/Modified D. (see Section 4.6)	Airborne exposure hazards not expected; monitoring not required.				
Tasks D, I, J, M, N, and Q	D/Modified D. (see Section 4.6)	Total VOCs: 0 to 9 ppm	C	Total VOCs: > 9 to 25 ppm	Stop work and evaluate conditions	Total VOCs: > 25 ppm
Tasks C, E, G, K, L, and S	D/Modified D. (see Section 4.6)	Total VOCs: 0 to 9 ppm Dust: 0 to 0.29 mg/m^3	C	Total VOCs: > 9 to 25 ppm Dust: >0.29 to 0.5 mg/m^3	Stop work and evaluate conditions	Total VOCs: > 25 ppm Dust: > 1 mg/m^3
Tasks O, P, and T	Modified D	Total VOCs: 0 to 9 ppm Dust: 0 to 0.5 mg/m^3 Carbon Monoxide: <25 ppm O2 : > 19.5% and < 22.5% LEL: 0 to 10%		Total VOCs: > 9 to 25 ppm Dust: >0.5 to 1 mg/m^3 Carbon Monoxide: 25 to 50 ppm O2 : > 19.5% and < 22.5% LEL: 0 to 10%	Stop work and evaluate conditions	Total VOCs: > 25 ppm Dust: > 1 mg/m^3 Carbon Monoxide: > 50 ppm O2 : < 19.5% or >22.5% LEL: >10%
Tasks R and T	D (see Section 4.6)	Exposure to VOCs, dusts, carbon monoxide, and O2/LEL is not anticipated during any surface water and sediment sampling activities. Therefore, air monitoring equipment is not required for this task.				

THE DEFINITION OF "SUSTAINED": THE AIRBORNE BREATHING ZONE CONCENTRATION REMAINS CONSTANT FOR 1 MINUTE.

4.5.1 Personal Monitoring

Amec Foster Wheeler could not rule out the possibility of lead levels in the breathing zone above the action limit of 0.03 mg/m^3 in the breathing zone when excavating the slag material (2006), therefore, personal monitoring was conducted during this operation. Personal monitoring was used to characterize the worker exposure to lead through the monitoring of representative employees. Employee selection was based on work task and duration of exposure. Sampling was representative of a full shift and included at least one sample for each job classification. Sampling and analysis was done in accordance with NIOSH methodology. Samples were submitted for laboratory analysis of lead and RCRA-8 metals. All analytical results were well below the OSHA PELs.

Based on the extent of excavation activities conducted during the July 2006 Slag Removal Action and the amount of slag excavated, Amec Foster Wheeler assumes the air monitoring and air sampling results represent "worst-case" conditions with respect to workers' exposure potential to airborne contaminants. Therefore, dust monitoring and the collection of personal air samples are not necessary during the supplemental soil removal activities in 2007, the tank closure activities in January 2008, the Soil Vapor and Indoor Air (2007 & 2008) Investigation, ASD activities (Fall 2008), and groundwater investigation activities (2008-2009). However, engineering controls in the form of dust suppression must be continued throughout the supplemental removal action to ensure that airborne dust is not created during any intrusive activity. Dust monitoring will be conducted during the June 2012 Phase I Soil Capping: Parcel C-1 as described in Section 4.5 above.

4.5.2 Perimeter Monitoring During Slag Excavation/Removal

Perimeter monitoring was conducted in 2006 to document the dust emissions generated while excavating the slag. Sampling was conducted as follows:

- Perimeter monitoring stations were setup on four sides of the exclusion zone (e.g., north, south, east, and west).
- A portable weather station was established to record wind direction, approximate speed, etc.
- Monitoring was conducted using a TSI Dust TRAK portable particulate meter.

The complete results of the air monitoring and air samples collected during the slag removal in July 2006 are presented in the *Slag Removal Action Summary Report, Amec Foster Wheeler September 2006*. As described previously, based on the results of the dust monitoring and the air samples collected for lead

and RCRA-8 metals analysis, perimeter monitoring and worker personal air samples will not be collected during the supplemental removal action (2007), the tank closure activities (2008), the Phase 1 Soil Capping: Parcel C-1 Phase II and Phase III, and Parcel C remediation and capping. Real-time dust monitoring will be conducted by Amec Foster Wheeler as described in Section 4.5 and worker personal air samples will be collected by the general contractor during the Phase I Soil Capping: Parcel C-1 Phase II and Phase III, and Parcel C remediation and capping.

4.6 WORK TASK SUMMARY

The field activities summarized in Section 2.0 have varying health and safety risks associated with them. The hazard evaluation associated with each activity and personal protective requirements are summarized as follows:

Task A: Erosion Controls and Chain Link Fence

Hazard Evaluation: Low degree of hazard. Exposure to COCs exist primarily via dermal contact. Physical hazards on site include uneven ground and sharp fencing material.

Respiratory Protection and Monitoring: Level D.

Protective Clothing: Level D with leather work gloves.

Task B: Tree and Shrub Removal

Hazard Evaluation: Low to moderate degree of hazard. Exposure to COCs exists primarily through inhalation of dust and dermal contact. Poison ivy is present in and around the work area. Cutting tools and a wood chipper present physical hazards.

Respiratory Protection and Monitoring: Modified Level D with work gloves (nitrile gloves not required).

Protective Clothing: Modified Level D.

Task C: Temporary Access Road Grading and Loading Pad

Hazard Evaluation: Exposure potential via inhalation during grading activities. Physical hazards on site include working around heavy equipment and uneven ground.

Respiratory Protection and Monitoring: Level D (see Table 4-2). Use dust monitor station immediately downwind. If sustained levels of 0.5 mg/m^3 are observed, implement engineering controls such as water suppression and continue dust monitoring. If levels are still sustained above 0.5 mg/m^3 upgrade to Level C. If PID readings in the breathing zone are detected during the work activity above 9 ppm, upgrade to Level C respiratory protection.

Protective Clothing: Modified Level D.

Task D: Reconstruction or Decommissioning of Monitoring Well GZA-5

Hazard Evaluation: Low degree of hazard. Highest Exposure potential via dermal contact with impacted soils and inhalation of VOCs.

Respiratory Protection and Monitoring: Level D. Monitor periodically during sampling with a PID. If readings in the breathing zone are detected during the work activity above 9 ppm, upgrade to Level C respiratory protection.

Protective Clothing: Level D.

Task E: Excavation of Slag Material and Soil

Hazard Evaluation: Low to moderate degree of hazard. Exposure potential via inhalation and slop stability considerations. Heavy equipment operation within limited work area.

Respiratory Protection and Monitoring: Modified Level D (see Table 4-2). As described previously, dust monitoring stations were used to monitor dust conditions immediately downwind of the work area. The action level of 0.5 mg/m^3 (sustained in the breathing zone) was implemented; however, based on the success of the implemented engineering controls (water suppression) and the results of the continued dust monitoring, the action level was not exceeded and therefore Level C upgrade was not necessary. Ambient air was monitored periodically during sampling using with a PID. Readings in the breathing zone never exceeded 9 ppm, therefore, upgrade to Level C respiratory protection was not necessary. Continuous PID monitoring will be performed during all intrusive work.

Protective Clothing: Modified Level D.

Task F: Metal Debris Removal

Hazard Evaluation: Low to moderate degree of hazard. Sharp edges of debris present potential physical hazard.

Protective Clothing: Level D, work gloves.

Task G: Loading of Material Into Trucks for Transport Off-site

Hazard Evaluation: Low to moderate degree of hazard. Exposure potential via inhalation during loading of material into trucks. As described previously, dust monitoring stations were used to monitor dust conditions immediately downwind of the truck loading area. The action level of 0.5 mg/m^3 (sustained in the breathing zone) was implemented; however, based on the success of the implemented engineering controls (water suppression) and the results of the continued dust monitoring, the action level was not exceeded and therefore Level C upgrade was not necessary. Ambient air was monitored periodically during sampling using with a PID. Physical hazards associated with loading and transport of slag material using heavy equipment.

Respiratory Protection and Monitoring: Level D.

Protective Clothing: Level D.

Task H: Site Restoration

Hazard Evaluation: Low to medium degree of hazard. Heavy equipment presents physical hazard.

Protective Clothing: Level D.

Task I: Surface Soil Sampling

Hazard Evaluation: Exposure potential via inhalation or dermal contact with organic contaminants.

Respiratory Protection and Monitoring: Level D (see Table 4-2). Monitor periodically during sampling with a PID. If readings in the breathing zone are detected during the work activity above 9 ppm, upgrade to Level C respiratory protection.

Protective Clothing: Level D.

Task J: Surface Water and Sediment Sampling

Hazard Evaluation: Surface waters do not pose a dermal or inhalation hazard. Exposure is possible primarily via dermal contact with low or moderate levels of organic or inorganic contaminants that may be present in sediment. The greatest potential for exposure exists when opening the plastic sediment tubes. Safety hazards include all aspects of working near and on water including the potential for drowning and boating accidents.

Respiratory Protection and Monitoring: Level D (see Table 4-2). Monitor the opening of each sediment tube with a PID. If readings are detected during the work activity, screen for VC using a Dräger tube. If VC is detected or VOCs are present in the breathing zone above 9 ppm, upgrade to Level C respiratory protection.

Protective Clothing: Level D.

Task K: Geophysics

Hazard Evaluation: Geophysics is not an invasive activity and there is little exposure to COCs. Safety hazards are present when operating a boat on water.

Respiratory Protection and Monitoring: None required.

Protective Clothing: Level D.

Task L: Excavation of Soil Along Perimeter of Former Slag Pile Removal Area

Hazard Evaluation: Low to moderate degree of hazard. Exposure potential via inhalation considerations. Heavy equipment operation within limited work area.

Respiratory Protection and Monitoring: Modified Level D (see Table 4-2). Implement engineering controls such as water suppression during all intrusive activities.

Protective Clothing: Modified Level D.

Task M: Soil Sampling of Excavation and in the Area of Former Slag Pile Excavation

Hazard Evaluation: Low to moderate degree of hazard. Exposure potential via inhalation considerations. Heavy equipment operation in the area. **Entry into any excavation that is not shored or sloped in accordance with OSHA requirements (29 CFR 1926 Subpart P-Excavations) is prohibited.**

Respiratory Protection and Monitoring: Level D (see Table 4-2). Monitor periodically during sampling with a PID. If readings in the breathing zone are detected during the work activity above 9 ppm, upgrade to Level C respiratory protection.

Protective Clothing: Modified Level D.

Task N: Tank Closure Activities (near former Building N)

Hazard Evaluation: Low to moderate degree of hazard. Exposure potential via inhalation considerations. Heavy equipment operation in the area. **Entry into any excavation that is not shored or sloped in accordance with OSHA requirements (29 CFR 1926 Subpart P-Excavations) is prohibited.**

Respiratory Protection and Monitoring: Level D (see Table 4-2). Monitor periodically during sampling with a PID. If readings in the breathing zone are detected during the work activity above 9 ppm, upgrade to Level C respiratory protection.

Protective Clothing: Modified Level D.

Task O: Soil Vapor and Indoor Air Investigation

Hazard Evaluation: Low to moderate degree of hazard. Exposure potential via inhalation considerations. Heavy equipment operation in the area and drilling indoors.

Respiratory Protection and Monitoring: Level D (see Table 4-2). Monitor continuously during activity with a PID. If readings in the breathing zone are detected during the work activity above 9 ppm, upgrade to Level C respiratory protection. Monitor continuously during indoor drilling activities with a multi-gas meter for oxygen, LEL, and carbon monoxide levels. Action levels for these gases are shown in Table 4-3.

Protective Clothing: Modified Level D.

Task P: Construction of Active Soil Depressurization System at Existing Retail Building

Hazard Evaluation: Low to moderate degree of hazard. Exposure potential via inhalation considerations. Heavy equipment operation in the area, and drilling indoors.

Respiratory Protection and Monitoring: Level D (see Table 4-2). Monitor continuously during activities with a PID. If total VOC readings in the breathing zone are detected during the work activity above 9 ppm, upgrade to Level C respiratory protection. Monitor continuously during indoor drilling activities with a multi-gas meter for oxygen, LEL, and carbon monoxide levels. Action levels for these gases are shown in Table 4-3 above.

Protective Clothing: Level D.

Task Q: Groundwater Investigation Activities

Hazard Evaluation: Low to moderate degree of hazard. Exposure potential via inhalation considerations. Heavy equipment operation in the area. Work on or near water.

Respiratory Protection and Monitoring: Level D (see Table 4-2). Monitor continuously during activities with a PID. If total VOC readings in the breathing zone are detected during the work activity above 9 ppm, upgrade to Level C respiratory protection.

Protective Clothing: Level D.

Task R: Sampling Activities (Surface Water and Sediment) from a General Contractor's Barge

Hazard Evaluation: Moderate degree of hazard. Barge operation. Drowning hazards - work on and near water. Cold weather extremes.

Respiratory Protection and Monitoring: Level D (see Table 4-2). Monitoring not required based on tasks.

Protective Clothing: Level D.

Task S: Phase I Soil Capping Parcel D

Hazard Evaluation: Low to moderate degree of hazard. Exposure potential via inhalation and dermal contact considerations. Heavy equipment and hand tools (chain saw, machete by general contractor) operation. Modified Level D (see Table 4-2). As described previously, dust monitoring stations will be installed to monitor dust conditions upwind and immediately downwind of the work area. The action level of 0.29 mg/m^3 (sustained in the breathing zone) will be implemented; however, based on the success of the implemented engineering controls (water suppression) and the results of previous dust monitoring, Amec Foster Wheeler does not anticipate the action level to be exceeded. Therefore Level C upgrade is not anticipated during this task. Ambient air will also be monitored using a PID. Readings in the breathing zone exceed 9 ppm, will require upgrade to Level C respiratory protection; however, based on previous ambient air PID monitoring, Amec Foster Wheeler does not anticipate upgrade to Level C respiratory protection for this task. Continuous PID monitoring will be performed during all intrusive work. **Amec Foster Wheeler entry into any excavation is prohibited.**

Respiratory Protection and Monitoring: Modified Level D (see Table 4-2). Implement engineering controls such as water suppression during all intrusive activities.

Protective Clothing: Modified Level D.

Task T: Phase II, Phase III, and Parcel C Remediation and Capping

Hazard Evaluation: Low to moderate degree of hazard. Exposure potential via inhalation and dermal contact considerations. Heavy equipment and hand tools (chain saw, machete by general contractor) operation. Modified Level D (see Table 4-2). As described previously, dust monitoring stations will be installed to monitor dust conditions upwind and immediately downwind of the work area. The action level of 0.29 mg/m^3 (sustained in the breathing zone) will be implemented; however, based on the success of the implemented engineering controls (water suppression) and the results of previous dust monitoring, Amec Foster Wheeler does not anticipate the action level to be exceeded. Therefore Level C upgrade is not anticipated during this task. Ambient air will also be monitored using a PID. Readings in the breathing zone exceed 9 ppm, will require upgrade to Level C respiratory protection; however, based on

previous ambient air PID monitoring, Amec Foster Wheeler does not anticipate upgrade to Level C respiratory protection for this task. Continuous PID monitoring will be performed during all intrusive work. The %LEL action level is >10% LEL. At this action level, work will cease in the work area and the crew will back off and allow the gas to dissipate. The contractor will recheck the atmosphere while approaching the work area to confirm LEL levels have dropped. If LEL levels continue to exceed the action level, provisions for active ventilation and spark proof/intrinsically safe equipment may be necessary. **Amec Foster Wheeler entry into any excavation is prohibited.**

Respiratory Protection and Monitoring: Modified Level D (see Table 4-2). Implement engineering controls such as water suppression during all intrusive activities.

Protective Clothing: Modified Level D.

5.0 SITE CONTROL

5.1 ZONATION

The general zonation protocols that should be employed at hazardous waste sites are described in Appendix G of the original 1994 HASP. The site-specific zonation that will be used for this project is described as follows:

The exclusion zone will be established as a 15-foot radius surrounding the excavations, stockpiles or on-site treatment equipment. The support zone will be established based on site access and road layouts. As discussed in Section 5.0 of this HASP, a decontamination station will be established within the contaminant reduction zone, between the exclusion and support zones.

Signs:

The following sign must be posted at the entrance to any area with a potential for lead levels to exceed the PEL (Slag excavation area).

WARNING
LEAD WORK AREA
POISON
NO SMOKING OR EATING

5.2 COMMUNICATIONS

Site communications will be as follows:

√ Verbal
____ Two-way radio
√ Cellular telephone
√ Hand signals

- Hand gripping throat ---------- Out of air, can't breathe
- Grip partner's wrist or both hands around waist ---------- Leave area immediately
- Hands on top of head ---------- Need assistance
- Thumbs up ---------- OK, I am all right, I understand
- Thumbs down ---------- No, negative

____ Horn

- Help ---------- Three short blasts (. . .)
- Evacuation ---------- Three long blasts (_ _ _)
- All Clear ---------- Alternating long and short blasts (_ . _ .)

____ Siren
____ Other:

5.3 WORK PRACTICES

Work practices will conform to Amec Foster Wheeler corporate safety and health requirements. Briefings of specific safety practices will be conducted prior to the initiation of activities at the site.

5.4 DECONTAMINATION/DISPOSAL

Used PPE will be removed at the end of each work task or the end of the work day and placed in contractor trash bags for offsite disposal. Mud and dirt will be removed from disposable PPE to extent practical prior to placement in the bags and work boots will be rinsed at a designated location to remove accumulated dirt.

A sign will be placed near the decontamination station is and/or where equipment is decontaminated that states:

CAUTION: CLOTHING CONTAMINATED WITH LEAD. DO NOT REMOVE DUST BY BLOWING OR SHAKING. DISPOSE OF LEAD CONTAMINATED WASH WATER IN ACCORDANCE WITH APPLICABLE LOCAL, STATE, OR FEDERAL REGULATIONS.

