2012 Surface Water Sampling Work Plan
Middle River Complex
2323 Eastern Boulevard
Middle River, Maryland

Prepared for:

Lockheed Martin Corporation

Prepared by:

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July 2012

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ACRONYMS

COC	chain of custody
COPC	chemical of potential concern
ERA	Ecological Risk Assessment
ESA	Environmental Site Assessment
GIS	geographic information system
GLM	Glenn L. Martin Company
HASP	health and safety plan
HHRA	Human Health Risk Assessment
IDW	investigation-derived waste
Lockheed Martin	Lockheed Martin Corporation
MDE	Maryland Department of the Environment
MRAS	Middle River Aircraft Systems
MRC	Middle River Complex
MSA	Martin State Airport
PDF	portable document format
PM	project manager
PPE	personal protective equipment
REC	recognized environmental condition
Tetra Tech	Tetra Tech, Inc.
USEPA	US Environmental Protection Agency
VCP	Voluntary Cleanup Program
VOC	volatile organic compound

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Section 1
Introduction

On behalf of Lockheed Martin Corporation (Lockheed Martin), Tetra Tech, Inc. (Tetra Tech) has prepared this *2012 Surface Water Monitoring Work Plan* for the Lockheed Martin Middle River Complex (MRC) in Middle River, Maryland (see Figure 1-1). This work plan addresses the 2012 surface water sampling at five transects in Dark Head Cove at Outfalls 5, 6, 7, 8, and 9 and in Cow Pen Creek near the location of the Western Plume along a transect centerline in the creek. The sampling objective is to provide additional surface water quality data to determine the concentrations and spatial distributions of chemicals of potential concern in Dark Head Cove and Cow Pen Creek that may be emanating from the Middle River Complex site.

This work plan is organized as follows:

Section 2—Site Background: Briefly describes the site and where detailed background information and reports of previous investigations can be found.

Section 3—Investigation Approach and Methodology: Presents the technical approach to surface water sampling and describes the field methodology to be employed.

Section 4—Project Deliverables: Describes requirements of the reports that will summarize the investigation findings.

Section 5—References: Cites references used to compile this work plan.

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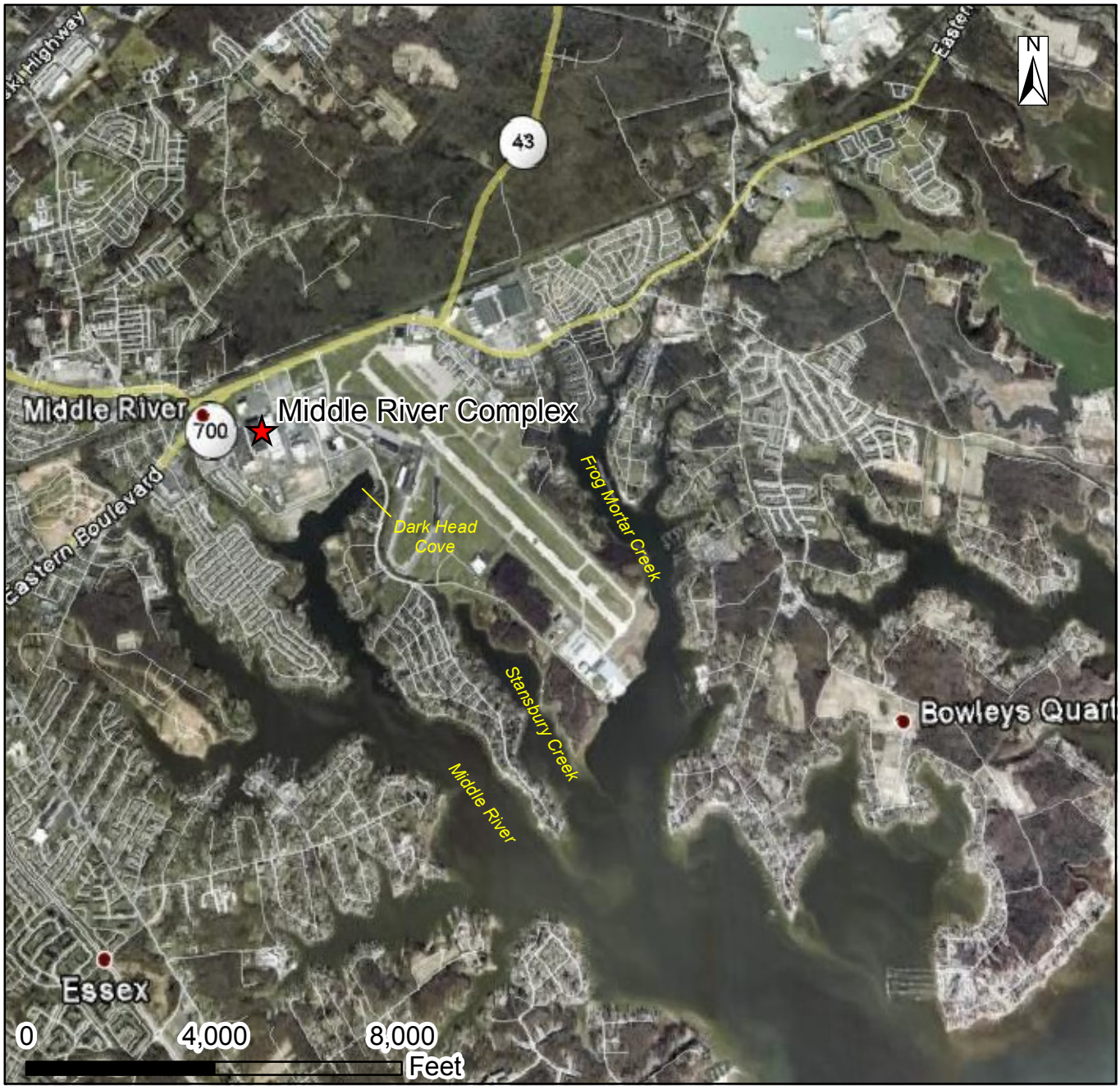

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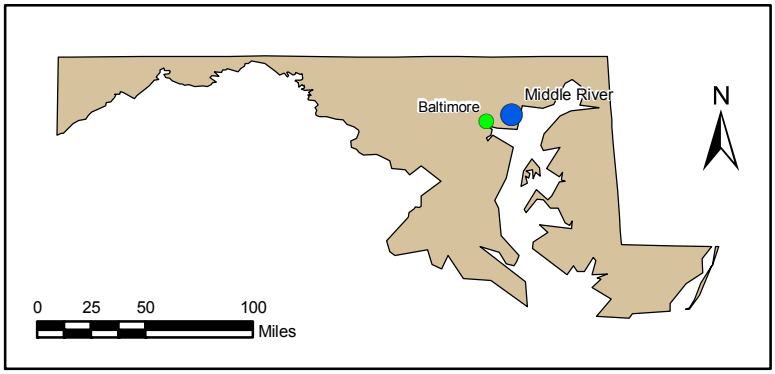

FIGURE 1-1

MIDDLE RIVER COMPLEX
LOCATION MAP

Lockheed Martin Middle River Complex
Middle River, Maryland

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Section 2
Site Background

The Middle River Complex (MRC), part of the Chesapeake Industrial Park, is at 2323 Eastern Boulevard in Middle River, Maryland, approximately 11.5 miles northeast of downtown Baltimore. It comprises approximately 161 acres, including 12 main buildings, an active industrial area and yard, perimeter parking lots, an athletic field, a vacant concrete lot, trailer and parts storage lot, and numerous grassy spaces along its perimeter. It is bounded by Eastern Boulevard (Route 150) to the north, Martin State Airport (MSA) to the east, Dark Head Cove to the south, and Cow Pen Creek to the west. Figure 2-1 is a map showing the MRC layout.

Currently, Lockheed Martin Corporation's (Lockheed Martin) primary activities at the MRC include facility and building management and maintenance. The main tenant at the site, MRA Systems, Inc., (MRAS), a subsidiary of General Electric Company, designs, manufactures, fabricates, tests, overhauls, repairs, and maintains aeronautical structures, parts, and components for military and commercial applications. Lockheed Martin Mission Systems & Sensors—Littoral Ships & Systems (a Lockheed Martin business segment) conducts engineering activities and fabricates, assembles, tests, and otherwise supports vertical-launch systems. A subsidiary of Lockheed Martin, Applied NanoStructured Solutions LLC, also occupies a portion of MRC, engaging in research and design of nanotechnology applications.

In 1929, the Glenn L. Martin Company (GLM), a predecessor entity of Lockheed Martin, acquired a large parcel of undeveloped land in Middle River, Maryland to manufacture aircraft for U.S. government and commercial clients. In the early 1960s, GLM merged with American-Marietta Company to form Martin Marietta Corporation. Around 1975, the adjacent eastern airport area (currently MSA), approximately 750 acres, was transferred to the State of Maryland. In the mid-1990s, Martin Marietta Corporation merged with Lockheed to form Lockheed Martin Corporation, with its principal subsidiary specializing in constructing and testing new ordnance for U.S. government and commercial clients. Shortly after the merger,

General Electric Company acquired most of Lockheed Martin's aeronautical business in Middle River and a General Electric subsidiary, MRA Systems, Inc., began operations.

Numerous environmental investigations have been conducted at the Lockheed Martin MRC. These include underground storage-tank closures and abandonments, soil excavations, Phase I Environmental Site Assessments (ESAs), and Phase II ESAs. In 2003, a facility-wide Phase I ESA was conducted at the Lockheed Martin MRC. The Phase I investigation identified 13 Recognized Environmental Concerns (RECs) at the facility associated primarily with current site conditions (Earth Tech, 2003). Subsequent review of historic site activities identified another 18 RECs at the facility (Tetra Tech, 2004).

Many of the RECs are in the southern portion of the facility along the waterfront. Soil and groundwater sampling at the RECs identified sporadic soil and groundwater contamination in environmental media underlying the facility. The MRC has entered into the Maryland Department of the Environment (MDE) Voluntary Cleanup Program (VCP) and studies of soil and groundwater at the MRC are ongoing.

With respect to surface water and sediment studies, on March 17–18, 2005, surface water and sediment were sampled in the surface-water bodies (i.e., Cow Pen Creek, Dark Head Cove, and Dark Head Creek) adjacent to the facility's southern and western property boundaries. Ten additional surface water and 50 additional sediment samples were collected in October 2005 to further characterize and delineate chemicals identified during the March sampling event. The later event included much more extensive investigation of Dark Head Cove, as well as vertical profiling of chemical concentrations in sediments.

In March 2005, seven surface-water samples (SW-1 through SW-7) and 12 sediment samples (SD-1 through SD-12) were collected from Cow Pen Creek and Dark Head Cove. Two (SW/SD-1 and SW/SD-2) were collected as background reference-samples, one (SW/SD-1) was hydraulically upgradient of the facility's first outfall (along Cow Pen Creek), and one (SW/SD-2) was from a cove within Dark Head Creek. The remaining sampling locations were positioned along the facility waterfront approximately 10 feet from the shoreline and spaced to generally coincide with outfall locations.

In October 2005, 10 surface-water samples (SW-8 through SW-17) and 50 sediment samples from 30 locations (SD-13 through SD-42) were collected from Cow Pen Creek and Dark Head Cove. Surface-water sampling locations were distributed to provide data sufficient to broadly evaluate surface-water quality. Sediment-sampling locations were chosen to evaluate the horizontal distribution of chemicals of concern previously identified in March 2005.

The 2006 human health risk assessment (HHRA), based on data from the 2005 sampling events, concluded that non-carcinogenic effects for both surface water and sediment were regulatory acceptable because the "Hazard Index" calculated for a hypothetical recreational receptor was less than 1.0. Carcinogenic risks of exposures to surface water (incidental ingestion, dermal contact) were less than the MDE threshold limit of 1E-05, or a one–in-100,000 probability of developing cancer (Tetra Tech, 2006). Carcinogenic risks for exposures to sediment exceeded this MDE threshold for carcinogenic effects; however, the estimated risks were within the U. S. Environmental Protection Agency (USEPA) acceptance range of 1E-04 to 1E-06, or a one-in-10,000 to one-in-one-million probability of developing cancer.

The 2006 HHRA evaluated incidental ingestion and dermal contact with surface waters and sediments as direct contact exposure pathways. Risks associated with consumption of fish from the study area were not evaluated in the 2006 HHRA. The 2006 ecological risk assessment (ERA) (likewise based on the 2005 data) identified cadmium in surface water and barium, silver, benzo(a)pyrene, benzo(g,h,i)perylene, and indeno(1,2,3-cd)pyrene as the primary chemicals of potential concern (COPC) in sediment. Food-chain modeling also identified mercury in sediment as a concern (Tetra Tech, 2006).

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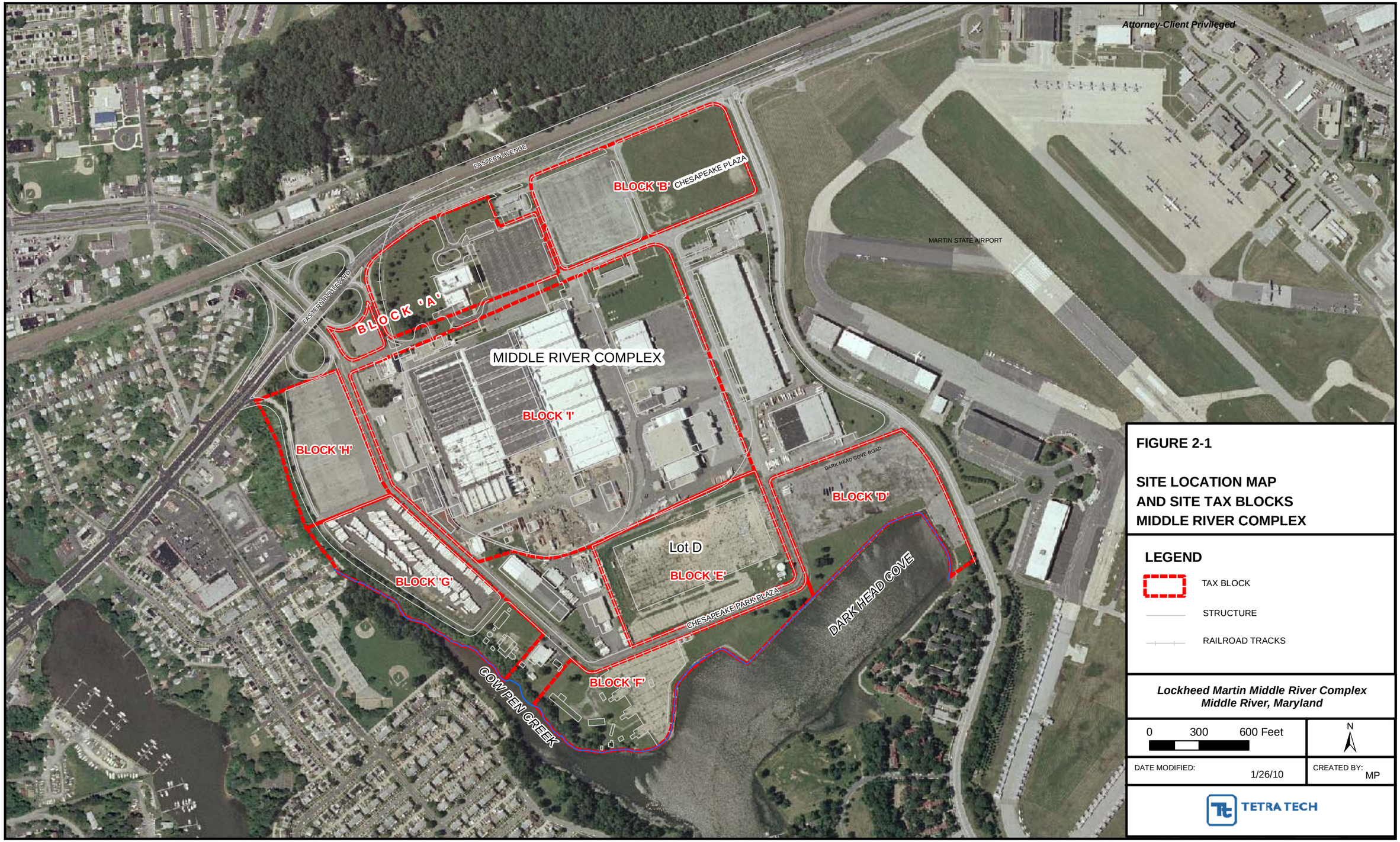

FIGURE 2-1

SITE LOCATION MAP
AND SITE TAX BLOCKS
MIDDLE RIVER COMPLEX

LEGEND

- TAX BLOCK
- STRUCTURE
- RAILROAD TRACKS

Lockheed Martin Middle River Complex
Middle River, Maryland

0 300 600 Feet

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Section 3
Investigation Approach and Methodology

As stated in Section 1, the overall objective is to provide additional surface water quality data to determine the concentrations and spatial distributions of chemicals of potential concern in Dark Head Cove and Cow Pen Creek that may be emanating from the Middle River Complex (MRC) site. Before initiating groundwater monitoring, appropriate Tetra Tech Inc. (Tetra Tech) personnel will become familiar with the site-specific health and safety plan (HASP) and the respective Safe Work permits and emergency response plan included in the HASP.

Tetra Tech will conduct mandatory health and safety tailgate meetings before each day's fieldwork. The Tetra Tech site health and safety officer will document the topics covered and personnel in attendance. Safety requirements are addressed in detail in the site-specific Tetra Tech HASP, included as Appendix A.

3.1 SURFACE WATER SAMPLING

Before all field tasks, appropriate Tetra Tech personnel will become familiar with the site-specific HASP and the respective Safe Work permits and emergency response plan included in the HASP. Tetra Tech will conduct a mandatory health and safety tailgate meeting before each day's field activities. The Tetra Tech site health and safety officer will document the topics covered and personnel attending these meetings.

3.1.1 Surface Water Sampling and Analyses

One round of surface waste samples will be collected from Dark Head Cove and Cow Pen Creek in June 2012, 13 surface water samples will be collected from five transects in Dark Head Cove at Outfalls 5, 6, 7, 8, and 9 and in Cow Pen Creek near the location of the Western Plume along a transect centerline in the creek (see Figure 3-1).

Surface water sampling in Dark Head Cove will be collected along transects at Outfalls 5, 6, 7, 8, and 9. Two samples will be collected along the transect, one 10-feet offshore (A-sample) and one 50-feet offshore (B-sample). At Outfall 5, which has two outlets, samples will be collected 10-feet offshore from both outlets but only one sample will be collected 50-feet offshore on a line perpendicular to the bulkhead and halfway between the outlets.

Surface water sampling will be conducted in Cow Pen Creek near the location of the Western Plume and will be located along a transect centerline in the creek. The samples will be collected 10-feet upstream and 10-feet downstream from the estimated Western Plume boundaries. Table 3-1 presents the surface water sampling locations and the amended sampling schedule for the 2012 monitoring program.

Surface water samples will be collected as grab samples using direct fill sampling techniques. All samples will be collected at a depth of approximately one foot below the water surface. The VOC samples will be collected using a stainless-steel, discrete interval sampler (Bacon Bomb Sampler). The sampler will be lowered to approximately one foot below the water surface, the check valve will be engaged to allow the sampler to fill, the sampler will be brought to the surface, and the water will be removed through a valve to fill three laboratory–cleaned, hydrochloric acid–preserved, 40-milliliter (mL) sample vials. The discreet interval sampler will be cleaned after each use by rinsing with distilled water. Equipment cleaning will take place after each sample is collected. No decontamination fluids will be containerized during this sampling event.

Samples will be analyzed via laboratory analysis for VOCs via Method 8260B. No duplicates will be collected during this investigation. One trip blank sample per sampling event (i.e., one per cooler) will be collected for VOC analysis for quality assurance/quality control. Water quality parameters, including temperature, pH, specific conductance, hardness, salinity, turbidity, dissolved oxygen, and oxidation reduction potential shall be measured at all surface water sample locations at the time of sampling. In addition, the depth of water at the sampling location and the tidal stage at the time of sampling shall be recorded. All information will be documented on a surface water sample form.

The surface water sampling locations will be surveyed using a hand held global positioning system receiver. Sampling locations will be surveyed in the Maryland State Plane North American Datum 1983 (feet).

3.1.2 Documentation

A master site logbook will be maintained as an overall record of field activities for the site. Sample documentation will include completed chain of custody (COC) forms and matrix specific sample log sheets. The COC forms are standardized to summarize and document pertinent sample information, such as sample identification and type, matrix, date and time of collection, preservation, and requested analysis. Sample custody procedures are designed to document sample acquisition and integrity.

3.1.3 Sample Nomenclature and Handling

Each surface water sample collected during the characterization study will be identified with a unique sample identification tag. Surface water samples will be labeled with an "SW" prefix followed by the sample number, followed by an "A" designating a sample 10 feet from the shoreline and a "B" designating a sample 50 feet from the shoreline and a six-digit sampling date. For example, a surface water sample collected on June 15, 2012 from MRC-SW5A would be labeled MRC-SW5A-061512. Trip blanks will be labeled with a "TB" prefix followed by the blank's six-digit submittal date (e.g., TB-061512).

Sample handling includes field related considerations concerning the selection of sample containers, preservatives, allowable holding times, and analyses requested. Proper custody procedures will be followed throughout all phases of sample collection and handling. COC protocols will be used throughout sample handling to assure the evidentiary integrity of sample containers. These protocols will demonstrate that the samples were handled and transferred in a manner that would prevent or detect possible tampering.

Sample containers will be released under signature from the laboratory and will be accepted under signature by the sampler(s) or individual responsible for maintaining custody until the sample containers are transferred to the sampler(s). Transport containers being returned to the laboratory will be sealed with strapping tape and a tamper proof custody seal. The custody seal will include the signature of the individual releasing the transport container, along with the date and time.

3.1.4 Equipment Decontamination

Both dedicated and disposable equipment will be used for surface water sampling to minimize decontamination activities. The stainless steel bacon bomb sampler will be decontaminated before and after each use. Equipment decontamination will consist of a potable water rinse and air drying.

3.1.5 Waste Management

No investigation-derived waste (IDW) will be generated during the surface water sampling. General waste will be disposed of in the proper waste disposal containers at the facility. Decontamination of the stainless steel bacon bomb sampler with potable water will be done over the surface water body; therefore, no IDW will be generated during surface water sampling.

3.2 DATA MANAGEMENT

Data handling procedures to be followed by the laboratory will meet the requirements of the laboratory subcontract. All analytical and field data will be maintained in project files; files will include copies of the COC forms, sample log forms, sampling location maps, and documentation of quality assurance and data manipulation.

3.2.1 Data Tracking and Control

A cradle to grave sample tracking system will be used from the beginning to the end of the sampling event. Before field mobilization, the field operations leader will coordinate and initiate sample tracking. Sample jar labels will be handwritten in the field and reviewed to ensure that they are accurate and adhere to work plan requirements. The project manager (PM) will coordinate with the analytical laboratory to ensure that they are aware of the number and type of samples and analyses to expect. When field sampling is underway, the field operations leader will forward the COC forms to the PM (or designee) and the laboratory for each day that samples are collected. The PM (or designee) will confirm that the COC forms provide the information required by the work plan. This will allow for early detection of errors made in the field so that adjustments can be made while the field team is still mobilized.

After all requested analyses are complete, the laboratory will submit an electronic deliverable for every sample delivery group. When all electronic deliverables have been received from the laboratory, the PM or designee will ensure that the laboratory has performed all requested

analyses. Ideally, discrepancies will be noted early enough so that all samples can be analyzed within the prescribed holding times.

3.2.2 Sample Information

Data from field measurements will be recorded using appropriate log sheets and summarized in tabular form, as will raw instrument data from the laboratory. The field operations leader will verify field data daily; laboratory data will be verified by the group supervisor and then by the laboratory's quality control/documentation department.

3.2.3 Project Data Compilation

The analytical laboratory will generate an Adobe® portable document format (PDF) file of the analytical data packages, as well as electronic database deliverables. The electronic database will be checked against the PDF file from the laboratory and updated as required, based on data qualifier flags applied during data validation. All data, such as units of measure and chemical nomenclature, will be consistent with the project database.

3.2.4 Geographical Information System

Data management systems consist of a relational database and geographical information system (GIS) used to manage environmental information pertaining to MRC. The relational database stores chemical, geological, hydrogeologic, and other environmental data collected during environmental investigations; the GIS is created from the relational database and contains subsets of the larger data pool. The GIS allows posting of environmental data onto base maps to represent the information graphically. Compiled sample, chemical, and positional data will be incorporated into the GIS.

3.3 DATA REVIEW

Data from the laboratory will be entered into a sample database and evaluated against risk-based criteria. Data validation, consisting of data completeness, holding time, calibrations, laboratory and field blank contamination, field duplicate precision, and detection limits, will be completed concurrent with the data evaluation. The review will be based on USEPA Region 3's *Modifications to the National Functional Guidelines for Data Review* (USEPA, 1993 and 1994) and the specifics of the analytical method used. Data from this sampling event will consist of

surface water samples that will make it easier to understand the nature and extent of surface water contamination.

Table 3-1

Surface Water Sample Locations for the 2012 Monitoring Program
Middle River Complex, Middle River, Maryland

Sample Location	Sample Number	Distance from Shore (feet)	Analytical Parameters (all samples)	Sample Months	Quantity
Dark Head Cove					
Outfall 5	SW5A1, SW5A2 SW5B	10 (*2 samples here only) 50	VOCs, Field Parameters	June event	2 1
Outfall 6	SW6A SW6B	10 50	VOCs, Field Parameters	June event	1 1
Outfall 7	SW7A SW7B	10 50	VOCs, Field Parameters	June event	1 1
Outfall 8	SW8A SW8B	10 50	VOCs, Field Parameters	June event	1 1
Outfall 9	SW9A SW9B	10 50	VOCs, Field Parameters	June event	1 1
Cow Pen Creek					
Near Western Plume	SW1A SW2A	Upstream Downstream (Both Centerline)	VOCs, Field Parameters	June event	1 1

Notes:*Two near shore samples (10-feet) will be collected only at Outfall 5. One sample will be collected at each outlet to the Cove.

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MIDDLE RIVER COMPLEX

OUTFALL 01
OUTFALL 02
OUTFALL 03
OUTFALL 04
OUTFALL 05
OUTFALL 06
OUTFALL 07
OUTFALL 08
OUTFALL 09

SW1A
SW2A
SW5A1
SW5A2
SW5B
SW6A
SW6B
SW7A
SW7B
SW8A
SW8B
SW9A
SW9B

COW PEN CREEK
DARK HEAD COVE

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Figure 3-1
2012 Proposed Surface Water Sampling Locations
Lockheed Martin Middle River Complex
Middle River, Maryland

Legend

- 2012 Proposed Surface Water Sample Location
- Stormwater Outfall Location
- TCE Isoconcentration (UG/L)
- Inferred

0 50 100 200 300 400 500 Feet

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Approved By:

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Section 4
Project Deliverables

A data summary report will be prepared for the June 2012 sampling event. A description of field activities, including field procedures, analytical results, and data validation, and a brief data comparison against screening criteria will be completed. The surface water sampling results will be evaluated with respect to the appropriate ecological and human health screening levels, including: *Maryland Ambient Water Quality Criteria for Human Health Consumption of Organisms, Code of Maryland Regulations 26.08.02.03; and USEPA Region 3 Biological Technical Advisory Group Freshwater Screening Levels* (USEPA, 2006), and any site-specific swimming screening levels developed by Lockheed Martin based on prior assessments of Frog Mortar Creek at Martin State Airport. The report will also include figures depicting the extent of surface water impacts. Surface water sampling results from this sampling event will also be included as part of the *2012 Annual Groundwater Monitoring Report*. Data will be entered and maintained in the Middle River Complex (MRC) environmental geographic information system (EGIS).

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Section 5
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APPENDIX A—HEALTH AND SAFETY PLAN

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HEALTH AND SAFETY PLAN
FOR
LOCKHEED MARTIN CORPORATION

MULTIMEDIA CHARACTERIZATION

MIDDLE RIVER COMPLEX
MIDDLE RIVER, MARYLAND

TETRA TECH , INC.

20251 Century Boulevard Suite 200
Germantown, Maryland 20874-7114

JUNE 2012

HEALTH AND SAFETY PLAN
FOR
MULTIMEDIA CHARACTERIZATION
AT
LOCKHEED MARTIN CORPORATION
LOCKHEED MARTIN MIDDLE RIVER COMPLEX

2323 EASTERN BOULEVARD
MIDDLE RIVER, MARYLAND

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JUNE 2012

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1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been developed to provide the minimum practices and procedures for Tetra Tech, Inc. (Tetra Tech) and subcontractor personnel engaged in Multimedia Characterization activities at the Lockheed Martin Middle River Complex in Middle River, Maryland.

This HASP must be used in conjunction with the Tetra Tech Health and Safety Guidance Manual (HSGM). The HSGM contains Tetra Tech Health and Safety Standard Operating Procedures (SOPs), as well as detailed reference information on a variety of topics referenced in this HASP. This HASP and the contents of the Guidance Manual were developed to comply with the requirements stipulated in 29 CFR 1910.120 (OSHA's Hazardous Waste Operations and Emergency Response Standard) and applicable sections of 29 CFR 1926 (Safety and Health Regulations for Construction).