All workers **MUST** shower at the end of the workday if there is a potential for lead levels to be above the PEL (Level C PPE is worn).

5.5 PERSONNEL ROLES, LINES OF AUTHORITY, AND COMMUNICATION

The site HSO or the Health and Safety designee is the primary authority for directing operations at the site under emergency conditions. All communications both on- and off-site will be directed through the HSO or designee. Points of contact at the redevelopment site will interact with the HSO or designee for communicating redevelopment-specific requirements.

5.6 EMERGENCY MEDICAL TREATMENT/FIRST AID

In the event that an on-site emergency develops, the procedures delineated in Table 5-1 are to be immediately followed.

TABLE 5-1

EMERGENCY PROCEDURES

- The HSO (or alternate) should be immediately notified via the on-site communication system. The HSO assumes control of the emergency response.
- The HSO notifies the PM and client contact of the emergency. The HSO shall then contact the Northern Division HSE Manager (Cindy Sundquist) who will then contact the Corporate Director of ES&H.
- If applicable, the HSO shall notify off-site emergency responders (e.g., fire department, hospital, police department, etc.) and shall inform the response team as to the nature and location of the emergency on-site.
- If applicable, the HSO evacuates the site. Site workers should move to the predetermined evacuation point.
- For small fires, flames should be extinguished using the fire extinguisher. Large fires should be handled by the local fire department.
- In an unknown situation or if responding to toxic gas emergencies, appropriate PPE, including SCBAs, should be donned.
- If chemicals are accidentally spilled or splashed into eyes or on skin, use eyewash and/or shower.
- If a worker is injured, first aid shall be administered by certified first aid provider.
- An injured worker shall be decontaminated appropriately.
- After the response, the HSO shall follow-up with the required company reporting procedures, including the Incident Analysis Forms (Appendix D).

Injuries requiring medical treatment beyond first aid (as well as work-related vehicle incidents) will require the employee to submit a post incident drug test. It is the responsibility of the Supervisor/PM to ensure that the employee who has had an on-the-job incident as defined in Amec Foster Wheeler (formerly MACTEC's) Human Resource Policy HR4-02B, Drug and Alcohol-Free Workplace Policy for Employees (in Section 3.2), submits to this required testing. The policy is located on the Amec Foster

Wheeler (formerly MACTEC) Intranet under Human Resources for further information. The *Procedures for Post Accident and Reasonable Suspicion Testing* may be found on the Intranet (via the Incident Reporting Procedures link under "Medical Treatment"). Contact Cindy Sundquist, at (207) 828-3309, or Collette Myers at 770-360-0607, if you have any questions on incident-related drug testing.

5.6.1 Amec Foster Wheeler Early Injury Case Management Program

If the emergency involves an injury to an Amec Foster Wheeler employee, the HSE Coordinator or Field Lead are to implement the Amec Foster Wheeler Early Injury Case Management program. See procedures below:

NON-EMERGENCY INCIDENT	EMERGENCY INCIDENT
Steps 1 & 2 must be completed before seeking medical attention other than local first aid. 1. Provide first-aid as necessary. Report the situation to your immediate supervisor AND HSE coordinator (all incidents with the apparent starting event should be reported within 1 hour of occurrence). 2. Injured employee:	1. Provide emergency first aid. Supervisor on duty must immediately call 911 or local emergency number; no employee may respond to outside queries without prior authorization. Any outside media calls concerning this incident must be referred immediately to Greg Simpson and Dave Heislein. 2. Once medical attention is sought and provided, the supervisor must:
Call WorkCare 24/7 Hotline* (888) II-XPRTS or (888) 449-7787	
WorkCare will assess the situation and determine whether the incident requires further medical attention. During this process, WorkCare will perform the following: • Explain the process to the caller. • Determine the nature of the concern. • Provide appropriate medical advice to the caller. • Determine appropriate path forward with the caller. • Maintain appropriate medical confidentiality. • Help caller to execute path forward, including referral to the appropriate local medical facility. • Send an email notification to the Corporate HSE Department.	WorkCare will be responsible for performing the following: • Contact the treating physician. • Request copies of all medical records from clinic. • Send an email update to the Corporate HSE Department.
1. IMMEDIATELY after contacting WorkCare send a brief email notification AND inform verbally (direct contact is required) ONE of HSE corporate representatives. See Incident Flow Chart. 2. Make all other local notifications and client notifications. 3. Local Supervisor, HSE Coordinator, HSO and any applicable safety committees to complete preliminary investigation, along with the initial Incident Report within 24 hours. 4. Corporate Loss Prevention Manager to complete Worker's Compensation Insurance notifications as needed. 5. Corporate HSE to conduct further incident notifications, investigation, include in statistics, classify, and develop lessons learned materials. * - **NOTE: Step 2 is only applicable to the North-American operations and to incidents involving Amec Foster Wheeler personnel. High potential near misses, general contractors' incidents, regulatory inspections, spills and property damages above $1,000 should be reported immediately, following directions from Step 3.**	

Incident Flow Chart

Call Within 60 Minutes

Incident Occurs

- **EMERGENCY** → **CALL 911 EMERGENCY** → **Supervisor Immediately Calls** After Medical Attention is Sought and Provided → **Contact Supervisor HSE Coordinator and WorkCare (24/7) Hotline (888) II-XPRTS or (888) 449-7787**
- **NON-EMERGENCY** → *Within 60 Minutes* → **Contact Supervisor HSE Coordinator and WorkCare (24/7) Hotline (888) II-XPRTS or (888) 449-7787**

Verbally Contact One HSE Representative Below Within 2 Hours

E&I Corporate HSE Department Contacts List

Name/E-Mail	Office Location	Contact Information
Bruce Voss bruce.voss@amec.com	Cathedral City, CA	760.202.3737 (office) 951.897.6381 (cell)
Chad Barnes chad.barnes@amec.com	Tempe, AZ	480.940.2320 (office) 480.495.9846 (cell)
Cindy Sundquist cynthia.sundquist@amec.com	Portland, ME	207.828.3309 (office) 207.650.7593 (cell) 207.892.4402 (home)
Don Kubik don.kubik@amec.com	Oakland, CA	510.663.4100 (office) 510.368.6433 (cell)
Gabe Sandholm gabe.sandholm@amec.com	Minneapolis, MN	612.252.3785 (office) 425.698.9156 (cell)
Howard Gordon howard.gordon@amec.com	Golden, CO	303.273.5041 (office) 303.888.3233 (cell)
John Mazur john.mazur@amec.com	Wilmington, NC	910.452.1185 x 16 (office) 910.431.2330 (cell) 910.681.0538 (home)
Lori Dowling lori.dowling@amec.com	Prince George, BC	250.564.3243 (office)
Philip Neville philip.neville@amec.com	Thorold, ON	905.687.6616 (office) 905.380.4465 (cell)
Tim Kihn tim.kihn@amec.com	Edmonton, AB	780.944.6363 (office) 780.717.5058 (cell)
Vlad Ivensky (can call 24/7) vladimir.ivensky@amec.com	Plymouth Meeting, PA	610.877.6144 (office) 484.919.5175 (cell} 215.947.0393 (home)

5.7 EMERGENCY TELEPHONE NUMBERS

Police Department (Providence)	911
Primary Hospital: Rhode Island Hospital	(401) 444-4000
Fire Department (Providence)	911
Poison Control Center (Boston)	(800) 682-9211
Poison Control Center (National)	(800) 222-1222
Site HSO*: To be determined (task specific) *as identified on the daily Record of Safety Meeting form	(781) 245-6606
Project Manager: David Heislein	(781) 245-6606 (339) 927-3792 (Cell)
Amec Foster Wheeler RHSE Mgr: Cindy Sundquist	(207) 82 (207) 650-7593 (Cell)
Amec Foster Wheeler HS Coordinator: Annette McLean	(978) 392-5396 (978) 614-5355 (Cell)
Textron Inc.: Mr. Greg Simpson	(401) 457-3577

5.7.1 Routes to Emergency Medical Facilities

The primary source of medical assistance for the site is Rhode Island Hospital

Exit the Site on Downing Street. At first major intersection, take a right onto Reservoir Avenue (Route 2). Watch for sign for route 10 South (approximately 1 mile along Reservoir Avenue). Take Route 10 to Route 95 North. Take Exit 18 (Thurbers Avenue); bear left onto Thurbers Avenue. At red light take right onto Eddy Street. Proceed 1-1/4 miles on Eddy Street to the Hospital.

6.0 ADMINISTRATION

6.1 PERSONNEL AUTHORIZED DOWNRANGE

Personnel authorized to participate in downrange activities at this site have been reviewed and certified for site operations by the PM and the Regional Health and Safety Manager (RHSM). Certification involves the completion of appropriate training, a medical examination, and a review of this site-specific HASP. All persons entering the site must use the buddy system, and check in with the Site Manager and/or HSO before going downrange.

CERTIFIED Amec Foster Wheeler TEAM PERSONNEL:

Mark Maggiore*+ _____ _____

_____ _____

Chris Mazzolini*+ _____ _____

Dave Heislein*+ _____ _____

OTHER CERTIFIED PERSONNEL:

_____ _____

*FIRST-AID-TRAINED
+CPR-TRAINED

6.2 HASP APPROVALS

By their signatures, the undersigned certify that this HASP will be used for the protection of the health and safety of all persons entering this site. Signatures also serve as certification of completion of the hazard assessments as required by 29 CFR 1910.132.

Health and Safety Officer	Date
Project Manager	Date
Local HS Coordinator	Date

6.3 FIELD TEAM REVIEW

I have read and reviewed the health and safety information in the HASP. I understand the information and will comply with the requirements of the HASP.

SITE/PROJECT: Former Gorham Manufacturing Facility – Providence, RI

6.4 MEDICAL DATA SHEET(S)

Telephone: Area Code ( ) ___-____

This Medical Data Sheet will be completed by all on-site personnel and kept in the Support Zone during site operations. It is not a substitute for the Medical Surveillance Program requirements consistent with the Amec Foster Wheeler Corporate Health and Safety Program for Hazardous Waste Sites. This data sheet will accompany any personnel when medical assistance or transport to hospital facilities is required. If more space is required, use the back of this sheet.

Project:_____

Name:_____

Address:_____

Home Telephone: Area Code ( )_____

Age: _____ Height: _____ Weight: _____

In case of emergency, contact: _____

Address:_____

Telephone: Area Code ( )_____

Do you wear contact lenses? Yes ( ) No ( )

Allergies:_____

List medication(s) taken regularly:_____

Particular sensitivities:_____

Previous/current medical conditions or exposures to hazardous chemicals:

_____

Name of Personal Physician:_____

6.4.1 Emergency Telephone Numbers

Update all phone numbers

Police Department (Providence)	(401) 272-3121
Primary Hospital: Rhode Island Hospital	(401) 444-4000
Fire Department (Providence)	(401) 421-1293
Poison Control Center (Boston)	(800) 682-9211
Poison Control Center (National)	(800) 222-1222
Site HSO: To be determined (978) XXX-XXXX	
Field Operations Leader: To be determined	(978) XXX-XXXX
Project Manager: Mr. Dave Heislein	(781) 245-6606 (339) 927-3792 (Cell)
Amec Foster Wheeler RHSE Mgr: Ms. Cindy Sundquist	(207) 828-3309 (207) 650-7593 (Cell)
Textron, Inc.: Mr. Greg Simpson	(401) 457-6007

DIGSAFE PERMIT NO. _____

6.4.2 Routes to Emergency Medical Facilities

The primary source of medical assistance for the site is Rhode Island Hospital

Exit the Site on Downing Street. At first major intersection, take a right onto Reservoir Avenue (Route 2). Watch for sign for route 10 South (approximately 1 mile along Reservoir Avenue). Take Route 10 to Route 95 North. Take Exit 18 (Thurbers Avenue); bear left onto Thurbers Avenue. At red light take right onto Eddy Street. Proceed 1-1/4 miles on Eddy Street to the Hospital.

HEALTH AND SAFETY PLAN
PART II

FORMER GORHAM MANUFACTURING SITE
333 ADELAIDE AVENUE
PROVIDENCE, RHODE ISLAND

ATTACHMENTS

Amec Foster Wheeler Environment & Infrastructure, Inc.

JANUARY 2007
Revised: January 11, 2008
Revised: December 12, 2008
Revised: October 29, 2009
Revised: December 9, 2011
Revised: June 13, 2012
Revised: February 2015

ATTACHMENT A

AIR MONITORING DATA WORK SHEET

Air Monitoring Work Sheet

Sample Date: _____ Project Number: _____ Page ___ of ___

Sampled by: _____ Project Name: _____

Collection media: _____ Compound(s) sampled for: _____ Barometric pressure: _____ Temperature: _____

Sample Number	Pump Number and Type	Pump Flow Rate	Sample Start Time	Sample Stop Time	Total Sample Time	Total Sample Volume	Sample Location (if personal, note name and job)	Sample Results (mg/m^3)

Notes (describe activities, unusual circumstances, weather conditions, etc.): _____

_____

Sampler's Signature: _____

ATTACHMENT B

JOB HAZARD ANALYSIS FORMS

- **FIELD WORK – GENERAL**
- **EXCAVATION AND BACKFILLING**
- **SOIL SAMPLING**
- **INSECT BITES AND STINGS**
- **GROUNDWATER SAMPLING**
- **SUB-SLAB INDOOR AIR SAMPLING**
- **SUBSLAB SOIL VAPOR SURVEY ACTIVITIES**
- **GROUNDWATER SAMPLING FROM A GENERAL CONTRACTOR'S BOAT/BARGE**
- **SURFACE WATER/SEDIMENT SAMPLING AND INSTALLING DIFFUSION SAMPLERS FROM SHORE**
- **GEOPROBE OVERSIGHT (Provided for Awareness Only)**
- **SAMPLING ACTIVITIES (SURFACE WATER AND SEDIMENT) FROM A GENERAL CONTRACTOR'S BARGE**
- **POISONOUS PLANTS**
- **CLEARNING AND GRUBBING (Provided for Awareness Only)**

Job Hazard Analysis

Job Title: Field Work - General **Date of Analysis:** 02/18/2015

Minimum Recommended PPE*: hard hat, steel-toed boots, safety glasses, hearing protection. Leather gloves when using power and hand tools.
*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. Mobilization/ See Mobilization/Demobilization and Site Preparation JHA Demobilization and Site Preparation	1A) See Mobilization/Demobilization and Site Preparation JHA	1A) See Mobilization/Demobilization and Site Preparation JHA
2. Communication	2A) Safety, crew unity	2A) Talk to each other. ▪ Log all workers and visitor on and off the site. ▪ Let other crewmembers know when you see a hazard. ▪ Avoid working near known hazard trees (trees that are rotten, dead, damaged, etc.). ▪ Always know the wherabouts of fellow crewmembers. ▪ Carry a radio and spare batteries or cell phone. ▪ Review Emergency Evacuation Procedures (see below).
3. Walking and working in the field	3A) Falling down, twisted ankles and knees, poor footing	3A) Always watch your footing. ▪ Horseplay is strictly prohibited ▪ Slow down and use extra caution around logs, rocks, and animal holes. ▪ Extremely steep slopes (>50%) can be hazardous under wet or dry conditions; consider an alternate route. ▪ Wear laced boots with a minimum 8" high upper and non-skid Vibram-type soles for ankle support and traction.
	3B) Falling objects	3B) Protect head agains falling objects. ▪ Wear your hardhat for protection from falling limbs and pinecones, and from tools and equipment carried by other crewmembers. ▪ Stay out of the woods during extremely high winds.
	3C) Damage to eyes	3C) Protect eyes: ▪ Watch where you walk, ecpecially around trees and brush with limbs sticking out. ▪ Exercise caution when clearing limbs from tree trunks. Advise wearing eye protection. ▪ Ultraviolet light from the sun can be damaging to the eyes; look for sunglasses that specify significant protection from UV-A and UV-B radiation. If safety glasses require, use one's with tinted lenses
	3D) Chemical/Toxicological Hazards	3D) Chemical/Toxicological Hazards ▪ See HASP for appropriate level of PPE ▪ Use monitoring equipment, as outlined in HASP, to monitor breathing zone ▪ Read MSDSs for all chemicals brought to the site ▪ Be familiar with hazards associated with site contaminants. ▪ Ensure that all containers are properly labelled ▪ Decon thoroughly prior to consumption of food, beverage or tobacco.
	3E) Bee and wasp stings	3E) See JHA for Insect Stings and Bites
	3F) Ticks and infected mosquitos	3F) See JHA for Insect Stings and Bites
	3G) Contact with Poisonous Plants	3G) See JHA for Poisonous Plants

Job Hazard Analysis

Job Title: Field Work - General **Date of Analysis:** 02/18/2015

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	3H) Lifting Injuries (e.g., Back Injuries)	3H) Lifting Injuries (e.g., Back Injuries) • Site personnel will be instructed on proper lifting techniques. • Perform warm-up excercises before starting work. • **DO NOT EXCEED THE Amec Foster Wheeler LIFTING LIMIT OF 50 POUNDS.** • Use two people to lift, lower, or carry equipment or materials heavier than 50 pounds. • Mechanical devices should be used to reduce manual handling of materials. • Drive the field vehicle as close to the point that the heavy equipment/material will be used as long as the area is safe to drive into and you do not create hazards to you, your co-worker, or the vehicle.
	3I) Shoveling	3I) Shoveling ▪ Select the proper shovel for the task. A long handled, flat bladed shovel is recommend for loose material ▪ Inspect the handle for splinters and/or cracks ▪ Ensure that the blade is securely attached to the handle ▪ Never be more than 15 inches from the material you are shoveling ▪ Stand with your feet about hip width for balance and keep the shovel close to your body. ▪ Bend from the knees (not the back) and tighten your stomach muscles as you lift. ▪ Avoid twisting movements. If you need to move the snow to one side reposition your feet to face the direction the snow will be going. ▪ Avoid lifting large shoveling too much at once. When lifting heavy material, pick up less to reduce the weight lifted. ▪ Pace yourself to avoid getting out of breath and becoming fatigued too soon. ▪ Be alert for signs of stress such as pain, numbness, burning and tingling. Stop immediately if you feel any of these symptoms.
	3J) Slips/Trips/Falls	3J) Slips/Trips/Falls • Maintain work areas safe and orderly; unloading areas should be on even terrain; mark or repair possible tripping hazards. • Site SHSO inspect the entire work area to identify and mark hazards. • Be aware of work area conditions that can cause slip hazards such as ponding of water on concrete surfaces. Ponding of water on smooth surfaces, such as concrete, coupled with the warm or freezing weather conditions has the potential to cause slippery condiitons such as growth of scum or ice, as applicable. Adding a layer of clean fill to the surface may prevent the growth of scum, and/or create a non-slippery walking surface.
	3K) Vehicular Traffic	3K) Vehicular Traffic ▪ Spotters will be used when backing up trucks and heavy equipment and when moving equipment. ▪ High visibility vests will be worn when workers are exposed to vehicular traffic at the site or on public roads.
	3L) Overhead Hazards	3L) Overhead Hazards ▪ Personnel will be required to wear hard hats that meet ANSI Standard Z89.1. ▪ All ground personnel will stay clear of suspended loads. ▪ All equipment will be provided with guards, canopies or grills to protect the operator from falling or flying objects. ▪ All overhead hazards will be identified prior to commencing work operations.