All contractor responsibilities stipulated in Section 1 of the Lockheed Martin Remediation Contractor's ESH Handbook (LM Handbook) will be adhered to. The LM Handbook can be found in Attachment I of this HASP.

Copies of all pertinent environmental, safety and health (ESH) records must be maintained at the job site. This includes, but is not limited to, this site-specific HASP, the Tetra Tech Health and Safety Guidance Manual, personnel training documentation, evidence of enrollment in a medical surveillance program, accident/injury reporting, work area inspections, periodic safety meetings, MSDS's, air monitoring data, waste container inspections, etc. These records must also be provided electronically to the Lockheed Martin Project Lead.

This HASP has been developed using the latest available information regarding known or suspected chemical contaminants and potential physical hazards associated with the proposed work and site. The HASP will be modified if the scope of work changes or if new information regarding site conditions, hazards, or contaminants of concern becomes available. If deviations are encountered from the field work plan, the contractor shall A) notify to the Lockheed Martin Project Lead and B) suspend work to assess changes to the work plan(s) and the HASP. Changes to the work plan(s) and the HASP shall be reviewed by the Project Lead. Procedures addressing changes to this HASP as described in Section 6 of the LM Handbook (Attachment I) will be followed.

1.1 KEY PROJECT PERSONNEL AND ORGANIZATION

This section defines responsibilities for site safety and health for Tetra Tech employees conducting field activities under this field effort. All personnel assigned to participate in the field work have the primary

responsibility for performing all of their work tasks in a manner that is consistent with the Tetra Tech Health and Safety Policy, the health and safety training that they have received, the contents of this HASP, and in an overall manner that protects their personal safety and health and that of their co-workers. The following persons are the primary point of contact and have the primary responsibility for observing and implementing this HASP and for overall on-site health and safety.

- The Tetra Tech Project Manager (PM) is responsible for the overall direction and implementation of this HASP.

- The Field Operations Manager (FOL) manages field activities, executes the work plan, and enforces safety procedures as applicable to the work plan.

- The Project Health and Safety Officer (PHSO) is responsible for developing this HASP in accordance with applicable OSHA regulations. Specific responsibilities include:
  - Providing information regarding site contaminants and physical hazards.
  - Establishing air monitoring and decontamination procedures.
  - Assigning personal protective equipment based on task and potential hazards.
  - Determining emergency action procedures.
  - Identifying appropriate emergency contacts.
  - Stipulating training and medical surveillance requirements.
  - Providing standard work practices to minimize potential injuries and exposures associated with hazardous waste site work.
  - Modify this HASP, where and when necessary.

- The Site Safety Officer (SSO) supports site activities by advising the PM on the aspects of health and safety on site. These duties may include the following:
  - Coordinate health and safety activities with the FOL.
  - Select, inspect, implement, and maintain personal protective equipment.
  - Establish work zones and control points.
  - Implements air-monitoring program for onsite activities.
  - Verify training and medical status of onsite personnel status in relation to site activities.
  - Implements hazard communication, respiratory protection, and other associated safety and health programs as necessary.
  - Coordinates emergency services.
  - Provides site specific training for onsite personnel.
  - Investigates accidents and injuries (see Attachment II Incident Report Form)

- Provides input to the PHSO regarding the need to modify, this HASP, or other applicable health and safety associated documents as per site-specific requirements.

- The Project Health Physicist (PHP) supports site activities by advising the PM on the aspects of health and safety on site. These duties may include the following:
  - Coordinate radiological activities with the FOL.
  - Select, implement, and survey personal protective equipment.
  - Establish radiological areas.
  - Provides site specific training for onsite personnel.
  - Provides input to the PHSO regarding the need to modify, this HASP, or other applicable health and safety associated documents as per site-specific requirements.

- Compliance with the requirements of this HASP are monitored by the SSO and coordinated through the Tetra Tech Health and Safety Manager (HSM).

Note: In some cases one person may be designated responsibilities for more than one position. For example, the FOL may also be responsible for the SSO duties. This action will be performed only as credentials, experience, and availability permits.

1.2 STOP WORK

All employees are empowered, authorized, and responsible to stop work at any time when an imminent and uncontrolled safety or health hazard is perceived. In a Stop Work event (immediately after the involved task has been shut down and the work area has been secured in a safe manner) the employee shall contact the Project Manager and the Corporate Health and Safety Manager. Through observations and communication, all parties involved shall then develop, communicate, and implement corrective actions necessary and appropriate to modify the task and to resume work. If worked was stopped for radiological reasons, Project Manager and Corporate Health and Safety Officer will consult with PHP prior to resuming work.

1.3 SITE INFORMATION AND PERSONNEL ASSIGNMENTS

Site Name: Lockheed Martin Middle River Complex **Address:** Middle River, Maryland

LMC Contact: Tom Blackman **Phone Number:** (301) 214-9958
Scott Lapp (410) -682-0365 office
(410) 967-8745 cell
John Morgan (410) 682-1382 office
(410) 215-4530 cell

Purpose of Site Visit: Multimedia Characterization activities

Proposed Dates of Work: May 2012 until completion

Project Team:

Tetra Tech Management Personnel:	Discipline/Tasks Assigned:	Telephone
Mike Martin	Program Manager	(301) 528-3022 office (410) 707-5259 cell
Tony Apanavage	Project Manager (PM)	(301) 528-3021 (301) 233-8230 cell
TBD	Field Operations Leader (FOL)	
TBD	Site Safety Officer (SSO)	
Matthew M. Soltis, CIH, CSP	Health and Safety Manager	(412) 921-8912
Clyde Snyder	Project Health and Safety Officer (PHSO)	(412) 921-8904
Amy Stanford	Project Health Physicist (PHP)	(706) 832-7394

Non-Tetra Tech Personnel	Affiliation/Discipline/Tasks Assigned	Telephone
John Morgan	Facilities Manager	(410) 682-1328
Mike Musheno	Environment Safety & Health/Projects	(484) 875-2819
Tom Ambrose	Facilities Supervisor	(410) 682-1308
LMC Security Office (Chief Philip Johnston)	Site Security	(410) 682-1050
Jimmy Yeager	Lockheed Martin ESH Manger	(301) 873-1444

Hazard Assessment (for purposes of 29 CFR 1910.132) for HASP preparation has been conducted by:

Prepared by: Clyde Snyder

2.0 EMERGENCY ACTION PLAN

2.1 INTRODUCTION

This section has been developed as part of a planning effort to direct and guide field personnel in the event of an emergency. In the event of an emergency, the field team will primarily evacuate and assemble to an area unaffected by the emergency and notify the appropriate local emergency response personnel/agencies. Workers who are ill or who have suffered a non-serious injury may be transported by site personnel to nearby medical facilities, provided that such transport does not aggravate or further endanger the welfare of the injured/ill person. The emergency response agencies listed in this plan are capable of providing the most effective response, and as such, will be designated as the primary responders. These agencies are located within a reasonable distance from the area of site operations, which ensures adequate emergency response time.

Tetra Tech personnel may participate in minor event response and emergency prevention activities such as:

- Initial fire-fighting support and prevention
- Initial spill control and containment measures and prevention
- Removal of personnel from emergency situations
- Provision of initial medical support for injury/illness requiring only first-aid level support
- Provision of site control and security measures as necessary

2.2 EMERGENCY PLANNING

Through the initial hazard/risk assessment effort, emergencies resulting from chemical, physical, or fire hazards are the types of emergencies which could be encountered during site activities. To minimize or eliminate the potential for these emergency situations, pre-emergency planning activities will include the following (which are the responsibility of the SSO and/or the FOL):

- Coordinating with Lockheed Martin Middle River and/or local emergency response personnel to ensure that Tetra Tech emergency action activities are compatible with existing emergency response procedures.

- Establishing and maintaining information at the project staging area (support zone) for easy access in the event of an emergency. This information will include the following:

  - Chemical Inventory (of chemicals used onsite), with Material Safety Data Sheets.

- Onsite personnel medical records (Medical Data Sheets).
- A log book identifying personnel onsite each day.
- Hospital route maps with directions (these should also be placed in each site vehicle).
- Emergency Notification - phone numbers.

The Tetra Tech FOL will be responsible for the following tasks:

- Identifying a chain of command for emergency action.

- Educating site workers to the hazards and control measures associated with planned activities at the site, and providing early recognition and prevention, where possible.

- Periodically performing practice drills to ensure site workers are familiar with incidental response measures.

- Providing the necessary equipment to safely accomplish identified tasks.

2.3 EMERGENCY RECOGNITION AND PREVENTION

2.3.1 Recognition

Emergency situations that may be encountered during site activities will generally be recognized by visual observation. Visual observation will also play a role in detecting potential exposure events to some chemical hazards. To adequately recognize chemical exposures, site personnel must have a clear knowledge of signs and symptoms of exposure associated with the principle site contaminants of concern as presented in this HASP. Tasks to be performed at the site, potential hazards associated with those tasks and the recommended control methods are discussed in detail in Sections 5.0 and 6.0. Additionally, early recognition of hazards will be supported by daily site surveys to eliminate any situation predisposed to an emergency. The FOL and/or the SSO will be responsible for performing surveys of work areas prior to initiating site operations and periodically while operations are being conducted. Survey findings are documented by the FOL and/or the SSO in the Site Health and Safety logbook; however, site personnel will be responsible for reporting hazardous situations. Where potential hazards exist, Tetra Tech will initiate control measures to prevent adverse effects to human health and the environment.

The above actions will provide early recognition for potential emergency situations, and allow Tetra Tech to instigate necessary control measures. However, if the FOL and the SSO determine that control measures are not sufficient to eliminate the hazard, Tetra Tech will withdraw from the site and notify the appropriate response agencies listed in Table 2-1.

2.3.2 Prevention

Tetra Tech and subcontractor personnel will minimize the potential for emergencies by following the Health and Safety Guidance Manual and ensuring compliance with the HASP and applicable OSHA regulations. Daily site surveys of work areas, prior to the commencement of that day's activities, by the FOL and/or the SSO will also assist in prevention of illness/injuries when hazards are recognized early and control measures initiated.

2.3.3 Fire Prevention / Flammable Liquids

Tetra Tech and subcontractor personnel are responsible for fire protection in all of their work areas at all times during the duration of this field effort (24 hours per day/seven days per week). Approved fire-fighting equipment and extinguishers, in adequate quantities for their work activates must be provided.

The Lockheed Martin Project Lead will be notified as soon as possible of any fire, if Tetra Tech or subcontractor personnel use a Lockheed Martin fire extinguisher, and of any and all fires that are extinguished. In case of fire, Tetra Tech and subcontractor personnel will call 9-1-1.

All flammable and combustible liquids must be stored, dispensed and used in accordance with OSHA regulations and the Uniform Fire Code. Bonding and grounding of containers containing flammable liquids will be required.

All fire prevention/flammable liquids safety procedures and requirements stipulated in Section 3.15 of the LM Handbook (Attachment I) will also be adhered to.

2.4 EVACUATION ROUTES, PROCEDURES, AND PLACES OF REFUGE

An evacuation will be initiated whenever recommended hazard controls are insufficient to protect the health, safety or welfare of site workers. Specific examples of conditions that may initiate an evacuation include, but are not limited to the following: severe weather conditions; fire or explosion; monitoring instrumentation readings which indicate levels of contamination are greater than instituted action levels; and evidence of personnel overexposure to potential site contaminants.

In the event of an emergency requiring evacuation, personnel will immediately stop activities and report to the designated safe place of refuge unless doing so would pose additional risks. When evacuation to the primary place of refuge is not possible, personnel will proceed to a designated alternate location and remain until further notification from the Tetra Tech FOL. Safe places of refuge will be identified prior to the commencement of site activities by the SSO and will be conveyed to personnel as part of the pre-

activities training session. This information will be reiterated during daily safety meetings. Whenever possible, the safe place of refuge will also serve as the telephone communications point for that area. During an evacuation, personnel will remain at the refuge location until directed otherwise by the Tetra Tech FOL or the on-site Incident Commander of the Emergency Response Team. The FOL or the SSO will perform a head count at this location to account for and to confirm the location of site personnel. Emergency response personnel will be immediately notified of any unaccounted personnel. The SSO will document the names of personnel onsite (on a daily basis) in the site Health and Safety Logbook. This information will be utilized to perform the head count in the event of an emergency.

Evacuation procedures will be discussed during the pre-activities training session, prior to the initiation of project tasks. Evacuation routes from the site and safe places of refuge are dependent upon the location at which work is being performed and the circumstances under which an evacuation is required. Additionally, site location and meteorological conditions (i.e., wind speed and direction) may dictate evacuation routes. As a result, assembly points will be selected and communicated to the workers relative to the site location where work is being performed. Evacuation should always take place in an upwind direction from the site.

2.5 EMERGENCY CONTACTS

Prior to initiating field activities, personnel will be thoroughly briefed on the emergency procedures to be followed in the event of an accident. Table 2-1 provides a list of emergency contacts and their associated telephone numbers. This table must be posted where it is readily available to site personnel. Facility maps should also be posted showing potential evacuation routes and designated meeting areas.

Any pertinent information regarding allergies to medications or other special conditions will be provided to medical services personnel. This information is listed on Medical Data Sheets filed onsite (see Attachment III). If an exposure to hazardous materials has occurred, provide hazard information from Table 6-1 to medical service personnel**.**

The Lockheed Martin Project Lead shall be contacted immediately in the event of a fatal or serious injury, and unpermitted environmental release, or any ESH incident that is likely to generate significant publicity or an adverse situation for Lockheed Martin. Detailed requirements are describe in Section 1.15 of the LM Handbook (Attachment I).

In the event of an emergency not requiring 9-1-1, LMC facility personnel should be contacted in the order presented on Table 2-1.

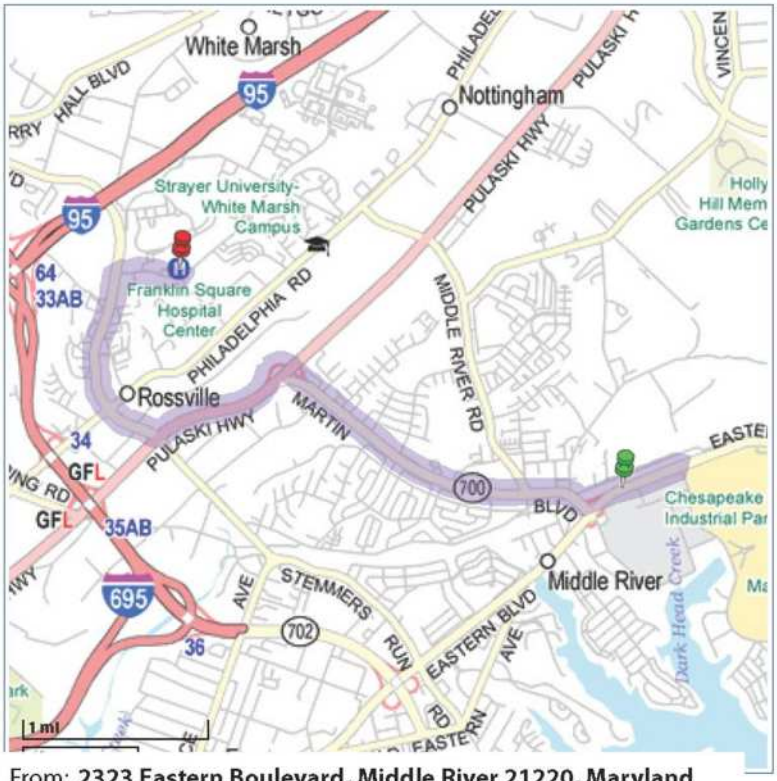
TABLE 2-1

EMERGENCY CONTACTS
LOCKHEED MARTIN MIDDLE RIVER COMPLEX, MARYLAND

AGENCY	TELEPHONE
EMERGENCY (Police, Fire, and Ambulance)	**911**
Franklin Square Hospital	(410) 682-7000
State of Maryland Emergency Response Center	(410) 974-3551
Local Emergency Planning Coordinator's office	(410) 887-2919
Chemtrec	(800) 424-9300
National Response Center	(800) 424-8802
Poison Control Center	(800) 222-1222
Mike Martin, Program Manager	(301) 528-3022 office (410) 707-5259 cell
PM, Tony Apanavage	(301) 528-3021 office (301) 233-8230 cell
HSM, Matthew M. Soltis, CIH, CSP	(412) 921-8912
PHSO, Clyde Snyder	(412) 921-8904 (724) 516-0907 cell
Amy Stanford (PHP)	(706) 832-7394
John Morgan, Facilities Manager	(410) 682-1328
Mike Musheno, ESH/ Projects	(410) 682-1315 office (610) 656-4012 cell
Scott Lapp	(410) 682-0365 office (410) 967-8745 cell
John Morgan	(410) 682-1382 office (410) 215-4530 cell
Tom Ambrose, Facilities Supervisor	(410) 682-1308 (856) 842-2590 cell
LMC Security (Chief Philip Johnston)	(410) 682-1050

2.6 EMERGENCY ROUTE TO HOSPITAL

FIGURE 2-1
ROUTE TO HOSPITAL



From: **2323 Eastern Boulevard, Middle River 21220, Maryland**
To: **Franklin Square Hospital Center(Baltimore), MD**
Total Distance: **5.0 miles (8.0km)**
Total Estimated Time: **0 hrs., 13mins.**

Directions

2323 Eastern Boulevard, Middle River 21220, Maryland to Franklin Square Hospital Center(Baltimore), MD
Distance: 5.0 miles (8.0km) Time: 0 hrs., 13mins.

1. Start out heading EAST on EASTERN BOULEVARD. Drive for 0.3 miles.
2. Make a U-turn at MD-150 E. Drive for 0.3 miles.
3. Take exit on your RIGHT towards MD-700 / MARTIN BLVD / US-40. Drive for 0.2 miles.
4. Go STRAIGHT on MD-700 W. Drive for 1.6 miles.
5. Take US-40 W on your LEFT. Drive for 1 mile.
6. Turn RIGHT onto ROSSVILLE BOULEVARD. Drive for 1 mile.
7. Turn RIGHT onto FRANKLIN SQUARE DRIVE. Drive for 0.3 miles.
8. Turn LEFT onto HOSPITAL DRIVE. Drive for a short distance.
9. You have reached Franklin Square Hospital Center(Baltimore), MD

2.7 EMERGENCY ALERTING AND ACTION/RESPONSE PROCEDURES

Tetra Tech personnel will be working in close proximity to each other at Lockheed Martin Middle River Complex (LMC MRC). As a result, hand signals, voice commands, and line of site communication will be sufficient to alert site personnel of an emergency.

If an emergency warranting evacuation occurs, the following procedures are to be initiated:

- Initiate the evacuation via hand signals, voice commands, or line of site communication
- Report to the designated refuge point where the FOL will account for all personnel
- Once non-essential personnel are evacuated, appropriate response procedures will be enacted to control the situation.
- If personnel have been evacuated from a radiological area, contact the PHP.
- Describe to the FOL (FOL will serve as the Incident Coordinator) pertinent incident details.

In the event that site personnel cannot mitigate the hazardous situation, the FOL and SSO will enact emergency notification procedures to secure additional assistance in the following manner:

Dial 911 and call other pertinent emergency contacts listed in Table 2-1 and report the incident. Give the emergency operator the location of the emergency, the type of emergency, the number of injured, and a brief description of the incident. Stay on the phone and follow the instructions given by the operator. The operator will then notify and dispatch the proper emergency response agencies.

2.8 PPE AND EMERGENCY EQUIPMENT

A first-aid kit, eye wash units (or bottles of disposable eyewash solution) and fire extinguishers (strategically placed) will be maintained onsite and shall be immediately available for use in the event of an emergency. This equipment will be located in the field office as well as in each site vehicle. At least one first aid kit supplied with equipment to protect against bloodborne pathogens will also be available on site. Personnel identified within the field crew with bloodborne pathogen and first-aid training will be the only personnel permitted to offer first-aid assistance.

Safety eyewear meeting ANSI Z87.1 is required in areas designated as “Eye Projection Required” and is also required on all jobs where a potential injury to the eye is possible whether or not the area is posted.

Safety shoes and boots which meet the ANSI Z41 Standard shall be provided when impact and/or compression hazards exist.

Appropriate MSHA/NIOSH-approved respiratory protective devices must be worn when applicable state and/or federal action levels or OSHA permissible exposure levels are exceeded. Appropriate air monitoring and respiratory protection equipment will be supplied and maintained if inhalation hazards are anticipated and a respiratory protection adhering to all state and federal regulations implemented.

Hearing protection must be worn in all areas posted to indicate high noise level or where employees are exposed to noise levels in excess of the OSHA action level (85 dBA over an 8-hour time-weighted average or a dose of fifty percent).

Protective clothing such as suits, aprons, boots or gloves shall be worn where there is a hazard to the body through dermal contact with chemicals, dusts, heat or other harmful agents or conditions.

Hard hats meeting the ANSI Z89.1 Standard will be worn in all areas where there is danger of impact to the head or hazard from falling or moving objects.

All personal protective clothing and equipment will be used and approved as detailed in Section 3.1 of the LM Handbook (Attachment I).

Protective clothing for radiological work, if applicable, will be worn in accordance with Tetra Tech Radiologicial Protection Operating Procedures (Tt RPOP), found in the project work plan.

2.9 HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE

Tetra Tech and subcontractor personnel conducting work at Lockheed Martin will adhere to Title 29, Code of Federal Regulations, Section 1910.120 – Hazardous Waste Operations and Emergency Response or the applicable state OSHA standards.

Tetra Tech and/or subcontractor personnel will to perform periodic work area inspections to determine the effectiveness of the site safety and health plan and to identify and correct unsafe conditions in the work area. These inspections shall be documented and available to Lockheed Martin upon request for review.

The requirements and regulations described in Section 3.20 of the LM Handbook (Attachment I) will be adhered to.

2.10 DECONTAMINATION PROCEDURES / EMERGENCY MEDICAL TREATMENT

During any site evacuation, decontamination procedures will be performed only if doing so does not further jeopardize the welfare of site workers. Decontamination will be postponed if the incident warrants

immediate evacuation. However, it is unlikely that an evacuation would occur which would require workers to evacuate the site without first performing the necessary decontamination procedures.

Tetra Tech personnel will perform rescue operations from emergency situations and may provide initial medical support for injury/illnesses requiring only "Basic First-Aid" level support, and only within the limits of training obtained by site personnel. Basic First-Aid is considered treatment that can be rendered by a trained first aid provider at the injury location and not requiring follow-up treatment or examination by a physician (for example; minor cuts, bruises, stings, scrapes, and burns). Personnel providing medical assistance are required to be trained in First-Aid and in the requirements of OSHA's Bloodborne Pathogen Standard (29 CFR 1910.1030). Medical attention above First-Aid level support will require assistance from the designated emergency response agencies. Attachment II provides the procedure to follow when reporting an injury/illness, and the form to be used for this purpose.

2.11 INJURY/ILLNESS REPORTING

Any pertinent information regarding allergies to medications or other special conditions will be provided to medical services personnel. This information is listed on Medical Data Sheets filed onsite (see Attachment III). If an exposure to hazardous materials has occurred, provide information on the chemical, physical, and toxicological properties of the subject chemical(s) to medical service personnel.

If any Tetra Tech personnel are injured or develop an illness as a result of working on site, the Tetra Tech “Injury/Illness Procedure” (Attachment II) must be followed. Following this procedure is necessary for documenting of the information obtained at the time of the incident.

Tetra Tech personnel will contact the LMC personnel in the order presented in Table 2-1 in the event of a fatality injury, environmental release (spill), near-miss incident, or an ESH incident that is likely to generate significant publicity. A written report of the incident/injury/spill and corrective action(s) must be submitted to LMC personnel within one (1) day of the incident.

Section 8.1 of the LM Handbook (Attachment I) describing the requirements of accident, injury, illness and incident reporting will be addressed.

2.11.1 TOTAL Incident Reporting System

TOTAL is Tetra Tech’s new online incident reporting system. Use TOTAL to directly report health and safety incidents, notify key personnel, and initiate the process for properly investigating and addressing the causes of incidents, including near-miss events. An incident is considered any unplanned event. It may include several types of near misses, events where no loss was incurred, or incidents that resulted in injuries or illness, property or equipment damage, chemical spills, fires, or damage to motor vehicles.

TOTAL looks like the incident reporting form in Attachment II. TOTAL is an intuitive system that will guide you through the necessary steps to report an incident within 24 hours of its occurrence. Behind the scenes, TOTAL is a powerful tool for H&S professionals, and will help Tetra Tech to better track incidents, analyze root causes, implement corrective action plans, and share lessons learned. The ultimate result is a more safe and healthy working environment.

TOTAL is maintained on the Tetra Tech Intranet site at https://my.tetratech.com/

Once on the "My Tetratech" site, TOTAL can be found under the Health and Safety tab, Incident Reporting section, select "Report an Incident (TOTAL)". This will connect you directly to TOTAL. TOTAL can also be accessed directly from the internet using the following web address: http://totalhs.tetratech.com/

Note: When using the system outside the Tetra Tech intranet system or when operating in a wireless mode, a VPN connection will be required. The speed of the application may be affected dependent upon outside factors such as connection, signal strength, etc. Enter the system using your network user name and password. The user name should be in the following format - TT\nickname.lastname.

3.0 SITE BACKGROUND

3.1 SITE HISTORY

The LMC MRC is located at 2323 Eastern Boulevard in Middle River, Maryland. The site consists of approximately 180 acres of land and twelve main buildings. The subject property also includes perimeter parking lots, an athletic field, Lot D (presently a vacant lot with a concrete foundation for former Building D), a trailer and parts storage lot, and a vacant waterfront lot. The site is bounded by Eastern Boulevard (Route 150) to the north, Dark Head Creek to the south, Cow Pen Creek to the west, and Martin State Airport to the east.

Currently, LMC activities at the site are limited to facility and building management and maintenance. There are two main tenants at the site, Middle River Aircraft Systems (MRAS) and Naval Electronics & Surveillance Systems (NE&SS), also referred to as Vertical Launch Systems. MRAS conducts design, manufacturing, fabrication, testing, overhaul, and repair and maintenance of aeronautical structures, parts, and components for military and commercial applications. NE&SS conducts fabrication, assembly, testing and support of vertical launch systems. Historically, the property has been used for aircraft and missile launching systems design, development, and sales.

The purpose of these investigations are to characterize soil (surface/subsurface), surface water, groundwater, sediment, and indoor air quality in areas of the facility. Based on review of available facility information during the Phase I Environmental Site Assessment, no indication of current or historical site activities, within these areas, potentially resulting in a release of any hazardous substances or petroleum products was identified.

The facility is divided into blocks for the purpose of site investigations. The blocks included for investigation in this HASP are the following:

- Block D
- Block E
- Block F
- Block G
- Block H
- Block I*

*Work in Block I will not be conducted at this time information in this HASP is placed only for reference purposes at this time.

3.2 BLOCK E BUILDING D RAD INVESTIGATION

Recognized environmental condition (REC) #1 (Former Building D) is the only one of the three RECs located in Block E that were identified in the Phase I environmental site assessment that has a radiological concern. This investigation takes place in Tax Block E in former Building D. Former Building D, which was built in the early 1940s for final assembly of aircraft frames, was demolished in 1972. The building had an assembly floor (first floor), and a basement (current concrete slab), and occupied approximately 400,000 square feet.

The former basement areas were used for welding, extrusion milling, engine preparation, and assembly. The northwestern and southwestern portions of the basement housed several offices and laboratories used for radiological operations. Cleaning, plating, and finishing work areas were located along the southern interior wall near the building's center.

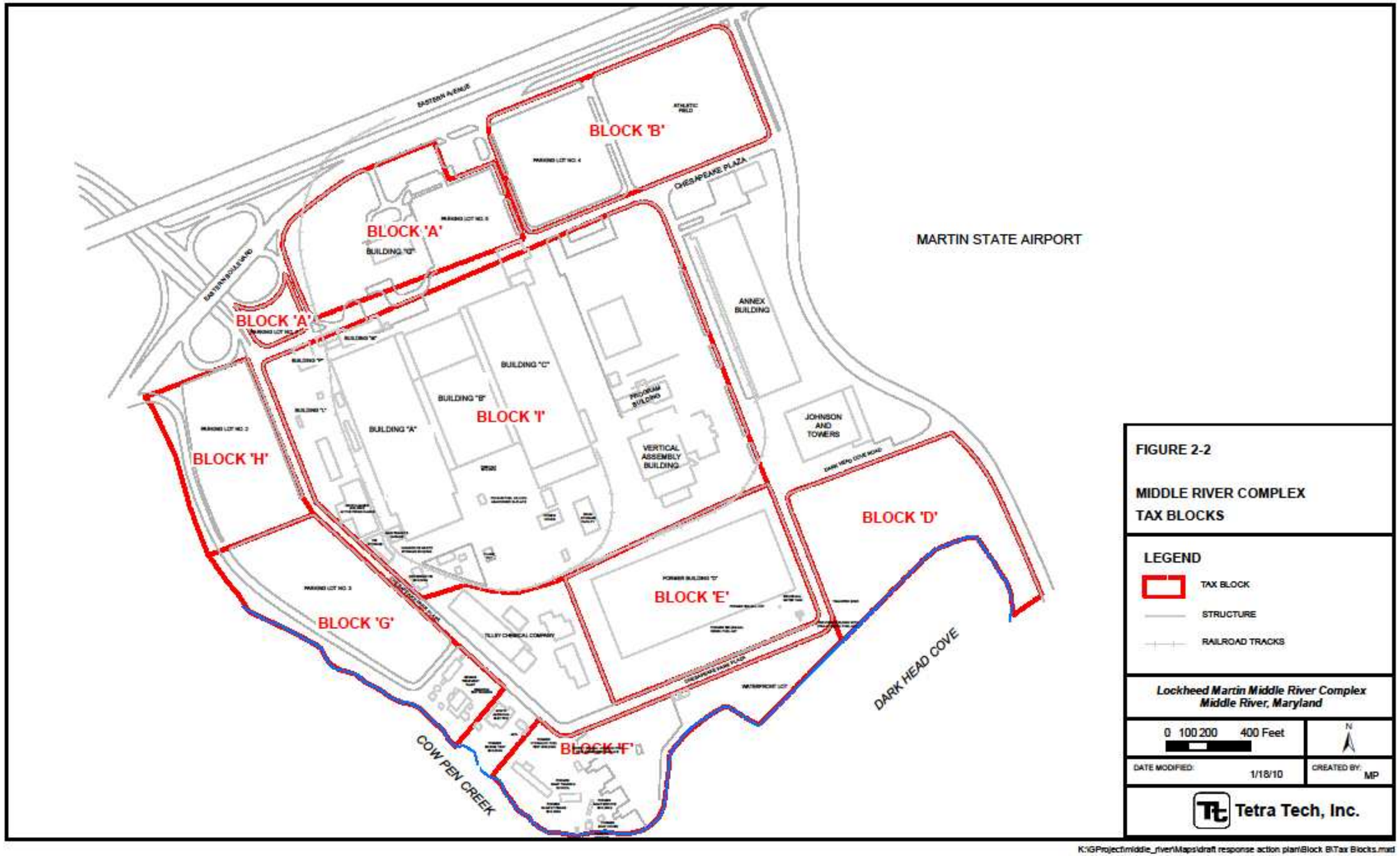
Since the building was demolished it had been used for storage, including the storage of airplane carcasses from the Martin State Airport air museum.

A radiological survey of REC #1 (Former Building D) was performed in March 2004 (Tetra Tech, 2004b) to determine if radiological activities possibly conducted in Building D had affected the underlying environmental media. The survey focused on the remaining Former Building D foundation slab where suspected radiological activities may have occurred. A cobalt-60 source was also located in the wet lab. The radiological survey covered two areas where isotopes were known to have been used, based on information obtained from MRC personnel who had been present when such operations occurred during the late 1950s–1960s. The primary area was in the southwestern portion of the building, along the southern exterior wall; the secondary area was immediately north of the first area, along the western exterior wall of Former Building D.

The radiological survey uses alpha and beta monitors and a gamma radiation survey instrument; see the Work Plan for more detailed explanation. See Figure 3-1 for the specific location of each block.

FIGURE 3-1

SITE MAP



K:\GProject\middle_river\Maps\draft response action plan\Block B\Tax Blocks.mxd

4.0 SCOPE OF WORK

This section discusses the specific tasks that are to be conducted as part of this scope of work. These tasks are the only ones addressed by this HASP. Any tasks to be conducted outside of the elements listed here will be considered a change in scope requiring modification of this document. The PM or a designated representative will submit the requested modifications to this document to the HSM.

Specific tasks to be conducted include the following:

- Mobilization/demobilization activities
- Indoor Air Quality Sampling using Summa Canisters
- Soil borings via Direct Push Technology (DPT)
- Test Pits, Excavations
- Membrane Interface Probe via DPT
- Concrete Coring
  - Installation of permanent soil gas vapor monitoring points
- Monitoring well installation
  - Installation and development using DPT
  - Soil Vapor Points Installation
- Multimedia sampling including
  - Surface water and sediment sampling from a barge
  - Groundwater
  - Soil vapor points sampling
  - Surface and Subsurface soil
  - Storm Water Sampling
  - Sediment Sampling
- Decontamination
- Geophysical Survey
- Geographical Survey
- IDW Management
- Building D Rad Investigation
- Block E additional media characterization:
  - Work area exposure surveys
  - Collection of background samples
  - Collection of soil, concrete, and perch water samples
  - Perform surface scans and removable contamination surveys for personnel protection during sampling and imaging operations.

For more detailed description of the planned tasks associated with LMC MRC, refer to the Work Plan (WP). Any tasks to be conducted outside of the elements listed here will be considered a change in scope requiring modification of this document. All requested modifications to this document will be submitted to the HSM by the PM or a designated representative.

No other activities are anticipated to be necessary. If it becomes apparent that additional or modified tasks must be performed beyond those listed above, the work is not to proceed until the FOL or SSO notifies the Project Manager and the HSM, so that any appropriate modifications to this HASP can first be developed and communicated to the intended task participants.

5.0 IDENTIFYING AND COMMUNICATING TASK-SPECIFIC HAZARDS AND SAFE WORK PRACTICES

The purpose of this section is to identify the anticipated hazards and appropriate hazard prevention/hazard control measures that are to be observed for each planned task or operation. These topics have been summarized for each planned task through the use of task-specific Safe Work Permits (SWPs), which are to be reviewed in the field by the SSO with all task participants prior to initiating any task. Additionally, potential hazard and hazard control matters that are relevant but are not necessarily task-specific are addressed it the following portions of this section.

Section 6.0 presents additional information on hazard anticipation, recognition, and control relevant to the planned field activities.

In the event of an emergency, not requiring 911, LMC facility personnel should be contacted in the order presented on Table 2-1.

5.1 GENERAL SAFE WORK PRACTICES

In addition to the task-specific work practices and restrictions identified in the SWPs (Attachment IV) the following general safe work practices are to be followed when conducting work on-site.

- Eating, drinking, chewing gum or tobacco, taking medication, or smoking in contaminated or potentially contaminated areas or where the possibility for the transfer of contamination exists is prohibited.

- Wash hands and face thoroughly upon leaving a contaminated or suspected contaminated area. If a source of potable water is not available at the work site that can be used for hands-washing, the use of waterless hands cleaning products will be used, followed by actual hands-washing as soon as practicable upon exiting the site.

- Avoid contact with potentially contaminated substances including puddles, pools, mud, or other such areas. Avoid, kneeling on the ground or leaning or sitting on equipment. Keep monitoring equipment away from potentially contaminated surfaces.

- Plan and mark entrance, exit, and emergency evacuation routes.

- Rehearse unfamiliar operations prior to implementation.

- Buddies should maintain visual contact with each other and with other on-site team members by remaining in close proximity to assist each other in case of emergency.

- Establish appropriate safety zones including support, contamination reduction, and exclusion zones.

- Minimize the number of personnel and equipment in contaminated areas (such as the exclusion zone). Non-essential vehicles and equipment should remain within the support zone.

- Establish appropriate decontamination procedures for leaving the site.

- Immediately report all injuries, illnesses, and unsafe conditions, practices, and equipment to the SSO.

- Observe co-workers for signs of toxic exposure and heat or cold stress.

- Inform co-workers of potential symptoms of illness, such as headaches, dizziness, nausea, or blurred vision.

5.2 DRILLING (HSA/DPT/HANDCART MOUNTED DPT UNIT/ROTOSONIC) SAFE WORK PRACTICES

The following Safe Work Practices are to be followed when working near operating drilling equipment.

5.2.1 Before Drilling

- Identify underground utilities, buried structures, and aboveground utility lines before drilling. Tetra Tech personnel will use the Utility Locating and Excavation Clearance Standard Operating Procedure provided in the Tetra Tech Health and Safety Guidance Manual.

- Drill rigs will be inspected by the SSO or designee, prior to the acceptance of the equipment at the site and prior to the use of the equipment. Needed repairs or identified deficiencies will be corrected prior to use. The inspection will be accomplished using the Equipment Inspection Checklist provided in Attachment V. Additional inspections will be performed at least once every 10-day shift or following repairs.

- Check operation of the Emergency Stop/Kill Switch and/or the "Dead Man's" operational controls. These operational checks are required initially as part of the equipment pre-use inspection, and then

periodically thereafter. Periodic checks are required at least weekly, or more frequently if recommended by the rig manufacturer.

- Ensure that machine guarding is in place and properly adjusted.

- Block drill rig and use out riggers/levelers to prevent movement of the rig during operations.

- The work area around the point of operation will be graded to the extent possible to remove any trip hazards near or surrounding operating equipment.

- The driller's helper will establish an equipment staging and lay down plan. The purpose of this is to keep the work area clear of clutter and slips, trips, and fall hazards. Mechanisms to secure heavy objects such as drill flights will be provided to avoid the collapse of stacked equipment.

- Potentially contaminated tooling will be wrapped in polyethylene sheeting for storage and transport to the centrally located equipment decontamination unit.

- Prior to each instance of engaging the HSA drill rig, the Driller will look to ensure that the drilling area is clear of personnel and obstructions, and verbally alert everyone in the area that the rig is about to be engaged.

- Prior to the start of boring operations, one individual will be designated at the person responsible for immediate activation of the emergency stop device (if applicable) in the event of an emergency. This individual will be made known to the field crew and will be responsible for visually checking the work area and verbally alerting everyone of boring operations prior to engaging the equipment.

5.2.2 During Drilling

- The Driller will ensure that an individual is constantly stationed at a location were the drill rig emergency stop switch can be immediately engaged.

- Minimize contact to the extent possible with contaminated tooling and environmental media.

- Support functions (sampling and screening stations) will be maintained a minimum distance from the drill rig of the height of the mast plus five feet or 35-feet for Rotosonic/HSA, 25-feet for DPT operations whichever is greater to remove these activities from within physical hazard boundaries.

- Only qualified operators and knowledgeable ground crew personnel will participate in the operation of the drill rig.

- During maintenance, use only manufacturer provided/approved equipment (i.e. auger flight connectors, etc.)

- In order to minimize contact with potentially contaminated tooling and media and to minimize lifting hazards, multiple personnel should move auger flights and other heavy tooling.

- Only personnel absolutely essential to the work activity will be allowed in the exclusion zone.

5.2.3 After Drilling

- Equipment used within the exclusion zone will undergo a complete decontamination and evaluation by the SSO to determine cleanliness prior to moving to the next location, exiting the site, or prior to down time for maintenance.

- Motorized equipment will be fueled prior to the commencement of the day's activities. During fueling operations equipment will be shutdown and bonded to the fuel source.

- When not in use drill rigs will be shutdown, and emergency brakes set and wheels will be chocked to prevent movement.

- The mast will be completely lowered and outrigger completely retracted during movement to decontamination or the next location.

- Areas subjected to subsurface investigative methods will be restored to equal or better than original condition. Any contamination that was brought to the surface by drilling or DPT operations will be removed and containerized. Physical hazards (debris, uneven surfaces, ruts, etc.) will be removed, repaired or otherwise corrected. In situations where these hazards cannot be removed these areas will be barricaded to minimize the impact on field crews working in the area.

5.2.4 Concrete Coring Operations

The following safe work practices will be employed during concrete coring operations:

- Identify underground utilities before commencing any concrete operations.

- Use wetting techniques to minimize dust and friction.

- When applying water to the core bit the operator should apply water until the slurry begins to look like heavily creamed coffee.

- Wear the well-fitting nitrile gloves (rather than cotton or leather gloves) when in coring.

- Wash and dry hands before putting on gloves and every time that you remove your gloves.

- Replace grossly contaminated or worn-out gloves.

- Make sure the coring machine is properly anchored.

- Standing on the machine may cause the bit to bind up in the hole

- Use the manufacturers recommended speed (revolutions per minute) for the diameter of the bit used.

- The coring machine will be inspected to ensure housings; plugs; guards are intact, and the coring machine is in good operating order.

- If the power source to be employed is not through a Ground Fault Circuit Interrupter (GFCI) then a temporary GFCI plug extension shall be put in place.

- A shop vac or similar device also connected to the GFCI will be used to collect the water employed during the coring process. All water in the coring area will be cleaned to reduce the potential for slip, trip and falls. Place floor wet signs as necessary from all approach venues.

- The preferred method is to bolt the coring machine to the floor during coring operations. It is however acceptable to utilize sand bags or similar weighted devices to control movement during this activity.

- No open core holes will be permitted after the termination of the shift. All cores will be placed back in the holes or the holes will be fitted for their permanent casings for the sub-slab soil gas vapor monitoring points.

- All core holes finished with protective casings or finished using concrete will be finished to grade again to prevent slip, trips, and/or falls.

5.3 SAFE BOATING PRACTICES (I.E., WORKING FROM WATER VESSELS/BARGES)

Offshore soil boring activities will require site personnel to work from barges in tidal bodies of water. To avoid potential hazards associated with working on water (drowning), the field team shall employ lifelines (tie-off procedure), safety harnesses, when on the barge. U.S. Coast Guard (USCG) approved personal flotation devices (PFD) will be on hand for all participants and will be used. Due to the obvious hazards associated with working on water during inclement weather, field activities may be temporarily suspended or terminated at the discretion and direction of the FOL or SSO. Tetra Tech personnel will also follow the Tetra Tech procedures for working over water outlined in Standard Opering Procedure SWP 5-6 found in Attachment VI

Refer to the Tetra Tech Boat Safety Checklist in Attachment VII of this HASP.

5.3.1 U.S.C.G. Flotation Device Types

Use the following information to determine the proper type of U.S.C.G. PFD.

Off Shore Life Jacket (Type I, 22lbs buoyancy)

Type I life jacket is the best choice for rough or open waters. This type will float you the best and is favorable if rescue may be long in coming. This type will turn an unconscious person upright in the water. Though is bulky it does have a highly visible color for easier detection.

Near Shore Buoyant Vest (Type II, 15.5lbs buoyancy)

Type II is a good choice for calmer waters. It will turn most unconscious persons face-up in the water. Though it is less bulky than Type I, it is not intended for long hours in calm or rough water.

Flotation Aid (Type III, 15.5lbs buoyancy)

Type III is probably the most comfortable device offering more freedom of movement, such as water skiing or fishing, but is not intended for rough water. Also, an unconscious person may end up face-down in the water.

Throwable Devices (Type IV)

Throwable devices are intended for calm waters with heavy boat traffic where help is always close. It is not intended for unconscious persons or non-swimmers or long hours in the water. They are good backups for the other devices.

Site personnel shall wear Type III personal flotation devices in the event someone falls overboard, boats sinks or capsizes. Type IIIs were selected as they offer the most flexibility for working while still meeting minimum requirements for buoyancy. In situations where personal flotation devices cannot be worn due to the task to be conducted, the flotation devices shall be immediately available/accessible. It is recommended that personal flotation devices be continually worn during colder months due to the potential for hypothermia to restrict muscle movement and therefore, self rescue and maintaining buoyancy. In addition, a single Type IV Throwable Flotation Device shall be maintained on board the boat with at least 90 feet of 3/8 polypropylene line.

When work activities take personnel within four feet of navigable waters edge personnel will have immediately accessible a lifeline with a throwing bag or Type IV flotation device facilitate extraction from the water. Personnel working on water's edge will do so using the buddy system to assist in rescue efforts, if needed.

Device	Type	Description
Off Shore Life Jacket	Type I 22lbs buoyancy	Best in rough or open waters. Floats best especially in long time rescue. Will turn unconscious upright. Bulky but highly visible.
Near Shore Buoyant Vest	Type II, 15.5lbs buoyancy	Good in calmer waters. Will turn most unconscious face-up. Less bulky. Not for long time rescue.
Flotation Aid	Type III 15.5lbs buoyancy	Most comfortable device offering more freedom of movement. Not intended for rough water. Unconscious may end up face-down
Throwable Devices	Type IV	Throwable devices for calm waters with heavy boat traffic where help is always close. Not for unconscious, non-swimmers or long hours. Good backups for the other devices.

5.3.2 U.S.C.G Boat Regulations

No person born on or after January 1, 1986 shall operate a vessel that is fitted with propulsion machinery of more than ten (10) horsepower on waterways unless the person has successfully completed a boating safety education program as approved by the director of the Department of Environmental Management. Certain bodies of water in some states may also have local restrictions as to type and size of watercraft or motor horsepower, restricted use areas, boat speed, and times for use. The FOL is responsible for checking with appropriate local authorities to identify and address any additional requirements/restrictions.

The U.S.C.G. requires boats to have the following equipment on board:

- One personal flotation device per person
- A sound producing device such as an air horn or whistle which can be heard one half mile.

Speed Limits

Any motorboat or vessel operated within a harbor or inlet or any pond of other confined body of water shall not exceed 45 mph from sunrise to sunset and 25 mph during periods of darkness or restricted visibility. Lower speed limits may be regulated in certain areas.

Reckless and Negligent Operation

Negligent or grossly negligent operation of a vessel which endangers lives and/or property is prohibited by law. A civil penalty may be imposed by the Coast Guard for this offense under federal laws. An operator may be subjected to a fine of up to $5,000 and or imprisonment for up to one year, or both. The Maryland penalty is a fine of up to $500 for the first offense.

Some examples of actions that may constitute negligent or grossly negligent operation include but are not limited to:

- Operating in a swimming area
- Operating under the influence of alcohol or drugs.
- Excessive speed in the vicinity of other boats or in dangerous waters.
- Hazardous water skiing practices
- Bow riding, also riding on seatback, gunwale or transom.

Termination of Use

A Maryland Natural Resources Police Officer who observes a boat being operated in an unsafe condition and who determines that an especially hazardous condition exists may direct the operator to take immediate steps to correct the condition, including returning to port. Termination for unsafe use may be imposed for, but is not limited to:

- Insufficient number of USCG approved Personal Flotation Devices.
- Insufficient fire extinguishers.
- Overloading beyond manufacturer's recommended safe loading capacity.
- Improper navigation light display.

- Ventilation requirements for tank and engine spaces not met.
- Fuel leakage.
- Fuel in bilges.
- Improper backfire flame control.

Boating Accident Reports

The operator of any boat involved in an accident must stop, render assistance, and offer identification. An accident report must be made to the Department within 48 hours if:

- A person dies within 24 hours;
- A person loses consciousness or receives medical treatment beyond first aid or is disabled more than 24 hours;
- A person disappears from the vessel under circumstances that indicate death or injury.

Accidents must be reported within 10 days if damage to all vessels and other property totals more than $500.00 or an earlier report is not required. Running aground or hitting a fixed or floating object is considered a boating accident. Boating accident report forms (DNR-149) are obtainable from the Natural Resources Police. They must be submitted to the Natural Resources Police by the operator of the vessel or vessels involved. Accident reports are required by federal law and furnish information for use in accident prevention. Information from individual reports will not be publicly disclosed nor may the information be used in court.

Rendering Assistance

Federal law requires the operator of a vessel to provide assistance that can be safely provided to any individual in danger on the water. Persons who fail to provide assistance may be subject to fine or imprisonment.

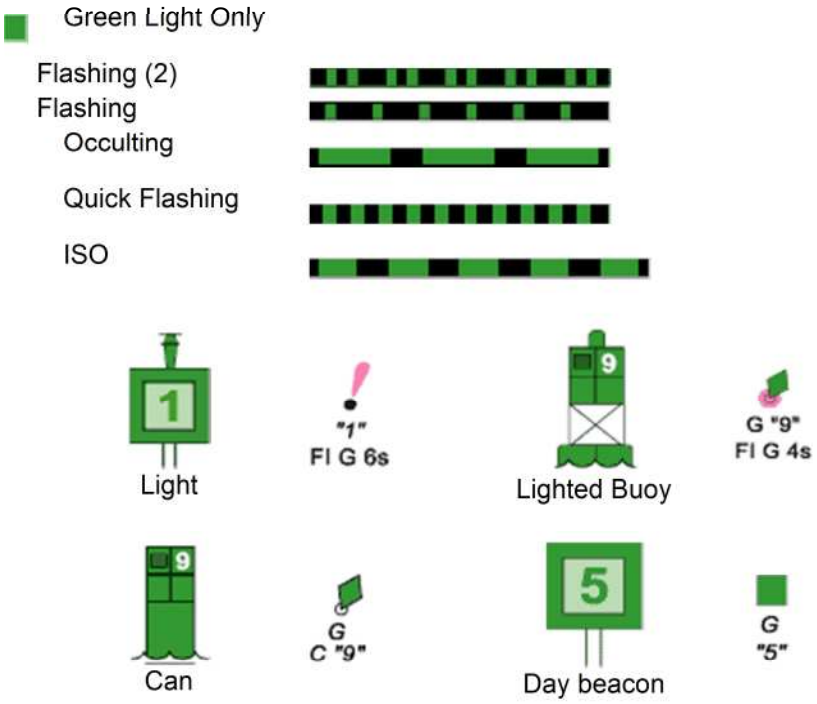
Vessels Required to be Registered in Maryland

All vessels, whether commercial or recreational, must be registered in Maryland if it is equipped with any kind of primary or auxiliary mechanical propulsion; if it is not currently documented with the U. S. Coast Guard; and if it is being used principally in Maryland. An owner of a federally documented vessel, though exempt from state numbering requirements, shall apply to the Maryland Department of Natural Resources for documented use decals, and is subject to the state excise tax requirements.

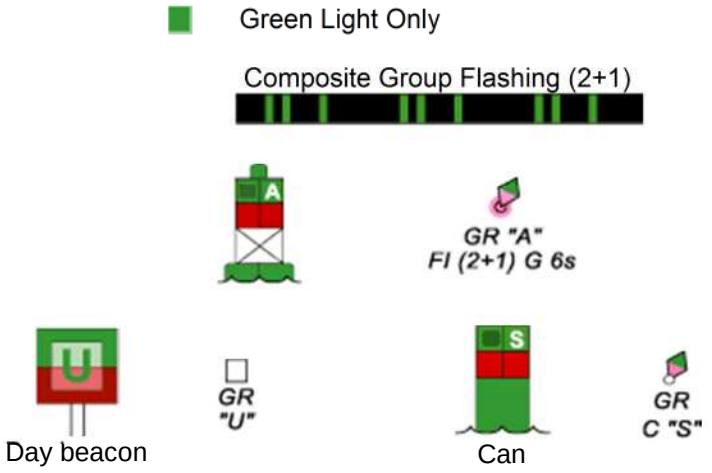
5.3.3 Uniform State Waterway Marking System (USWMS)

Lateral System (As Seen Entering From Seaward)

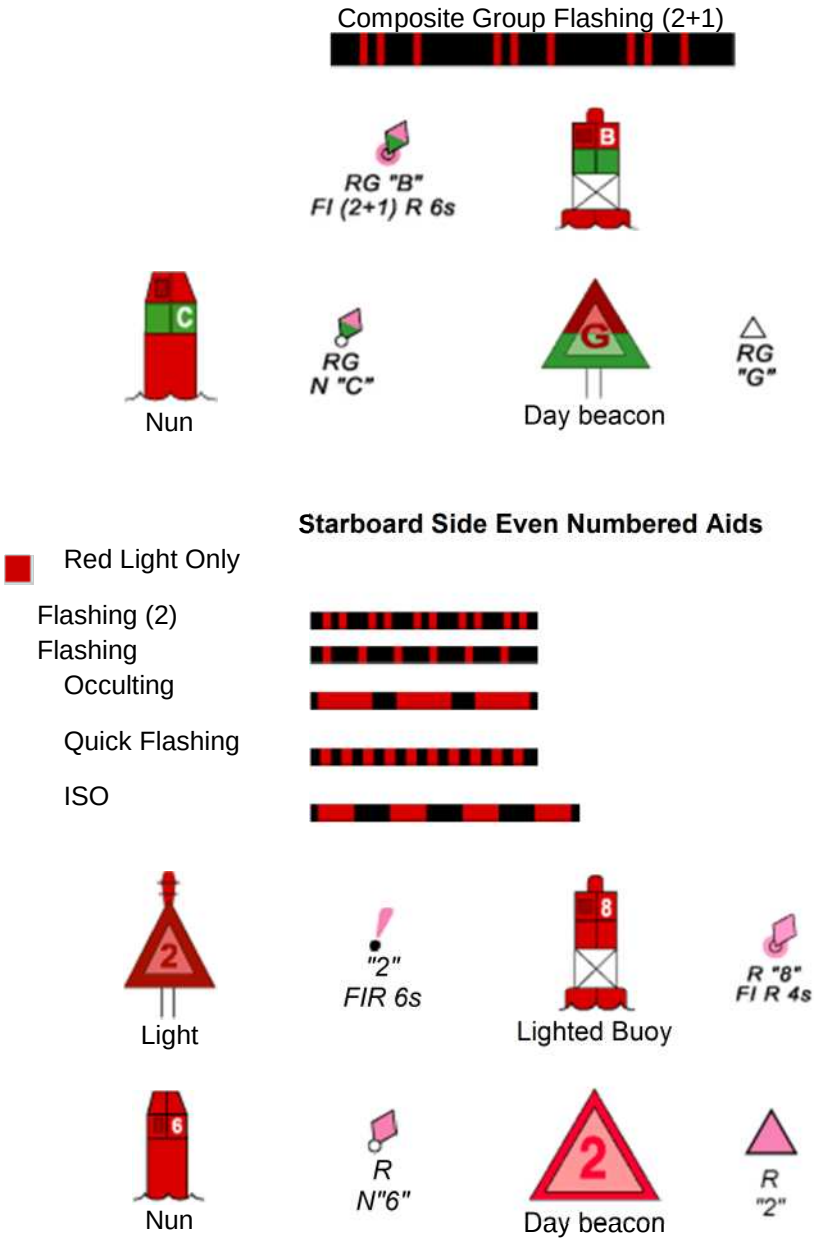
Port Side Odd Numbered Aids



Preferred Channel No Numbers-May Be Lettered
Preferred Channel To Starboard Topmost Band Green



Preferred Channel No Numbers-May Be Lettered
Preferred Channel To Port Topmost Band Red



Lateral Aids to Navigation generally indicates which side of an aid to navigation a vessel should pass when channels are entered from seaward. In the absence of a route leading from seaward, the conventional direction of buoyage, generally follows a clockwise direction around landmasses. The most important characteristic of an aid is its color. The "3R" rule "Red Right Returning" is the essential rule of thumb for using the lateral system. This means that when entering one body of water from a larger body of water (i.e. returning to a harbor from a bay or sound), keep the red aids to starboard (right) side and green aids to port (left) side. In addition, each aid is numbered, and these numbers increase as entering from seaward.

Preferred Channel Marks are found at junctions of navigable channels and often mark wrecks or obstructions. A vessel may normally pass this aid on either side, but the top color band indicates the preferred channel. If the top band of the aid is red, it is treated as a red mark and kept to starboard as the vessel passes it while returning from sea. Caution: It may not always be possible to pass on either side of preferred channel aids to navigation. The appropriate nautical chart should always be consulted.

Lateral System

May show green reflector or light

Port Side

Solid Black Buoy
(Being replaced by Green Can Buoy)

Usually found in pairs
pass between these buoys

_ Looking upstream _

May show red reflector or light

Starboard Side

Solid Red Buoy
(Being replaced by Red Nun Buoy)

Cardinal System

May show white reflector or light

Red striped white buoy

Do not pass between buoy and nearest shore

Black topped white buoy

Pass to north or east of buoy

Red topped white buoy

Pass to south or west of buoy

5.4 PERMANENT SOIL GAS VAPOR MONITORING POINTS WITHIN BUILDINGS SAFE WORK PRACTICES

Installation of permanent soil gas vapor monitoring points will be conducted within buildings on site. Soil gas monitoring points will be installed at various locations using electric powered concrete coring machine will be used to push through the concrete floor.

Prior to installation of the VMPs, appropriate procedures will be followed to address the potential presence of asbestos-containing materials (ACM) at all proposed VMP locations. An outside contractor licensed by the State of Maryland to manage all aspects of asbestos will perform inspections and

sampling if necessary to determine the absence or presence of ACM prior to any work being performed. If necessary, ACM such as floor tile will be removed to facilitate installation of the new VMPs. All removed materials will be replaced to prevent any potential tripping hazards. After final locations have been established, Tetra Tech will initiate subsurface utility clearance. Tetra Tech will place a call to Miss Utility and, in addition, will use a private utility locating service (Enviroscan) to identify and mark subsurface utilities and anomalies. All utilities within a 15-foot radius of each designated drilling location will be located using the appropriate technology and marked with paint. Standard utility locating methods may not be effective based on the presence of subsurface metal (rebar) or the presence of metal-stored materials. In the case that standard methods are not effective, alternative methods such as line tracing will be utilized to effectively identify and mark any utilities. Proposed VMP boring locations may be offset based on the results of the asbestos or subsurface utility survey.

Operation of electric powered equipment within enclosed areas such as buildings presents the hazard of dusts generated during concrete coring. Additional hazards that may be present during these operations include, increased noise levels, contact with utilities, electrocution hazards (particularly if water is present). Use wetting methods to suppress airborne dusts generated during concrete coring within a building.