Job Hazard Analysis

Job Title: Field Work - General **Date of Analysis:** 02/18/2015

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	3M) Dropped Objects	3M) Dropped Objects ▪ Steel toe boots meeting ANSI Standard Z41 will be worn.
	3N) Noise	3N) Noise ▪ Hearing protection will be worn with a noise reduction rating capable of maintaining personal exposure below 85 dBA (ear muffs or plugs); all equipment will be equipped with manufacturer's required mufflers. Hearing protection shall be worn by all personnel working in or near heavy equipment.
	3O) Eye Injuries	3O) Eye Injuries ▪ Safety glasses meeting ANSI Standard Z87 will be worn.
	3P) Heavy Equipment (overhead hazards, spills, struck by or against)	3P) Heavy Equipment ▪ Equipment will have seat belts. ▪ Operators will wear seat belts when operating equipment. ▪ Do not operate equipment on grades that exceed manufacturer's recommendations. ▪ Equipment will have guards, canopies or grills to protect from flying objects. ▪ Ground personnel will stay clear of all suspended loads. ▪ Personel are prohibited from riding on the buckets, or elsewhere on the equipment except for designated seats with proper seat belts or lifts specifically designed to carry workers. ▪ Ground personnel will wear high visibility vests ▪ Spill and absorbent materials will be readily available. ▪ Drip pans, polyethylene sheeting or other means will be used for secondary containment. ▪ Ground personnel will stay out of the swing radius of excavators. ▪ Eye contact with operators will be made before approaching equipment. ▪ Operator will acknowledge eye contact by removing his hands from the controls. ▪ Equipment will not be approached on blind sides. ▪ All equipment will be equipped with backup alarms and use spotters when significant physical movement of equipment occurs on-site, (i.e., other than in place excavation or truck loading). ▪ Inspect rigging prior to each use.
	3Q) Struck by vehicle/equipment	3Q) Struck by vehicle/equipment ▪ Be aware of heavy equipment operations. ▪ Keep out of the swing radius of heavy equipment. ▪ Ground personnel in the vicinity of heavy equipment operations will be within the view of the operator at all times and will wear high visibility vests. ▪ Ground personnel will be aware of the counterweight swing and maintain an adequate buffer zone. ▪ Ground personnel will not stand directly behind heavy equipment when it is in operation. ▪ Drivers will keep workers on foot in their vision at all times, if you lose sight of someone, Stop! ▪ Spotters will be used when backing up trucks and heavy equipment and when moving equipment. ▪ High visibility vests will be worn when workers are exposed to vehicular traffic at the site or on public roads.

Job Hazard Analysis

Job Title: Field Work - General **Date of Analysis:** 02/18/2015

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	3R) Struck/cut by tools	3R) Struck/cut by tools ▪ Cut resistant work gloves will be worn when dealing with sharp objects. ▪ All hand and power tools will be maintained in safe condition. ▪ Do not drop or throw tools. Tools shall be placed on the ground or worksurface or handed to another employee in a safe manner. ▪ Guards will be kept in place while using hand and power tools.
	3S) Caught in/on/between	3S) Caught in/on/between ▪ Workers will not position themselves between equipment and a stationary object. ▪ Workers will not wear long hair down (place in pony-tail and tuck into shirt) or jewelry if working with tools/machinery.
	3T) Contact with Electricity/Lightning	3T) Contact with Electricity/Lighting ▪ All electrical tools and equipment will be equipped with GFCI. ▪ Electrical extension cords will be of the “Hard” or “Extra Hard” service type. ▪ All extension cords shall have a three-blade grounding plug. ▪ Personnel shall not use extension cords with damaged outer covers, exposed inner wires, or splices. ▪ Electrical cords shall not be laid across roads where vehicular traffic may damage the cord without appropriate guarding. ▪ All electrical work will be conducted by a licensed electrician. ▪ All utilities will be marked prior to excavation activities. ▪ All equipment will stay a minimum of 10 feet from overhead energized electrical lines (50 kV). This distance will increase by 4 inches for each 10 kV above 50 kV. Rule of Thumb: Stay 10 feet away from all overhead powerlines known to be 50 kV or less and 35 feet from all others.) ▪ The SHSO shall halt outdoor site operations whenever lightning is visible, outdoor work will not resume until 30 minutes after the last sighting of lightning.
	3U) Equipment failure	3U) Equipment failure ▪ All equipment will be inspected before use. If any safety problems are noted, the equipment should be tagged and removed from service until repaired or replaced.
	3V) Hand & power tool usage.	3V) Hand & power tool usage ▪ Inspect the tool daily. ▪ Remove broken or damaged tools from service. ▪ Use the tool for its intended purpose. ▪ Use in accordance with manufacturers instructions. ▪ See JHA for Power Tool Use - Electrical and Power Tool Use - Gasoline

Job Hazard Analysis

Job Title: Field Work - General **Date of Analysis:** 02/18/2015

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	3W) Fire Protection	3W) Fire Protection ▪ Ensure that adequate number and type of fire extinguishers are present at the site ▪ Inspect fire extinguishers on a monthly basis – document ▪ All employees who are expected to use fire extinguishers will have received training on an annual basis. ▪ Obey no-smoking policy ▪ Open fires are prohibited ▪ Maintain good housekeeping. Keep rubbish and combustibles to a minimum. ▪ Keep flammable liquids in small containers with lids closed or a safety can. ▪ When dispensing flammable liquids, do in well vented area and bond and ground containers.
4. Environmental health considerations	4A) HEAT Stress	4A) Take precautions to prevent heat stress ▪ Remain constantly aware of the four basic factors that determine the degree of heat stress (air temperature, humidity, air movement, and heat radiation) relative to the surrounding work environmental heat load. ▪ Know the signs and symptoms of heat exhaustion, heat cramps, and heat stroke. Heat stroke is a true medical emergency requiring immediate emergency response action. NOTE: The severity of the effects of a given environmental heat stress is decreased by reducing the work load, increasing the frequency and/or duration of rest periods, and by introducing measures which will protect employees from hot environments. ▪ Maintain adequate water intake by drinking water periodically in small amounts throughout the day (flavoring water with citrus flavors or extracts enhances palatability). ▪ Allow approximately 2 weeks with progressive degrees of heat exposure and physical exertion for substantial acclimatization. ▪ Acclimatization is necessary regardless of an employee's physical condition (the better one's physical condition, the quicker the acclimatization). Tailor the work schedule to fit the climate, the physical condition of employees, and mission requirements. ▪ A reduction of work load markedly decreases total heat stress. ▪ Lessen work load and/or duration of physical exertion the first days of heat exposure to allow gradual acclimatization. ▪ Alternate work and rest periods. More severe conditions may require longer rest periods and electrolyte fluid replacement.
	4B) Wet Bulb Globe Temperature (WBGT) Index	4B) WBGT ▪ Curtail or suspend physical work when conditions are extremely severe (see attached Heat Stress Index). ▪ Compute a Wet Bulb Globe Temperature Index to determine the level of physical activity (take WBGT index measurements in a location that is similar or closely approximates the environment to which employees will be exposed). WBGT THRESHOLD VALUES FOR INSTITUTING PREVENTIVE MEASURES 80-90 degrees F — Fatigue possible with prolonged exposure and physical activity. 90-105 degrees F — Heat exhaustion and heat stroke possible with prolonged exposure and physical activity. 105-130 degrees F — Heat exhaustion and heat stroke are likely with prolonged heat exposure and physical activity.

Job Hazard Analysis

Job Title: Field Work - General **Date of Analysis:** 02/18/2015

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	4C) Cold Extremes	4C) Take precautions to prevent cold stress injuries ▪ Cover all exposed skin and be aware of frostbite. While cold air will not freeze the tissues of the lungs, slow down and use a mask or scarf to minimize the effect of cold air on air passages. ▪ Dress in layers with wicking garments (those that carry moisture away from the body – e.g., cotton) and a weatherproof slicker. A wool outer garment is recommended. ▪ Take layers off as you heat up; put them on as you cool down. ▪ Wear head protection that provides adequate insulation and protects the ears. ▪ Maintain your energy level. Avoid exhaustion and over-exertion which causes sweating, dampens clothing, and accelerates loss of body heat and increases the potential for hypothermia. ▪ Acclimate to the cold climate to minimize discomfort. ▪ Maintain adequate water/fluid intake to avoid dehydration.
	4D) Wind	4D) Effects of the wind ▪ Wind chill greatly affects heat loss (see attached Wind Chill Index). ▪ Avoid marking in old, defective timber, especially hardwoods, during periods of high winds due to snag hazards.
	4E) Thunderstorms	4E) Thunderstorms ▪ Monitor weather channels to determine if electrical storms are forcased. ▪ Plan ahead and identify safe locations to be in the event of a storm. (e.g., sturdy building, vehicle, etc.) ▪ Suspend all field work at the first sound of thurnder. You should be in a safe place when the time between the lightning and thunder is less than 30 seconds. ▪ Only return to work 30 minutes after the after the last strike or sound of thunder
5. Check and calibrate industrial hygiene and other field instruments and	5A) Exposure to Calibration Gases/Chemicals due to: • Use of damaged instruments.	5A) Verify proper operation of the instrument prior to calibration. Calibrate instruments in an area with adequate ventilation and follow the manufacturer's recommendations. ▪ Wear appropriate PPE to conduct calibrations as specified in the instrument manual.

Job Hazard Analysis

Job Title: Field Work - General **Date of Analysis:** 02/18/2015

Key Work Steps	Hazards/Potential Hazards	Safe Practices
equipment as required and as recommended by the manufacturer	5B) Exposure to Site contaminants due to: • Improper instrument calibration; • Misinterpretation of calibration results; • Improper instrument repair; • Improper use of instrument due to lack of training.	5B) Calibrate the instrument in accordance with the manufacturer's recommendations (see instrument manual) using the applicable calibration standard and calibration procedure. • Perform calibrations at a frequency recommended by the manufacturer. Be aware of the instrument's limitations (e.g., detection limit, maximum sensitivity) and the conditions (e.g., humidity) that may affect correct operation or accuracy of that equipment. Possible sources of error that may affect the correct calibration of the instrument. • Use only calibration materials recommended by the manufacturer for calibration. Do not use substitutions. • Confirm that the connections between the instrument and the calibration gas/material is leak-free. • Record all instrument calibrations in the field logbook. Include the instrument ID (type/manufacture/serial number/lamp eV, etc.), calibration gas used (chemical and concentration), and instrument result. • Do not attempt to repair instrument. Return to the vendor for replacement. Report any damaged or malfunctioning instrument to the vendor. • All personnel must be familiar with operation of the instrument and understand: - Theroy of its operation including any alarms and their setpoints - Materials the instrument can and cannot detect, - Instrument's limitations - The expected responses to calibration gases/materials - Interfering gases/chemicals and their affects on the instrument readings - When re-zeroing is appropriate

Heat Index Chart

% Relative Humidity

Temperature	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
110	108	112	117	123	130											
105	102	105	108	113	117	122	130									
100	97	98	102	104	107	110	115	120	126	132						
95	91	93	95	96	98	100	104	106	109	113	119	124	130			
90	86	87	88	90	91	92	95	97	98	100	103	106	110	114	117	121
85	81	82	83	84	85	86	87	88	89	90	92	94	96	97	100	102
80	76	77	78	78	79	79	80	81	82	83	84	85	86	87	88	89

Legend	
80-89 degrees	Fatigue is possible with prolonged exposure and/or physical activity.
90-104 degrees	Sunstroke, heat cramps and heat exhaustion are possible with prolonged exposure and/or physical activity.
105-129 degrees	Sunstroke, heat cramps and heat exhaustion are likely. Heat stroke is possible with prolonged exposure and/or physical activity.
130+ degrees	Heatstroke/sunstroke is highly likely with continued exposure.

Wind Chill Chart

Wind (mph) \ Temperature (°F)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5		36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10		34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15		32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20		30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25		29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30		28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35		28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40		27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45		26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50		26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55		25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60		25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes | 10 minutes | 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

Job Hazard Analysis

Job Title: Excavation and Backfilling **Date of Analysis:** 02/18/2015

Minimum Recommended PPE*: High visibility vest, hard hat, steel-toed boots, safety glasses, hearing protection
*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. Identify location of underground utilities	1A) Encountering electrical, gas, communications, water, or other underground utility lines	1A) Identify utility locations prior to mobilizing: ▪ Contact "Dig Safe" and obtain a permit (or one call center) to have underground utilities located and marked prior to any subsurface work on site. ▪ Confirm other utility providers (e.g., local water, sewer, etc.) have been notified and the utilities marked. ▪ Use facility engineers and/or employ a private utility locator for utilities on private property. ▪ Maintain utility markings throughout the duration of the field work. If the site activity will remove/destroy the original markers of underground installation(s), place offset markers prior any intrusive work to mark the location of the utilities. Pin flags in colors corresponding to the color code used by Dig Safe will be used to mark the offset and the path of all site utilities. ▪ Work at adequate offsets from utility locations. For areas where utility locations cannot be verified, hand dig for the first 3 feet. Immediately cease work if unknown utility markings are discovered.
2. Excavation of impacted soils	2A) Underground utilities	2A) Underground utilities ▪ Work at adequate offsets from utility locations ▪ For areas where utility locations cannot be verified, workers must hand dig for the first 3 feet ▪ Immediately cease work if unknown utility markings are discovered. ▪ Conform to utility clearances based on voltage of lines. For power lines of 50 KV or less stay at least 10 feet away. For power lines of > 50 KV, add an additional 0.4 inches per KV over 50 KV. Rule of thumb: Stay 10 feet away if power line known to be 50 KV or less. Stay 35 feet away for lines > 50 KV or if voltage is unknown.
	2B) Vapor/Dust Exposure	2B) Vapor/Dust Exposure ▪ Conduct breathing zone air monitoring as described in the HASP. ▪ Implement dust control measures as applicable as described in the HASP. ▪ Wear proper PPE as described in the HASP.
	2C) Odors	2C) Odors ▪ If applicable, implement odor control mitigation in accordance with the Site Management Plan.
	2D) Heavy Equipment	2D) Heavy Equipment ▪ See General Site Hazards described in the HASP.
	2E) Cave-ins	2E) Cave-ins Excavation work must be conduct in accordance with OSHA 1926 Subpart P (650-652) Excavations including but not limited to: ▪ Amec Foster Wheeler personnel shall not enter the excavation for any reason. The general contractor shall: ▪ Designate a competent person to inspect, decide soil classification, proper sloping, the correct shoring, or sheeting for the excavation.

Key Work Steps	Hazards/Potential Hazards	Safe Practices
		▪ Guard by a shoring system, slope of the ground, or some other equivalent means. Walls and faces of trenches 5 feet or more deep, and all excavations in which employees may be exposed to danger from moving ground or cave-in shall be guarded. ▪ Cordon-off the perimeter of the excavation to delineate cave-in hazard area. ▪ Construct diversion ditches or dikes to prevent surface water from entering excavation and provide good drainage of the areas surrounding the excavation. ▪ Collect ground water/rain water from excavation and dispose of properly ▪ Store spoils, materials and equipment at least 2 feet from the edge of the excavation; prevent excessive loading of the excavation face. ▪ Inspect excavations (when personnel entry is required) daily, any time conditions change and document the inspection.
	2F) Slips/Trips/Falls	2F) Slips/Trips/Falls The general contractor shall: ▪ Provide sufficient egress (stairs, ladders, or ramps) when workers enter excavations over 4 feet in depth, and place these structures so that workers travel no more than 25 feet to reach ladders. Provide at least two means of exit for personnel working in excavations. ▪ Maintain minimum safe distance from the excavation and only approach the excavation on the short side.
	2G) Confined Space	2G) Confined Space **Amec Foster Wheeler personnel are not authorized to enter excavations. Soil samples will be collected from the excavator bucket. No exceptions.** ▪ Treat excavations over 4 feet deep as confined spaces and implement confined space permit entry procedure prior to entry. ▪ Monitor atmosphere in excavation for oxygen, flammable then toxic vapors, in that order. ▪ Implement confined space entry JHA.
	2H) Site Security	2H) Site Security ▪ Fill in excavation prior to leaving the site or provide barricades or fencing (able to withstand 200 lbs. of vertical pressure) to protect the excavation from the public and place warning signs on fence/barricade. ▪ Consider hiring a security guard ▪ If cover excavation with plywood or other material, ensure cover is labeled with the words “cover” or “hole.”
3) Backfilling of Soils	3A) Heavy Equipment	3A) Heavy Equipment ▪ See General Site Hazards (Heavy Equipment)
	3B) Cave-ins	3B) Cave-ins ▪ See 2E above.