5.5 EXCAVATION SAFE WORK PRACTICES

Soil excavation activities will be performed through the use of a track or wheel mounted excavator that is outfitted with a boom and excavator bucket that is adequate to complete the entire excavation task in a manner that will not involve or require any entry into the open excavation by any person or by any part of the excavator except for the boom/bucket. The process for performing the excavation and the visual inspections will involve the following:

1. First, any surface encumbrances within the intended work area of the excavation will be removed or supported, as necessary, in accordance with OSHA 1926.651(a).
2. The FOL will assure that the intended excavation area is cleared of any utility installations that may reasonably be expected to be encountered during excavation work (in accordance with the Tetra Tech Utility Locating SOP and with OSHA 1926.651 [b]).
3. Prior to being put into service at the site, the excavator will be inspected by the SSO, and this inspection will be documented.
4. The excavator will be positioned and operated so that it never approaches closer than 4 feet from the edge of an open excavation (other than the boom and bucket portion of the excavator).
5. At no time during the active operation of the excavator will any person (other than the operator) be permitted to approach the vehicle closer than a distance of the length of the excavator boom and bucket (fully-extended) plus 5 feet, but not less than 25 feet, whichever is greater.

6. After a test pit has been created, and after the excavator has been either removed or completely neutralized or shut down, Tetra Tech personnel may approach to perform the visual inspection activities. Tetra Tech personnel will not be permitted to enter any open excavation or approach closer than 2 feet from the edge of an open excavation.

Hazards associated with these activities may include:

- Being struck by the excavator or being trapped between an immovable object and the excavator.
- Being struck by truck traffic being loaded out.
- Slips, trips, and falls associated with movement over uneven terrain or over the sidewall of the excavation
- Contact with contaminants of concern.

Control measures will include:

- The Tetra Tech Site Safety Officer will serve as the Excavation Competent Person (as defined in OSHA 1926.651 [b], as "*one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them".*
- Assuring that all personnel remain clear of the operating excavator at all times during its operation (a minimum "no approach" zone of 25 feet from the excavator or the length of the fully extended excavator boom/bucket length plus 5 feet, whichever is greater).
- ***All work tasks will be performed in a manner that does not require any entry into an open excavation***. In fact all persons are to be restricted form approaching within 2 feet of the edge of any open excavation.
- The FOL and the Excavator Operator will establish and maintain clear communications at all times. Also, the FOL is responsible for assuring that all persons are aware that it is their responsibility to remain outside of the "No Approach" Zone and out of the operator's blind spots.
- Hard hat, hearing protection and a high visibility vest will be required by all persons working near the excavation work area. Also, all personnel will be required to wear steel toe safety footwear, preferably with sole designs that include an aggressive lug to enhance traction
- Personnel will be made aware that they are to never place him/herself between the excavator and an immovable object.
- The assignment of an Excavation Competent Person is also an important part of hazard recognition, evaluation, and control to protect personnel during excavation activities.

Excavation Competent Person (ECP)

The ECP is responsible for addressing responsibilities as defined in OSHA 29 CFR 1926 Subpart P. For this project, the SSO will serve as the ECP. Specific ECP responsibilities include the following:

- Assuring that surface encumbrances are avoided, removed, or supported in accordance with (IAW) OSHA 1926.651 (a)
- Assuring that the FOL has accomplished the utility locating/avoidance processes prior to beginning any excavation (IAW 1926.651 [b])
- Assuring that no load (e.g., excavator boom or bucket) passes over the head of any person (IAW 1926.651[e])
- Assuring that adjacent structures, sidewalks, etc. are not undermined by excavation activities.
- Assuring that stockpiled material is placed in a location, at a height, and in a manner that does not represent the hazard of employees being struck by loose or falling materials.
- Because it is anticipated that excavations will be backfilled to grade the same day that they are created, the need to perform visual inspections (such as daily and after rain events, as specified in OSHA 1926.651[k][1]) should not be necessary. However, if such a need is encountered due to inclement weather or other reason, the ECP will be responsible for performing and documenting these excavation inspections. The inspection checklists in Attachment V are provided for this purpose.
- Assuring that stockpiled material will be placed no closer than 4 feet from the edge of an open excavation.

5.6 HAND AND POWER TOOL SAFE WORK PRACTICES

The following safe work practices will be employed during hand and power tool usage:

- All hand and power tools will be maintained in a safe condition.
- Electrical power tools shall be grounded or double insulated with proper assured equipment grounding inspections or Ground Fault Interrupter (GFI) circuit protection provided.
- Pneumatic power tools shall be secured to the hose or whip by some positive means.
- Only properly trained Contractor employees shall operate power-actuated tools.
- All grinding machines shall conform to OSHA and ANSI requirements.

Hand and power tool use procedures are detailed in Section 3.16 of the LM handbook and will be followed.

5.7 HOUSEKEEPING / CLEANUP SAFE WORK PRACTICES

Housekeeping procedures described in Section 5 of the LM Handbook (Attachment I) will be addressed and the following housekeeping practices will be employed during this field effort:

- Ensure discharge permits and/or Stormwater Pollution Prevention Plans (if applicable) are available at the project job site.
- Tetra Tech and/or subcontractor personnel will clean up its respective work area(s) and maintain work areas free from all slip, trip, and fall hazards at all times.
- Debris shall be kept cleared from work areas, passageways, stairs, and in and around buildings or other structures. The work area must be left free from accumulation of waste and rubbish at the end of each work shift.
- Combustible scrap and debris shall be removed at regular intervals during the course of work. Safe means shall be provided to facilitate such removal.
- At the end of each working day and/or the conclusion of work being performed, the work area will be restored to the same degree of neatness as when work commenced.
- Tetra Tech and/or subcontractor will furnish necessary equipment and/or receptacles to remove waste and rubbish from the job site unless otherwise specified by Lockheed Martin.

6.0 HAZARD ASSESSMENT AND CONTROLS

This section provides reference information regarding the chemical and physical hazards which may be associated with activities that are to be conducted as part of the scope of work.

6.1 CHEMICAL HAZARDS

The areas in this investigation have been characterized. Based on historical data from past use and previous sampling events the following contaminants were found to exist at the site:

- VOCs
- SVOCs
- Metals
- PCBs

Although the above chemicals are identified as site contaminants, the latest sampling data indicates that the chemicals in Table 6-1 are the primary contaminants of concern to site personnel performing intrusive work. Although all the chemical contaminants listed above may be present, not all are approaching levels of concern from a human health aspect. The chemicals of concern (COCs) listed below could approach airborne concentrations reaching current occupational exposure limits (OEL). Table 6-1 below shows these and/or common types of these constituents, and a comparison of potential worst case air concentrations (when available) with current Occupational Exposure Limits (OELs).

TABLE 6-1
COMPARISON OF COPCs, AVAILABLE WORST-CASE AIR CONCENTRATIONS, AND CURRENT OCCUPATIONAL EXPOSURE LIMITS

Contaminant of Concern (in soil)	Maximum Concentration In Soil	Worst-Case Air Concentration That Could Be Encountered	Current OSHA PEL or ACGIH TLV
Block D			
Benzene	0.02 mg/kg in soil	1.25 ppm	ACGIH: 0.5 ppm TWA_8 1 ppm STEL
Carbon Disulfide	0.035 mg/kg in soil	5.85 ppm	OSHA: 4 ppm
Methylene Chloride	0.12 mg/kg in soil	31.49 ppm	OSHA: 25 ppm

TABLE 6-1
COMPARISON OF COPCs, AVAILABLE WORST-CASE AIR CONCENTRATIONS, AND CURRENT OCCUPATIONAL EXPOSURE LIMITS

Block E			
Contaminant of Concern (in soil)	**Maximum Concentration In Groundwater**	**Worst-Case Air Concentration That Could Be Encountered**	**Current OSHA PEL or ACGIH TLV**
Acetone	16 mg/kg in soil	2,317.77 ppm	OSHA: 1000 ppm ACGIH: 500 ppm, TWA_8
Chlorobenzene	4 mg/kg in soil	23.62 ppm	OSHA: 75 ppm ACGIH: 10 ppm, TWA_8
1,2 Dichlorobenzene	1,20 mg/kg in soil	70.28 ppm	OSHA: NA ACGIH: 25 ppm, TWA_8
1,4 Dichlorobenzene	130 mg/kg in soil	93.28 ppm	OSHA: 75 ppm ACGIH: 10 ppm, TWA_8
Methylene Chloride	4.8 mg/kg in soil	1,259.65 ppm	OSHA: 25 ppm ACGIH: 50 ppm, TWA_8
PCBs	24,000 mg/kg	0.10 ppm	OSHA: 0.37 ppm
Trichlorobenzene	9600 mg/kg	381.50 ppm	OSHA: 5ppm
Vinyl Chloride	0.004 mg/kg in soil	4.55 ppm	OSHA: 1 ppm, TWA_8 5 ppm Ceiling
Contaminant of Concern (in water)	**Maximum Concentration In Water**	**Worst-Case Air Concentration That Could Be Encountered**	**Current OSHA PEL or ACGIH TLV**
Carbon Tetrachloride	13 ug/l in water	2.33 ppm	OSHA: 10 ppm ACGIH: 5 ppm TWA_8
Trichlorobenzene	11,000 ug/l in water	86.1 ppm	OSHA: NA ACGIH: 5 ppm, $Ceiling_8$
TCE (VOC)	19,000 ug/l in water	1,424.39 ppm	OSHA: 300 ppm Ceiling ACGIH: 50 ppm TWA_8 100 ppm STEL
Block F			
Contaminant of Concern (in soil)	**Maximum Concentration In Soil**	**Worst-Case Air Concentration That Could Be Encountered**	**Current OSHA PEL or ACGIH TLV**
Napthalene	159 mg/kg in soil	36.62 ppm	OSHA: 10 ppm ACGIH: 10 ppm TWA_8

TABLE 6-1
COMPARISON OF COPCs, AVAILABLE WORST-CASE AIR CONCENTRATIONS, AND CURRENT OCCUPATIONAL EXPOSURE LIMITS

Block G			
Contaminant of Concern (in soil)	**Maximum Concentration In Soil**	**Worst-Case Air Concentration That Could Be Encountered**	**Current OSHA PEL or ACGIH TLV**
1,1-Dichloroethene	0.007 mg/kg in soil	1.8 ppm	OSHA: NA ACGIH: 5 ppm, TWA_8
Contaminant of Concern (in water)	**Maximum Concentration In Water**	**Worst-Case Air Concentration That Could Be Encountered**	**Current OSHA PEL or ACGIH TLV**
1,1-Dichloroethene	780 ug/l in water	210.01 ppm	OSHA: NA ACGIH: 5 ppm, TWA_8
Trichloroethylene	2,800 ug/l in water	209.91 ppm	OSHA: 100 ppm ACGIH: 10 ppm, TWA_8
Vinyl Chloride (VOC)	7.2 ug/l in water	3.2 ppm	OSHA: 1 ppm, TWA_8 5 ppm Ceiling
Block H			
Various VOC's - none found to be above threshold limits in soil or water			
Block I Note: At this time work will not be conducted in Block I but this info is placed here for future investigations.			

Contaminant of Concern (in soil)	Maximum Concentration In Soil	Worst-Case Air Concentration That Could Be Encountered	Current OSHA PEL or ACGIH TLV
Benzene	0.45 mg/kg	28.19 ppm	ACGIH: 0.5 ppm TWA_8 1 ppm STEL
1,2,3, Trimethylbenezene	11 mg/kg	10.6 ppm	OSHA: NA ACGIH: 25 ppm, TWA_8
1,2,4-Trimethylbenezene	46 mg/kg	47.7 ppm	OSHA: NA ACGIH: 25 ppm, TWA_8
1,1-Dichloroethane	4.3 mg/kg	482.98 ppm	OSHA: 100 ppm TWA_8 ACGIH: 100 ppm, TWA_8
1,1-Dichloroethene	0.74 mg/kg	180.12 ppm	OSHA: NA ACGIH: 5 ppm, TWA_8
1,1,1-Trichloroethane	22 mg/kg	1,119.31 ppm	OSHA: 350 ppm TWA_8 ACGIH: 350 ppm, TWA_8
Vinyl Chloride	0.031 mg/kg	40.34 ppm	OSHA: 1 ppm, TWA_8 5 ppm Ceiling
Xylene	36 mg/kg	181.66 ppm	OSHA: 350 ppm TWA_8 ACGIH: 350 ppm, TWA_8
Lead	2,600 mg/kg	4.81 mg/m3	OSHA: 0.05 mg/m3 TWA_8 ACGIH: 0.05 mg/m3, TWA_8

Table Notes:

TWA_8: Average air concentration over an 8-hour work period that is not to be exceeded
OSHA Ceiling: Concentration in air that is not to be exceed

Note: All sites contain various metals, however none above occupational exposure limits if visible dust is observed. Area wetting methods will be used to suppress dust at all locations.

As indicated in Table 6-1, are from a worst-case scenario, COC concentrations immediately above a captured air phase above contaminated soil or water (such as in the head space during soil drilling or excavation activities) could potentially reach concentrations that exceed the OELs. However, in regarding the results of this data evaluation, it is important to recognize the following:

- The planned work area is outdoors with ample natural ventilation that will reduce any airborne VOCs through dilution and dispersion

- The soil value used in this evaluation was the ***highest*** concentration detected during the most recent soil sampling events

As a result of these factors, it is possible that workers participating in site activities may encounter airborne concentrations of COCs that could represent an occupational exposure concern, however it is unlikely. To monitor this route, real-time direct reading monitoring instruments will be used (as described in Section 7.0). This will be performed during the intrusive tasks in soil and IDW management activities, as these tasks are the most likely to involve encountering/releasing any VOCs into the airphase.

Potential exposure concerns to the COCs may also occur through ingestion, or coming into direct skin contact with contaminated groundwater. The likelihood of worker exposure concerns through these two routes are considered unlikely, provided that workers follow good personal hygiene and standard good sample collection/sample handling practices, and wear appropriate PPE as specified in this HASP. Examples of onsite practices that are to be observed that will protect workers from exposure via ingestion or skin contact include the following:

- No hand-to-mouth activities on site (eating, drinking, smoking, etc.)
- Washing hands upon leaving the work area and prior to performing any hand to mouth activities
- Wearing surgeon's-style gloves whenever handling potentially-contaminated media, including groundwater and any potential free product, sampling equipment, and sample containers.

6.1.1 Volatile Organic Compounds (VOCs)

The majority of VOCs are often related to chlorinated solvents and associated degradation products, paint thinners, dry cleaning solvents, constituents of petroleum fuels (e.g. gasoline and natural gas), and crude oil tanking. Symptoms of exposure to VOCs can include abdominal pain, irritation of the skin, eyes, nose, and throat, dizziness, tremors, vomiting, GI bleeding, enlarged liver, pallor of the extremities, and frostbite like-symptoms.

Short-term exposure to VOCs, such as TCE and VC, can cause irritation of the nose and throat and central nervous system (CNS) depression, with symptoms such as drowsiness, dizziness, giddiness, headache, loss of coordination. High concentrations have caused numbness and facial pain, reduced eyesight, unconsciousness, irregular heartbeat and death. Very high concentrations have produced death due to CNS effects, and, in rare cases, irregular heart beat. Permanent nervous system damage and/or liver injury have resulted from severe overexposure.

6.1.2 Metals

The physical effects of poisoning from the heavy metals tend to be a very slow process and occur over a long period of continued exposure to the source of the toxic metal. The physical symptoms which are typically induced by the presence of toxic metals in the body tend to be very vague and can include

symptoms such as persistent fatigue, the appearance of splitting and blinding headaches, the presence of an upset stomach, disorders such as colic and even anemia in some cases. The central nervous system is the main part of the human body likely to be affected by the presence of toxic metals. Symptoms of a disrupted central nervous system include the appearance of muscular tremors, the development of spells of dizziness, the presence of insomnia, the poor concentration abilities in the person and a sudden lack of muscular coordination in the body.

6.2 EXHAUST GASES/FUMES CREATED DURING INDOOR ACTIVITIES

Short-term (acute) effects of workers exposed to high concentrations of exhaust gasses/fumes may include irritation of the eyes, nose, and throat; lightheadedness; heartburn; headache; weakness, numbness and tingling in the extremities; chest tightness; wheezing; and vomiting. Some studies have suggested that workers exposed to diesel/gasoline exhaust are more likely to have chronic respiratory symptoms such as persistent cough and mucous, bronchitis, and reduced lung capacity than unexposed workers. Of particular concern is the potential for exposure to carbon monoxide which is present in diesel and more predominately, in gasoline engine exhaust. Upon entering the bloodstream, carbon monoxide combines with hemoglobin over 200 times more tightly than oxygen. Hemoglobin, then, is unable to carry oxygen in the blood. Carbon monoxide may also combine with myoglobin which may cause muscle metabolism disturbances, especially in the heart. The degree of toxicity depends primarily on carbon monoxide concentrations, exposure time, individual susceptibility, and exertion level.

To prevent or minimize potential exposures to carbon monoxide and other exhaust gas constituents, safe work practices identified in Section 5.4 and air monitoring measures listed Section 7.1.2 will be used.

6.3 RADIOLOGICAL HAZARDS

Based on historical information, and the results of previous screening and sampling events, alpha, beta and gamma radiation may exist at Former Building D. Unstable radioactive elements can be found in a wide range of concentrations in all rocks, soil, and water. The most common radioactive elements, uranium and thorium, decay slowly and produce other radioactive elements, such as radium, which in turn undergo still further radioactive decay. These radioactive product elements have different chemical properties, decay at different rates, and emit different levels of radiation energy than either uranium or thorium. The two most common isotopes of radium (Ra) are Ra-226 and Ra-228. Ra-226 has a long half-life (1,600 years) compared to that of Ra-228 (5.75 years). A half-life is the time required for half of the initial amount of a radionuclide to decay. Ra-226 decays by emitting the nucleus of a helium atom (alpha particle), whereas Ra-228 emits an electron (beta particle). Radiological survey and soil sampling activities will be performed to determine if remedial actions have removed radiological contamination to acceptable levels.

Of particular concern are exposures that occur as a result of inhalation of radium dusts or radium contaminated particles. However, site activities are unlikely to generate airborne dusts that can be inhaled. Rather the greatest potential for exposure is anticipated to be via ingestion of contaminated soils as a result of hand to mouth activities (eating, drinking, smoking, etc.). As a result, minimizing contact with potentially contaminated soils through the use of avoidance and ppe use as well as the implementation of sound decontamination procedures and personal hygiene practices will be used to prevent exposures to radium. Safe work permits contained in Attachment IV provide specific control methods that will be used to minimize potential exposures to site personnel.

6.4 SUB SLAB AND IAQ SAMPLING BUILDINGS A,B,C

Previous sampling data indicates the presence of VOC'S, within Block I (see Table 6-1) for concentrations.

6.5 PHYSICAL HAZARDS

The following is a list of physical hazards that may be encountered at the site or may be present during the performance of site activities.

- Slips, trips, and falls
- Cuts (or other injuries associated with hand tool use)
- Lifting (strain/muscle pulls)
- Ambient temperature extremes (heat stress)
- Pinches and compressions
- Vehicular and foot traffic
- Noise in excess of 85 dBA
- Flying projectiles
- Contact with underground or overhead utilities/electrical safety
- Heavy equipment hazards (rotating equipment, hydraulic lines, etc.)
- Compressed gas cylinders

Specific hazards are discussed further below, and are presented relative to each task in the task-specific Safe Work Permits.

6.5.1 Slips, Trips, and Falls

During various site activities there is a potential for slip, trip, and fall hazards associated with wet, steep, or unstable work surfaces. To minimize hazards of this nature, personnel required to work in and along areas prone to these types of hazards will be required to exercise caution, and use appropriate precautions (restrict access, guardrails, life lines and/or safety harnesses) and other means suitable for the task at hand. Site activities will be performed using the buddy system.

6.5.2 Strain/Muscle Pulls from Heavy Lifting

During execution of planned activities there is some potential for strains, sprains, and/or muscle pulls due to the physical demands and nature of this site work. To avoid injury during lifting tasks personnel are to lift with the force of the load carried by their legs and not their backs. When lifting or handling heavy material or equipment use an appropriate number of personnel. Keep the work area free from ground clutter to avoid unnecessary twisting or sudden movements while handling loads.

6.5.3 Heat/Cold Stress

Because of the length of planned project activities, the likely seasonal weather conditions that will exist during the planned schedule, and the physical exertion that can be anticipated with some of the planned tasks, it will be necessary for the field team to be aware of the signs and symptoms and the measures appropriate to prevent cold stress. This is addressed in detail in Section 4.0 of the Tetra Tech Health and Safety Guidance Manual, which the SSO is responsible for reviewing and implementing as appropriate on this project. Tetra Tech personnel will also follow the guidance for Heat Stress and prevention of Sun Exposure found in Tetra Tech Safe Work Procedures SWP 5-15 and 5-26 found in Attachment VIII.

6.5.4 Pinch/Compression Points

Handling of tools, machinery, and other equipment on site may expose personnel to pinch/compression point hazards during normal work activities. Where applicable, equipment will have intact and functional guarding to prevent personnel contact with hazards. Personnel will exercise caution when working around pinch/compression points, using additional tools or devices (e.g., pinch bars) to assist in completing activities.

6.5.5 Natural Hazards

Natural hazards such as poisonous plants, bites from poisonous or disease carrying animals or insects (e.g., snakes, ticks, mosquitoes) are often prevalent at sites that are being investigated as part of

hazardous waste site operations. To minimize the potential for site personnel to encounter these hazards, nesting areas in and about work areas will be avoided to the greatest extent possible. Work areas will be inspected to look for any evidence that dangerous animals may be present. Based on the planned location for the work covered by this HASP, encountering wild animals is not a likely probability.

During warm months (spring through early fall), tick-borne Lyme disease may pose a potential health hazard. The longer a disease carrying tick remains attached to the body, the greater the potential for contracting the disease. Wearing long sleeved shirts and long pants (tucked into boots and taped) will prevent initial tick attachment, while performing frequent body checks will help prevent long term attachment. Site first aid kits should be equipped with medical forceps and rubbing alcohol to assist in tick removal. For information regarding tick removal procedures and symptoms of exposure, consult Section 4.0 of the Health and Safety Guidance Manual.

Contact with poisonous plants and bites or stings from poisonous insects are other potential natural hazards. Long sleeved shirts and long pants (tucked into boots), and avoiding potential nesting areas, will minimize the potential for exposure. Additionally, insect repellents may be used by site personnel. Personnel who are allergic to stinging insects (such as bees, wasps and hornets) must be particularly careful since severe illness and death may result from allergic reactions. As with any medical condition or allergy, information regarding the condition must be listed on the Medical Data Sheet (see Attachment III of this HASP), and the FOL or SSO notified.

6.5.6 Vehicular and Equipment Traffic

Vehicle and equipment traffic hazards are present for both indoor and outdoor work. While conducting work inside Buildings A, B and C workers should be aware of various vehicles and equipment including but not limited to forklifts, golf carts, maintenance carts and bicycles. All indoor means of vehicular transport are either manual or propane powered as to avoid producing toxic fumes in an indoor environment. Caution should be taken while walking, riding or conducting work in these buildings. Pedestrian traffic should walk in painted aisles marked on the ground whenever possible and should take caution when approaching intersections in the buildings. Mirrors and motion alarms notify of pedestrian and vehicular traffic as they approach major intersections throughout the buildings, however, every intersection does not possess these same warning methods. Each worker must receive cart training provided by either the onsite maintenance contractor or a qualified person who has already received the training. Cart traffic shall always yield to pedestrian traffic. Each cart is also equipped with a horn that can be used when approaching an intersection or a blind corner to notify any oncoming traffic.

If working in or near streets or roadways, hazards associated with vehicular and equipment traffic are likely to exist during various site activities and whenever site personnel performed work on or near

roadways. Site personnel will be instructed to maintain awareness of traffic and moving equipment when performing site activities. When working near roadways, site personnel will wear high visibility vests. Also, when conducting work other methods of traffic safety will be utilized such as strategically positioning the worker's truck, the use of traffic cones, traffic signs and caution tape to quarantine off each work site. Workers shall also be aware of the potential for train traffic through the site. The train runs in a northern direction from Tilley Chemical (neighboring chemical packaging and distribution company) along the western side of Building A out to a railway located north of Eastern Boulevard. All personnel should be cautious of the train running thru work areas. At this time all work areas are not within the railroad right of way but site personnel should be cautious when working in the vicinity of the train tracks.

6.5.7 Inclement Weather

Project tasks under this Scope of Work will be performed outdoors. As a result, inclement weather may be encountered. In the event that adverse weather (electrical storms, snow, ice, tornadoes, etc.) conditions arise, the FOL and/or the SSO will be responsible for temporarily suspending or terminating activities until hazardous conditions no longer exist.

6.5.8 Contact with Underground or Overhead Utilities/Electrical Safety

Contact with energized sources can result in severe injury and even death. There are two areas of concern with this potential hazard: contact with energized processing equipment and contact with energized utilities including underground utilities (i.e., electrical transmission lines, gas lines, water lines, etc.) and overhead utilities (i.e., power lines, etc.).

- Use and application of the Tetra Tech Standard Operating Procedure (SOP) for Utility Locating and Excavation Clearance found in the Tetra Tech Health and Safety Guidance Manual will be employed. This procedure provides step-by-step instructions for clearance of underground utilities, as well as avoidance techniques, and required documentation.

- Establishment of a suitable clearance distance (20-feet) from overhead utilities will be the primary method to control hazards conveyed through contact with these power sources.

- Identify underground utilities and buried structures before commencing any DPT operations. Follow the Tetra Tech Utility Locating and Excavation Clearance Standard Operating Procedure.

In addition, the electrical safety procedures stipulated in Section 3.9 of the LM Handbook and the overhead power line safety procedures in Section 3.14 of the LM Handbook will also be followed.

No hazardous energy work is being conducted as part of this field effort. However, should activities associated with lockout/tagout be required, the requirements stipulated in Section 3.5 of the LM Handbook (Attachment I) will also be adhered to.

6.5.9 Heavy Equipment Hazards

Ensure that workers are thoroughly trained and competent to perform their assigned task with the equipment used in investigation. Ensure that back-up alarms are functional on equipment. Heavy equipment will be subjected to an equipment inspection, upon arrival on-site and prior to leaving. This inspection will be recorded on the Equipment Inspection Checklist provided in Attachment V of this HASP. The equipment operators and on-site Supervisors responsible for the equipment are to ensure that the Equipment Inspection Checklist has been reviewed and completed, and that all moving parts are guarded if such parts are exposed. Check/test all emergency stop controls. Use escort vehicles with flashing lights to ward and control local traffic when moving large equipment to support area.

Only trained and authorized workers may operate heavy equipment, industrial vehicles and/or cranes. All manufacturer's specifications and limitations will be adhered to.

In addition, the heavy equipment, industrial vehicle, and crane operation safety procedures stipulated in Section 3.13 of the LM Handbook and will be followed.

6.5.10 Compressed Gas Cylinders

Work utilizing compressed gas cylinders is not anticipated as part of this field effort. However, if work utilizing compressed gas cylinders is required, this HASP will be updated/amended as necessary and the procedures in Section 3.17 of the LM Handbook (Attachment I) will be followed.

7.0 AIR AND RADIATION MONITORING

The COCs outlined in Section 6 have the potential to be present in concentrations that could present an inhalation hazard during planned site activities at the individual blocks. To assure that such exposures are avoided and documented, a direct reading instrument will be used to monitor worker exposures to chemical hazards present at the various blocks. A Photoionization Detector (PID) using a lamp energy of 11.7 eV will be used to monitor the air when conducting site activities. For Block I only a Flame Ionization Detector (FID) will be used to detect the presence of 1,1 Dichloroethane which is not detected by the PID. A Draeger Tube 0.5/a will be used when the presence of VOCs is confirmed. The PID will be used for most onsite activities to screen source areas (sample locations, monitoring wells, etc.) and worker breathing zones for volatile and detectable site contaminants. The presence of elevated airborne concentrations of volatile organic compounds will suggest an increased exposure threat to site personnel and will require site activities to be suspended until readings return to background levels. The use of personal protective equipment and the observance of the other control requirements presented in this HASP have been selected to minimize potential for personnel exposures to hazardous concentrations (known or unknown) of site contaminants.

Some COCs (PAHs, PCB, metals) are not volatile and are unable to be detected with traditional field instrumentation (photoionization detectors). For metals visible dust will require area wetting to control the dust since the level of the contaminants are above the visible spectrum. Generation of dusts should be minimized. If airborne dusts are observed, use area wetting methods. Site contaminants may adhere to or be part of airborne dusts or particulates. Although unlikely to be present, the generation of dusts should be minimized to avoid inhalation of contaminated dusts or particulates.

Instruments will be used primarily to monitor source points and worker breathing zone (BZ) areas, while observing instrument action levels. The SSO shall obtain and document the daily background reading at an upwind, unaffected area and observe for readings above that background level. The SSO shall monitor source areas (e.g., above collected samples and confined areas, etc.) for the presence of any reading above the daily-established background level. If elevated readings are observed above the PEL, the SSO shall monitor the workers' BZ areas. If elevated readings are observed, the following process will be followed:

- The SSO shall order site personnel to stop work and retreat upwind to a safe, unaffected area, where they will remain until further directed by the SSO.

- The SSO shall begin wetting procedures to control dust and then re-approach the work area while continuously monitoring the BZ areas.

- Only when levels are below the PEL standard in BZ areas will work be permitted to resume.

- If background levels are not regained, the SSO will contact the HSM for additional direction.

There is a sampling task where the use of DRIs will not be required that is for the marine operations (surface water and sediment sampling tasks from a small water vessel/boat and drilling soil borings from a barge). An evaluation of available data from previous investigations at the intended sampling areas did not identify any volatile substances (only low concentrations of metals, PCBs, and PAHs. Furthermore, these types of substances only represent an inhalation concern if they are either present in inhalable air as suspended solid particulates in sizes that can be inspired into to the body, or if they are heated to very high temperatures and are present as fumes. Neither of these types of situations is plausible for the marine operations. Therefore, DRI usage will not be required for those tasks only.

Tetra Tech will issue or cause to be issue all necessary personal protective equipment and air monitoring equipment prior to commencing the job to all its agents and personnel, including full instructions and training on the use of the equipment. The requirements included in Section 3.1 of the LM Handbook (Attachment I) addressing monitor equipment will be followed.

Radiological contaminants of concern are alpha, beta and possibly gamma sources. Past actions have likely removed much of the site contamination; however this effort is to determine if contamination exists and to determine background levels. For this reason, a radiological field survey and sampling will be performed to identify any areas of elevated radioactivity. Radiological work will be monitored by the PHP in accordance with Tt RPOP. Action levels are established in the project work plan.

7.1 INSTRUMENTS AND USE

Instruments will be used primarily to monitor source points and worker breathing zone areas, while observing instrument action levels. The SSO shall obtain and document the daily background (BG) reading at an upwind, unaffected area and observe for readings above that BG level. The SSO shall monitor source areas (e.g., monitoring wells) for the presence of any reading above the daily-established BG level. If elevated readings are observed, the SSO shall monitor the workers breathing zone (BZ) areas with the PID. If the appropriate instrument Action Level is exceeded (see below), the following process will be followed:

- The SSO shall order all personnel to stop work and retreat upwind to a safe, unaffected area, where they will remain until further directed by the SSO.

- The SSO shall allow at least 5 minutes to pass so that the work area can ventilate, and will then re-approach the work area while continuously monitoring the BZ areas.

- Only when BG levels are regained in BZ areas will work be permitted to resume.

- If BG levels are not regained, the SSO will contact the HSM for additional direction.

I**nstrument Action Levels**: Monitoring instruments use will follow the action levels specified below:

- A Draeger Tube 0.5/a will be used when the presence of VOCs is confirmed:
  - If the readings are Benzene, the action level is 5 ppm/sustained 10 minutes/4 times/day
  - If readings are not Benzene, the action levels are as follows:

Instrument Action Levels:

The use of either a PID will be acceptable at all sites, provided that the following action levels are observed:

ACTION LEVELS			
Location	**Instrument**	**Action Level**	**Exposure Time**
Block D	PID with 11.7 eV lamp	1 ppm	4 exposures of 5 minutes one day
Block E	PID with 11.7 eV lamp	7 ppm	4 exposures of 5 minutes one day
Block F	PID with 11.7 eV lamp	1000 ppm	4 exposures of 5 minutes one day
Block G	PID with 11.7 eV lamp	7 ppm	4 exposures of 5 minutes one day
Block H	PID with 11.7 eV lamp Precautionary use	10 ppm	4 exposures of 5 minutes one day
Block I*	PID with 11.7 eV lamp	1 ppm	4 exposures of 5 minutes one day
Block I* (1,1 Dichloroethane only)	FID	1,900 ppm	4 exposures of 5 minutes one day

***Reference only at this time**

7.1.1 Carbon Monoxide Detector and Colorimetric Tubes for Nitrogen Dioxide

A direct-read carbon monoxide detector such as a Draeger PAC III Single Gas Monitor, an Industrial Scientific T82 Single Gas Monitor (or equivalent) will be used during all soil boring and concrete coring operations performed in Building B146 to evaluate airborne concentrations of carbon monoxide. Although other exhaust gases may be present, carbon monoxide has been selected as the primary indicator

compound to determine potential exposure concerns. Conservative action levels for carbon monoxide have been established to prevent potential exposures to other exhaust gas compounds including oxides nitrogen and sulfur.

As a precautionary measure, colorimetric tubes for nitrogen dioxide (NO_2) will also be available for use and will be required whenever elevated CO readings are observed. To evaluate NO2 concentrations a Nitrogen Dioxide Draeger tube (0.5/c) will be used. These tubes detected NO2 at concentrations ranging from 0.5 to 10 ppm or 5 to 25 ppm depending on the number of pump strokes that are used. For the purpose of determining exposure concerns, the lower range will be used which will require 5 strokes of the hand pump. A color change from pale grey to blue grey indicates the presence of NO_2.

7.1.2 Radiation Survey Instrument

Radiological instruments will be used for field survey and sampling as described below. Radiological surveys will be performed in accordance with the guidance provided in the Tt RPOP.

Instrument	Detector	Type of Activity Detected	Survey Type
Ludlum Model 2350 Digital Data Logger	Phoswhich Probe	Alpha/Beta	Contamination Surveys (counts per minute [cpm])
Ludlum Model 2241 Scaler/Ratemeter	2” x 2” Ludlum Model 44-10 NaI Scintillation Probe	Gamma	Dose Rate Surveys (cpm)
Ludlum Model 19 Survey Meter	1” x 1” Sodium Iodide (NaI)Tl scintillator	Low-Level Gamma	Dose Rate (micro Röntgen per hour [µR/hr])

7.2 INSTRUMENT MAINTENANCE AND CALIBRATION

Hazard monitoring instruments will be maintained and pre-field calibrated by the equipment provider (i.e., rental agency used). Operational checks and field calibration will be performed on site instruments each day prior to their use. Field calibration will be performed on instruments according to manufacturer’s recommendations. These operational checks and calibration efforts will be performed in a manner that complies with the employees health and safety training, the manufacturer's recommendations, and with the applicable manufacturer standard operating procedure (which the SSO must assure are included with the instrument upon its receipt onsite). Field calibration efforts must be documented. Figure 7-1 is provided for documenting these calibration efforts. This information may instead be recorded in a field operations logbook, provided that the information specified in Figure 7-1 is recorded. This required information includes the following:

- Date calibration was performed
- Individual calibrating the instrument
- Instrument name, model, and serial number
- Any relevant instrument settings and resultant readings (before and after) calibration
- Identification of the calibration standard (lot no., source concentration, supplier)
- Any relevant comments or remarks

Radiological instruments will be calibrated with known source before field use. Pre-operational checks will be performed on the instruments each day before use in accordance with the guidance provided in the Tt RPOP.

7.3 DOCUMENTING INSTRUMENT READINGS

The SHSO is responsible for ensuring that air monitoring instruments are used in accordance with the specifications of this HASP and with manufacturer's specifications/recommendations. In addition, the SHSO is also responsible for ensuring that all instrument use is documented. This requirement can be satisfied either by recording instrument readings on pre-printed sampling log sheets or in a field log book. **This includes the requirement for documenting instrument readings that indicate no elevated readings above noted daily background levels (i.e., no-exposure readings)**. At a minimum, the SHSO must document the following information for each use of an air monitoring device:

- Date, time, and duration of the reading
- Site location where the reading was obtained
- Instrument used (e.g., PID, etc.)
- Personnel present at the area where the reading was noted
- Other conditions that are considered relevant to the SHSO (such as weather conditions, possible instrument interferences, etc.)

Radiological surveys and instrument pre-operational checks will be documented in accordance with the Tt RPOP.

FIGURE 7-1

DOCUMENTATION OF FIELD CALIBRATION

SITE NAME: _____ **PROJECT NO.:** _____

Date of Calibration	Instrument Name and Model	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot Number)	Remarks/ Comments
				Pre-Calibration	Post-Calibration	Pre-Calibration	Post-Calibration		

8.0 TRAINING/MEDICAL SURVEILLANCE REQUIREMENTS

8.1 INTRODUCTORY/REFRESHER/SUPERVISORY TRAINING

This section is included to specify health and safety training and medical surveillance requirements for Tetra Tech personnel participating in on site activities. Tetra Tech personnel must complete 40 hours of introductory hazardous waste site training prior to performing work at the LMC MRC. Tetra Tech personnel who have had introductory training more than 12 months prior to site work must have completed 8 hours of refresher training within the past 12 months before being cleared for site work. In addition, 8-hour supervisory training in accordance with 29 CFR 1910.120(e)(4) will be required for site supervisory personnel. Tetra Tech and subcontractor personnel working on site who are potentially exposed to hazardous substances shall receive initial and annual refresher training in accordance with *29 CFR 1910.120(e) – Hazardous Waste Operations and Emergency Response* or the applicable state OSHA standard. Lockheed Martin shall be provided with electronic copies of the training certificates.

Documentation of Tetra Tech introductory, supervisory, and refresher training as well as site-specific training will be maintained at the site. Copies of certificates or other official documentation will be used to fulfill this requirement.

The requirements described in Section 3.20.3 of the LM Handbook (Attachment I) addressing training will be followed.

8.2 SITE-SPECIFIC TRAINING

Tetra Tech SSO will provide site-specific training to Tetra Tech employees who will perform work on this project. Figure 8-1 will be used to document the provision and content of the project-specific and associated training. Site personnel will be required to sign this form prior to commencement of site activities. This training documentation will be employed to identify personnel who through record review and attendance of the site-specific training are cleared for participation in site activities. This document shall be maintained at the site to identify and maintain an active list of trained and cleared site personnel.

The Tetra Tech SSO will also conduct a pre-activities training session prior to initiating site work. This will consist of a brief meeting at the beginning of each day to discuss operations planned for that day, and a review of the appropriate Safe Work Permits with the planned task participants. A short meeting may also be held at the end of the day to discuss the operations completed and any problems encountered.

8.3 MEDICAL SURVEILLANCE

Tetra Tech personnel participating in project field activities will have had a physical examination meeting the requirements of Tetra Tech's medical surveillance program. Documentation for medical clearances will be maintained in the Tetra Tech Pittsburgh office and made available, as necessary, and will be documented using Figure 8-1 for every employee participating in onsite work activities at this site. Tetra Tech shall provide evidence of employee enrollment in a medical surveillance program. Lockheed Martin does not provide medical surveillance examinations to contractor employees.

The medical surveillance requirements described in Section 3.20.4 of the LM Handbook (Attachment I) will be followed.

Each field team member, including visitors, entering the exclusion zone(s) shall be required to complete and submit a copy of the Medical Data Sheet (see Attachment III of this HASP). This shall be provided to the SSO, prior to participating in site activities. The purpose of this document is to provide site personnel and emergency responders with additional information that may be necessary in order to administer medical attention.

8.4 SITE VISITORS

Site visitors for the purpose of this document are identified as representing the following groups of individuals:

- Personnel invited to observe or participate in operations by Tetra Tech
- Regulatory personnel (i.e. EPA, MDEP, OSHA)
- Property Owners
- Authorized Personnel
- Other authorized visitors

Non Tetra Tech personnel working on this project are required to gain initial access to the facility by coordinating with the Tetra Tech FOL or designee and following established facility access procedures.

Once access to the base is obtained, personnel who require site access into areas of ongoing operations will be required to obtain permission from the PM. In addition, site visitors wishing to observe operations in progress will be escorted by a Tetra Tech representative and shall be required to meet the minimum requirements discussed below:

- Site visitors will be directed to the FOL/SSO, who will sign them into the field logbook. Information to be recorded in the logbook will include the individual's name (proper identification required), the entity which they represent, and the purpose of the visit.

- Site visitors must be escorted and restricted from approaching any work areas where they could be exposed to hazards from Tetra Tech operations. If a visitor has authorization from the client and from the Tetra Tech Project Manager to approach our work areas, the FOL must assure that the visitor first provides documentation indicating that he/she/they have successfully completed the necessary OSHA introductory training, receive site-specific training from the SSO, and that they have been physically cleared to work on hazardous waste sites. Site visitors wishing to enter the exclusion zone will be required to produce the necessary information supporting clearance to the site. This shall include information attesting to applicable training and medical surveillance as stipulated in Section 8.0 of this document. In addition, to enter the site operational zones during planned activities, visitors will be required to first go through site-specific training covering the topics stipulated in Section 8.2 of this HASP. All jobsite visitors must have a safety orientation prior to commencing work or touring the site. A visitor log will be kept to document the orientation.

- Once the site visitors have completed the above items, they will be permitted to enter the operational zone. Visitors are required to observe the protective equipment and site restrictions in effect at the site at the time of their visit. Visitors entering the exclusion zones during ongoing operations will be accompanied by a Tetra Tech representative. Visitors not meeting the requirements, as stipulated in this plan, for site clearance will not be permitted to enter the site operational zones during planned activities. Any incidence of unauthorized site visitation will cause the termination of on site activities until the unauthorized visitor is removed from the premises. Removal of unauthorized visitors will be accomplished with support from local law enforcement personnel.

FIGURE 8-1

SITE-SPECIFIC TRAINING DOCUMENTATION

My signature below indicates that I am aware of the potential hazardous nature of performing field activities at LCM MRC and that I have received site-specific training which included the elements presented below:

- Names of designated personnel and alternates responsible for site safety and health
- Safety, health, and other hazards present on site
- Use of personal protective equipment
- Safe use of engineering controls and equipment
- Medical surveillance requirements
- Signs and symptoms of overexposure
- Emergency response procedures (evacuation and assembly points)
- Incipient response procedures
- Review of the contents of relevant Material Safety Data Sheets
- Review of the use of Safe Work Permits
- Stop Work Procedures

I have been given the opportunity to ask questions and all of my questions have been answered to my satisfaction. The dates of my training and medical surveillance requirements indicated below are accurate.

Name (Printed and Signature)	Site-Specific Training Date	40-Hour Training (Date)	8-Hour Refresher Training (Date)	8-Hour Supervisory Training (Date)	Medical Exam

9.0 SITE CONTROL

This section outlines the means by which Tetra Tech will delineate work zones and use these work zones in conjunction with decontamination procedures to prevent the spread of contaminants into previously unaffected areas of the site. It is anticipated that a three-zone approach will be used during work at this site. This approach will be comprised of an exclusion zone, a contamination reduction zone, and a support zone. It is also anticipated that this approach will control access to site work areas, restricting access by the general public, minimizing the potential for the spread of contaminants, and protecting individuals who are not cleared to enter work areas.

Radiological areas, if applicable, will be posted independently of work zones in accordance with the Tt RPOP.

9.1 EXCLUSION ZONE

The exclusion zone will be considered the areas of the site of known or suspected contamination. It is anticipated that the areas around active/intrusive activates will have the potential for contaminants brought to the surface. These areas will be marked and personnel will maintain safe distances. Once active/intrusive activities have been completed and any surface contamination has been removed, the potential for exposure is again diminished and the area can then be reclassified as part of the contamination reduction zone. The exclusion zones for this project are those areas of the site where active work (DPT work areas, drilling, installation, and sample collection, etc.) is being performed plus a designated area of at least 25 feet surrounding the work area. Exclusion zones will be delineated as deemed appropriate by the FOL, through means such as erecting visibility fencing, barrier tape, cones, and/or postings to inform and direct personnel.

9.1.1 Exclusion Zone Clearance

An Exclusion Zone (EZ) will be established at each well installation/sampling location. The purpose of establishing and maintaining these localized exclusion zones is to define areas where more rigorous safety and health protection measures will be required and to designate areas restricted to non-essential and unauthorized personnel. The size and dimensions of these EZs will vary based on the nature of the planned activities, and may be subject to change at the SSO's discretion based on factors such as visual observations, nearby concurrent operations, and other factors. However, the following dimensions represent basic considerations for establishing EZs:

- DPT and associated concurrent sampling activities. The EZ for this activity will be set at the height of the mast, plus five feet surrounding the point of operation, with a minimum of 25-feet. This distance will also apply when surface and subsurface soil sampling from behind these type rigs.

- Monitoring well development, purging, construction and use, and collecting groundwater soil, sediment samples, water level readings and indoor air sampling. The EZ for these activities will be set to encompass an area of at least 10-feet surrounding the well head.

- Decontamination operations. The EZ for this activity will be set at 25 feet surrounding the gross contamination wash and rinse as well as 25-feet surrounding the heavy equipment decontamination area. Sample equipment decontamination boundaries will be set at 10-feet surrounding hand wash and rinse areas.

- Investigative Derived Waste (IDW) area will be constructed and barricaded. Only authorized personnel will be allowed access.

EZs will be marked using barrier tape, traffic cones and/or drive pole, or other readily-visible devices. Signs may also be posted at the SSO's discretion to inform and direct site personnel and site visitors. EZs shall remain marked until the SSO has evaluated the restoration effort and has authorized changing the zone status.

A pre-startup site visit will be conducted by members of the identified field team in an effort to identify proposed subsurface investigation locations, conduct utility clearances, and provide upfront notices concerning scheduled activities within the facility.

Subsurface activities will proceed only when utility clearance has been obtained. In the event that a utility is struck during a subsurface investigative activity, the emergency numbers provided in Section 2.0, Table 2-1, will be notified.

9.2 CONTAMINATION REDUCTION ZONE

The contamination reduction zone (CRZ) will be a buffer area between the exclusion zone and any area of the site where contamination is not suspected. This area will also serve as a focal point in supporting exclusion zone activities. This area will be delineated using barrier tape, cones, and postings to inform and direct facility personnel. Decontamination will be conducted at a central location. Equipment potentially contaminated will be bagged and taken to that location for decontamination.

9.3 SUPPORT ZONE

The support zone for this project will include a staging area where site vehicles will be parked, equipment will be unloaded, and where food and drink containers will be maintained. The support zones will be established at areas of the site where away from potential exposure to site contaminants during normal working conditions or foreseeable emergencies.

9.4 SAFE WORK PERMITS

Exclusion Zone work conducted in support of this project will be performed using Safe Work Permits (SWPs) to guide and direct field crews on a task by task basis. An example of the SWP to be used is provided in Figure 9-1. Partially completed SWPs for the work to be performed are attached (Attachment IV) to this HASP. These permits were completed to the extent possible as part of the development of this HASP. It is the SSO's responsibility to finalize and complete all blank portions of the SWPs based on current, existing conditions the day the task is to be performed, and then review that completed permit with all task participants as part of a pre-task tail gate briefing session. This will ensure that site-specific considerations and changing conditions are appropriately incorporated into the SWP, provide the SSO with a structured format for conducting the tail gate sessions, as well will also give personnel an opportunity to ask questions and make suggestions. All SWPs require the signature of the FOL or SSO.

9.5 SITE SECURITY

As this activity will take place at an active facility, the first line of security will be provided by the facility entrance/gate restricting the general public. The second line of security will take place at the work site referring interested parties to the FOL and LMC Contact.

Security at the work areas will be accomplished using field personnel. This is a multiple person operation, involving multiple operational zones. Tetra Tech personnel will retain complete control over active operational zones.

The site contact will serve as the focal point for facility personnel and interested parties and will serve as the primary enforcement contact.

9.6 SITE VISITORS

Site visitors for the purpose of this document are identified as representing the following groups of individuals:

- Personnel invited to observe or participate in operations by Tetra Tech
- Regulatory personnel (i.e. EPA, MDEP, OSHA)
- Property Owners
- Authorized Personnel
- Other authorized visitors

Non Tetra Tech personnel working on this project are required to gain initial access to the facility by coordinating with the Tetra Tech FOL or designee and following established facility access procedures.

Once access to the base is obtained, personnel who require site access into areas of ongoing operations will be required to obtain permission from the PM. In addition, site visitors wishing to observe operations in progress will be escorted by a Tetra Tech representative and shall be required to meet the minimum requirements discussed below:

- Site visitors will be directed to the FOL/SSO, who will sign them into the field logbook. Information to be recorded in the logbook will include the individual's name (proper identification required), the entity which they represent, and the purpose of the visit.

- Site visitors must be escorted and restricted from approaching any work areas where they could be exposed to hazards from Tetra Tech operations. If a visitor has authorization from the client and from the Tetra Tech Project Manager to approach our work areas, the FOL must assure that the visitor first provides documentation indicating that he/she/they have successfully completed the necessary OSHA introductory training, receive site-specific training from the SSO, and that they have been physically cleared to work on hazardous waste sites. Site visitors wishing to enter the exclusion zone will be required to produce the necessary information supporting clearance to the site. This shall include information attesting to applicable training and medical surveillance as stipulated in Section 8.0 of this document. In addition, to enter the site operational zones during planned activities, visitors will be required to first go through site-specific training covering the topics stipulated in Section 8.2 of this HASP. All jobsite visitors must have a safety orientation prior to commencing work or touring the site. A visitor log will be kept to document the orientation.

- Once the site visitors have completed the above items, they will be permitted to enter the operational zone. Visitors are required to observe the protective equipment and site restrictions in effect at the site at the time of their visit. Visitors entering the exclusion zones during ongoing operations will be accompanied by a Tetra Tech representative. Visitors not meeting the requirements, as stipulated in this plan, for site clearance will not be permitted to enter the site operational zones during planned activities. Any incidence of unauthorized site visitation will cause the termination of on site activities

until the unauthorized visitor is removed from the premises. Removal of unauthorized visitors will be accomplished with support from local law enforcement personnel.

9.7 SITE MAP

Once the areas of contamination, access routes, topography, and dispersion routes are determined, a site map will be generated and adjusted as site conditions change. These maps will be posted to illustrate up-to-date collection of contaminants and adjustment of zones and access points.

9.8 BUDDY SYSTEM

Personnel engaged in on site activities will practice the "buddy system" to ensure the safety of personnel involved in this operation.

9.9 COMMUNICATION

As personnel will be working in proximity to one another during field activities, a supported means of communication between field crew members will not be necessary.

External communication will be accomplished by using the cell phones/telephones at predetermined and approved locations. External communication will primarily be used for the purpose of resource and emergency resource communications. Prior to the commencement of activities at the LCM MRC, the FOL will determine and arrange for telephone communications.

9.10 SELF-AUDITS

The procedures outlined in Section 7 of the LM Handbook (Attachment I) addressing self-audits will be adhered to.

Tetra Tech and/or subcontractor personnel will perform periodic work area/project field inspections to monitor compliance with project environmental, safety and health requirements. The name of Tetra Tech's jobsite health and safety (H&S) representative will be provided to Lockheed Martin prior to starting work at the jobsite.

For jobs that are ongoing, an annual H&S audit shall be conducted and for jobs with a duration of less than one year at least one audit shall occur. A competent H&S representative designated by the Tetra Tech shall perform the audit. Unsafe acts and/or non-compliance conditions noted during inspections shall be corrected immediately.

The documentation related to the audits and inspections shall be submitted electronically to the Lockheed Martin Project Lead.

FIGURE 9-1
SAFE WORK PERMIT

Permit No. _____ Date: _____ Time: From _____ to _____

I. Work limited to the following (description, area, equipment used): _____

II. Primary Hazards: Potential hazards associated with this task: _____

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____ Tetra Tech
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____ Tetra Tech

V. Protective equipment required

Level D ☐ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required

Yes ☐ Specify on the reverse
No ☐

Modifications/Exceptions: _____

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures

Primary Route(s) of Exposure/Hazard: _____

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☐ Yes ☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes ☐ No
Safety Glasses	☐ Yes ☐ No	Safety belt/harness	☐ Yes ☐ No
Chemical/splash goggles	☐ Yes ☐ No	Radio/Cellular Phone	☐ Yes ☐ No
Splash Shield	☐ Yes ☐ No	Barricades	☐ Yes ☐ No
Splash suits/coveralls	☐ Yes ☐ No	Gloves (Type –)	☐ Yes ☐ No
Impermeable apron	☐ Yes ☐ No	Work/rest regimen	☐ Yes ☐ No
Steel toe Work shoes or boots	☐ Yes ☐ No	Chemical Resistant Boot Covers	☐ Yes ☐ No
High Visibility vest	☐ Yes ☐ No	Tape up/use insect repellent	☐ Yes ☐ No
First Aid Kit	☐ Yes ☐ No	Fire Extinguisher	☐ Yes ☐ No
Safety Shower/Eyewash	☐ Yes ☐ No	Other	☐ Yes ☐ No

Modifications/Exceptions: _____

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.) ☐ Yes ☐ No
If yes, SHSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. Special instructions, precautions: _____

Permit Issued by: _____ Permit Accepted by: _____

10.0 SPILL CONTAINMENT PROGRAM AND WASTE MANAGEMENT PLAN

10.1 SCOPE AND APPLICATION

It is not anticipated that bulk hazardous materials (over 55-gallons) will be generated or handled at any given time as part of this scope of work. It is also not anticipated that such spillage would constitute a danger to human health or the environment. However, as the job progresses, some potential may exist for accumulating Investigative Derived Wastes (IDW) such as decontamination fluids, soil cuttings, disposable sampling equipment and PPE.

10.2 POTENTIAL SPILL AREAS

Potential spill areas will be periodically monitored in an ongoing attempt to prevent and control further potential contamination of the environment. Currently, limited areas are vulnerable to this hazard including:

- Resource deployment
- Waste transfer
- Central staging

It is anticipated that the IDW generated as a result of this scope of work will be containerized, labeled, and staged to await further analyses. The results of these analyses will determine the method of disposal.

10.3 LEAK AND SPILL DETECTION

To establish an early detection of potential spills or leaks, a periodic walk-around by the personnel staging or disposing of drums area will be conducted during working hours to visually determine that storage vessels are not leaking. If a leak is detected, the contents will be transferred, using a hand pump, into a new vessel. The leak will be collected and contained using absorbents such as Oil-Dry, vermiculite, or sand, which are stored at the vulnerable areas in a conspicuously marked drum. This used material, too, will be containerized for disposal pending analysis. Inspections will be documented in the project logbook.

In case of a spill or release of hazardous chemicals, Tetra Tech shall immediately notify the Lockheed Martin Project Lead, and/or if the severity of the spill warrants, the local fire department by calling 9-1-1. Tetra Tech shall take all necessary steps to control the spread of the release and to provide site control to prevent unauthorized personnel from entering the affected area.

Section 8.2 of the LM Handbook (Attachment I) pertaining to spill reporting will be addresses.

10.4 PERSONNEL TRAINING AND SPILL PREVENTION

Personnel will be instructed in the procedures for incipient spill prevention, containment, and collection of hazardous materials in the site-specific training. The FOL and the SSO will serve as the Spill Response Coordinators for this operation, should the need arise.

10.5 SPILL PREVENTION AND CONTAINMENT EQUIPMENT

The following represents the types of equipment that should be maintained at the staging areas for the purpose of supporting this Spill Prevention/Containment Program.

- Absorbent materials such as: Sand, clean fill, vermiculite, or other non combustible absorbent (Oil-dry)
- Drums (55-gallon U.S. DOT 1A1 or 1A2)
- Shovels, rakes, and brooms
- Hand pump
- Container labels

Hazardous materials shall be stored in designated areas and all containers effectively closed. Spill equipment/supplied shall be readily available to contain and/or mitigate accidental spills of hazardous materials.

10.6 SPILL CONTROL PLAN

This section describes the procedures the Tetra Tech field crew members will employ upon the detection of a spill or leak.

- Notify the SSO or FOL immediately upon detection of a leak or spill. Activate emergency alerting procedures for that area to remove non-essential personnel.

- Employ the personal protective equipment stored at the staging area. Take immediate actions to stop the leak or spill by plugging or patching the container or raising the leak to the highest point in the vessel. Spread the absorbent material in the area of the spill, covering it completely.

- Transfer the material to a new vessel; collect and containerize the absorbent material. Label the new container appropriately. Await analyses for treatment and disposal options.

- Re-containerize spills, including 2-inch of top cover impacted by the spill. Await test results for treatment or disposal options.

It is not anticipated that a spill will occur that the field crew cannot handle. Should this occur, notification of the appropriate Emergency Response agencies will be carried out by the FOL or SSO in accordance with the procedures discussed in Section 2.0 of this HASP.

As mentioned above, in the event of a spill or release of hazardous chemicals, Tetra Tech will immediately notify the LMC personnel in the order presented in Table 2-1, and/or if the severity of the spill warrants, the local fire department by calling 9-1-1.

10.7 WASTE MANAGEMENT PLAN

Tetra Tech personnel will adhere to the decontamination and waste management procedures laid out the Tetra Tech HSGM and the Tetra Tech Decontamination of Field Equipment and Waste Handling Standard Operating Procedure (Attachment IX).

In addition, all requirements described in Sections 4.1 and 4.2 of the LM Handbook (Attachment I) will be addressed.

11.0 CONFINED-SPACE ENTRY

It is not anticipated, under the proposed scope of work, that confined space and permit-required confined space activities will be conducted. **Therefore, personnel under the provisions of this HASP are not allowed, under any circumstances, to enter confined spaces**. A confined space is defined as an area which has one or more of the following characteristics:

- Is large enough and so configured that an employee can bodily enter and perform assigned work.
- Has limited or restricted means for entry or exit (for example, tanks, manholes, sewers, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry).
- Is not designed for continuous employee occupancy.