Completed by: Annette McLean Date: 02/18/2015

Job Hazard Analysis

Job Title: Groundwater Sampling **Date of Analysis:** 02/18/2015

Minimum Recommended PPE*: steel-toed boots, safety glasses, chemical resistant gloves

*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. Prepare for sampling event	1A) Chemical exposure	1A) Chemical Exposure ▪ Read HASP and determine air monitoring and PPE needs.
2. Carrying equipment to well	2A) Back or muscle strain	2A) Back or muscle strain ▪ Use proper lifting techniques when lifting pumps or generators. ▪ Use mechanical aids if available. ▪ Use 2 person lift for heavy items.
3. Calibrate monitoring equipment	3A) Exposure to calibration gases	3A) Exposure to calibration gases ▪ Review equipment manuals. ▪ Calibrate in a clean, well-ventilated area.
4. Opening the well cap, taking water level readings	4A) Contact with poisonous plants or the oil from poisonous plants	4A) Contact with poisonous plants or the oil from those plants: ▪ Look for signs of poisonous plants and avoid. ▪ Wear PPE as described in the HASP. ▪ Do not touch anything part of your body/clothing. ▪ Always wash gloves before removing them. ▪ Discard PPE in accordance with the HASP.
	4B) Contact with biting insects (i.e., spiders, bees, etc.) which may have constructed a nest in the well cap/well.	4B) Contact with stinging/biting insects ▪ Discuss the types of insects expected at the Site and be able to identify them. ▪ Look for signs of insects in and around the well. ▪ Wear Level of PPE as described in the HASP. At a minimum, follow guidelines in the JHA "Insects Stings and Bites." ▪ If necessary, wear protective netting over your head/face. ▪ Avoid contact with the insects if possible. ▪ Inform your supervisor and the Site Health and Safety Supervisor if you have any allergies to insects and insect bites. Make sure you have identification of your allergies with you at all times and appropriate response kits if applicable. Get medical help immediately if you are bitten by a black widow or brown recluse, or if you have a severe reaction to any spider bite or bee sting.
	4C) Exposure to hazardous Inhalation and contact with hazardous substances (VOC contaminated groundwater/soil); liquid splash; flammable atmospheres.	4C) Exposure to hazardous substances ▪ After the initial headspace reading (if required by the Work Plan), allow the well to vent for several minutes before obtaining water level and before sampling. ▪ Wear PPE as identified in HASP. ▪ Review hazardous properties of site contaminants with workers before sampling operations begin. ▪ Monitor breathing zone air in accordance with HASP to determine levels of contaminants present. ▪ When decontaminating equipment wear additional eye/face protection over the safety glasses such as a face shield.

Job Hazard Analysis

Job Title: Groundwater Sampling **Date of Analysis:** 02/18/2015

Minimum Recommended PPE*: steel-toed boots, safety glasses, chemical resistant gloves

*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	4D) Back strain due to lifting bailers or pumps and from moving equipment to well locations	4D) Back strain ▪ Use mechanical aids when possible, if mechanical aids are not available, use two person lifts for heavy items. ▪ Use proper lifting techniques
	4E) Foot injuries from dropped equipment	4E) Foot Injuries ▪ Be aware when moving objects, ensure you have a good grip when lifting and carrying objects. ▪ Do not carry more than you can handle safely. ▪ Wear Steel toed boots.
5. Collecting water samples	5A) Fire/Explosion/Contamination hazard from refueling generators	5A) Fire/Explosion/Contamination hazard from refueling generators ▪ Turn the generator off and let it cool down before refueling. ▪ Segregate fuel and other hydrocarbons from samples to minimize contamination potential. ▪ Transport fuels in approved safety containers. The use of containers other than those specifically designed to carry fuel is prohibited. ▪ See JHA for Gasoline use.
	5B) Electrocution	5B) Electrocution ▪ A ground fault circuit interrupter (GFCI) device must protect all AC electrical circuits. ▪ Use only correctly grounded equipment. Never use three-pronged cords which have had the third prong broken off. ▪ Make sure that the electrical cords from generators and power tools are not allowed to be in contact with water. ▪ Do not stand in wet areas while operating power equipment. ▪ Always make sure all electrically-powered sampling equipment is in good repair. Report any problems so the equipment can be repaired or replaced. ▪ When unplugging a cord, pull on the plug rather than the cord. ▪ Never do repairs on electrical equipment unless you are both authorized and qualified to do so.
	5C) Exposure to contaminants	5C) Exposure to Contaminants ▪ Stand up wind when sampling. ▪ Monitor breathing zone with appropriate monitoring equipment (see HASP). ▪ Wear chemical resistant PPE as identified in HASP. ▪ See section 4C) under Safe Practices above.
	5D) Infectious water borne diseases	5D) Infectious water borne diseases ▪ Wear chemical resistant gloves and other PPE – as identified in HASP. ▪ Prevent water from contacting skin. ▪ Wash exposed skin with soap and water ASAP after sampling event. ▪ Ensure that all equipment is adequately decontaminated using a 10% bleach solution.

Job Hazard Analysis

Job Title: Groundwater Sampling **Date of Analysis:** 02/18/2015

Minimum Recommended PPE*: steel-toed boots, safety glasses, chemical resistant gloves

*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	5E) Exposure to water preservatives	5E) Exposure to water preservatives ▪ Work in a well-ventilated area, upwind of samples. ▪ Wear chemical resistant PPE as identified in HASP. ▪ When preserving samples always add acid to water, avoid the opposite. ▪ See JHA Acids – Sampling.
	5F) Slips/trips/falls	5F) Slips/trips/falls ▪ Ground can become wet/muddy, created by spilled water. ▪ Place all purged water in drums for removal. ▪ Wear good slip resistant footwear.
	5G) Repetitive Motion and other Ergonomic Issues	5A) Ergonomic Issues ▪ Use mechanical means where possible to raise and lower equipment into well. ▪ Alternate raising and lowering equipment between field sampling team members, and alternate bailing the well. ▪ Use safe lifting techniques.
6. Sample Processing	6A) Contaminated water	6A) Contaminated water ▪ Wear appropriate PPE as identified in HASP. ▪ Prevent water from contacting skin. ▪ Work in well-ventilated area – upwind of samples. ▪ Waste will be returned to the operation office for storage and disposal.
7. Shipping Samples	7A) Freeze burns, back strain, hazardous chemical exposure, sample leakage	7A) Freeze burns, back strain, hazardous chemical exposure, sample leakage ▪ Wear appropriate chemical resistant gloves as identified in HASP. ▪ Wear leather or insulated gloves when handling dry ice. ▪ Follow safe lifting techniques – get help lifting heavy coolers. ▪ Samples that contain hazardous materials under the DOT definition, must be packaged, manifested and shipped by personnel that have the appropriate DOT HAZMAT training.

Job Hazard Analysis - HASP Format
Job Title: Groundwater Sampling from a General Contractor's Boat/Barge Date of Analysis: 12/11/08

Minimum Recommended PPE*: Safety boots/Shoes; Personal Flotation Device; Safety Glasses

***See HASP for all required PPE**

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1) Prepare for site visit	1A) Slips, trips, falls	1A) Slips, trips, falls ▪ Familiarize self with site prior to visit. ▪ Complete appropriate training before going on site. ▪ Ensure the General Contractor has appropriate trained staff to operate the boat/barge. ▪ Provide the Project Manager your field work itinerary so that he/she knows your daily schedule. ▪ Prepare listing of emergency phone numbers, both on and offsite. ▪ Identify site/activity PPE needs – see HASP. ▪ Ensure that First Aid training is current.
2. Working at the site	2A) General Field Work – Walking and working in the field, Environmental conditions, communication	2A) See JHA for Field Work – General.
3. Weather Extremes	3A) Weather extremes (thunder, wind, etc.)	3A) See JHA for Field Work – General.
4. Working Near or in the Water	4A) Drowning Hazards	4A) Drowning Hazards The General Contractor must: ▪ Inspect the vessel to ensure it is safe to use (no holes, defects, etc.). ▪ Ensure that the anchors are adequate weight and the anchor ropes are adequate lengths to securely anchor the vessel in the water at each sampling location. ▪ Attach a safety line anchored to a stable point on shore to the vessel if the body of water is fast moving. ▪ Do not overload the vessel. ▪ Distribute the weight of people and equipment evenly to keep the vessel stable. ▪ Keep the load as low as possible and secure equipment to prevent it from shifting and affecting the stability of the vessel. ▪ When entering or exiting the vessel, maintain three points of contact (with the vessel) and stay low to maintain balance.

Job Hazard Analysis - HASP Format
Job Title: Groundwater Sampling from a General Contractor's Boat/Barge Date of Analysis: 12/11/08

Minimum Recommended PPE*: Safety boots/Shoes; Personal Flotation Device; Safety Glasses

***See HASP for all required PPE**

Key Work Steps	Hazards/Potential Hazards	Safe Practices
		▪ All personnel working on or near the water must: ▪ Don a Coast Guard approved personal flotation device (PFD) rated for your weight when working within 6 feet of the water's edge. Keep the PFD fastened at all times. Due to the amount of gear, equipment, etc. that personnel will need to transport, a Coast Guard-approved inflatable PFD may be used in lieu of the standard type PFD. ▪ Do not lean your shoulders too far outside of the vessel as this can capsize the vessel. ▪ Stay away from dams. It is illegal and dangerous to boat near them. ▪ Stay clear of "strainers" (fallen trees, branches, etc.). **Rescue Procedures** ▪ If you fall out of the vessel, hold onto the vessel - unless it presents a life-threatening situation. If floating in current, position yourself on the upstream side of the capsized vessel. Keep your feet up (on the surface) and pointed downstream and swim to shore. ▪ Swim to calm water before attempting to stand up in the water.
5. Load/carry equipment to the site.	5A) Slips, trips, falls	5A) Slips, trips, falls ▪ See JHA Field Work – General.
	5B) Irate property owners, pets	5B) Irate property owners, pets ▪ Call property owners in advance. ▪ Check in to introduce yourself upon arrival. ▪ Be courteous and diplomatic

Job Hazard Analysis - HASP Format
Job Title: Groundwater Sampling from a General Contractor's Boat/Barge Date of Analysis: 12/11/08

Minimum Recommended PPE*: Safety boots/Shoes; Personal Flotation Device; Safety Glasses

***See HASP for all required PPE**

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	5C) Crime	5C) Crime ▪ Do not enter areas where threats are present. ▪ Contract security where applicable. Use the buddy system. ▪ Maintain contact with support such as radio or cell phone.
	5D) Struck by traffic – General Contractor launches vessel.	5D) Struck by traffic – General Contractor launches vessel. ▪ Wear high-visibility safety vest, use buddy system. ▪ Use traffic cones and a lookout. Have the General Contractor launch the vessel from public boat launch facilities if available.
	5E) Battery handling – acid exposure	5E) Battery handling – acid exposure ▪ Amec Foster Wheeler personnel shall not touch nor operate any of the General Contractor's vessel equipment.

Job Hazard Analysis - HASP Format
Job Title: Groundwater Sampling from a General Contractor's Boat/Barge Date of Analysis: 12/11/08

Minimum Recommended PPE*: Safety boots/Shoes; Personal Flotation Device; Safety Glasses

***See HASP for all required PPE**

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	5F) Working on the boat/barge: Capsize	5F) Working on the boat/barge: Capsize ▪ Ascertain from the General Contractor's supervisor the vessel's maximum weight, person capacity, and engine size limit. ▪ Balance the gear and people on the vessel. ▪ All personnel near the water or on water must wear approved, properly sized and buckled Coast Guard-approved PFD suited to their weight. ▪ Ensure vessel lines and body parts are out of the water before the vessel engine is turned on. ▪ General Contractor should provide signal flags and communication to protect the public of vessel activities where applicable. ▪ General Contractor should test the motor prior to shoving away from the launch dock/pier/platform. ▪ The General Contractor must ensure that all appropriate equipment (e.g., fire extinguisher, life ring with at least 90 feet of rope, etc.) is provided and accessible according to Coast Guard safe boating recommendations. The General Contractor must include a bailer, anchor, second means of propulsion, line and throw able floatation, etc. See the Amec Foster Wheeler EH&S Manual – Boating Safety for examples of these equipment.
	5G) Noise – engine (if applicable – noise at 85 decibels or greater)	5G) Noise – engine (if applicable – noise at 85 decibels or greater) ▪ Wear hearing protection.

Job Hazard Analysis - HASP Format
Job Title: Groundwater Sampling from a General Contractor's Boat/Barge Date of Analysis: 12/11/08

Minimum Recommended PPE*: Safety boots/Shoes; Personal Flotation Device; Safety Glasses

***See HASP for all required PPE**

Key Work Steps	Hazards/Potential Hazards	Safe Practices
6. Collecting Field parameters	6A) Falling into water and capsize	6A) Falling into water and capsize ▪ General Contractor shall use equipment that facilitates reaching the sampling location from a safe distance (extensions, etc.). ▪ Work using the buddy system. ▪ Wear PFD when working on the water. ▪ The General Contractor must balance equipment and people and anchor or secure the vessel at the sample location. ▪ Amec Foster Wheeler person should remain in an area on the vessel that is out of the way of operating equipment, etc. ▪ Avoid leaning over the side of the boat/barge. ▪ General Contractor should steer vessel to meet waves on the bow. ▪ If moving about, keep weight low.
	6B) Slips trips and falls	6B) Slips trips and falls ▪ Wear appropriate safety-toe, non-slip footwear. ▪ Survey and clear walking area. ▪ Do not walk on slippery surfaces. ▪ Maintain good housekeeping. ▪ Provide walkways, platforms or secure walking surface. ▪ Use the buddy system and maintain communications with support staff.

Job Hazard Analysis - HASP Format
Job Title: Groundwater Sampling from a General Contractor's Boat/Barge Date of Analysis: 12/11/08

Minimum Recommended PPE*: Safety boots/Shoes; Personal Flotation Device; Safety Glasses

***See HASP for all required PPE**

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	6C) Vermin, leaches, Insect/animal born disease	6C) Vermin, leaches, Insect/animal born disease ▪ Survey the area for dens, nests, etc. ▪ Identify areas where biological hazards may be present. ▪ Be aware of your surroundings. ▪ Wear insect netting clothing or apply insect repellant on all exposed skin surfaces as appropriate – consider sample contamination. ▪ Wear long sleeve shirt and full-length pants. ▪ Do not put hand/arm into/under an area that you cannot see into/under clearly. ▪ Do not touch any suspected contaminant without appropriate hand PPE. ▪ Wash hands as soon as possible upon completion of task. ▪ Perform routine inspections for ticks, leaches, etc. of yourself and co-workers. Ticks may be present during colder months. ▪ Remain vigilant and respectful of wildlife. (See JHA for Insects, Stings and Bites.) ▪ Wear wind impervious outerwear.

Job Hazard Analysis - HASP Format
Job Title: Groundwater Sampling from a General Contractor's Boat/Barge Date of Analysis: 12/11/08

Minimum Recommended PPE*: Safety boots/Shoes; Personal Flotation Device; Safety Glasses

***See HASP for all required PPE**

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	6D) Run aground – shifting or unbalanced vessel - equipment/personnel/slip/ fall/overboard	6D) Run aground – shifting or unbalanced vessel – equipment/personnel/slip/fall/overboard ▪ The General Contractor must operate the vessel at a safe speed. ▪ The General Contractor should post a look out for shallow or submerge obstacles. ▪ Remain seated (if applicable) when under way. ▪ The General Contractor should be aware and alert for signs of tides, flooding, flash floods, and dam releases. ▪ The General Contractor should use the anchor line or a pole/paddle to pull the vessel back toward the way direction of deeper water.
7. Sample collection	7A) Same as Item #6 above.	7A) Same as Item #6 above.
	7B) Bending, pulling, twisting	7B) Bending, pulling, twisting ▪ Use a proper lifting technique.
	7C) Splash	7C) Splash ▪ Wear safety glasses (tinted for sun if applicable). ▪ Be aware if sampling water through a filter (if applicable), if it becomes plugged with sediment it may unexpectedly "blow off" the hose and splash. ▪ Change filter prior to sedimentation back-pressure. ▪ Minimize pouring distance to limit the splash between containers.

Job Hazard Analysis - HASP Format
Job Title: Groundwater Sampling from a General Contractor's Boat/Barge Date of Analysis: 12/11/08

Minimum Recommended PPE*: Safety boots/Shoes; Personal Flotation Device; Safety Glasses

***See HASP for all required PPE**

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	7D) Chemical exposure	7D) Chemical exposure ▪ Wear PPE including protective gloves and safety glasses as appropriate. See HASP. ▪ Review and understand material safety data sheet (MSDS) for all chemicals being handled. ▪ Work slowly and carefully when handling acids and caustic substances. ▪ Wear adequate PPE and wash hands after completion of task.
8. Vessel Operations	8A) Lack of boating skills, boating incident	8A) Lack of boating skills, boating incident ▪ The General Contractor must have completed Coast Guard –approved safety boating course or other equivalent and recognized boating course and have a HASP that describes the hazards and hazard controls for vessel operation. ▪ All employees must wear PFDs while the vessel is underway. ▪ The General Contractor must maintain vessel and proper safety equipment. ▪ Carry a cell phone or two-way radio. ▪ If on navigable waterway, file a float plan with the Project Manager ▪ Always follow the buddy system.