Additionally, a Permit-Required Confined Space must also have one or more of the following characteristics:

- Contains or has a potential to contain a hazardous atmosphere.
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly caving walls or by a floor that slopes downward and tapers to a smaller cross-section.
- Contains any other recognized, serious, safety or health hazard.

For further information on confined space, consult the Health and Safety Guidance Manual or call the PHSO. If confined space operations are to be performed as part of the scope of work, detailed procedures and training requirements will have to be addressed and this HASP will be updated/amended as necessary to address the confined space entry requirements detailed in Section 3.3 of the LM Handbook (Attachment I).

12.0 HOT WORK

No hot work activities are being conducted as part of this field effort. Should hot work be required, this HASP will be amended/updated as necessary to include the requirements stipulated in Section 3.4 of the LM Handbook (Attachment I).

13.0 USE OF LOCKHEED MARTIN MATERIALS AND EQUIPMENT

No Lockheed Martin materials, tools, equipment, PPE shall be used until authorized by Lockheed Martin.

No Tetra Tech personnel will start, stop, relocate, or adjust any Lockheed Martin process or production equipment without approval of the Lockheed Martin Project Lead. Details of these requirements are described in Section 3.6 of the LM Handbook.

14.0 ELEVATED LOCATIONS / LADDERS / SCAFFOLDS

No elevated location work, ladder work, or scaffolding activities are being conducted as part of this field effort. Should any of these activities be required, this HASP will be amended/updated as necessary to include the requirements stipulated in Sections 3.10, 3.11, and 3.12 of the LM Handbook (Attachment I).

15.0 DANGEROUS OPERATIONS

Tetra Tech and subcontractor personnel will isolate their work areas from Lockheed Martin operations, employees, and the public. Barricades, signs, and signals will be employed as necessary and will be visible at all times where hazards exist.

Tetra Tech and subcontractors will effectively barricade excavations, floor openings, etc. as required by OSHA regulations.

Prior to beginning work, Tetra Tech and subcontractors must inform the Lockheed Martin Project Lead of any potentially dangerous operations.

All requirements addressing dangerous operations are detailed in Section 3.7 of the LM Handbook and will be adhered to.

16.0 EXCAVATIONS, TRENCHES, AND EARTHWORK

Excavation, trench work, or earthwork is being conducted as part of this field effort. The excavation, test pit work, required, in this HASP will include the requirements stipulated in Section 3.8 of the LM Handbook (Attachment I) and a trained, competent person will be designated to oversee the activities. Excavation safe work practices are outlined in Section 5.5 of this HASP

17.0 ASBESTOS

Asbestos abatement work may be conducted as part of this field effort. This HASP includes the requirements stipulated in Section 3.19 of the LM Handbook (Attachment I) and can be found in Section 5.4 of this HASP.

Asbestos containing material (ACM) or presumed asbestos containing material (PACM) if it is to be disrupted, Tetra Tech and/or subcontractor personnel shall immediately report to the Lockheed Martin Project Lead and to other employers of employees working at the job site any anticipated work that could lead to the discovery, disturbance, and/or spill of ACM and/or PACM. All operations will cease and the Asbestos contractor called in to remove or investigate the suspected ACM. The approval of the Lockheed Martin Project Lead is required before resuming operations.

Tetra Tech and/or subcontractor personnel shall not disturb any pipe insulation, boiler insulation, or any other material reasonably suspected of containing asbestos until the Lockheed Martin is notified and approval is obtained.

Abatement of asbestos can be performed only by persons properly trained and licensed to perform such activities.

All requirements addressed in Section 3.18 of the LM Handbook pertaining to incidental asbestos exposure will be followed.

18.0 NANOTECHNOLOGY

No nanotechnology work is being conducted as part of this field effort. Should it be required, this HASP will be amended/updated as necessary to include the requirements stipulated in Section 3.21 of the LM Handbook (Attachment I).

19.0 WORK INVOLVING AIR EMISSIONS

No work involving air emissions is being conducted as part of this field effort. Should it be required, this HASP will be amended/updated as necessary to include the requirements stipulated in Section 4.3 of the LM Handbook (Attachment I).

20.0 WORK INVOLVING WATER DISCHARGES

No work involving water discharges is being conducted as part of this field effort. Should it be required, this HASP will be amended/updated as necessary to include the requirements stipulated in Section 4.4 of the LM Handbook (Attachment I).

21.0 MATERIALS AND DOCUMENTATION

The Tetra Tech Field Operations Leader (FOL) shall ensure the following materials/documents are taken to the project site and used when required.

- A complete copy of this HASP
- Health and Safety Guidance Manual
- Incident Reports
- Medical Data Sheets
- Material Safety Data Sheets for chemicals brought on site, including decontamination solutions, fuels, sample preservatives, calibration gases, etc.
- A full-size OSHA Job Safety and Health Poster (posted in the site trailer)
- Training/Medical Surveillance Documentation Form (Blank)
- First-Aid Supply Usage Form
- Emergency Reference Form (Section 2.0, extra copy for posting)
- Directions to the Hospital

21.1 MATERIALS TO BE POSTED AT THE SITE

The following documentation is to be posted or maintained at the site for quick reference purposes. In situations where posting these documents is not feasible (such as no office trailer), these documents should be separated and be immediately accessible.

- **Chemical Inventory Listing (posted)** - This list represents all chemicals brought on-site, including decontamination solutions, sample preservations, fuel, etc. This list should be posted in a central area.

- **MSDSs (maintained)** - The MSDSs should also be in a central area accessible to all site personnel. These documents should match all the listings on the chemical inventory list for all substances employed on-site. It is acceptable to have these documents within a central folder and the chemical inventory as the table of contents.

- **The OSHA Job Safety & Health Protection Poster (posted – Attachment X)** - This poster should be conspicuously posted in places where notices to employees are normally posted, as directed by 29 CFR 1903.2 (a)(1). Each FOL shall ensure that this poster is not defaced, altered, or covered by other material. The law also states that reproductions or facsimiles of the poster shall be at least 8 1/2 by 14 inches with 10 point type.

- **Site Clearance (maintained)** - This list is found within the training section of the HASP (Figure 8-1). This list identifies all site personnel, dates of training (including site-specific training), and medical surveillance. The list indicates not only clearance, but also status. If personnel do not meet these requirements, they do not enter the site while site personnel are engaged in activities.

- **Emergency Phone Numbers and Directions to the Hospital(s) (posted)** - This list of numbers and directions will be maintained at all phone communications points and in each site vehicle.

- **Medical Data Sheets/Cards (maintained)** - Medical Data Sheets will be filled out by on-site personnel and filed in a central location. The Medical Data Sheet will accompany any injury or illness requiring medical attention to the medical facility. A copy of this sheet or a wallet card will be given to all personnel to be carried on their person.

- **Personnel Monitoring (maintained)** - All results generated through personnel sampling (levels of airborne toxins, noise levels, etc.) will be posted to inform individuals of the results of that effort.

- **Placards and Labels (maintained)** - Where chemical inventories have been separated because of quantities and incompatibilities, these areas will be conspicuously marked using DOT placards and acceptable [Hazard Communication 29 CFR 1910.1200(f)] labels.

The purpose of maintaining or posting this information, as stated above, is to allow site personnel quick access. Variations concerning location and methods of presentation are acceptable providing the objective is accomplished.

21.2 HAZARD COMMUNICATION – USE OF HAZARDOUS MATERIALS

All hazardous substance (as defined by OSHA) brought onto Lockheed Martin remediation sites must be accompanied by a MSDS and the containers labeled in accordance with the Red OSHA Hazard Communication Standard, 29 CFR 1910.1200 or applicable state OSHA standard. Tetra Tech and subcontractor personnel will provide MSDSs for chemicals brought on site. The contents of these documents will be reviewed by the SSO with the user(s) of the chemical substances prior to any actual use or application of the substances on site. A chemical inventory of the chemicals used on site will be developed using the Health and Safety Guidance Manual. The MSDSs will then be maintained in a central location (i.e., temporary office) and will be available for anyone to review upon request.

The Lockheed Martin Project Lead shall be notified prior to bringing any quantity of hazardous materials onto Lockheed Martin remediation sites. Hazardous materials shall be stored in designated areas and all

containers effectively closed. Spill equipment/supplied shall be readily available to contain and/or mitigate accidental spills of hazardous materials.

All other hazard communication requirements are detailed in Section 3.2 and Section 4.1 of the LM Handbook (Attachment I) and will be adhered to.

22.0 ACRONYMS / ABBREVIATIONS

CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CSP	Certified Safety Professional
DRI	Direct Reading Instrument
FOL	Field Operations Leader
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSM	Health and Safety Manager
IDW	Investigation Derived Waste
MDEP	Maryland Department of Environmental Protection
N/A	Not Available
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor)
PHP	Project Health Physicist
PHSO	Project Health and Safety Officer
PID	Photoionization Detector
PM	Project Manager
PPE	Personal Protective Equipment
SSO	Site Safety Officer
TBD	To be determined
TCE	Trichloroethene
Tetra Tech	Tetra Tech, Inc.
Tt RPOP	Tetra Tech Radiological Protection Operating Procedures
VC	Vinyl Chloride
VOCs	Volatile Organic Compounds

ATTACHMENT I

LOCKHEED MARTIN'S

REMEDIATION CONTRACTOR'S ESH

HANDBOOK

LOCKHEED MARTIN

REMEDIATION CONTRACTOR'S ESH HANDBOOK

June 10, 2009

Revision 1

Lockheed Martin Corporation
Energy, Environment, Safety & Health

A COPY OF THE JOB SPECIFIC HASP SHALL BE AVAILABE AT THE JOB SITE FOR THE DURATION OF THE PROJECT

REVISION STATUS

REVISION	DATE	COMMENTS
1	06/10/2009	

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CONTRACTOR'S ESH HANDBOOK

GENERAL

Lockheed Martin Corporation management at all levels is committed to conducting operations and activities in a manner that provides and maintains safe and healthful working conditions, protects the environment, and conserves natural resources.

This *Contractor's ESH Handbook* has been prepared to assist each project jobsite employer/contractor in satisfying its' contractual and legal accident prevention responsibilities, in such a manner that a safe, efficient operation is assured. All applicable requirements outlined in this handbook shall be incorporated into the contractor's site specific Safety and Health Plan The site specific Safety and Health plan shall be submitted to the Lockheed Martin Project Lead at least two weeks prior to starting work on any Lockheed Martin remediation projects.

This material must not be considered to be all inclusive as to the hazards that might be encountered, safe practices that should be performed, or safe conditions that should be maintained during the course of any project. Moreover, this handbook does not replace the contractor's legal obligation to its employees under all relevant environmental, safety and health requirements and laws. All legal standards not specifically referenced in this handbook shall apply when applicable.

1 CONTRACT RESPONSIBILITIES

The Contractor agrees to comply with all rules and procedures contained in this document, known as the *Remediation Contractor's ESH Handbook*, unless Lockheed Martin specifically agrees, in writing, to a modification or exemption. In addition, the Contractor and subcontractors, at any tier, shall:

1.1 Lockheed Martin is a drug free-work workplace. This requirement extends to contractors working on Lockheed Martin remediation projects. Additionally, the use of tobacco is not permitted on Lockheed Martin owned property.

1.2 Take all prudent and proper environmental, safety and health (ESH) precautions to protect Lockheed Martin employees, all other workers, and the public from ESH hazards associated with contractor activities.

1.3 Comply with all applicable Federal, State, municipal, local, and any other applicable occupational safety and health statutes, rules, ordinances, regulations, and requirements issued or imposed by any governmental authority (including, but not limited to *Title 29, Code of Federal Regulations Parts 1903, 1904, 1910* and *1926*).

1.4 Comply with all applicable Federal, State, municipal, local, and any other applicable air pollution statutes, rules, ordinances, regulations, and requirements issued or imposed by any governmental authority.

1.5 Comply with all Federal, State, municipal, local and Lockheed Martin hazardous materials, hazardous waste, and non-hazardous waste statutes, rules, ordinances, regulations, and requirements (including, but not limited to *Title 40, Code of Federal Regulations*).

1.6 Obtain the applicable ESH permits to conduct the work in compliance with local, state, federal ESH regulations and site requirements (including, but not limiting to *Title 29, Code of Federal Regulations, 1910 and 1926*).

1.7 Ensure that all employees and subcontractors have received the appropriate level of ESH training in accordance with applicable ESH regulations necessary for the performance of the work requested by Lockheed Martin.

1.8 To instruct, prior to commencement of operations, all employees on the jobsite about relevant governmental laws and regulations, specific hazards expected to be encountered and proper safety precautions to be observed. In addition, jobsite employees shall read and certify that they have read and understand the job specific health and safety plan (HASP). The certification forms provided by the contractor within the HASP shall be electronically sent to the Lockheed Martin Project Lead.

1.9 Provide all jobsite visitors with a safety orientation prior to commencing work or touring the site. A visitor log shall be kept to document the orientation.

1.10 To ensure Contractor's job specific health and safety plan (HASP) encompasses Federal, State, municipal, local and the Lockheed Martin requirements found within this document the HASP should contain a section on crisis management / emergency response. A copy of the job specific HASP shall be maintained at the job site where jobsite employees have access to a copy. All Contractor Project Managers shall be provided a copy of the *Contractor's ESH Handbook* found within the Lockheed Martin Request for Proposal or as an appendix of the Key National Contractor Agreement. Contractors shall flow these requirements down to their subcontractors.

1.11 Contractor understands that Lockheed Martin may immediately stop Contractor's work if Contractor violates any applicable Federal, State, municipal, local, or any other rules, regulations, and requirements, *Remediation Contractor's ESH Handbook* provisions, or other contract terms and conditions regarding environmental, safety and health compliance. Lockheed Martin shall not incur work stoppage charges unless the contractor demonstrates that the work stoppage was unwarranted for any of the reasons stated above. Any dispute regarding work stoppage charges must be resolved through binding arbitration.

1.12 Contractor is advised that the Project may be inspected from time to time by Lockheed Martin or a representative of Lockheed Martin. Periodic Lockheed Martin inspections in no way relieve the Contractor of their obligation to maintain its own inspection program to identify unsafe conditions or acts. ESH violations will be considered in evaluation of Contractor's performance.

1.13 Lockheed Martin is not responsible for training or supervising Contractor employees or abating workplace hazards created by the Contractor or to which the Contractor's employees are exposed.

1.14 Contractor agrees to maintain copies of all pertinent ESH records at the job site. Pertinent records include, but is not limited to, personnel training documentation, evidence of enrollment in a medical surveillance program, accident/injury reporting, work area inspections, periodic safety meetings, MSDS's, air monitoring data, waste container inspections, etc. These records shall also be provided electronically to the Lockheed Martin Project Lead.

1.15 Contractor shall contact the Lockheed Martin Project Lead immediately in the event of a fatal or serious injury, an unpermitted environmental release, or any ESH incident that is likely to generate significant publicity or an adverse situation for Lockheed Martin (e.g., alleged releases of contaminants beyond property boundaries, purported fish or wildlife impacts, allegations of adverse community health or property impacts, etc.)

2 DEFINITION

2.1 Contractor: any agent/agency engaged by Lockheed Martin through written contract (or other written agreement) to perform work on Lockheed Martin Remediation Sites. For the purposes of this *Remediation Contractor's ESH Handbook*, "Contractor" shall also include Contractor's subcontractors at any tier.

2.2 EPA: the Environmental Protection Agency.

2.3 Fed/OSHA: the Federal Occupational Safety and Health Administration

2.4 Hazard Communication Program: a written program meeting the requirements of Title 29, Code of Federal Regulations, Section 1910.1200 - Hazard Communication.

2.5 Lockheed Martin: Lockheed Martin Corporation, Corporate Energy, Environment, Safety & Health

2.6 Lockheed Martin Project Lead: the Lockheed Martin Corporate Environment, Safety & Health individual that has been designated to manage a specific project.

2.7 Lockheed Martin Contract Representative: the Lockheed Martin Corporate Environment, Safety & Health contract representative (Contract Administrator/Buyer) for the project.

2.8 RCRA: the Federal Resource Conservation and Recovery Act and all amendments or revisions.

3 SAFETY & HEALTH

Contractor shall comply with applicable provisions of Federal, State, municipal, local, and any other applicable occupational safety and health statutes, rules, ordinances, regulations and requirements. Contractor shall take all precautions for the protection of the safety and health of Contractor employees, subcontractor employees, and Lockheed Martin employees to prevent accidents or injury to them or to other persons on, about, or adjacent to site of work performance. Notwithstanding this handbook, Contractor will hold harmless Lockheed Martin for any incident, violation, regulatory agency inspection resulting in a finding, or any other ESH issue that occurs to a Contractor employee.

Within Section 3.0, Lockheed Martin is identifying specific requirements within the Federal regulations that need extra attention. These are not all encompassing and adherence to the all rules and regulations must be followed.

3.1 PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT

1926 Subpart E or 1910 Subpart I
1910.139 / 1926.103
ANSI Z87.1
ANSI Z41 Standard
ANSI Z89.1 Standard

3.1.1 Protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact.

- Eye Protection. Safety eyewear meeting ANSI Z87.1 shall be worn in areas designated as "Eye Protection Required" and on all jobs where a potential injury to the eyes is possible whether or not the area is posted.
- Foot Protection. Affected employee(s) shall wear protective footwear when working in areas where there is a danger of foot injuries due to falling or rolling objects, or objects piercing the sole, and where such employee's feet are exposed to electrical hazards. Safety shoes and boots which meet the ANSI Z41 Standard shall be provided when impact and/or compression hazards exist. Soft-shoes, including but not limited to, tennis shoes, athletic shoes, moccasins, sandals, and open-toed or open-heeled shoes shall not be worn.
- Respiratory Protection Devices. Appropriate, MSHA/NIOSH-approved respiratory protective devices must be worn when applicable state and/or federal action levels or OSHA permissible exposure levels (PELs) are exceeded. Contractor must have fully implemented a respiratory protection program meeting the requirements of *Title 29, Code of Federal Regulations, Section 1910.139 / 1926.103* or applicable state OSHA regulations prior to issuing and using respiratory equipment. Contractor shall supply and maintain

appropriate air monitoring and respiratory protection equipment if inhalation hazards are anticipated.

- Protective Clothing such as suits, aprons, boots, or gloves shall be worn where there is a hazard to the body through dermal contact with chemicals, dusts, heat or other harmful agents or conditions.
- Hearing Protection (muffs and/or plugs) must be worn in all areas posted to indicate high noise level or where Contractor employees are exposed to noise levels in excess of the OSHA action level (85 dBA over a 8-hour time-weighted average or a dose of fifty percent).
- Hard Hats will be worn in all areas where there is a danger of impact to the head or hazard from falling or moving objects. Hard hats must meet the ANSI Z89.1 Standard.

3.1.2 Contractor will issue or cause to be issued prior to commencing the job all necessary personal protective equipment and air monitoring equipment to all its agents and employees, together with full instructions and training on the use of said equipment.

3.1.3 Contractor will meet all applicable Federal, Sate, municipal, local, and Lockheed Martin requirements for protective clothing and equipment. Contractor will properly supervise all its agents and employees to ensure protective clothing and equipment are used in conformance with applicable rules and regulations.

3.2 HAZARD COMMUNICATION - USE OF HAZARDOUS MATERIALS

Title 29, Code of Federal Regulations, Section 1926.59 Hazard Communication
Title 29, Code of Federal Regulations, Section 1910.1200 Hazard Communication

3.2.1 Contractor personnel shall not bring any hazardous substances (as defined by OSHA) onto Lockheed Martin remediation sites unless accompanied by a Material Safety Data Sheet (MSDS) and the containers are appropriately labeled. MSDS's must be maintained at the job site.

3.2.2 Contractor shall notify the Lockheed Martin Project Lead prior to bringing onto Lockheed Martin remediation sites any quantity of hazardous materials.

3.2.3 Contractor shall ensure all containers of hazardous materials are labeled in accordance with the Fed OSHA Hazard Communication Standard, 29 CFR 1910.1200 or applicable state OSHA standard.

3.2.4 Do not handle or use any hazardous material that does not have adequate safety warning labels.

3.2.5 Do not dump, drain or discharge any hazardous materials or wastes into any sink, drain or sewer.

3.2.6 The Lockheed Martin Project Lead shall inform the Contractor(s) of the identity of hazardous chemicals to which Contractor's employees may be exposed from

Lockheed Martin operations, if applicable. The Lockheed Martin Project Lead shall provide the following information:

- Where to obtain information concerning any hazardous substances used in Lockheed Martin operations that the Contractor's employees may come in contact with while performing their work;
- If Lockheed Martin owns or uses chemicals on a remediation site for any process where contractors could be exposed, Lockheed Martin shall make available to the Contractor Material Safety Data Sheets (MSDS) and sufficient information to permit the Contractor to train its employees on the hazards of the chemical Appropriate protective measure Contractor employees may take to protect themselves from exposure to known hazards from Lockheed Martin operations; and
- Appropriate work practice procedures (safety rules) for the location where work is to be performed.

3.2.7 Contractor shall ensure its employees are trained in the safe handling and use of hazardous materials in accordance with *29 CFR 1910.1200 - Hazard Communication* or the applicable state-OSHA hazard communication standard.

3.2.8 Contractor shall ensure that all applicable employees are medically qualified (as defined by OSHA) to perform the work assigned.

3.2.9 Hazardous materials shall be stored in designated areas and all containers effectively closed. Spill equipment/supplies shall be readily available to contain and/or mitigate accidental spills of hazardous materials.

3.3 CONFINED SPACE ENTRY

Title 29, Code of Federal Regulations, Section 1910.146 Permit-Required Confined Spaces

3.3.1 If Contractor or any other employee must enter a confined space (tank, vat, pit, sewer, etc.), the entry must be performed in accordance with the applicable state OSHA or federal OSHA regulations.

3.3.2 Before Contractor's employees are permitted entry into any confined space, the internal atmosphere shall be tested with a calibrated direct-reading instrument for the following conditions in the order given: 1) Oxygen content, 2) Flammable gases & vapors, and 3) Potential toxic air contaminants. Contractor shall furnish the air testing equipment and a person competent in the use of the testing equipment.

3.3.3 When possible, the Contractor shall notify the Lockheed Martin Project Lead prior to entering a permit required confined space. A permit shall be issued by the contractor prior to entry and electronically submit a copy to the Lockheed Martin Project Lead.

3.3.4 To ensure the safety of Contractor personnel during entry into confined spaces, the Contractor shall have a written confined space entry program.

3.4 HOT WORK REQUIREMENTS (i.e., welding, torch cutting, brazing, etc.)

Title 29, Code of Federal Regulations, Section 1910 Subpart Q
Title 29, Code of Federal Regulations, Section 1926 Subpart J

3.4.1 All hot work activities shall be conducted in accordance with the hot work permit requirements outlined in the site specific HASP (i.e., fire suppression equipment availability, removal of combustibles, fire watch, etc.).

3.4.2 Contractor personnel must secure all oxygen and acetylene cylinders in a manner that will prevent them from falling or tipping over. Oxygen and acetylene cylinders must be stored separately. Oxygen cylinders in storage must be separated from fuel gas cylinders a distance of 20 feet or by a noncombustible barrier 5 feet high. Acetylene cylinders shall not be stored horizontally, lying on their side.

3.4.3 When welding, Contractor personnel shall use welding curtains and/or suitable protective devices to protect persons from indirect exposure to welding flashes.

3.5 LOCKOUT / TAGOUT - Control of Hazardous Energy

Title 29, Code of Federal Regulations, Section 1910.147

3.5.1 Contractors are required to establish a written program and utilize procedures for affixing appropriate lockout devices or tagout devices to energy isolating devices, and to otherwise disable machines or equipment to prevent unexpected energization, start-up or release of stored energy in order to prevent injury to employee.

3.5.2 Contractor shall not service and/or maintain machines and equipment in which the unexpected energization or start up of the machines or equipment, or release of stored energy could cause injury to employees. Servicing and/or maintaining such equipment shall not be conducted until appropriate energy control methods have been initiated.

The Contractor shall provide training to ensure that the purpose and function of the energy control program are understood by their employees and that the knowledge and skills required for the safe application, usage, and removal of the energy controls are acquired by the employees.

3.5.3 If Contractor needs to service or maintain Lockheed Martin equipment, Contractor(s) shall notify the Lockheed Martin Project Lead and/or on-site facility operator (if applicable) of the intended equipment service for any unscheduled maintenance.

3.5.4 Upon completion of the job, Contractor is to notify the Lockheed Martin Project

Lead and/or on-site facility operator (if applicable) so power can be resumed to the equipment after the lock-outs and tags have been removed.

3.6 USE OF LOCKHEED MARTIN MATERIALS AND EQUIPMENT

3.6.1 Contractor's employees shall not use Lockheed Martin tools, equipment, materials, or personal protective equipment unless otherwise authorized by Lockheed Martin.

3.6.2 Contractor shall not start or stop any production equipment without the approval of the Lockheed Martin Project Lead.

3.6.3 Contractor shall not adjust or relocate any Lockheed Martin process equipment without the approval of the Lockheed Martin Project Lead.

3.7 DANGEROUS OPERATIONS - WARNINGS AND BARRICADES

Title 29, Code of Federal Regulations, Section 1926, Subpart G-Signs, signals and barricades

3.7.1 Contractor shall isolate their work areas from Lockheed Martin operations, employees, and the public by using barricades or other effective means of isolation. Signs, signals and barricades shall be visible at all times where a hazard exists.

3.7.2 Contractor personnel shall erect and properly maintain, at all times, all necessary safeguards for the protection of Contractor personnel, Lockheed Martin employees and the public. This includes:

- If doing any overhead work, Contractor must utilize warning signs and barricades, or station someone on the ground to prevent passers-by from entering the area below the overhead work;
- Contractor must effectively barricade excavations, floor openings, etc., as required by OSHA regulations;
- Contractor must construct and maintain all scaffolds and working platforms in accordance with OSHA regulations; and
- If Contractor's equipment, barricades or other safeguards restrict fire lanes or fire equipment access, the Contractor shall notify the Lockheed Martin Project Lead about its notification to the local fire department.

3.7.3 Prior to commencing work, Contractor must inform Lockheed Martin Project Lead of any work posing a potential danger to personnel.

3.8 EXCAVATIONS, TRENCHES, EARTHWORK

Title 29, Code of Federal Regulations, Section 1926 Subpart P

3.8.1 Review the Lockheed Martin intrusive fieldwork requirements in Appendix A.

3.8.2 If workers are to enter excavations, a competent person must be designated and trained in soil classification and the recognition of trenching and excavation hazards.

3.8.3 Excavations and trenches shall be inspected by a competent person daily and after every rainstorm, earthquake, or other hazard-increasing occurrence.

3.8.4 Inspect the face, banks, and top daily when workers are exposed to falling or rolling materials.

3.8.5 Shore, bench, slope, or use equivalent methods to protect workers in excavations four feet deep or more.

3.8.6 Locate soil at least two feet from the edge of the excavation, or one foot from the edge when the excavation is less than five feet deep.

3.8.7 Ladders or steps shall be provided and secured in all trenches four feet or more in depth. Ladders shall be located to require no more than twenty-five feet of lateral travel before having access or egress and shall extend three feet above the top of the trench bank.

3.8.8 Install crossings with standard guardrails and toeboards when the excavation is more than 7½ feet deep.

3.8.9 All open trenches and other excavations shall be provided with suitable barriers, signs, and lights to the extent that adequate protection is provided to the public.

3.8.10 Do not excavate beneath the level of adjacent foundations, retaining walls, or other structures until a qualified person has determined that the work will not be hazardous. Support undermined sidewalks.

3.9 ELECTRICAL SAFETY

Title 29, Code of Federal Regulations, Section 1926 Subpart K-Electrical
Title 29, Code of Federal Regulations, Section 1910.269 Electrical Power Generation, Transmission and Distribution

3.9.1 Only qualified persons are permitted to work on electrical systems, as defined by *Title 29, Code of Federal Regulations Section 1910.269(a)(2).* Qualified persons shall be trained and competent in:

- The skills and techniques necessary to distinguish exposed live parts from other parts of electrical equipment;
- The skills and techniques necessary to determine the nominal voltage of exposed live parts;
- The minimum approach distances specified by OSHA corresponding to the voltages to which the qualified employee will be exposed; and

- The proper use of the special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment.

3.9.2 Contractor personnel shall properly ground all electrical tools, mechanical digging or concrete breaking equipment and all other electrical equipment while in use.

3.9.3 All electrical work, installation and wire capacities shall be in accordance with the pertinent provisions of the National Electrical Code, ANSI and OSHA.

3.9.4 Covers or barriers must be installed on boxes, fittings, and enclosures to prevent accidental contact with live parts.

3.9.5 Temporary wiring installations must be grounded.

3.9.6 Electrical systems shall be de-energized utilizing appropriate lockout/tagout procedures prior to conducting work.

3.10 ELEVATED LOCATIONS / FALL PROTECT

Cal/OSHA General Industry Safety Orders, 8 CCR 3210
Title 29, Code of Federal Regulations, Section 1926 Subpart M – Fall Protection

3.10.1 California employers: Guardrails shall be provided on all open sides of unenclosed room openings, open and glazed sides of landings, balconies or porches, platforms, runways, ramps, or working levels more than 30 inches above the floor, ground, or other working areas. The railing must be provided with a toeboard where the platform, runway, or ramp is 6 feet or more above places where employees normally work or pass and the lack of a toeboard could create a hazard from falling tools, material, or equipment.

3.10.2 Contractor must provide fall protection systems whenever a worker is exposed to a fall of four feet or more (in construction the threshold is six feet). Guardrails are the most common forms of fall protection systems. If guardrail systems are not feasible, safety nets, personal fall arrest systems, positioning device systems, warning line systems, or some other demonstrated, effective means of fall protection shall be used. Fall protection systems and devices shall be inspected prior to each use Title 29, Code of Federal Regulations, Section 1926 Subpart M.

3.11 LADDERS

Title 29, Code of Federal Regulations, Section 1910 Subpart D – Walking and Working Surfaces
Title 29, Code of Federal Regulations, Section 1926 Subpart X - Ladders

3.11.1 The use of ladders with broken or missing rungs or steps, broken or split rails or other defective construction is prohibited.

3.11.2 Ladders shall extend no less than 36 inches above landing and be secured to

prevent displacement.

3.11.3 Portable ladders must be equipped with safety shoes.

3.11.4 Wooden ladders shall not be painted.

3.11.5 Do not use metal ladders for electrical work or near live electrical parts.

3.12 SCAFFOLDS

Title 29, Code of Federal Regulations, Section 1910.28 – Safety Requirements for Scaffolding
Title 29, Code of Federal Regulations, Section 1926 Subpart L - Scaffolds

3.12.1 Scaffolds must be provided for all work that cannot be done safely by employees standing on solid construction at least 20 inches wide, except where such work can be safely done from ladders.

3.12.2 Erection and dismantling of scaffolds shall be performed in accordance with good engineering practice.

3.12.3 Footings or anchorage for any scaffold shall be sound, rigid and capable of carrying the maximum intended load without settling or displacement.

3.12.4 No unstable objects such as concrete blocks shall be used to support scaffolds or planks.

3.12.5 Any part of a scaffold weakened or damaged shall be repaired or replaced immediately.

3.12.6 All scaffold planking shall be free of knots and cracks (Class A number) and shall completely cover the work platform.

3.12.7 Scaffold planks shall be laid tight, cleated at both ends or overlapped a minimum of 12 inches and nailed or bolted to prevent movement. Overlaps to occur directly above scaffold supports.

3.12.8 A safe and unobstructed means of access, such as a walkway, stair, or ladder shall be provided to all scaffold platforms.

3.13 HEAVY EQUIPMENT, INDUSTRIAL VEHICLES, AND CRANES

Title 29, Code of Federal Regulations, Section 1926 Subparts N, O and W

3.13.1 Only trained and authorized workers may operate heavy equipment, industrial vehicles, and/or cranes.

3.13.2 The Contractor shall designate a competent person who shall inspect all machinery and equipment prior to each use to make sure it is in safe operating condition.

3.13.3 The Contractor shall comply with the manufacturer's specifications and limitations applicable to the operation of any and all heavy equipment, industrial vehicles, and cranes.

3.13.4 Seatbelts are required to be worn if the vehicle has Roll-Over Protection Structures (ROPS).

3.13.5 The swing radius of cranes shall be barricaded.

3.13.6 Equipment shall not be lubricated while in use.

3.13.7 Rated load capabilities, recommended operating speeds, special hazard warning, specific hand signal diagrams and special instructions shall be visible to the operator while he is at the control station.

3.13.8 Contractor's employees shall not be allowed to work under the load of cranes. Tag lines shall be used on all loads.

3.14 OVERHEAD POWER LINES

Title 29, Code of Federal Regulations, Section 1926.550 (a) (15)

3.14.1 If work is to be performed near overhead power lines, the lines must be de-energized and grounded by the owner or operator of the lines, or other protective measures must be provided before work is started. Protective measures (such as guarding or insulating the lines) must be designed to prevent employees from contacting the lines.

3.14.2 Unqualified employees and mechanical equipment must stay at least 10 feet away from overhead power lines. If the voltage is over 50,000 volts, the clearance should be increased by four inches for each additional 10,000 volts.

3.14.3 When mechanical equipment is being operated near overhead lines, employees standing on the ground may not contact the equipment unless it is located so that the required clearance cannot be violated even at the maximum reach of the equipment.

3.14.4 A person shall be designated to observe clearance of the equipment and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means.

3.14.5 Any overhead wire shall be considered to be an energized line unless and until the person owning such line or the electrical utility authorities indicates that it is not energized.

3.15 FIRE PREVENTION / FLAMMABLE LIQUIDS

Title 29, Code of Federal Regulations, Section 1926 Subpart F or 1910 Subpart E

3.15.1 Contractor shall be responsible for fire protection in its work and operational areas,

including offices, tool rooms, and storage areas 24 hours per day, seven days per week through the duration of this Contract. Approved fire-fighting equipment, in adequate quantities, must be provided.

3.15.2 Contractor shall familiarize Contractor's employees with the locations of fire extinguishers in their respective work areas and ensure they are prepared to use them safely if necessary. In certain remote field locations or within abandoned (discontinued) facilities where fire extinguishers may not exist in the immediate work area, contractor shall provide and locate fire extinguisher(s) in close proximity to the active work area(s).

3.15.3 In case of fire, Contractor shall call 9-1-1. Contractor shall also inform all Contractor and Lockheed Martin employees in the area to evacuate to a safe place and direct arriving fire response personnel to the fire. Notify the Lockheed Martin Project Lead as soon as reasonably possible.

3.15.4 Contractor employees shall only attempt to put out a fire when such action can be performed safely.

3.15.5 If a Contractor employee uses a Lockheed Martin fire extinguisher, Contractor shall report its use to the Lockheed Martin Project Lead.

3.15.6 Contractor shall report all fires extinguished by the Contractor to the Lockheed Martin Project Lead.

3.15.7 Contractors are to store, dispense, and use flammable and combustible liquids in accordance with OSHA regulations and the Uniform Fire Code. Bonding and grounding of containers containing flammable liquids will be required.

3.15.8 Open flames and smoking shall not be permitted in flammable or combustible liquid storage areas.

3.15.9 Contractor shall provide sufficient fire extinguishers necessary for their work activities.

3.16 HAND AND POWER TOOLS

Title 29, Code of Federal Regulations, Section 1910 Subpart P – Hand and Portable Powered Tools and Other Hand-Held Equipment
Title 29, Code of Federal Regulations, section 1926 Subpart I – Tools Hand and Power

3.16.1 All hand and power tools, whether furnished by Contractor, or by Contractor’s employee, shall be maintained in a safe condition.

3.16.2 Electrical power tools shall be grounded or double insulated with proper assured equipment grounding inspections or Ground Fault Interrupter (GFI) circuit protection provided.

3.16.3 Pneumatic power tools shall be secured to the hose or whip by some positive means.

3.16.4 Only properly trained Contractor employees shall operate power-actuated tools.

3.16.5 All grinding machines shall conform to OSHA and ANSI requirements.

3.17 COMPRESSED GAS CYLINDERS

Title 29, Code of Federal Regulations, Section 1910.101 – Compressed Gases
Title 29, Code of Federal Regulations, Section 1926.350 – Gas Welding and Cutting

3.17.1 Compressed gas cylinders shall be secured in an upright position at all times.

3.17.2 When transporting, moving and storing cylinders, valve protection caps shall be in place and secured.

3.17.3 Compressed gas cylinders shall be kept away from excessive heat, shall not be stored where they might be damaged or knocked over by passing or falling objects, and shall be stored at least 20 feet away from highly combustible materials.

3.17.4 Cylinders shall be labeled as to the nature of their contents.

3.17.5 Oxygen cylinders in storage shall be separated from fuel gas cylinders or combustible materials a minimum of 20 feet or by a noncombustible barrier at least five feet high having a fire-resistant rating of at least one-half hour.

3.17.6 Acetylene cylinders shall be stored and used in a vertical, valve-end-up position only.

3.17.7 Anti-flashback arrestors shall be installed on all oxygen and acetylene cylinders.

3.18 INCIDENTAL CONTACT WITH ASBESTOS

3.18.1 This section applies to all contractors who incidentally disrupt the matrix of asbestos containing material (ACM) or presumed asbestos containing material (PACM); i.e., contractors who have not been specifically hired to perform ACM abatement.

3.18.2 Contractor shall immediately report to the Lockheed Martin Project Lead and to other employers of employees working at the job site any discovery, disturbance, and/or spill of ACM and/or PACM. Contractor(s) is to cease all operations in the immediate area of the suspect ACM and/or PACM and demarcate the area. The approval of the Lockheed Martin Project Lead is required before resuming operations.

3.18.3 Contractor shall not disturb any pipe insulation, boiler insulation, or any other material reasonably suspected of containing asbestos until the Contractor notifies the Lockheed Martin Project Lead. Lockheed Martin approval is required before operations may commence.

3.18.4 Abatement of asbestos can be performed only by persons properly trained and licensed to perform such activities

3.19 ASBESTOS ABATEMENT CONTRACTORS

3.19.1 This section applies to Contractors performing maintenance, construction, repair, renovation, demolition, salvage, or any other operation in which any material containing more than 1% asbestos is sanded, abrasive blasted, sawed, shoveled, removed, or otherwise handled in a manner that would generate airborne asbestos fibers. These requirements are in addition to any requirements contained in Contractor's scope of work.

3.19.2 All Contractors working with asbestos shall comply with applicable federal and state OSHA, EPA, local air district, and other applicable Federal, State, municipal, and local statutes, regulations, rules, and ordinances; and specific contract terms and conditions regarding the handling of, use of, and work involving asbestos.

3.19.3 The contractor shall ensure that a competent person, as defined by OSHA supervises all asbestos work performed within regulated areas.

3.19.4 Before commencing work, all asbestos abatement contractors shall supply to Lockheed Martin proof of:

- Asbestos abatement contractor certification by the state Contractor's License Board
- Liability insurance for Contractor employees engaged in asbestos work operations
- Copies of asbestos work notification letters to state OSHA
- Local air district Asbestos Demolition/Renovation Notification

3.19.5 Contractors shall minimize the creation and spread of airborne asbestos fibers by using appropriate work practices, engineering controls, and established procedures (i.e., wet methods, HEPA filter vacuums, negative pressure enclosure, local exhaust ventilation equipped with HEPA filter dust collection system, etc.).

3.19.6 All Class I, II and III asbestos work shall be conducted within regulated areas. The regulated area shall be demarcated in any manner that minimizes the number of persons within the area and protects persons outside the area from exposure to airborne asbestos. Where critical barriers or negative pressure enclosures are used, they may demarcate the regulated area. Signs shall be provided and displayed at each location where a regulated area is required to be established. Signs shall be posted at such a distance from such a location that an employee may read the signs

and take necessary protective steps before entering the area marked by the signs. Warning signs shall bear the following information:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY

3.19.7 On multiple employer worksites requiring the establishment of a regulated area, the asbestos Contractor shall inform other employers on the site of the nature of the work with asbestos and/or PACM, of the existence of and requirements pertaining to regulated areas, and the measures taken to ensure that employees of such other employers are not exposed to asbestos.

3.19.8 Contractors shall package and label asbestos waste in accordance with federal and or applicable state OSHA requirements and federal or applicable state hazardous waste regulations. Labels shall be affixed to all products containing asbestos and to all containers containing such products, including waste containers. Labels shall be printed in large, bold letters on a contrasting background and shall contain the following information:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

3.19.9 Contractors shall properly dispose of all asbestos waste. Proper disposal includes the use of hazardous waste manifests and Lockheed Martin approved and licensed waste haulers, and disposal facilities according to federal RCRA law and applicable state hazardous waste regulations. Contractor shall contact the Lockheed Martin Project Lead before transporting or disposing of any hazardous waste. Lockheed Martin must review all hazardous waste manifests prior to shipment.

3.19.10 Contractors shall ensure that employee exposure air monitoring is conducted as required by federal or applicable state OSHA regulations. All other air monitoring (i.e. clearance sampling) shall be conducted by a third-party contracted air monitoring firm not affiliated with the Contractor.

3.19.11 Contractor shall, at no cost to the employee, institute a training program for and ensure the participation of all employees engaged in asbestos-related work who may reasonably be expected to be exposed to asbestos fibers from asbestos containing construction materials.

3.19.12 Contractor shall institute a medical surveillance program for all employees who are or will be exposed to airborne concentrations of fibers of asbestos at or above the TWA and/or excursion limit.

3.20 HAZARDOUS WASTE OPERATIONS and EMERGENCY RESPONSE (HAZWOPER)

Title 29, Code of Federal Regulations, Section 1910.120 - Hazardous Waste Operations and Emergency Response

Title 29, Code of Federal Regulations, Section 1926.65 – Hazardous Waste Operations and Emergency Response

This section applies to Contractors performing hazardous waste-type activities. This includes operations that pose a potential or reasonable possibility for employee exposure to hazardous waste/chemical contaminants during site investigations, clean-up operations, abatement, or hazardous substance removal work (remedial actions). These requirements are in addition to any requirements contained in Contractor's scope of work.

3.20.1 Contractor shall provide a **site-specific safety and health plan** at least two (2) weeks prior to field mobilization to the Lockheed Martin Project Lead (global statement – move to the beginning).

Contractor shall provide a **safety and health plan** in accordance with *Title 29, Code of Federal Regulations, Section 1910.120 - Hazardous Waste Operations and Emergency Response* or the applicable state OSHA standard and, at a minimum, shall contain the following elements:

- Safety and health risk or hazard analysis for each anticipated site task
- Employee training requirements
- Personal protective equipment to be used by employees for each of the site tasks and operations
- Medical surveillance requirements
- Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment to be used
- Site control measures
- Decontamination requirements and procedures
- Emergency response plan
- Confined space procedures (if applicable)
- Emergency response plan
- Confined space procedures (if applicable)
- Spill containment program
- Periodic documented safety meetings
- Periodic documented work area safety inspections and corrective actions

3.20.2 Contractors performing hazardous waste-type operations shall adhere to the requirements specified in *29 CFR 1910.120 - Hazardous Waste Operations and Emergency Response* or the applicable state OSHA standard.

3.20.3 Training: All Contractor and subcontractor employees working on site who are potentially exposed to hazardous substances shall receive initial and annual

refresher training in accordance with *29 CFR 1910.120(e) – Hazardous Waste Operations and Emergency Response* or the applicable state OSHA standard. Lockheed Martin shall be provided with electronic copies of the training certificates.

3.20.4 Medical Surveillance: Contractor employees must be enrolled in a medical surveillance program prior to performing hazardous waste operations. Upon Lockheed Martin request, Contractor shall provide evidence of employee enrollment in a medical surveillance program. Lockheed Martin does not provide medical surveillance examinations to Contractor employees.

3.20.5 Periodic work area inspections: Contractor agrees to perform periodic work area inspections to determine the effectiveness of the site safety and health plan and to identify and correct unsafe conditions in contractor's responsible work area. These inspections shall be documented and available to Lockheed Martin upon request for review.

3.21 MANAGEMENT OF NANOTECHNOLOGY

3.21.1 The Lockheed Martin Project Lead shall work with the designated contractor responsible for nanotechnology to implement this procedure and ensure areas where nanomaterials (materials incorporating engineered nanoparticles or nanoscale features that exhibit unique physical and chemical properties as a result of the nanoparticles or nanoscale features) will be used meet engineering control requirements of this procedure.

3.21.2 The contractor shall ensure that the safety and environmental hazards of nanomaterials are managed as described in the requirements of this section.

3.21.3 A plan must be developed and executed that addresses the following requirements:

3.21.3.1 **Hazard Analysis:** Identify potential adverse health effects and environmental impacts that could result from the chemical and physical properties exhibited by the nanomaterials and/or nanoparticles in use, to be used, under development, or to be developed at the site.

3.21.3.2 **Exposure Assessment**: Evaluate all tasks involving nanomaterials and identify where exposures could occur. The evaluation must include at a minimum, an evaluation of materials; chemical intermediates; by-products; end-products; waste products; processes; process equipment; the amount of material used; material form; degree of containment; duration of use; and work space including laboratory and manufacturing space.

3.21.3.3 **Exposure Control**

- Implement appropriate controls to mitigate worker exposure and environmental emissions identified in sections 3.21.2.1 and 3.21.2.2 of this procedure.

- Implement Control Bands as indicated on the Control Band Matrix below.

Exposure Duration	Bound Materials	Potential Release	Free / Unbound
Hazard Group A (Known to be inert)			
Short	1	1	2
Medium	1	1	2
Long	1	2	2
Hazard Group B (Understand reactivity/function)			
Short	1	2	2
Medium	1	2	3
Long	1	3	3
Hazard Group C (Unknown Properties)			
Short	2	2	3
Medium	2	3	4
Long	2	4	4

Duration Key:
Short - Less than 4 hrs/day; 2 days/week
Medium - Between 4 to 6 hrs/day; 3 to 5 days/week
Long - 6 to > 8 hrs/day; 3 to 5 days/week

Release Key:
Bound Materials: Nanoparticles in a solid matix e.g. polycarbonate
Potential Release: Nanoparticles in friable or solgel matrix
Free / Unbound: Nanoparticles unbound, not aggregated

Control Band:
1. General Ventilation and PPE
2. Engineering Controls and/or Respirators and additional PPE
3. Containment e.g. glove box
4. Specialist Advise

- Establish designated areas for Control Banding. The designated area shall, at a minimum, include warning signs informing employees that they are entering a nanomaterial work area as well as signs specifying administrative controls and personal protective equipment (PPE) required for entry.
- Identify appropriate administrative controls (e.g. good housekeeping methods, HEPA vacuums, wet wipe methods, employee training, safe work practices), engineering controls (e.g. containment, exhaust ventilation) and Personal Protective Equipment (e.g. respiratory protection, protective coveralls, gloves, goggles) based on Control Band and best industry practices.
- Develop and execute procedures for housekeeping, including clean-as-you-go practices that do not re-suspend particles.
- Develop and execute procedures for management of nanomaterial-associated waste.

4 ENVIRONMENTAL

Contractors shall comply with all applicable provisions of Federal, State, municipal, local, and other environmental statutes, rules, and regulations. Contractor shall take all necessary precautions to protect the environment. Contractor shall also store, transport, dispose, or otherwise handle hazardous wastes and non-hazardous wastes to prevent discharges of materials into the environment except in accordance with applicable governmental regulations.

4.1 HAZARD COMMUNICATION - USE OF HAZARDOUS MATERIALS

4.1.1 Contractor shall develop a Waste Management Plan in accordance with the requirements outlined in the LMC Remediation Waste Management Procedure in

Appendix B. Lockheed Martin shall approve the Waste Management Plan prior to work commencement.

4.1.2 Contractor must segregate hazardous from non-hazardous waste; all hazardous waste generated by its operations must be labeled in accordance with all governmental regulations.

4.1.3 Contractor shall dispose of all hazardous waste within the time frame stipulated by local, state, or federal regulations. Contractor shall not leave behind on Lockheed Martin remediation sites any containers of hazardous materials or waste (including drums, roll-offs, maintenance chemicals, etc.), empty or not, after the termination of operations.

4.1.4 In case of a spill or release of hazardous materials or waste, Contractor shall immediately notify the Lockheed Martin Project Lead and if the severity of the spill warrants, notify the local fire department (Call 9-1-1). The Contractor shall be liable for the costs of any spill resulting from Contractor's actions, including, but not limited to, costs of containment, cleanup, and disposal.

4.2 NON-HAZARDOUS WASTE DISPOSAL

4.2.1 Contractor shall develop a Waste Management Plan in accordance with the requirements outlined in the LMC Remediation Waste Management Procedure in Appendix B. This plan must be approved by the Lockheed Martin Project Lead.

4.3 WORK INVOLVING AIR EMISSIONS

4.3.1 Contractor shall work with the Lockheed Martin Project Lead to identify applicable Federal, state, and/or local permit application requirements for air emission sources (i.e., stationary point source, fugitive emissions, etc.) associated with the anticipated project.

4.3.2 Contractor shall submit permit applications and/or notifications to the Lockheed Martin Project Lead for review prior to submittal to the applicable regulatory agency.

4.3.3 Contractor shall abide by the requirements of the permit(s) and gather emissions data (as applicable) to document compliance. This data shall be electronically submitted to the Lockheed Martin Project Lead.

4.3.4 Contractor shall immediately contact the Lockheed Martin Project Lead in the event permit conditions are not met.

4.3.5 Ensure permits are posted on permitted equipment (or in close proximity) as required by the respective permit.

4.4 WORK INVOLVING WATER DISCHARGES

4.4.1 At no time is an unauthorized, unpermitted release allowed. Contractor shall notify the Lockheed Martin Project Lead in the event of a release and obtain the approval of Lockheed Martin before discharging any material into storm drains or sewers.

4.4.2 Contractor shall work with the Lockheed Martin Project Lead to identify applicable National Pollutant Discharge Elimination System (NPDES), Stormwater Pollution Prevention Plans (SWPPP), and POTW requirements associated with the anticipated project.

4.4.3 Contractor shall submit permit applications and/or Notice of Intent forms to the Lockheed Martin Project Lead for review prior to submittal to the applicable regulatory agency.

4.4.4 Contractor shall abide by the requirements of the discharge permit(s) and maintain discharge monitoring information and inspection data to document compliance. This documentation shall be electronically provided to the Lockheed Martin Project Lead.

4.4.5 Contractor shall immediately contact the Lockheed Martin Project Lead in the event permit conditions are not met.

5 HOUSEKEEPING / CLEANUP

5.1 Ensure discharge permits and/or SWPPP plans (as applicable) are available at the project job site.

5.2 Contractor shall continuously clean up its respective work area(s). Contractor shall maintain its work areas free from all slip, trip, and fall hazards at all times.

5.3 Debris shall be kept cleared from work areas, passageways, stairs, and in and around buildings or other structures. The work area must be left free from accumulation of waste and rubbish at the end of each work shift.

5.4 Combustible scrap and debris shall be removed at regular intervals during the course of work performed by Contractor. Safe means shall be provided to facilitate such removal.

5.5 At the end of each working day and/or the conclusion of work being performed, Contractor shall restore the work area to the same degree of neatness as when work commenced.

5.6 Contractor shall furnish necessary equipment and/or receptacles to remove waste and rubbish from the job site unless otherwise specified by the Lockheed Martin.

6 CHANGE MANAGEMENT

If deviations are encountered from the field work plan, the contractor shall A) notify to the Lockheed Martin Project Lead and B) suspend work to assess changes to the work plan(s) and the HASP. Changes to the work plan(s) and the HASP shall be reviewed by the PL.

7 REQUIREMENT TO PERFORM & DOCUMENT SELF-AUDITS

7.1 Contractor agrees to perform periodic work area/project field inspections to monitor compliance with project environmental, safety and health (ESH) requirements. The name of Contractor's jobsite ESH representative will be provided to Lockheed Martin prior to the Contractor starting work at the jobsite.

7.2 For jobs that are ongoing, an annual ESH audit shall be conducted and for jobs with a duration of less than one year at least one audit shall occur. A competent ESH representative designated by the Contractor shall perform the audit. Unsafe acts and/or non-compliance conditions noted during inspections shall be corrected immediately.

7.3 The documentation related to the audits and inspections shall be submitted electronically to the Lockheed Martin Project Lead.

8 ACCIDENT, INJURY, ILLNESS, INCIDENT and SPILL REPORTING

8.1 Contractor shall immediately contact the Lockheed Martin Project Lead and/or Lockheed Martin Safety & Health Manager in the event of a fatality, injury, environmental release (spill), near-miss incident, or any ESH incident that is likely to generate significant publicity. A written report of the incident/injury/spill and corrective action(s) taken shall be submitted to the Lockheed Martin Project Lead within one (1) day of the incident. Representatives from Lockheed Martin may conduct joint investigations with the contractor if deemed necessary.

8.2 In case of a spill or release of hazardous chemicals, Contractor shall immediately notify the Lockheed Martin Project Lead, and/or if the severity of the spill warrants, the local fire department by calling 9-1-1. Contractor shall take all necessary steps to control the spread of the release and to provide site control to prevent unauthorized personnel from entering the affected area. The Contractor shall be liable for the costs of any spill resulting from Contractor's actions, including, but not limited to, costs of containment, cleanup, and disposal.

9 FINES, PENALTIES AND COSTS

9.1 Contractor shall indemnify and hold Lockheed Martin harmless from any and all liability (including but not limited to fines and penalties), loss, cost, damage, or expense (including attorney's fees) suffered or incurred by Lockheed Martin by reason of Contractor's failure to comply with Federal, State, municipal, local or other laws, rules, regulations, ordinances and requirements, or failure to comply with generally accepted environmental safety and health practices.

10 LOCKHEED MARTIN ESH MANAGER

10.1 The Lockheed Martin ESH Manager is Jimmy Yeager. Contact Jimmy regarding any questions or concerns at (301) 873-1444 or via email at james.l.yeager@lmco.com.

Appendix A – LMC Requirements for Invasive Fieldwork

LMC Minimum
Requirements for Inv

Appendix B – LMC Waste Management Procedure

LMC Waste Mgmt
Procedure Rev 4

LOCKHEED MARTIN

CONTRACTOR'S ESH HANDBOOK

COMPLIANCE AGREEMENT

The Key National Contractor Program Manager has read and understands the contents of the *Contractor's ESH Handbook*. Contractor agrees while performing work on Lockheed Martin-owned or Lockheed Martin-controlled premises, that the Contractor shall require its employees and subcontractors at any tier to comply with the contents of this *Contractor's ESH Handbook* and the job specific HASP. A copy of the HASP shall be maintained at the job site and made readily available to contractor and subcontractor employees for their information. All contractor employees and subcontractors shall read and certify that they have read and understand the job specific health and safety plan (HASP). The certification forms shall be electronically sent to the Lockheed Martin Project Lead.

I further understand that this handbook and the rules and regulations it contains do not in any way relieve the Contractor (employer) of its responsibility to comply with the applicable environmental safety and health (ESH) regulations and its obligation to implement and enforce its own written ESH programs while working on this project.

Company: _____

Name: _____

Signature: _____

Title: _____

Date: _____

COMPLETE, SIGN AND RETURN THIS CERTIFICATE TO THE LOCKHEED MARTIN ESH MANAGER.

ATTACHMENT II

INCIDENT REPORT FORM

TETRA TECH, INC.
Safety Excellence

Tetra Tech, Inc.
Incident Report

Report Date	Report Prepared By	Incident Report Number

INSTRUCTIONS:

All incidents (including those involving subcontractors under direct supervision of Tetra Tech personnel) must be documented on the IR Form.

Complete any additional parts to this form as indicated below for the type of incident selected.

TYPE OF INCIDENT (Check all that apply)		Additional Form(s) Required for this type of incident
Near Miss (No losses, but could have resulted in injury, illness, or damage)	☐	Complete IR Form Only
Injury or Illness	☐	Complete Form IR-A; Injury or Illness
Property or Equipment Damage, Fire, Spill or Release	☐	Complete Form IR-B; Damage, Fire, Spill or Release
Motor Vehicle	☐	Complete Form IR-C; Motor Vehicle

INFORMATION ABOUT THE INCIDENT

Description of Incident

_____

_____

_____

Date of Incident	Time of Incident
	_____ AM ☐ PM ☐ *OR* Cannot be determined ☐
Weather conditions at the time of the incident	**Was there adequate lighting?**
_____	_____ Yes ☐ No ☐

Location of Incident

_____ Was location of incident within the employer's work environment? Yes ☐ No ☐

Street Address	City, State, Zip Code and Country

Project Name	Client:

Tt Supervisor or Project Manager	Was supervisor on the scene?
	Yes ☐ No ☐

WITNESS INFORMATION (attach additional sheets if necessary)

Name	Company

Street Address	City, State and Zip Code

Telephone Number(s)

CORRECTIVE ACTIONS

Corrective action(s) immediately taken by unit reporting the incident:

_____

_____

_____

Corrective action(s) still to be taken (by whom and when):

_____

_____

_____

ROOT CAUSE ANALYSIS LEVEL REQUIRED

Root Cause Analysis Level Required: Level - 1 ☐ Level - 2 ☐ None ☐

Root Cause Analysis Level Definitions

Level - 1	**Definition:** A Level 1 RCA is conducted by an individual(s) with experience or training in root cause analysis techniques and will conduct or direct documentation reviews, site investigation, witness and affected employee interviews, and identify corrective actions. Activating a Level 1 RCA and identifying RCA team members will be at the discretion of the Corporate Administration office. The following events may trigger a Level 1 RCA: ▪ Work related fatality ▪ Hospitalization of one or more employee where injuries result in total or partial permanent disability ▪ Property damage in excess of $75,000 ▪ When requested by senior management
Level - 2	**Definition:** A Level 2 RCA is self performed within the operating unit by supervisory personnel with assistance of the operating unit HSR. Level 2 RCA will utilize the 5 Why RCA methodology and document the findings on the tools provided. The following events will require a Level 2 RCA: ▪ OSHA recordable lost time incident ▪ Near miss incident that could have triggered a Level 1 RCA ▪ When requested by senior management

Complete the Root Cause Analysis Worksheet and Corrective Action form. Identify a corrective action(s) for each root cause identified within each area of inquiry.