Job Hazard Analysis - HASP Format

Job Title: Surface Water/Sediment Sampling and Installing Diffusion Samplers from Shore D**ate of Analysis:** 5/31/06

Minimum Recommended PPE*: Safety Boots/Shoes; Safety Glasses; Rubber boots; Waders; Personal Flotation Device;
*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. Prepare for site visit	1A) Slips, trips, falls	1A) Familiarize self with site prior to visit. ▪ Complete appropriate training before going on site. ▪ Provide appropriate person in district office your itinerary. ▪ Prepare listing of emergency phone numbers, both on and offsite. ▪ Identify site/activity PPE needs. ▪ Ensure that First Aid training is current, and that tetanus booster are current.
2. Check and calibrate sampling equipment.	2A) Muscle Strain - lifting, twisting, tugging	2A) Muscle Strain - lifting, twisting, tugging ▪ Inspect all PPE and equipment and ensure that it is working properly. ▪ Get assistance from a coworker or use mechanical means to move equipment (dolly, cart, etc.)
	2B) Slips, trips, falls, strain	2B) Slips, trips, and falls ▪ Wear proper footwear. ▪ Pay attention to where walking.
3. Load/carry equipment to the site.	3A) Slips, trips, falls,	3A) Slips, trips, falls ▪ See JHA for Mobilization / Demobilization and Site Preparation ▪ Survey and clear the pathway. See JHA for Clearing Brush and Trees
	3B) Muscle Strain - lifting, twisting, tugging	3B) Muscle Strain - lifting, twisting, tugging ▪ Proper lifting, ergonomic practices and body mechanics. ▪ Share the load, move items in smaller shifts, or use cart.
	3C) Irate property owners, pets	3C) Irate property owners, pets ▪ Call property owners in advance. ▪ Check in to introduce yourself upon arrival. ▪ Be courteous and diplomatic
	3D) Crime	3D) Crime ▪ Do not enter areas where threats are present. ▪ Contract security where applicable. ▪ Use the buddy system. ▪ Maintain contact with support such as radio or cell phone.
	3E) Struck by traffic - sampling from a bridge or roadway.	3E) Struck by traffic - sampling from a bridge or roadway. ▪ Wear orange/yellow safety vest ▪ Use buddy system. ▪ Use traffic cones and a lookout. ▪ Attempt to sample away from the bridge if possible
4. Field parameters	4A) Falling into water	4A) Falling into water ▪ Limit access to water. ▪ Use equipment that facilitates reaching the location from a safe distance. ▪ Work using the buddy system. Wear PFD if working NEAR or ON the water.

Job Hazard Analysis - HASP Format

Job Title: Surface Water/Sediment Sampling and Installing Diffusion Samplers from Shore D**ate of Analysis:** 5/31/06

Minimum Recommended PPE*: Safety Boots/Shoes; Safety Glasses; Rubber boots; Waders; Personal Flotation Device;
*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	4B) Slips trips and falls	4B) Slips trips and falls ▪ Wear appropriate footwear. ▪ Survey and clear walking area. ▪ Do not walk on slippery surfaces. ▪ Housekeeping.
	4C) Stuck in the mud or sand	4C) Stuck in the mud or sand ▪ Ensure secure footing. ▪ Provide walkways, platforms or secure walking surface. ▪ Use the buddy system and maintain communications with support staff. ▪ (See JHA for Rescue from Mud footing)
	4D) Vermin, leaches, Insect/animal born disease	4D) Vermin, leaches, Insect/animal born disease ▪ Survey the area for dens, nests, etc. ▪ Identify areas where biological hazards may be present. ▪ Be aware of your surroundings. ▪ Wear insect netting clothing or apply insect repellant on all exposed skin surfaces as appropriate – consider sample contamination ▪ Wear long sleeve shirt and full length pants ▪ Wear appropriate footwear (snake boots, etc.) ▪ Avoid high grass areas if possible ▪ Tuck pants leg into boot ▪ Do not put hand/arm into/under an area that you cannot see into/under clearly ▪ Do not touch any suspected contaminant without appropriate hand PPE ▪ Wash hands as soon as possible upon completion of task. ▪ Perform routine inspections for ticks, leaches, etc. of yourself and co-workers. ▪ Contract vermin relocation, if applicable. ▪ Remain vigilant and respectful of wildlife. ▪ See JHA for Insects, Stings and Bites ▪ See JHA for Dog – Wildlife Safety.

Job Hazard Analysis - HASP Format

Job Title: Surface Water/Sediment Sampling and Installing Diffusion Samplers from Shore D**ate of Analysis:** 5/31/06

Minimum Recommended PPE*: Safety Boots/Shoes; Safety Glasses; Rubber boots; Waders; Personal Flotation Device;
*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	4E) Weather – temperature extremes	4E) Weather – temperature extremes ▪ Train workers about weather and appropriate precautions. ▪ Heat: o Familiarize self with signs of heat related illnesses: cramps, heat rash, dehydration, heat exhaustion, and heat stroke. ▪ Sun: o Keep body protected o Wear sunscreen, wide brimmed hat or hardhat. o Drink plenty of fluids to remain hydrated. o Schedule work for cool part of day. o Take breaks in the shade. ▪ Wind: o Wear layered clothing, gloves, hard hat with winter liner, etc. ▪ Cold: o During cold weather - layer clothing and wear wind impervious outerwear o During warm months – wear a long sleeve cotton/breathable fabric shirt and pant.
5. Sample collection	5A) Same as Item #4 above.	5A) Same as Item #4 above.
	5B) Bending, pulling, twisting	5B) Bending, pulling, twisting ▪ Use a vibrating or wiggling motion on the sample device to break the soil suction. ▪ Proper lifting technique.
	5C) Splash	5C) Splash ▪ Wear appropriate safety glasses (tinted for sun). ▪ Be aware if sampling water through a filter, if it becomes plugged with sediment it may unexpectedly “blow off” the hose and splash. ▪ Change filter prior to sedimentation back pressure.
	5D) Chemical exposure	5D) Chemical exposure ▪ Wear PPE including protective gloves, coveralls, and safety glasses as appropriate. ▪ Work upwind of the sample location. ▪ Minimize exposure using a shovel/spoon or tool to collect the sample. ▪ Review and understand MSDS for all chemicals being handled. ▪ Be careful when handling acids and caustic substances. ▪ Wear adequate PPE and wash hands after completion of task.

Job Hazard Analysis - HASP Format

Job Title: Surface Water/Sediment Sampling and Installing Diffusion Samplers from Shore D**ate of Analysis:** 5/31/06

Minimum Recommended PPE*: Safety Boots/Shoes; Safety Glasses; Rubber boots; Waders; Personal Flotation Device;
*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	5E) Vegetation, sticks, reeds, - cuts and punctures	5E) Vegetation, sticks, reeds, - cuts and punctures ▪ Clear access to site. ▪ Be familiar with toxic plants such as poison ivy. Avoid such plants. ▪ Wash thoroughly after accidental contact with toxic materials and plants.
6. Sample preparation.	6A) Lifting heavy objects (covers, pumps, sampling equipment, coolers, etc.) Muscle strain	6A) Lifting heavy objects (covers, pumps, sampling equipment, coolers, etc.) Muscle strain ▪ Use proper ergonomics when lifting heavy objects ▪ Use appropriate mechanical assistance and tools when possible.
	6B) Chemical Exposure	6B) Chemical Exposure ▪ Wear PPE including protective gloves, coveralls, and safety glasses as appropriate. ▪ Wash/wipe or decontaminate exterior of sample containers and equipment. ▪ Use care handling preservatives (acids/bases.)
	6C) Sharps and knives	6C) Sharps and knives ▪ Use care handling tape dispensers, knives and sharp objects.
	6D) Extreme cold (ice preservation)	6D) Extreme cold (ice preservation) ▪ Minimize exposure to ice. ▪ Use a shovel/spoon or tool to fill bags for preserving samples in coolers.
7. Site exit and drive home or next site.	7A) Vehicle contamination	7A) Vehicle contamination ▪ Wash hands promptly. ▪ Contaminated PPE (booties, Tyvek, nitrile gloves) should be disposed on-site. ▪ Remove boots and soiled clothing for secure storage in trunk; decontaminate as soon as possible. ▪ Update exposure log.
	7B) Traffic hazards.	7B) Traffic hazards. ▪ See JHA for Mobilization / Demobilization and Site Preparation.

Job Hazard Analysis - Short Form HASP

Job Title: Geoprobe Investigation – Oversight and Sample Collection ONLY. It should be noted that Amec Foster Wheeler will not be operating the Geoprobe drill rig. Amec Foster Wheeler will only be describing and collecting soil / water samples. **Date of Analysis:** 4/21/06

Minimum Recommended PPE*: High visibility vest, hard hat, steel-toed boots, safety glasses, hearing protection, proper hand protection for soil sampling

*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. General Contractor Drive Geoprobe onto site	1A) Malfunction of vehicle/equipment	1A) Drivers shall perform a pre-operational check of equipment, read and be familiar with any operator's manual. ▪ Report all needed repairs promptly. ▪ Operators shall not use defective/unsafe equipment.
	1B) Wreck of Geoprobe while being driven	1B) Wreck of Geoprobe while being driven ▪ All drivers shall be properly licensed. ▪ Supervisors shall verify that drivers are capable and qualified on each type of equipment before allowing the equipment to be used unsupervised. ▪ Keep wind shields, windshield wipers, side mirrors and side windows clean ▪ Drivers shall conduct a pre-operation vehicle safety check ▪ Drivers shall plan ahead to minimize or eliminate the need for backing. Always check to the rear before backing and use an observer when available. If an observer is not available, the driver shall walk around the vehicle to make sure rear is clear prior to backing. ▪ Seat belts shall be worn when driving by driver and passengers. ▪ Choose the safest location possible to park equipment. Avoid parking in blind spots of other equipment. ▪ Adjust vehicle speed for load and weather. Tire chains should be utilized as dictated by weather conditions. ▪ When operating a vehicle off the roadway, be aware of possible hidden objects in the grass and unstable terrain. ▪ Never allow anyone between truck and trailer when backing to hook trailer ▪ Perform periodic checks of equipment on long trips to assure the load is secure. ▪ Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.
2. Loading/unloading of equipment	2A) Crush and pinch points created when loading/unloading equipment 2B) Heavy lifting, twisting, bending 2C) Slip, trips and falls	2A) Crush and pinch points created when loading/unloading equipment ▪ Be aware of crushing and pinching hazards when loading, unloading and fastening down equipment. ▪ Make sure cargo is properly loaded and secured. ▪ Wear protective equipment consistent with the hazard (hard hats, safety glasses, leather gloves, safety shoes, etc.) 2B) Size up the load, utilize help for heavy items, split loads as necessary. Use proper body mechanics and ergonomic techniques. 2C) Keep walking area clear. Proper housekeeping.
3. Geoprobe operation by General Contractor	3A) Vehicle movement/ unstable 3B) Crushing injuries, pinch points, entanglement and flying particles, 3C) Noise 3D) slip trips and falls, 3E) material under stress, equipment	Geoprobe operation by the General Contractor. Read Owner's Manual. 3A) Always apply the parking brake and shut off engine before exiting the vehicle. • Ensure back up alarm is operational. • Complete a visual inspection of the equipment prior to operation. Replace or repair equipment if necessary. Complete a checklist to document inspections and corrective

Job Hazard Analysis - Short Form HASP

Job Title: Geoprobe Investigation – Oversight and Sample Collection ONLY. It should be noted that Amec Foster Wheeler will not be operating the Geoprobe drill rig. Amec Foster Wheeler will only be describing and collecting soil / water samples. **Date of Analysis:** 4/21/06

Minimum Recommended PPE*: High visibility vest, hard hat, steel-toed boots, safety glasses, hearing protection, proper hand protection for soil sampling

*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	limitations, rope or cable blocks, hydraulic leaks 3F) utility lines, 3G) overhead loads, 3H) lifting 3I) Chemical exposure	actions required. • Keep body parts clear of probe foot. • Be familiar with Emergency kill switch and controls. Test prior to probing. • When on sloped surface position the unit parallel to the slope with the control on the uphill side. • Use caution on soft or loose surface. Be aware of the weight of loaded vehicle. • Be aware of weather and windy conditions. Do not operate during lighting storm or high winds. 3B) Heed all Caution, Warning or Danger decals on machine. • Ensure everyone is clear of moving parts. • Designate only one experienced operator to avoid unexpected engagement. • Operate only from the control side. Do not reach across operating probe. • Avoid placing your hands on top of the tool string when raising/lowering the hammer or swinging/ folding probe assembly. • DO not wear loose clothing. Tie back hair when operating equipment. • PPE – safety shoes, hard hat, safety glasses, hearing protection, gloves. Optional Tyvek or coveralls. 3C) PPE – hearing protection. 3D) Maintain an orderly and clean site. • Housekeeping. • Barricade or establish work zones to minimize unauthorized entry. • Adequate lighting 3E) Know the capacities, equipment limitations and acceptable operating loads. Follow the equipment operator's manual and proper maintenance requirements. • Stand clear of potential release of energy. Keep body part clear of moving parts. • Use the correct tool for the job. • Limit the rate of the hammer lowering while advancing the tool string to avoid raising the probe foot more than 6 inches off the ground surface. • In the event problem or binding, the operator should release all control levers to neutral. • Inspect hydraulic lines. Repair or replace damaged hoses. 3F) Be aware of surroundings. Establish safe "dig" zones. Contact Dig Safe or "one call" system to mark underground utilities or tanks. • Before moving onto a site, evaluate height restrictions due to overhead utilities and vegetation. • Borings to be located a minimum of 10 feet from overhead lines.

Job Hazard Analysis - Short Form HASP

Job Title: Geoprobe Investigation – Oversight and Sample Collection ONLY. It should be noted that Amec Foster Wheeler will not be operating the Geoprobe drill rig. Amec Foster Wheeler will only be describing and collecting soil / water samples. **Date of Analysis:** 4/21/06

Minimum Recommended PPE*: High visibility vest, hard hat, steel-toed boots, safety glasses, hearing protection, proper hand protection for soil sampling

*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
		• Do not drive the machine with the mast extended. 3G) Remain alert. Establish work zone to minimize workers under overhead loads. Avoid sudden jerks or overloading. Check load for balance and appropriate support prior to hoisting. 3H) Use mechanical means to lift heavy loads and removing rod. 3I) Don appropriate PPE for chemicals of concern. Work from upwind. Be aware or combustion fumes if equipment has auxiliary power. Practice good hygiene by washing hands, and no eating/smoking within the exclusion zone.
4. Operational area	4A) adverse weather conditions (temperature extremes), 4B) uneven terrain, 4C) poisonous plants/snakes/insects hazards	4A) Keep a weather eye. Monitor the weather forecast and actual conditions. • Wear appropriate clothing that does not restrict, cause over heat or is too loose. • Be aware of muddy conditions or puddles. 4B) Be aware of drop-offs, uneven ground and potential hidden objects which may cause loss of control when maneuvering rigs or create unstable drill set-ups. In heavily wooded area, scout to locate hidden objects. Use care when walking. 4C) Be aware of poisonous plants, insects, snakes, animals and animal waste products and carcasses. Wear long sleeve shirts, gloves, and high top boots when hazards cannot be avoided. Proper first aid supplies, insect repellents shall accompany field crews.
	4D) Contaminated soils, buried power or gas lines, landfills and containment of spills	4D) Contaminated soils, buried power or gas lines, landfills and containment of spills ▪ During drilling operations, always be aware of the possibility of encountering potentially hazardous materials, such as petroleum hydrocarbons, herbicides, pesticides, chemical manufacturing by-products or solid waste materials. ▪ In the event that any unknown or questionable materials are encountered, then the drilling operations are to be suspended immediately until further instructions are received from supervision. ▪ Do not handle any suspected contaminated materials unless trained to do so and proper protective methods are followed. ▪ During drilling operations, always be aware of the possibility of striking an un-located or improperly located gas or power line. ▪ In the event a buried utility line is struck, drilling operations are to be suspended **immediately**. - If the utility line is electric, keep personnel at least 10 feet from all metal surfaces connected with the drill rig. - If the utility is gas, then the area is to be evacuated and secured. Immediate notification to the utility company is MANDATORY. ▪ In the event of a gas or oil spill, the proper authorities are to be contacted immediately so that containment operations can be implemented.
5. General Contractor Mixing grout on site and filling/placing in	5A) Lifting 5B) Chemical exposure	5A) Size the load of materials to be moved and utilize appropriate help for lifting and moving. Use proper ergonomic and body mechanics to move materials (bags of grout, etc.). Use

Job Hazard Analysis - Short Form HASP

Job Title: Geoprobe Investigation – Oversight and Sample Collection ONLY. It should be noted that Amec Foster Wheeler will not be operating the Geoprobe drill rig. Amec Foster Wheeler will only be describing and collecting soil / water samples. **Date of Analysis:** 4/21/06

Minimum Recommended PPE*: High visibility vest, hard hat, steel-toed boots, safety glasses, hearing protection, proper hand protection for soil sampling

*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
hole between the well pipe and bore hole wall		mechanical mixer for large quantities of grout. 5B) PPE – Safety glasses, safety shoes, gloves, optional Tyvek/coveralls.
6. General Contractor cutting soil acetate sleeve open to sample soil	6A) cutting of hand with a razor blade	6A) Amec Foster Wheeler personnel must let the general contractor cut the sample liners as they have the appropriate tools to do so. 6B) General Contractor must be aware of where hands are placed prior and during cutting with hand saw
7. General Contractor driving drilling rig offsite.	22A) Reference item # 1	22A) Reference item #1.

Job Title: Sub-Slab-Indoor Air Sampling **Date of Analysis:** 11/1/2007
Minimum Recommended PPE*: steel-toed boots, safety glasses, chemical resistant gloves-nitrile, and flashlight/lamp
*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. Mobilization	8A) SEE JHA Mobilization/Demobilization/Site Preparation	8A) See JHA Mobilization/Demobilization/Site Preparation
2. General Site Hazards	9A) See JHA Field Work - General	9A) See JHA Field Work – General
	9B) Chemical exposure	9B) Chemical Exposure ▪ Read HASP and determine air monitoring and PPE needs.
3. Calibrate monitoring equipment	10A) Exposure to calibration gases	10A) Exposure to calibration gases ▪ Review equipment manuals. ▪ Calibrate in a clean, well-ventilated area.
4. Access Residence	11A) Tripping hazards	11A) Observe floors/stairs for potential tripping hazards
	11B) Back strain	11B) Watch back when carrying equipment into residence
	11C) Chemical Hazard	11C) Be careful when identifying residential chemicals ▪ Wear PPE as described in the HASP.
5. Drill Hole in basement floor	12A) Electrocution	12A) Electrocution ▪ A ground fault circuit interrupter (GFCI) device must protect all AC electrical circuits. ▪ Use only correctly grounded equipment. Never use three-pronged cords which have had the third prong broken off. ▪ Make sure that the electrical cords from generators and power tools are not allowed to be in contact with water. ▪ Do not stand in wet areas while operating power equipment. ▪ Always make sure all electrically-powered sampling equipment is in good repair. Report any problems so the equipment can be repaired or replaced. ▪ When unplugging a cord, pull on the plug rather than the cord. ▪ Never do repairs on electrical equipment unless you are both authorized and qualified to do so.
	12B) Exposure to hazardous Inhalation and contact with hazardous substances (VOC contaminated Soil Vapor).	12B) Exposure to hazardous substances ▪ Wear PPE as identified in HASP (steel-toed boots, safety glasses, nitrile gloves and a flashlight or lamp). ▪ Review hazardous properties of site contaminants with workers before sampling operations begin. ▪ Immediately monitor breathing zone using a PID after drilling hole to determine exposure and verify that level of PPE is adequate – see Action Levels in HASP.
	12C) Back strain due to lifting and from moving equipment	12C) Back strain ▪ Use mechanical aids when possible, if mechanical aids are not available, use two person lifts for heavy items. ▪ Use proper lifting techniques.
	12D) Foot injuries from dropped equipment/drill bit	12D) Foot Injuries ▪ Be aware when moving objects, ensure you have a good grip when lifting and carrying objects. ▪ Do not carry more than you can handle safely. ▪ Watch feet when drilling and hold drill firmly. ▪ Wear Steel toed boots.

Key Work Steps	Hazards/Potential Hazards	Safe Practices
6. Collecting Sub-Slab sample	13A) Burn Hazard/fire Hazard	13A) Burn Hazard/Fire Hazard from Melting Wax ▪ Place hot plate in safe location away from flammable material. ▪ Be careful with exposed skin when working around hot plate and hot wax. ▪ Poor wax with spoon and avoid splatter.
	13B) Cutting Hazard	13B) Be careful with sharp knives when cutting tubing
	13C) Exposure to contaminants	13C) Exposure to Contaminants ▪ Monitor breathing zone with appropriate monitoring equipment (see HASP). ▪ Wear chemical resistant PPE as identified in HASP. ▪ See section 5B) under Safe Practices above.
7. Collecting Indoor Air sample	14A) Pinching Hazard	14A) Pinching Hazard from attaching regulators/tubing ▪ Be careful when using wrenches to attach regulator and or tubing to cans to not pinch fingers.

Job Hazard Analysis - HASP Format

Job Title: Sampling Activities (Surface Water and Sediment Sampling) from a General Contractor's Barge
Date of Analysis: 12/19/11
Minimum Recommended PPE: Safety boots; Personal Flotation Device; Safety Glasses; Nitrile Gloves; Glove Liners; Work Clothing Appropriate for the Weather Conditions; a change of clothing.

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1) Prepare for site visit	1B) Slips, trips, falls	1B) Slips, trips, falls ▪ Familiarize self with site prior to visit. ▪ Complete appropriate training before going on site. ▪ Ensure the General Contractor has appropriate trained staff to operate the barge. ▪ Provide the Project Manager your field work itinerary so that he/she knows your daily schedule. ▪ Prepare listing of emergency phone numbers, both on and offsite. See HASP. ▪ Identify site/activity PPE needs – see HASP. ▪ Ensure that First Aid/CPR training is current.
2. Working at the site	2A) General Field Work – Walking and working in the field, Environmental conditions, communication	2A) See JHA for Field Work – General.
3. Weather Extremes	3A) Weather extremes (thunder, wind, snow, etc.)	3A) See JHA for Field Work – General.
4. Working Near or on the Water	4A) Drowning Hazards	4A) Drowning Hazards **The General Contractor must:** ▪ Have appropriate safety training for operation of the vessel (e.g., barge). ▪ A float plan must be prepared and implemented. For this task since Amec Foster Wheeler will maintain an employee on shore to watch and be in communication with vessel operations, the Float Plan is comprised of the HASP and the emergency call numbers. The shore-person is responsible for notifying emergency services if necessary. ▪ Notify the local emergency services (Fire Department) so that they are aware Amec Foster Wheeler and TG&B will be operating a vessel on the water. ▪ Inspect the vessel to ensure it is safe to use (no holes, defects, etc.). ▪ Ensure that the anchors are adequate weight and the anchor ropes are adequate lengths to securely anchor the vessel in the water at each sampling location. ▪ Attach a safety line anchored to a stable point on shore to the vessel if the body of water is fast

Job Hazard Analysis - HASP Format

Job Title: Sampling Activities (Surface Water and Sediment Sampling) from a General Contractor's Barge
Date of Analysis: 12/19/11
Minimum Recommended PPE: Safety boots; Personal Flotation Device; Safety Glasses; Nitrile Gloves; Glove Liners; Work Clothing Appropriate for the Weather Conditions; a change of clothing.

Key Work Steps	Hazards/Potential Hazards	Safe Practices
		moving. ▪ Not overload the vessel. ▪ Distribute the weight of people and equipment evenly to keep the vessel stable. ▪ Keep the load as low as possible and secure equipment to prevent it from shifting and affecting the stability of the vessel. **All personnel accessing and working on the vessel shall**: • When entering or exiting the vessel, maintain three points of contact (with the vessel) and stay low to maintain balance. ▪ Don a Coast Guard approved personal flotation device (PFD) rated for your weight when working within 6 feet of the water's edge. Keep the PFD fastened at all times. Due to the amount of gear, equipment, etc. that personnel will need to transport, a Coast Guard-approved inflatable PFD may be used in lieu of the standard type PFD. ▪ Do not lean your shoulders too far outside of the vessel as this can capsize the vessel. ▪ Stay away from dams. It is illegal and dangerous to boat near them. ▪ Stay clear of "strainers" (fallen trees, branches, etc.). **Rescue Procedures** ▪ If you fall out of the vessel, hold onto the vessel - unless it presents a life-threatening situation. If floating in current, position yourself on the upstream side of the capsized vessel. Keep your feet up (on the surface) and pointed downstream and swim to shore. ▪ Swim to calm water before attempting to stand up in the water. ▪ The on-shore Amec Foster Wheeler person will notify emergency services immediately.
5. Load/carry equipment to the site.	5A) Slips, trips, falls	5A) Slips, trips, falls ▪See JHA Field Work – General.

Job Hazard Analysis - HASP Format

Job Title: Sampling Activities (Surface Water and Sediment Sampling) from a General Contractor's Barge
Date of Analysis: 12/19/11
Minimum Recommended PPE: Safety boots; Personal Flotation Device; Safety Glasses; Nitrile Gloves; Glove Liners; Work Clothing Appropriate for the Weather Conditions; a change of clothing.

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	5B) Struck by traffic – General Contractor launches vessel.	5B) Struck by traffic – General Contractor launches vessel. ▪ Wear high-visibility safety vest, use buddy system. ▪ Use traffic cones and a lookout. Have the General Contractor launch the vessel from public boat launch facilities if available.
	5C) Battery handling – acid exposure	5C) Battery handling – acid exposure ▪ Amec Foster Wheeler personnel shall not touch nor operate any of the General Contractor's vessel equipment.
	5D) Working on the vessel (e.g., boat/barge): Capsize	5D) Working on the vessel: Capsize ▪ Ascertain from the General Contractor supervisor the vessel's maximum weight and person capacity limits. Do not overload the vessel. ▪ Balance the gear and people on the vessel. ▪ All personnel near the water or on water must wear approved, properly sized and buckled Coast Guard-approved PFD suited to their weight. ▪ Ensure vessel lines and body parts are out of the water before the vessel engine is turned on. ▪ General Contractor should provide signal flags and communication to protect the public of vessel activities where applicable. ▪ General Contractor should test the motor prior to shoving away from the launch dock/pier/platform. ▪ The General Contractor must ensure that all appropriate equipment (e.g., fire extinguisher, life ring with at least 90 feet of rope, etc.) is provided and accessible according to Coast Guard safe boating recommendations. The General Contractor must include a bailer, anchor, second means of propulsion, line and throwable floatation, etc. See the Amec Foster Wheeler EH&S Manual – Boating Safety for examples of these equipment.

Job Hazard Analysis - HASP Format

Job Title: Sampling Activities (Surface Water and Sediment Sampling) from a General Contractor's Barge
Date of Analysis: 12/19/11
Minimum Recommended PPE: Safety boots; Personal Flotation Device; Safety Glasses; Nitrile Gloves; Glove Liners; Work Clothing Appropriate for the Weather Conditions; a change of clothing.

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	5E) Noise – engine (if applicable – noise at 85 decibels or greater)	5E) Noise – engine (if applicable – noise at 85 decibels or greater) ▪ Wear hearing protection.
6. Collecting Field parameters	6A) Falling into water and capsize	6A) Falling into water and capsize ▪ General Contractor shall use equipment that facilitates reaching the sampling location from a safe distance (extensions, etc.). ▪ Work using the buddy system. ▪ Wear PFD when working on the water. ▪ The General Contractor must balance equipment and people and anchor or secure the vessel at the sample location. ▪ Amec Foster Wheeler person should remain in an area on the vessel that is out of the way of operating equipment, etc. ▪ Avoid leaning over the side of the vessel. ▪ General Contractor should steer vessel to meet waves on the bow. ▪ If moving about, keep weight low.
	6B) Slips trips and falls	6B) Slips trips and falls ▪ Wear appropriate safety-toe, non-slip footwear. ▪ Survey and clear walking area. ▪ Do not walk on slippery surfaces. ▪ Maintain good housekeeping. ▪ Provide walkways, platforms or secure walking surface. ▪ Use the buddy system and maintain communications with on-shore person.

Job Hazard Analysis - HASP Format

Job Title: Sampling Activities (Surface Water and Sediment Sampling) from a General Contractor's Barge
Date of Analysis: 12/19/11
Minimum Recommended PPE: Safety boots; Personal Flotation Device; Safety Glasses; Nitrile Gloves; Glove Liners; Work Clothing Appropriate for the Weather Conditions; a change of clothing.

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	6C) Vermin, leaches, Insect/animal born disease	6C) Vermin, leaches, Insect/animal born disease ▪ Survey the area for dens, nests, etc. ▪ Identify areas where biological hazards may be present. ▪ Be aware of your surroundings. ▪ Wear insect netting clothing or apply insect repellant on all exposed skin surfaces as appropriate – consider sample contamination. ▪ Wear long sleeve shirt and full-length pants. ▪ Do not put hand/arm into/under an area that you cannot see into/under clearly. ▪ Do not touch any suspected contaminant without appropriate hand PPE. ▪ Wash hands as soon as possible upon completion of task. ▪ Perform routine inspections for ticks, leaches, etc. of yourself and co-workers. Ticks may be present during colder months. ▪ Remain vigilant and respectful of wildlife. (See JHA for Insects, Stings and Bites.) ▪ Wear wind impervious outerwear.
	6D) Run aground – shifting or unbalanced vessel - equipment/personnel/slip/ fall/overboard	6D) Run aground – shifting or unbalanced vessel – equipment/personnel/slip/fall/overboard ▪ The General Contractor must operate the vessel at a safe speed. ▪ The General Contractor should post a look out for shallow or submerge obstacles. ▪ Remain seated (if applicable) when under way. ▪ The General Contractor should be aware and alert for signs of tides, flooding, flash floods, and dam releases. ▪ The General Contractor should use the anchor line or a pole/paddle to pull the vessel back toward the way direction of deeper water.

Job Hazard Analysis - HASP Format

Job Title: Sampling Activities (Surface Water and Sediment Sampling) from a General Contractor's Barge
Date of Analysis: 12/19/11
Minimum Recommended PPE: Safety boots; Personal Flotation Device; Safety Glasses; Nitrile Gloves; Glove Liners; Work Clothing Appropriate for the Weather Conditions; a change of clothing.

Key Work Steps	Hazards/Potential Hazards	Safe Practices
7. Sample collection	7A) Same as Item #6 above.	7A) Same as Item #6 above.
	7B) Bending, pulling, twisting	7B) Bending, pulling, twisting ▪ Use a proper lifting technique. ▪ Do not lift more than 50 pounds. Ask for assistance.
	7C) Splash	7C) Splash ▪ Wear safety glasses (tinted for sun if applicable). ▪ Be aware if sampling water through a filter (if applicable), if it becomes plugged with sediment it may unexpectedly "blow off" the hose and splash. ▪ Change filter prior to sedimentation back-pressure. ▪ Minimize pouring distance to limit the splash between containers.
	7D) Chemical exposure	7D) Chemical exposure ▪ Wear PPE including protective gloves and safety glasses as appropriate. ▪ Review and understand material safety data sheet (MSDS) for all chemicals being handled. ▪ Work slowly and carefully when handling acids and caustic substances. ▪ Wash hands after completion of task.

Job Hazard Analysis - HASP Format

Job Title: Sampling Activities (Surface Water and Sediment Sampling) from a General Contractor's Barge
Date of Analysis: 12/19/11
Minimum Recommended PPE: Safety boots; Personal Flotation Device; Safety Glasses; Nitrile Gloves; Glove Liners; Work Clothing Appropriate for the Weather Conditions; a change of clothing.

Key Work Steps	Hazards/Potential Hazards	Safe Practices
8. Vessel Operations	8A) Lack of boating skills, boating incident	8A) Lack of boating skills, boating incident ▪ The General Contractor must have completed Coast Guard –approved safety boating course or other equivalent and recognized boating course and have a HASP that describes the hazards and hazard controls for vessel operation. ▪ All employees must wear PFDs while the vessel is underway. ▪ The General Contractor must maintain vessel and proper safety equipment. ▪ Carry a cell phone or two-way radio. ▪ If on navigable waterway, file a float plan with the Project Manager. ▪ Always follow the buddy system.

Job Hazard Analysis

Job Title: Soil Sampling Using Hand Tools **Date of Analysis:** 02/18/2015

Minimum Recommended PPE*: High visibility vest, hard hat, steel-toed boots, safety glasses, hearing protection
*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
8. Prepare for sampling event	1A) Chemical exposure	1A) Chemical Exposure ▪ Read HASP and determine air monitoring and PPE needs.
9. Carrying/lifting/ using sampling equipment	2A) Back or muscle strain	2A) Back or muscle strain ▪ Use proper lifting techniques when lifting hand tools ▪ Use 2 person lift for heavy items
	2B)	4A)
	2C) Foot injuries from dropped equipment	4B) Foot Injuries ▪ Be aware when moving objects, ensure you have a good grip when lifting and carrying objects. ▪ Do not carry more than you can handle safely ▪ Wear steel toed boots
10. Calibrate monitoring equipment	1A) Exposure to calibration gases	3A) Exposure to calibration gases ▪ Review equipment manuals ▪ Calibrate in a clean, well-ventilated area
11. Preparing sampling location	4A) Contact with poisonous plants or the oil from poisonous plants	4C) See JHA Poisonous Plans.
	4B) Contact with biting insects (i.e., spiders, bees, etc.)	4D) See JHA Insects Stings and Bites
12. Collecting soil samples	5A) Encountering underground or overhead utilities	5A) Encountering underground or overhead utilities ▪ Have all utilities located, and the Utility Locate Form signed off by Project Manager and Office Manager. Keep form with HASP.
	5B) Exposure to contaminants	5B) Exposure to Contaminants ▪ Monitor breathing zone with appropriate monitoring equipment (see HASP) ▪ Wear chemical resistant PPE as identified in HASP
	5C) Exposure to preservatives	5C) Exposure to preservatives ▪ Work in a well-ventilated area, upwind of samples ▪ Wear chemical resistant PPE as identified in HASP ▪ Review MSDSs
	5D) Slips/trips/falls	5D) Slips/trips/falls ▪ Ground can become wet/muddy, wear sturdy slip resistant footwear that provides ankle support ▪ Watch where you place your feet

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	5E) Eye injury	5E) Eye Injury ▪ Wear eye protection when using hand tools that can cause debris (e.g., loose soil, rock bits, etc.) to become airborne
13. Using Manual Tools	6A) Hand Tools • Weather conditions • Slip trip • Electrocution • Mechanical malfunctions • Tight conditions • Pinch points (such as drum lids) • Exposure to chemicals • Site obstacles such as debris, stored materials, drums, and structures • Strain when lifting tool	6A) Hand Tools • Work using hand tools can continue in light rain, but shall be stopped in the event of severe weather, heavy rain, lightning, tornadoes, etc. • Inspect all tools daily and document the results of the inspections. Damaged equipment will be discarded or repaired if possible. • When carrying hand tools, be observant of walking/working surfaces – steep slopes should not be descended. Wear sturdy slip resistant steel toe boots that provides adequate ankle protection. • Be attentive to holes in walking/working surfaces - if necessary, fill in before work. • Good housekeeping – clean up debris and move or flag obstructions. • Wear PPE as required in the HASP • Wear work gloves over chemically-protective gloves when using hand tools. Avoid pinch points. • Lift with legs, not back. Do not twist. Get assistance when carrying hand tools (>50 pounds) if necessary. • When using, knives, or other tools, direct the tools away from other people working in close proximity. • Knives and scissors must be sharp; dull tools can cause more hazards than sharp ones. • The wooden handles of tools must not be splintered or cracked.

Completed by: Annette McLean Date: 02/20/2015

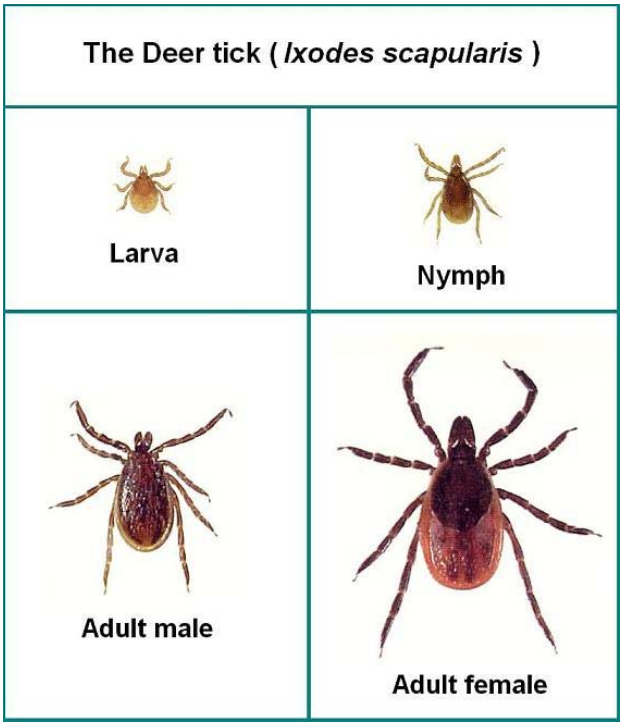
Job Hazard Analysis

Job Title: Insect Stings and Bites **Date of Analysis:** 02/18/2015

Minimum Recommended PPE*: Long sleeved shirt and pants, light colored clothing
*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
While adult ticks are the easiest to identify by species, immature stages of ticks may also transmit some pathogens. In addition, male and female ticks of the same species may look different. Of the many different tick species found throughout the world, only a select few bite and transmit disease to humans. Ticks common to the **northeast** are shown below. The maps provide expected distribution of ticks that cause disease.		
 **American Dog Tick**		American dog tick is the most commonly identified species responsible for transmitting *Rickettsia rickettsii*, which causes Rocky Mountain spotted fever in humans. The American dog tick can also transmit tularemia. This tick is widely distributed east of the Rocky Mountains. Larvae and nymphs feed on small rodents. Dogs and medium-sized mammals are the preferred hosts of adult *D. variabilis*, although it feeds readily on other large mammals, including humans. Distribution areas are shown in yellow (Center for Disease Control). 
 **Blacklegged Tick (a/k/a Deer Tick)** **See additional pictures of Deer Tick on next page.**		The blacklegged tick (Ixodes scapularis), commonly known as the **"deer tick",** can transmit the organisms responsible for anaplasmosis, babesiosis, and Lyme disease. This tick is widely distributed in the northeastern and upper midwestern United States.Larvae and nymphs feed on small mammals and birds, while adults feed on larger mammals and will bite humans on occasion. It is important to note that the pathogen that causes Lyme disease is maintained by wild rodent and other small mammal reservoirs, and is not transmitted everywhere that the blacklegged tick lives. In some regions, particularly in the southern U.S., the tick has very different feeding habits that make it an unlikely vector in the spread of human disease. Distribution areas are shown in yellow (CDC). 

Key Work Steps	Hazards/Potential Hazards	Safe Practices

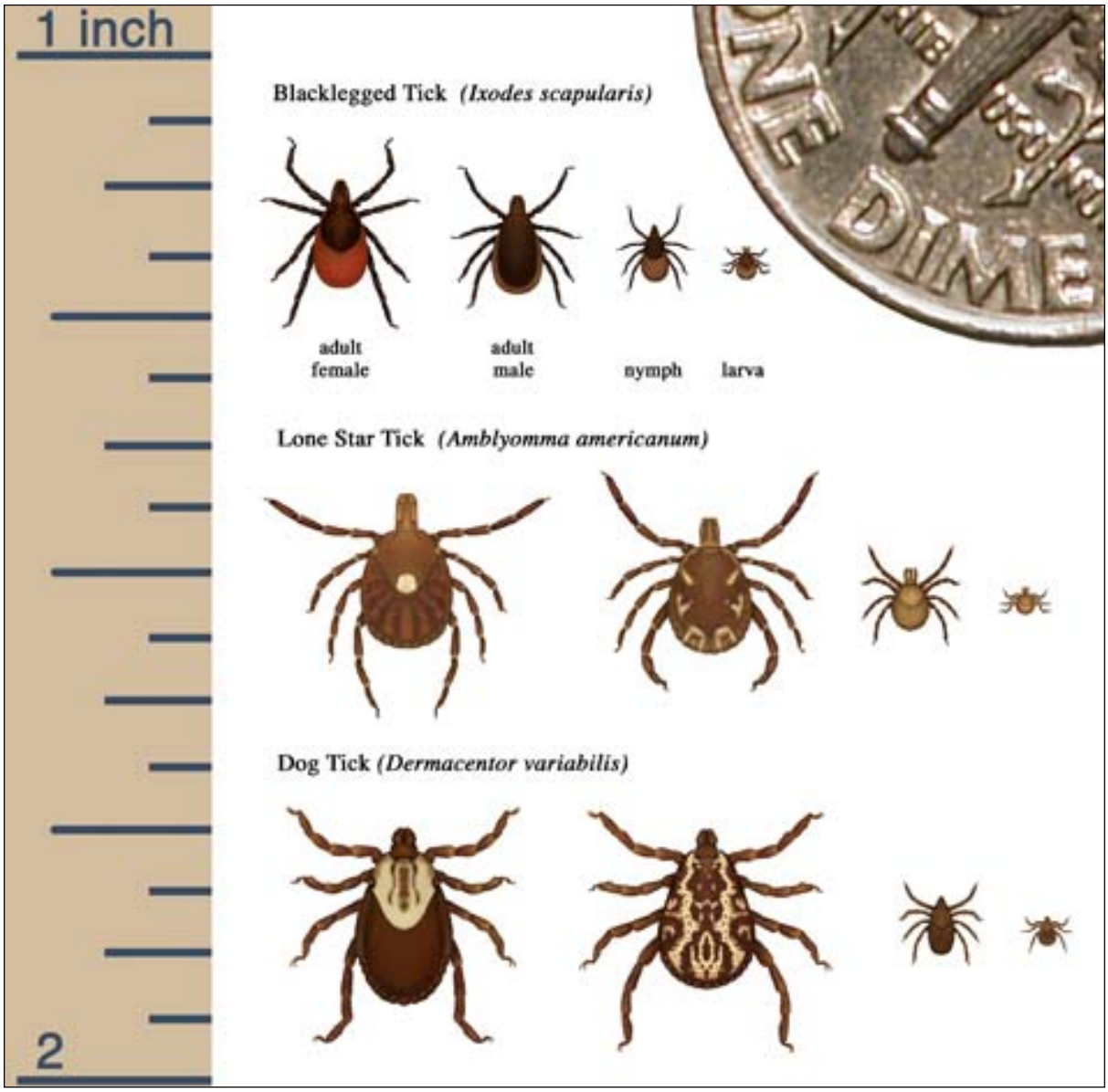


Note: Ticks are shown larger than actual size.

Lone star tick

The lone star tick (Amblyomma americanum) transmits Ehrlichia chaffeensis and Ehrlichia ewingii, causing human ehrlichiosis, tularemia, and STARI. The lone star tick is primarily found in the southeastern and eastern United States. White-tailed deer are a major host of lone star ticks and appear to represent one natural reservoir for E. chaffeensis. Larvae and nymphs feed on birds and deer. Both nymphal and adult ticks may be associated with the transmission of pathogens to humans. Distribution areas are shown in yellow (CDC).

Key Work Steps	Hazards/Potential Hazards	Safe Practices



Most ticks go through four life stages: egg, six-legged larva, eight-legged nymph, and adult. After hatching from the eggs, ticks must eat blood at every stage to survive. Ticks that require this many hosts can take up to 3 years to complete their full life cycle, and most will die because they don't find a host for their next feeding. The above picture shows the life stages of the Blacklegged Tick (Deer Tick), Lone Star Tick, and the American Dog Tick.

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. Traveling/working in areas with potential Tick Bites –Example outdoor wooded areas or fields.	1. Lyme Disease, Rocky Mountain Spotted Fever, etc.	1A) Spray clothing with insect repellant containing DEET or Permethrin as a barrier. Treat outer layer of field clothing by spraying with tick repellent product such as "Tick Stuff" (which contains permethrin) and allowing the treated clothing to dry before wearing it is advisable. **Follow the manufacturer's instructions for the specific tick repellent used.** 1B) Wear light colored clothing that fits tightly at the wrists, ankles, and waist. 1C) Each outer garment should overlap the one above it. 1D) Cover trouser legs with high socks or boots. 1E) Tuck in shirt tails. 1F) Search the body on a regular basis, especially hair and clothing; ticks generally do not attach for the first couple of hours. 1G) Conduct a full-body tick check using a hand-held or full-length mirror to view all parts of your body upon return from the field. 1H) Examine field gear. Ticks can ride into the home on clothing, boots, bags, etc., then attach to a person later. Tumble clothes in a dryer on high heat for an hour to kill remaining ticks. 1I) Bathe or shower as soon as possible after coming indoors (preferably within two hours) to wash off and more easily find ticks that are crawling on you. 1J) If a tick becomes attached, pull it by grasping it as close as possible to the point of attachment and pull straight out with gentle pressure. Wash skin with soap and water then cleanse with rubbing alcohol. Place the tick in an empty container for later identification, if the victim should have a reaction. Record dates of exposure and removal. 1K) Do not try to remove the tick by burning with a match or covering it with chemical agents. 1L) If you can not remove the tick, or the head detaches, seek propmt medical help. 1M) Watch for warning signs of illness: a large red spot on the bite area; fever, chills, headache, joint and muscle ache, significant fatigue, and facial paralysis are reactions that may appear within two weeks of the attack. Symptoms specific to Lyme disease include: confusion, short-term memory loss, and disorientation.

Key Work Steps	Hazards/Potential Hazards	Safe Practices
2. Working/traveling in areas with potential bee and wasp stings- Example wooded areas and fields	2. Allergic reactions, painful stings	2A) Be alert to hives in brush or in hollow logs. Watch for insects travelling in and out of one location. 2B) If you or anyone you are working with is known to have allergic reactions to bee stings, tell the rest of the crew and your supervisor. Make sure you carry emergency medication with you at all times. 2C) Wear long sleeve shirts and trousers; tuck in shirt. Bright colors and metal objects may attract bees. 2D) If you are stung, cold compresses may bring relief. 2E) If a stinger is left behind, scrape it off the skin. Do not use a tweezers as this squeezes the venom sack, worsening the injury. 2F) If the victim develops hives, asthmatic breathing, tissue swelling, or a drop in blood pressure, seek medical help immediately. Give victim antihistime, (Benadryl, chlo-amine tabs).
3. Traveling/working in areas of potential Mosquito Bites- Example- Woods, fields, near bodies of water and etc.	3. Skin irritation, encephalitis	3A) Wear long sleeves and trousers. 3B) Avoid heavy scents. 3C) Use insect repellants. If using DEET, do not apply directly to skin, apply to clothing only. 3D) Carry after-bite medication to reduce skin irritation.

Key Work Steps	Hazards/Potential Hazards	Safe Practices
4. Traveling/Working in areas of potential Spider Bites **Brown Recluse Spider**  Found in spaces with secluded, dry, sheltered areas such as underneath structures logs, or in piles of rocks or leaves, or indoors in dark closets, shoes, or attics. **Black Widow**  Found in spaces containing undisturbed areas such as woodpiles, under eaves, fences, and other areas where debris has accumulated. They may also be found living in outdoor toilets where flies are plentiful.	4. Itching, rash, pain, blisters, difficulty breathing, nausea and vomiting, high blood pressure, etc. **Brown Recluse:** Cannot bite humans without some form of counter pressure, for example, through unintentional contact that traps the spider against the skin. Bites may cause a stinging sensation with localized pain. A small white blister usually develops at the site of the bite. The venom of a brown recluse can cause a severe lesion by destroying skin tissue. **This skin lesion will require professional medical attention.** **Black Widow:** Pain at the bite area and then spreads to the chest, abdomen, or the entire body.	4A) Inspect or shake out any clothing, shoes, towels, or field equipment/gear before use. 4B) Wear protective clothing such as a long-sleeved shirt and long pants, hat, gloves, and boots when handling stacked or undisturbed piles of materials. 4C) Minimize the empty spaces between stacked materials. 4D) Remove and reduce debris and rubble from around the work areas. 4E) If possible, trim or eliminate tall grasses from around long-term work areas. Avoid these areas whenever possible. 4F) Store clothing/gear and field equipment in tightly closed plastic bags. 4G) Keep your tetanus boosters up-to-date (every 10 years). Spider bites can become infected with tetanus spores.

Completed by: Annette McLean Date 02/18/2015

Job Hazard Analysis

Job Title: Poisonous Plants **Date of Analysis:** 02/18/2015

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1) Mobilization	1A) See JHA Mobilization/ Demobilization/Site Preparation	1A) See JHA Mobilization/Demobilization/Site Preparation
2) Preparation	2A) Training – Identifying Poisonous Plants	2A) Provide training on identifying the specific poisonous plants that could be present at the site
		
	2B) Poison Ivy 	2B) Poison Ivy: ▪ Grows everywhere in United States except Hawaii and Alaska. ▪ In the East, Midwest, and the South, it grows as a vine. ▪ In the Northern and Western United States, it grows as a shrub. ▪ Each leaf has three leaflets. ▪ Leaves are green in the summer and red in the fall. ▪ In the late summer and fall, white berries may grow from the stems.
	2C) Poison Oak 	2C) Poison Oak: ▪ Oak-like fuzzy leaves in clusters of three. ▪ It has two distinct kinds: ▪ Eastern poison oak (New Jersey to Texas) grows as a low shrub. ▪ Western poison oak (Pacific Coast) grows to six-foot-tall clumps or vines up to 30 feet long. ▪ It may have clusters of yellow berries.
	2D) Poison Sumac 	2D) Poison Sumac ▪ Grows in standing water in peat bogs in the Northeast and Midwest and in swampy areas in parts of the Southeast. ▪ Each leaf has clusters of seven to 13 smooth-edged leaflets. ▪ The plants can grow up to 15 feet tall. ▪ The leaves are orange in spring, green in summer and red, and orange or yellow in fall. ▪ There may be clumps of pale yellow or cream-colored berries.

Key Work Steps	Hazards/Potential Hazards	Safe Practices
Giant Hogweed  Giant Hogweed  Giant Hogweed  Giant Hogweed Flower (clusters may reach up up to 2.5 feet across)  Giant Hogweed Flower Leaves  Giant Hogweed Stem Thick stem with coarse hairs, Blistery dark purple splotches.	▪ 2E) Giant Hogweed is a public health hazard. It's clear, watery sap has toxins that cause photo-dermatitis. Skin contact followed by exposure to sunlight produces painful, burning blisters that may develop into purplish or blackened scars. Contact with the eyes can cause temporary or permanent blindness. Since its introduction into North America, this plant has become established in rich moist soils along roadsides, stream banks and waste ground. It is present in eastern US. A biennial or perennial herb growing 8 to 15 feet tall, giant hogweed usually has a taproot or occasionally fibrous root. The hollow stems are 2 to 4 inches in diameter with dark reddish-purple splotches and coarse white hairs. The deeply incised compound leaves grow up to 5 feet in width. Hairs on the underside of the leaf are stiff, dense and stubby. The large umbrella-shaped flower heads are up to 2 1/2 feet in diameter across a flat top with numerous small flowers produced in mid-May through July. Some plants die after flowering; others flower for several years. The plant produces flattened, 3/8 inch long, oval dry fruits that have a broadly rounded base and broad marginal ridges. Plants sprout in the early spring (or late winter in mild years) from the roots or from seed. Grows in standing water in peat bogs in the Northeast and Midwest and in swampy areas in parts of the Southeast. Each leaf has clusters of seven to 13 smooth-edged leaflets. The plants can grow up to 15 feet tall. The leaves are orange in spring, green in summer and red, and orange or yellow in fall. There may be clumps of pale yellow or cream-colored berries.	

Key Work Steps	**Hazards/Potential Hazards**	**Safe Practices**
3A) Contact with poisonous plants	3A) Hand Contact	3A) Hand Contact ▪ Apply IvyX (or similar product) to hands, forearms and other potentially exposed parts of the body, prior to starting work in the morning and again right after lunch. ▪ Leather Gloves must be worn at all times when digging, screening or carrying field equipment. ▪ Leather gloves should be of sufficient length to cover the entire wrist and cuff of the shirt. ▪ Carefully remove gloves, without touching the exterior surface, when taking notes and prior to lunch or restroom breaks. ▪ Gloves that become worn should be replaced immediately. ▪ Do not scratch or rub the face or other exposed skin while wearing gloves. ▪ Workers will apply Tecnu (or similar product) to the hands and forearms immediately after removing their gloves, prior to lunch and again at the end of the day. Tecnu will help cleanse the urushiol oil from the skin before it can be absorbed. Sensitive individuals can also apply prior to showering in the evening.
	3B) Arm Contact	3B) Arm Contact ▪ Apply IvyX (or similar product) to hands, forearms and other potentially exposed parts of the body, prior to starting work in the morning and again right after lunch. ▪ Wear light weight, long sleeved shirts as the sleeves will provide a physical barrier between the skin and any urushiol oil encountered. Disposable gauntlets may we worn over arms to keep oil from clothing as well. ▪ Have the sleeves pulled down to the base of the hand, covering the forearm and wrist (all exposed skin). ▪ Workers will apply Tecnu (or similar product) to the hands and forearms immediately after removing their gloves, prior to lunch and again at the end of the day. Tecnu will help cleanse the urushiol oil from the skin before it can be absorbed. Sensitive individuals can also apply prior to showering in the evening.
	3C) Leg Contact	3C) Leg Contact ▪ Wear long pants and boots. ▪ Assume boots are contaminated with the urushiol oil and only handle with gloved hands.
4) Handling Contaminated Equipment and Clothing	4A) Exposure from Handling Contaminated Equipment	4A) Exposure from Handling Contaminated Equipment ▪ Do not handle any field equipment that may have come in contact with poison ivy/oak/sumac without gloves. ▪ Decontaminate all equipment at the end of each workday with a solution of water and dish soap. ▪ Scrub all surfaces of the screens and shovels with a brush. ▪ Rinse with cool water using a portable garden sprayer.

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	4B) Exposure from Handling Contaminated Clothing	4B) Exposure from Handling Contaminated Clothing ▪ Wash clothing potentially contaminated with urushiol oil prior to wearing again. ▪ Handle contaminated clothing with gloves as the oil can remain on environmental surfaces for up to 5 years.

Completed by: Annette McLean Date: 02/18/2015

Job Hazard Analysis - Short Form HASP

Job Title: Clearing weeds, brush and trees - **Oversight ONLY.** It should be noted that Amec Foster Wheeler will not be performing the clearing and grubbing activities, but will be in the general work area.

Minimum Recommended PPE*: Hard hat, chaps, safety glasses/goggles, steel toed boots, long pants, long sleeve shirt,

cotton or leather gloves

*See HASP for all required PPE

Key Work Steps	Hazards/Potential Hazards	Safe Practices
1. Going to site, work preparation	1A) General	1A) See Mobilization/demobilization and Site Preparation JHA
	1B) Chemical Exposures	1B) If clearing is to be conducted at a hazardous waste site, see HASP for monitoring procedures and required PPE.
2. Clearing light brush with Machete **NOTE**: Amec Foster Wheeler will not be conducting this task; the general contractor will be doing the clearing of weeds, brush, and small trees. Amec Foster Wheeler has included this JHA for informational purposes only.	2A) Cuts and Lacerations	2A) Cuts and Lacerations ▪ The machete should be used only to cut light brush. Do not use machetes for heavy cutting. Use long-handed lopping shears or brush hooks instead of machetes for cutting thorny bushes and briars. ▪ Remove vines and low hanging limbs that might catch machete and cause it to fly out of your hand or strike your body. ▪ Never use a machete while in a tree. ▪ Always use sharp tools. Dull tools are likely to slip or rebound. Sharpen machete blades only from six (6) inches from the butt of the handle to within two (2) inches of the point. The end of the machete blade should not be sharpened. To reduce the possibility of injury, it can even be blunted. ▪ Station machete users at no closer than ten (10) feet intervals. Under no conditions should party members who are using sharp-edged tools simultaneously be within 10 feet of each other. Protect yourself by retaining this minimum safety zone. ▪ Always have a firm footing before swinging the machete. While chopping, if possible, lean forward. ▪ Strokes should be made away from the body. No cut should ever be directed downward toward the feet or toward any other part of the body. ▪ Swing with a full swing at an approximate 45º, but do not over-swing or swing too hard. ▪ Right-handed: Right foot forward - when swinging downward toward the left or when swinging upward to the right. Left foot forward - when swinging downward toward the right or when swinging upward to the left. ▪ Left-handed - reverse the right-handed procedure. ▪ When not in use, the machete should be placed in a stout scabbard to reduce the chance of injury and to protect its cutting edge.
	2B) Eye Injury	2B) Eye Injury ▪ Maintain a distance of at least 10 feet between party members when walking through dense vegetation or woods so that rebounding branches don't cause eye injuries. ▪ Wear eye protection.
	2C) Slips/Trips/Falls	2C) Slips/Trips/Falls ▪ Be particularly careful when walking along a cleared survey line having protruding sharp stubs. They can cause serious injury if fallen upon.\ ▪ Wear sturdy work boots with high ankles and with good traction.

Key Work Steps	Hazards/Potential Hazards	Safe Practices
3. Clearing small trees or limbs with Axes	3A) Cuts/Lacerations	3A) Cuts/Lacerations ▪ Axes are for cutting trees with trunks or limbs greater than one inch in diameter. ▪ Remove vines and low hanging limbs that might catch the axe and cause it to fly out of your hand or strike your body. ▪ Make sure that the head of the axe is tight on the handle. ▪ Always use sharp tools. Dull tools are likely to slip or rebound. ▪ Never use an axe while in a tree. ▪ Proper grip of the handle is important. Where working space is ample and full-force chopping is necessary, place one hand near the end of the handle and move the other toward the head as the axe is being lifted; on the down stroke, this hand should slide toward the end of the handle. In crowded locations, hold the handle near its center with both hands. Strokes with this grip are easily controlled but are not too powerful. ▪ Keep your eyes on the spot you're aiming for. ▪ Warm the blade of an axe slightly before using it in cold weather. This can be done by holding the axe in gloved hands for a short period of time. A tempered steel blade, when cold, can fracture and cause particles of metal to fly. ▪ Do not chop frozen wood or very hard knots. They can cause the blade to rebound. ▪ When cutting a dead, hardwood tree, be very careful because many of them are extremely hard. ▪ To trim limbs from a fallen tree trunk, stand to the side of the tree opposite the limb. ▪ Carry an axe by gripping the handle just behind the head and turning the sharp edge outward. The axe should be sheathed.
	3B) Eye Injury	3B) Eye Injury ▪ Maintain a distance of at least 10 feet between party members when walking through dense vegetation or woods so that rebounding branches don't cause eye injuries. ▪ Wear eye protection.
	3C) Slips/Trips/Falls	3C) Slips/Trips/Falls ▪ Be particularly careful when walking along a cleared survey line having protruding sharp stubs. They can cause serious injury if fallen upon.\ ▪ Wear sturdy work boots with high ankles and with good traction.

Key Work Steps	Hazards/Potential Hazards	Safe Practices
4. Clearing brush using a Brush Hook	5A) Cuts/Lacerations	4A) Cuts/Lacerations ▪ The brush hook functions like an axe that has its cutting head reversed. It is used for rough work in brush too thick for an axe and finds its best use in thick underbrush where a low cut, requiring a long cutting edge, is needed. ▪ Always use sharp tools. Dull tools are likely to slip or rebound. ▪ Remove vines and low hanging limbs that might catch brush hooks and cause them to fly out of your hand or strike your body. ▪ Never use a brush hook while in a tree. ▪ To keep the head solidly on the handle, workers should carry a tool to adjust the collar or clamp. ▪ Hold the brush hook like you would an axe, except keep your upper hand a little more toward the cutting edge to give better balance when making a low cut. ▪ When cutting, try not to fight the foliage but, rather, strike at the base of the plants. Aim carefully and keep your body balance. ▪ Make sure adequate clearance is maintained. The brush hook can be more easily deflected than the axe because of the shape of its blade. ▪ Carry a brush hook like you would carry an axe. Keep your hand close to the head. Because the beak easily catches on vines and wires when the brush hook is carried with its head pointing backward, always point the head to the front. Never carry a brush hook on your shoulder. ▪ Because of their shape, brush hooks are difficult to store in trucks or tool houses unless special provisions are made. Sheathes should be provided to protect workmen and to keep the blades from being nicked.
	5B) Eye Injury	4B) Eye Injury ▪ Maintain a distance of at least 10 feet between party members when walking through dense vegetation or woods so that rebounding branches don't cause eye injuries. ▪ Wear eye protection.
	5C) Slips/Trips/Falls	4C) Slips/Trips/Falls ▪ Be particularly careful when walking along a cleared survey line having protruding sharp stubs. They can cause serious injury if fallen upon.\ ▪ Wear sturdy work boots with high ankles and with good traction.

Key Work Steps	Hazards/Potential Hazards	Safe Practices
5. Clearing brush /trees with a chainsaw	5A) Cuts/Lacerations	5A) Cuts/Lacerations ▪ The brush hook functions like an axe that has its cutting head reversed. It is used for rough work in brush too thick for an axe and finds its best use in thick underbrush where a low cut, requiring a long cutting edge, is needed. ▪ Always use sharp tools. Dull tools are likely to slip or rebound. ▪ Remove vines and low hanging limbs that might catch brush hooks and cause them to fly out of your hand or strike your body. ▪ Never use a brush hook while in a tree. ▪ To keep the head solidly on the handle, workers should carry a tool to adjust the collar or clamp. ▪ Hold the brush hook like you would an axe, except keep your upper hand a little more toward the cutting edge to give better balance when making a low cut. ▪ When cutting, try not to fight the foliage but, rather, strike at the base of the plants. Aim carefully and keep your body balance. ▪ Make sure adequate clearance is maintained. The brush hook can be more easily deflected than the axe because of the shape of its blade. ▪ Carry a brush hook like you would carry an axe. Keep your hand close to the head. Because the beak easily catches on vines and wires when the brush hook is carried with its head pointing backward, always point the head to the front. Never carry a brush hook on your shoulder. ▪ Because of their shape, brush hooks are difficult to store in trucks or tool houses unless special provisions are made. Sheathes should be provided to protect workmen and to keep the blades from being nicked.
	5B) Cuts, Hearing Loss, Eye Injuries, Head injuries	5B) Cuts, Hearing Loss, Eye Injuries, Head injuries ▪ Wear gloves, chaps, hard hat, safety glasses, hearing protection, and sturdy boots with slip resistant soles. ▪ Stop saw before carrying. ▪ Point bar forward when going downhill and the saw is at the side. ▪ Point bar to the rear when going uphill and the saw at the side. ▪ Pack and guard bar and dogs when carrying saw on the shoulder. ▪ Maintain minimum 10 feet walking space between crewmembers. ▪ Ensure fuel cap on saw is secure. ▪ Keep shirt collar up while carrying saw on shoulder. ▪ Leg protection (chaps) shall cover the full length of the thigh to the top of the boots.

	5C) Cuts, eye injury, hearing damage Kickback	5C) Cuts, eye injury, hearing damage Kickback
		▪ Wear gloves, eye and hearing protection, steel-toed shoes. Follow procedures in owner manual.
		▪ There are two recognized methods for safely starting a saw. In both methods, the trigger lock should not be used.
		  ▪ On Ground starting.
		  ▪ Stand starting.
		▪ Drop Starting is prohibited.

	5D) Cuts, eye injury, hearing damage, back strain, falling debris	5D) Cuts, eye injury, hearing damage, back strain, falling debris ▪ Wear gloves, eye and hearing protection, steel-toed shoes, back support, hard hat. ▪ Be aware of surroundings (i.e., power lines, vehicles, other employees). ▪ Use line or wedge to guide fall.

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	5E) Tree Falling	5E) Area Size up Surrounding ▪ Determine natural lean and condition of tree (rot, splits, loose bark etc.) and the best direction to be felled. ▪ Be aware of other trees leaning into the tree being felled. ▪ Be aware of snags in the area. ▪ Do not cut during shifting, high or gusty wind conditions. ▪ Clean materials away from the tree's base that may pose a hazard. ▪ Avoid cutting above your shoulders. ▪ Before cutting determine your primary and secondary escape routes to a predetermined safe area. ▪ Using the saw, prepare your escape route by cutting all tripping hazards. ▪ Keep proper spacing between operators (at least two tree lengths).
	5F) Making undercuts; Falling Materials Saw Cuts and Flying Material	5F) Saw Cuts and Flying Material ▪ The cut depth must be a minimum of 1/3 the tree's diameter. ▪ The cut width must be a minimum of 1/5 of the diameter and at 45-degree angle. ▪ Leave no Dutchman.
	5G) Back cut Wedging and Falling Material	5G) Back cut Wedging and Falling Material ▪ Announce Felling ▪ Notify others in the area that the tree is about to fall. ▪ Make the back cut slightly above (approximately 2 inches undercut), must be level and even. ▪ Remove loose bark before beginning back cut. ▪ Utilize swamper lookout under adverse conditions. ▪ Wedge tree as soon as possible after beginning back-cut continue with the back-cut and tamp in wedges periodical.
	5H) Being hit by Falling Trees/Branches/Pieces	5H) Being hit by Falling Trees/ Branches/ Pieces ▪ When the tree begins to fall, withdraw the saw from cut and shut off. ▪ Retreat to your safety area at an angle, not straight back. ▪ Do not turn your back on a falling tree. ▪ Continue to watch for falling limbs and/or other trees after the tree hits the ground. ▪ Try to avoid hanging tree up in standing timber. ▪ Do not attempt to fall trees without all the essential equipment. This equipment includes: PPE, chainsaw, small axe and swamper.

	5I) Kickback, Puller/swamper, uneven terrain, Fatigue	5I) Kickback, Puller/swamper, uneven terrain, Fatigue
		▪ Secure firm footing.
		  ▪ Keep feet spread apart in a wide balanced stance.
		  ▪ Feet should be placed so as to keep feet and legs away from saw chain.
		  ▪ Keep a firm grip on saw with both hands.
		▪ Look up for widow makers and other loose debris.
		  ▪ Don't cut under a hazard.
		  ▪ Remove the hazard or relocate the cutting location.
		  ▪ Flush cut limbs and stems.
		▪ Never cut with engine higher than your chest.
		▪ Clear debris from cutting location so that the guide bar tip is not accidentally stubbed.

Key Work Steps	Hazards/Potential Hazards	Safe Practices
	15A) Bucking Felled Trees and Kickback	15A) Bucking Felled Trees and Kickback ▪ When bucking logs, be aware of the direction the logs may roll or move after bucking. ▪ Do not stand on the downhill side of logs.
	5J) Explosion, fire, hazardous vapors, splashing fuel in eyes, spills	5J) Explosion, fire, hazardous vapors, splashing fuel in eyes, spills ▪ Wear eye protection ▪ Shut off engine and let cool before refueling ▪ Refuel in well-ventilated area on bare ground or other non-combustible surface ▪ Wipe fuel off saw ▪ Keep fuel away from sparks or open flame, never start saw within 10 feet of fueling area. No smoking during fueling. ▪ Do not start the saw at the point of fueling. ▪ Transport fuel in approved containers ▪ Have spill kit ready in case of fuel spill. ▪ Use proper saw gas and oil fuel mixture. Never use motor oil or bar lubricant to mix with saw gas. ▪ Fix pinched bar guide rails, bent bars or damaged tips immediately. ▪ Keep chain sharp and with proper tension at all times. ▪ Use gloves whenever working with the chain. ▪ Beware of hot muffler. ▪ Ensure chain brake is working properly. ▪ Ensure the carburetor is adjusted properly so the chain doesn't run at an idle. ▪ Stop saw If the bar oil runs out before the saw gas does.
	5K) Lightning, Rain, Strong winds, Darkness	5K) Lightning, Rain, Strong winds, Darkness ▪ All work shall terminate and each employee shall move to a place of safety when environmental conditions create a hazard for the employee.

ATTACHMENT C

SITE SAFETY ORIENTATION

SITE SAFETY ORIENTATION

Project: Site: _____

Project Number: _____ Date: _____

All applicable items listed below are to be reviewed **(√)** *on the first day of site activities and when new workers arrive on site. Training provider, please initial each item covered in the training, or note "NA" as applicable.*

Field Operations Leader (also known as the Amec Foster Wheeler General Supervisor): _____
Site Health and Safety Officer (also known as the Site Safety and Health Supervisor): _____
Local Health and Safety Representative (LHSR): _____
Employees' direct supervisor(s): _____
Location of HASP and MSDS on Site _____
HazCom labeling system if different from Local Operation _____
Site-specific medical surveillance requirements _____
Site control measures (location of exclusion zone, etc.) _____
Safety and health hazards on site _____
The Level of Protection and specific PPE to be used: _____
Work practices to be used on site to minimize exposure: _____
Decontamination procedures: _____
How to effectively use site/task engineering controls: _____
Applicable elements of the Site emergency response plan: _____
Any other site-specific health and safety related requirements: _____

Participating employees must print and sign their name in the spaces provided below:

_____ _____
_____ _____
_____ _____
_____ _____

ATTACHMENT D

RECORD OF SITE SAFETY MEETING

RECORD OF SITE SAFETY MEETING

Project: Site: _____

Project Number: _____ Date: _____

Safety Meeting Conducted by (print name): _____

Safety Meeting Conducted by (signature): _____

List of topics discussed this meeting:

_____

_____

_____

_____

Participating employees must print and sign their name in the spaces provided below:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____