NOTIFICATIONS

Title	Printed Name	Signature	Telephone Number	Date
Project Manager or Supervisor				
Site Safety Coordinator or Office H&S Representative				
Operating Unit H&S Representative				
Other: _____				

The signatures provided above indicate that appropriate personnel have been notified of the incident.

_____

TETRA TECH, INC.
Safety Excellence

TETRA TECH, INC.
INCIDENT FORM IR-A

INSTRUCTIONS:

Complete all sections below for incidents involving injury or illness.
Do NOT leave any blanks.
Attach this form to the IR FORM completed for this incident.

Incident Report Number: (From the IR Form)

EMPLOYEE INFORMATION

Company Affiliation

Tetra Tech Employee? ☐ TetraTech subcontractor employee (directly supervised by Tt personnel)? ☐

Full Name	**Company (if not Tt employee)**

Street Address, City, State and Zip Code	**Address Type**
_____	Home address (for Tt employees) ☐
_____	Business address (for subcontractors) ☐

Telephone Numbers

Work: _____	Home: _____	Cell: _____

Occupation (regular job title)	**Department**

Was the individual performing regular job duties?	**Time individual began work**
Yes ☐ No ☐	_____ AM ☐ PM ☐ *OR* Cannot be determined ☐

Safety equipment

Provided? Yes ☐ No ☐

Used? Yes ☐ No ☐ If no, explain why

_____

_____

_____

Type(s) provided:

☐ Hard hat ☐ Protective clothing
☐ Gloves ☐ High visibility vest
☐ Eye protection ☐ Fall protection
☐ Safety shoes ☐ Machine guarding
☐ Respirator ☐ Other (list)

_____

NOTIFICATIONS

Name of Tt employee to whom the injury or illness was first reported	**Was H&S notified within one hour of injury or illness?**
	Yes ☐ No ☐
Date of report	**H&S Personnel Notified**
Time of report	**Time of Report**

If subcontractor injury, did subcontractor's firm perform their own incident investigation?

Yes ☐ No ☐ If yes, request a copy of their completed investigation form/report and attach it to this report.

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INCIDENT FORM IR-A

INJURY / ILLNESS DETAILS

What was the individual doing just before the incident occurred? Describe the activity as well as the tools, equipment, or material the individual was using. Be specific. Examples: "Climbing a ladder while carrying roofing materials"; "Spraying chlorine from a hand sprayer"; "Daily computer key-entry"

What Happened? Describe how the injury occurred. Examples: "When ladder slipped on wet floor and worker fell 20 feet"; "Worker was sprayed with chlorine when gasket broke during replacement"; Worker developed soreness in wrist over time"

Describe the object or substance that directly harmed the individual: Examples: "Concrete floor"; "Chlorine"; "Radial Arm Saw". If this question does not apply to the incident, write "Not Applicable".

MEDICAL CARE PROVIDED

Was first aid provided at the site: Yes ☐ No ☐ If yes, describe the type of first aid administered and by whom?

Was treatment provided away from the site: Yes ☐ No ☐ If yes, provide the information below.

Name of physician or health care professional	**Facility Name**
Street Address, City State and Zip Code	**Type of Care?**
	Was individual treated in emergency room? Yes ☐ No ☐
	Was individual hospitalized overnight as an in-patient? Yes ☐ No ☐
Telephone Number	Did the individual die? Yes ☐ No ☐ If yes, date: _____
	Will a worker's compensation claim be filed? Yes ☐ No ☐

NOTE: Attach any police reports or related diagrams to this report.

SIGNATURES

I have reviewed this report and agree that all the supplied information is accurate

Affected individual (print)	**Affected individual (signature)**	**Telephone Number**	**Date**

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.

TETRA TECH, INC.
Safety Excellence

TETRA TECH, INC.
INCIDENT FORM IR-B

INSTRUCTIONS:

Complete all sections below for incidents involving property/equipment damage, fire, spill or release.
Do NOT leave any blanks.
Attach this form to the IR FORM completed for this incident.

Incident Report Number: (From the IR Form)	

TYPE OF INCIDENT (Check all that apply)

Property Damage ☐ Equipment Damage ☐ Fire or Explosion ☐ Spill or Release ☐

INCIDENT DETAILS

Results of Incident: Fully describe damages, losses, etc.

_____

_____

_____

Response Actions Taken:

_____

_____

_____

Responding Agency(s) (i.e. police, fire department, etc.)	**Agency(s) Contact Name(s)**

DAMAGED ITEMS (List all damaged items, extent of damage and estimated repair cost)

Item:	**Extent of damage:**	**Estimated repair cost**

SPILLS / RELEASES (Provide information for spilled/released materials)

Substance	**Estimated quantity and duration**	**Specify Reportable Quantity (RQ)**
		_____ Exceeded? Yes ☐ No ☐ NA ☐

FIRES / EXPLOSIONS (Provide information related to fires/explosions)

Fire fighting equipment used? Yes ☐ No ☐ If yes, type of equipment: _____

NOTIFICATIONS

Required notifications	**Name of person notified**	**By whom**	**Date / Time**
Client: _____ Yes ☐ No ☐			
Agency: _____ Yes ☐ No ☐			
Other: _____ Yes ☐ No ☐			

Who is responsible for reporting incident to outside agency(s)? Tt ☐ Client ☐ Other ☐ Name: _____

Was an additional written report on this incident generated? Yes ☐ No ☐ If yes, place in project file.

TETRA TECH, INC.
Safety Excellence

TETRA TECH, INC.
INCIDENT FORM IR-C

INSTRUCTIONS:

Complete all sections below for incidents involving motor vehicle accidents. Do NOT leave any blanks. Attach this form to the IR FORM completed for this incident.

Incident Report Number: (From the IR Form)	

INCIDENT DETAILS

Name of road, street, highway or location where accident occurred	**Name of intersecting road, street or highway if applicable**

County	**City**	**State**

Did police respond to the accident?	**Did ambulance respond to the accident?**
Yes ☐ No ☐	Yes ☐ No ☐
Name and location of responding police department	**Ambulance company name and location**

Officer's name/badge #	

Did police complete an incident report? Yes ☐ No ☐ If yes, police report number: _____
Request a copy of completed investigation report and attach to this form.

VEHICLE INFORMATION

How many vehicles were involved in the accident? _____ (Attach additional sheets as applicable for accidents involving more than 2 vehicles.)

Vehicle Number 1 – Tetra Tech Vehicle		**Vehicle Number 2 – Other Vehicle**	
Vehicle Owner / Contact Information		**Vehicle Owner / Contact Information**	
Color		**Color**	
Make		**Make**	
Model		**Model**	
Year		**Year**	
License Plate #		**License Plate #**	
Identification #		**Identification #**	
Describe damage to vehicle number 1		**Describe damage to vehicle number 2**	
Insurance Company Name and Address		**Insurance Company Name and Address**	
Agent Name **Agent Phone No.**		**Agent Name** **Agent Phone No.**	
Policy Number		**Policy Number**	

TETRA TECH, INC.
Safety Excellence

TETRA TECH, INC.
INCIDENT FORM IR-C

DRIVER INFORMATION

Vehicle Number 1 – Tetra Tech Vehicle		Vehicle Number 2 – Other Vehicle	
Driver's Name		**Driver's Name**	
Driver's Address		**Driver's Address**	
Phone Number		**Phone Number**	
Date of Birth		**Date of Birth**	
Driver's License #		**Driver's License #**	
Licensing State		**Licensing State**	
Gender	Male ☐ Female ☐	**Gender**	Male ☐ Female ☐
Was traffic citation issued to Tetra Tech driver? Yes ☐ No ☐		Was traffic citation issued to driver of other vehicle? Yes ☐ No ☐	
Citation #		**Citation #**	
Citation Description		**Citation Description**	

PASSENGERS IN VEHICLES (NON-INJURED)

List all non-injured passengers (excluding driver) in each vehicle.
Driver information is captured in the preceding section.
Information related to persons injured in the accident (non-Tt employees) is captured in the section below on this form.
Injured Tt employee information is captured on FORM IR-A

Vehicle Number 1 – Tetra Tech Vehicle		Vehicle Number 2 – Other Vehicle	
How many passengers (excluding driver) in the vehicle? ____		How many passengers (excluding driver) in the vehicle? ____	
Non-Injured Passenger Name and Address		**Non-Injured Passenger Name and Address**	
Non-Injured Passenger Name and Address		**Non-Injured Passenger Name and Address**	
Non-Injured Passenger Name and Address		**Non-Injured Passenger Name and Address**	

INJURIES TO NON-TETRATECH EMPLOYEES

Name of injured person 1				Address of injured person 1		
Age	**Gender**	**Car No.**	**Location in Car**	**Seat Belt Used?**	**Ejected from car?**	**Injury or Fatality?**
	Male ☐ Female ☐			Yes ☐ No ☐	Yes ☐ No ☐	Injured ☐ Died ☐
Name of injured person 2				**Address of injured person 2**		
Age	**Gender**	**Car No.**	**Location in Car**	**Seat Belt Used?**	**Ejected from car?**	**Injury or Fatality?**
	Male ☐ Female ☐			Yes ☐ No ☐	Yes ☐ No ☐	Injured ☐ Died ☐

OTHER PROPERTY DAMAGE

Describe damage to property other than motor vehicles	
Property Owner's Name	**Property Owner's Address**

COMPLETE AND SUBMIT DIAGRAM DEPICTING WHAT HAPPENED

ATTACHMENT III

MEDICAL DATA SHEET

MEDICAL DATA SHEET

This Medical Data Sheet must be completed by on-site personnel and kept in the command post during the conduct of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to hospital facilities is required.

Project _____

Name _____ Home Telephone _____

Address _____

Age _____ Height _____ Weight _____

Person to notify in the event of an emergency: Name: _____

Phone: _____

Drug or other Allergies: _____

Particular Sensitivities : _____

Do You Wear Contacts? _____

What medications are you presently using? _____

_____

Name, Address, and Phone Number of personal physician: _____

_____

_____

Note: Health Insurance Portability and Accountability Act (HIPAA) Requirements

HIPAA took effect April 14, 2003. Loosely interpreted, HIPAA regulates the disclosure of Protected Health Information (PHI) by the entity collecting that information. PHI is any information about health status (such as that you may report on this Medical Data Sheet), provision of health care, or other information. HIPAA also requires Tetra Tech to ensure the confidentiality of PHI. This Act can affect the ability of the Medical Data Sheet to contain and convey information you would want a Doctor to know if you were incapacitated. So before you complete the Medical Data Sheet understand that this form will not be maintained in a secure location. It will be maintained in a file box or binder accessible to other members of the field crew so that they can accompany an injured party to the hospital.

DO NOT include information that you do not wish others to know, only information that may be pertinent in an emergency situation or treatment.

_____ _____ _____

Name (Print clearly) Signature Date

ATTACHMENT IV

SAFE WORK PERMITS

SAFE WORK PERMIT
SITE MOBILIZATION AND DEMOBILIZATION ACTIVITIES
LOCKHEED MARTIN MIDDLE RIVER COMPLEX
MIDDLE RIVER, MARYLAND

Permit No. _____ Date: _____ Time: From _____ to _____

I. Work limited to the following (description, area, equipment used): Mobilization and demobilization activities

II. Primary Hazards: Lifting; slips, trips and falls; vehicular and foot traffic; insect/animal bites and stings; poisonous plants; inclement weather.

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____Tetra Tech
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____Tetra Tech

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, or coveralls, safety, glasses and safety footwear. Hard hats and hearing protection will be worn when working near operating equipment.

VI.

Chemicals of Concern	**Hazard Monitoring / Action Level(s)**	**Response Measures**
None anticipated	None	None

Primary Route(s) of Exposure/Hazard: NA

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☐ Yes ☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes ☐ No
Safety Glasses	☐ Yes ☐ No	Safety belt/harness	☐ Yes ☒ No
Chemical/splash goggles	☐ Yes ☒ No	Radio/Cellular Phone	☐ Yes ☒ No
Splash Shield	☐ Yes ☒ No	Barricades	☐ Yes ☒ No
Splash suits/coveralls	☐ Yes ☒ No	Gloves (Type – Work)	☒ Yes ☐ No
Impermeable apron	☐ Yes ☒ No	Work/rest regimen	☐ Yes ☒ No
Steel toe work shoes/boots	☒ Yes ☐ No	Chemical Resistant Boot Covers	☐ Yes ☐ No
High visibility vest	☐ Yes ☐ No	Tape up/use insect repellent	☐ Yes ☐ No
First Aid Kit	☐ Yes ☐ No	Fire Extinguisher	☐ Yes ☐ No
Safety Shower/Eyewash	☐ Yes ☐ No	Other	☐ Yes ☐ No

Modifications/Exceptions: Tyvek coverall to protect against natural hazards (e.g., ticks) if working/walking through areas of high grass. Use insect repellants containing at least 10% DEET and tape up in such areas. Follow manufacturer's recommendations for proper application and reapplication. Hard hat when overhead hazards exist. Safety glasses when near eye hazards. Hearing protection when in high noise areas.

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc)	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.) ☐ Yes ☒ No
If yes, SHSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. Special instructions, precautions: Preview work locations to identify potential hazards (slips, trips, and falls, natural hazards, etc.) Review PPE needs based on activities being performed and the associated hazards. Use safe lifting procedures and obtain assistance when handling heavy or awkward objects. Suspend site activities in the event of inclement weather. Observe site workers for signs and symptoms of heat/cold stress. Use sun block (SPF > 15) to prevent sunburn if necessary.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
SITE CONCRETE CORING OPERATIONS
LOCKHEED MARTIN MIDDLE RIVER COMPLEX
MIDDLE RIVER, MARYLAND

Permit No. _____ Date: _____ Time: From _____ to _____

I. Work limited to the following (description, area, equipment used): Concrete coring will take place in some areas of the complex. This activity will employ an electrical coring machine with water supplied cooling and dust suppression. This activity will also include: Installation of soil gas monitoring points, coring borehole restoration and protective casing installation.

II. Primary Hazards: Potential hazards associated with this task: heavy equipment hazards; elevated noise; energized systems/utilities; electrical shock; heavy lifting; slip, trip and fall; cuts and lacerations; vehicular and foot traffic; flying projectiles.

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____Tetra Tech
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____Tetra Tech

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

Modifications/Exceptions: _____

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
Dust (Concrete)	Visual –Visible dust	>2 mg/m3	Employ dust suppression –Wet it down

Primary Route(s) of Exposure/Hazard: Airborne concentrations of VOCs are not anticipated during this activity. Sand, bentonite, grout may cause mechanical irritation (eyes) as well as potential alkali burns; respiratory, eye, and mucous membrane irritation.

(Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☐ Yes ☐ No	Hearing Protection (Plugs/Muffs)	☒ Yes ☐ No
Safety Glasses	☒ Yes ☐ No	Safety belt/harness	☐ Yes ☒ No
Chemical/splash goggles	☐ Yes ☒ No	Radio/Cellular Phone	☐ Yes ☐ No
Splash shield	☐ Yes ☒ No	Barricades	☒ Yes ☐ No
Splash suits/coveralls	☐ Yes ☐ No	Gloves (Type – nitrile/work)	☒ Yes ☐ No
Impermeable apron	☐ Yes ☒ No	Work/rest regimen	☐ Yes ☒ No
Steel toe work shoes or boots	☒Yes ☐ No	Chemical resistant boot covers	☐ Yes ☐ No
High visibility vest	☐Yes ☐ No	Tape up/use insect repellent	☐ Yes ☒ No
First Aid Kit	☒Yes ☐ No	Fire extinguisher	☐ Yes ☐ No
Safety Shower/Eyewash	☐Yes ☒ No	Other	☐ Yes ☐ No

Modifications/Exceptions: Coveralls if the potential for soiling work clothing exists. Other PPE may be specified by the SSO based on conditions (rain gear, rubber boots, etc.)

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☒ Yes ☐ No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090 (Excavation/Penetration Permit is Required)

X. Special instructions, precautions: Ensure all equipment is powered through a GFCI to prevent possible electrocution hazards. Ensure the coring unit is stable and secured to prevent movement during operation. Keep water collected using a shop vac or similar device for wet applications. This device should also be routed through the GFCI. Inspect the unit before use Ensure wiring, casing, and guards are not damaged and the unit is suitable for use. As this activity may occur at night Ensure lighting within the work area is adequate. Use barricades, signs, temporary diking to control water spread during coring operations. Place signs and barricades to warn foot traffic of potential wet areas. Do not leave any core holes open and unattended. Ensure all protective casings that are installed are flat and level with existing grade. Heavy Equipment Inspection Checklist must be completed prior to beginning work.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
SITE GEOPHYSICAL/GEOGRAPHIC LAND SURVEYING
LOCKHEED MARTIN MIDDLE RIVER COMPLEX
MIDDLE RIVER, MARYLAND

Permit No. _____ Date: _____ Time: From _____ to _____

I. Work limited to the following (description, area, equipment used): Surveying activities both geophysical and geographical.

II. Primary Hazards: Potential hazards associated with this task: slip, trip and fall; vehicular and foot traffic; temperature extremes; inclement weather; insect /animal bites or stings, poisonous plants, etc.

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____Tetra Tech
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____Tetra Tech

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

Modifications/Exceptions: _____

VI.

Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
None expected during this task	NA	NA	NA

Primary Route(s) of Exposure/Hazard: _____

(Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☐ Yes ☒ No	Hearing Protection (Plugs/Muffs)	☐ Yes ☒ No
Safety Glasses	☐ Yes ☐ No	Safety belt/harness	☐ Yes ☒ No
Chemical/splash goggles	☐ Yes ☒ No	Radio/Cellular Phone	☐ Yes ☐ No
Splash Shield	☐ Yes ☒ No	Barricades	☐ Yes ☒ No
Splash suits/coveralls	☐ Yes ☐ No	Gloves (Type – Work)	☐ Yes ☐ No
Impermeable apron	☐ Yes ☒ No	Work/rest regimen	☐ Yes ☐ No
Steel toe work shoes or boots	☒ Yes ☐ No	Chemical Resistant Boot Covers	☐ Yes ☒ No
High Visibility vest	☐ Yes ☐ No	Tape up/use insect repellent	☐ Yes ☐ No
First Aid Kit	☐ Yes ☐ No	Fire Extinguisher	☐ Yes ☒ No
Safety Shower/Eyewash	☐ Yes ☒ No	Other	☐ Yes ☐ No

Modifications/Exceptions: Tape up, use insect repellents. Follow manufacturer's label directions for application and re-application of these products. Wear snake chaps in any high grass or brush areas.

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.) ☐ Yes ☒ No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. Special instructions, precautions: Suspend activities in the event of inclement weather.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
BLOCK D SOIL BORING AND MONITORING/DEEP WELL INSTALLATION
LOCKHEED MARTIN MIDDLE RIVER COMPLEX
MIDDLE RIVER, MARYLAND

Permit No. **Date:** **Time: From** **to**

I. Work limited to the following (description, area, equipment used): Soil boring and monitoring well installation. Soil boring will generally be performed using DPT and HSA Rigs, while the monitoring wells will be installed via HSA. This task includes well development and the installation of vapor monitoring points and installation of membrane interface probes.

II. Primary Hazards: Contact and transfer of site contaminants; heavy equipment hazards; elevated noise; energized systems/utilities; heavy lifting; slip, trip and fall; cuts and lacerations; vehicular and foot traffic; ambient temperature extremes; flying projectiles; insect/animal bites and stings, poisonous plants, inclement weather, drowning.

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____Tetra Tech
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____Tetra Tech

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐
Modifications/Exceptions: _____

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

VI. Chemicals of Concern (COCs) and Actions

COCs	Hazard Monitoring	Action Level(s)	Response Measures
VOCs	PID (except on boat/barge)	>1.00 ppm in BZ sustained 4 exp of 5 minutes	Screen BZ with Draeger tubes
Benzene	Draeger Tube 0.5/a	Up to 5 ppm/sustained 10 minutes/4 times/day	Evacuate site till background levels return
Dust	Visual –Visible dust	>2 mg/m3	Employ dust suppression –Wet it down

Primary Route(s) of Exposure/Hazard: Inhalation, ingestion and skin contact. Controls include monitoring instrument use, dust control, use of PPE, and following safe work practices. VOCs – irritating at all points of contact; CNS effects (blurred vision, narcotic effects, dizziness); Extremely high concentrations may result in Irregular heartbeats, possible cardiac arrest. Sand, bentonite, grout may cause mechanical irritation (eyes) as well as potential alkali burns; respiratory, eye, and mucous membrane irritation.

Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☒ Yes ☐ No	Hearing Protection (Plugs/Muffs)	☒ Yes ☐ No
Safety Glasses	☒ Yes ☐ No	Safety belt/harness	☐ Yes ☒ No
Chemical/splash goggles	☐ Yes ☒ No	Radio/Cellular Phone	☐ Yes ☐ No
Splash shield	☐ Yes ☒ No	Barricades	☐ Yes ☐ No
Splash suits/coveralls	☐ Yes ☐ No	Gloves (Type – nitrile/work)	☒ Yes ☐ No
Impermeable apron	☐ Yes ☒ No	Work/rest regimen	☐ Yes ☐ No
Steel toe work shoes or boots	☒Yes ☐ No	Chemical resistant boot covers	☐ Yes ☐ No
High visibility vest	☐Yes ☐ No	Tape up/use insect repellent	☐ Yes ☐ No
First Aid Kit	☐Yes ☐ No	Fire extinguisher	☐ Yes ☐ No
Safety Shower/Eyewash	☐Yes ☒ No	Other	☐ Yes ☐ No

Modifications/Exceptions: Coveralls if the potential for soiling work clothing exists. Other PPE is possible based on conditions (rain gear, rubber boots, etc.)

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☒ Yes ☐ No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090 (Excavation Permit is Required)

X. Special instructions, precautions: Any sustained VOC readings in worker BZs indicate an unanticipated condition requiring that site activities be suspended. Use safe lifting/carrying techniques. Inspect equipment prior to use. Ensure emergency stop devices are functional and test daily. Minimize contact with potentially contaminated media and assume soils/groundwater are contaminated. Use waterless hand cleaner products or disinfecting wipes on boat after sampling until access to proper hands washing facilities on shore can be reached. Heavy Equipment Inspection Checklist must be completed prior to beginning work.

Permit Issued by:_____ Permit Accepted by:_____

SAFE WORK PERMIT
BLOCK E AND G SOIL BORING AND MONITORING/DEEP WELL INSTALLATION
LOCKHEED MARTIN MIDDLE RIVER COMPLEX
MIDDLE RIVER, MARYLAND

Permit No. _____ Date: _____ Time: From _____ to _____

I. Work limited to the following (description, area, equipment used): Soil boring and monitoring well installation. Soil boring will generally be performed using DPT and HSA Rigs, while the monitoring wells will be installed via HSA. This task includes well development and the installation of vapor monitoring points and installation of membrane interface probes.

II. Primary Hazards: Contact and transfer of site contaminants; heavy equipment hazards; elevated noise; energized systems/utilities; heavy lifting; slip, trip and fall; cuts and lacerations; vehicular and foot traffic; ambient temperature extremes; flying projectiles; insect/animal bites and stings, poisonous plants, inclement weather, drowning.

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____Tetra Tech
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____Tetra Tech

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐
Modifications/Exceptions: _____

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

VI. Chemicals of Concern (COCs) and Actions

COCs	Hazard Monitoring	Action Level(s)	Response Measures
VOCs	PID (except on boat/barge)	>7.00 ppm in BZ sustained 4 exp of 5 minutes	Screen BZ with Draeger tubes
Benzene	Draeger Tube 0.5/a	Up to 5 ppm/sustained 10 minutes/4 times/day	Evacuate site till background levels return
Dust	Visual –Visible dust	>2 mg/m3	Employ dust suppression –Wet it down

Primary Route(s) of Exposure/Hazard: Inhalation, ingestion and skin contact. Controls include monitoring instrument use, dust control, use of PPE, and following safe work practices. VOCs – irritating at all points of contact; CNS effects (blurred vision, narcotic effects, dizziness); Extremely high concentrations may result in Irregular heartbeats, possible cardiac arrest. Sand, bentonite, grout may cause mechanical irritation (eyes) as well as potential alkali burns; respiratory, eye, and mucous membrane irritation.

Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☒ Yes ☐ No	Hearing Protection (Plugs/Muffs)	☒ Yes ☐ No
Safety Glasses	☒ Yes ☐ No	Safety belt/harness	☐ Yes ☒ No
Chemical/splash goggles	☐ Yes ☒ No	Radio/Cellular Phone	☐ Yes ☐ No
Splash shield	☐ Yes ☒ No	Barricades	☐ Yes ☐ No
Splash suits/coveralls	☐ Yes ☐ No	Gloves (Type – nitrile/work)	☒ Yes ☐ No
Impermeable apron	☐ Yes ☒ No	Work/rest regimen	☐ Yes ☐ No
Steel toe work shoes or boots	☒Yes ☐ No	Chemical resistant boot covers	☐ Yes ☐ No
High visibility vest	☐Yes ☐ No	Tape up/use insect repellent	☐ Yes ☐ No
First Aid Kit	☐Yes ☐ No	Fire extinguisher	☐ Yes ☐ No
Safety Shower/Eyewash	☐Yes ☒ No	Other	☐ Yes ☐ No

Modifications/Exceptions: Coveralls if the potential for soiling work clothing exists. Other PPE is possible based on conditions (rain gear, rubber boots, etc.)

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☒ Yes ☐ No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090 (Excavation Permit is Required)

X. Special instructions, precautions: Any sustained VOC readings in worker BZs indicate an unanticipated condition requiring that site activities be suspended. Use safe lifting/carrying techniques. Inspect equipment prior to use. Ensure emergency stop devices are functional and test daily. Minimize contact with potentially contaminated media and assume soils/groundwater are contaminated. Use waterless hand cleaner products or disinfecting wipes on boat after sampling until access to proper hands washing facilities on shore can be reached. Heavy Equipment Inspection Checklist must be completed prior to beginning work.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
BLOCK F SOIL BORING AND MONITORING/DEEP WELL INSTALLATION
LOCKHEED MARTIN MIDDLE RIVER COMPLEX
MIDDLE RIVER, MARYLAND

Permit No. _____ Date: _____ Time: From _____ to _____

I. Work limited to the following (description, area, equipment used): Soil boring and monitoring well installation. Soil boring will generally be performed using DPT and HSA Rigs, while the monitoring wells will be installed via HSA. This task includes well development and the installation of vapor monitoring points and installation of membrane interface probes.

II. Primary Hazards: Contact and transfer of site contaminants; heavy equipment hazards; elevated noise; energized systems/utilities; heavy lifting; slip, trip and fall; cuts and lacerations; vehicular and foot traffic; ambient temperature extremes; flying projectiles; insect/animal bites and stings, poisonous plants, inclement weather, drowning.

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____Tetra Tech
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____Tetra Tech

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐
Modifications/Exceptions: _____

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

VI. Chemicals of Concern (COCs) and Actions

COCs	Hazard Monitoring	Action Level(s)	Response Measures
VOCs	PID (except on boat/barge)	>1,000 ppm in BZ sustained 4 exp of 5 minutes	Screen BZ with Draeger tubes
Benzene	Draeger Tube 0.5/a	Up to 5 ppm/sustained 10 minutes/4 times/day	Evacuate site till background levels return
Dust	Visual –Visible dust	>2 mg/m3	Employ dust suppression –Wet it down

Primary Route(s) of Exposure/Hazard: Inhalation, ingestion and skin contact. Controls include monitoring instrument use, dust control, use of PPE, and following safe work practices. VOCs – irritating at all points of contact; CNS effects (blurred vision, narcotic effects, dizziness); Extremely high concentrations may result in Irregular heartbeats, possible cardiac arrest. Sand, bentonite, grout may cause mechanical irritation (eyes) as well as potential alkali burns; respiratory, eye, and mucous membrane irritation.

Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☒ Yes ☐ No	Hearing Protection (Plugs/Muffs)	☒ Yes ☐ No
Safety Glasses	☒ Yes ☐ No	Safety belt/harness	☐ Yes ☒ No
Chemical/splash goggles	☐ Yes ☒ No	Radio/Cellular Phone	☐ Yes ☐ No
Splash shield	☐ Yes ☒ No	Barricades	☐ Yes ☐ No
Splash suits/coveralls	☐ Yes ☐ No	Gloves (Type – nitrile/work)	☒ Yes ☐ No
Impermeable apron	☐ Yes ☒ No	Work/rest regimen	☐ Yes ☐ No
Steel toe work shoes or boots	☒Yes ☐ No	Chemical resistant boot covers	☐ Yes ☐ No
High visibility vest	☐Yes ☐ No	Tape up/use insect repellent	☐ Yes ☐ No
First Aid Kit	☐Yes ☐ No	Fire extinguisher	☐ Yes ☐ No
Safety Shower/Eyewash	☐Yes ☒ No	Other	☐ Yes ☐ No

Modifications/Exceptions: Coveralls if the potential for soiling work clothing exists. Other PPE is possible based on conditions (rain gear, rubber boots, etc.)

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☒ Yes ☐ No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090 (Excavation Permit is Required)

X. Special instructions, precautions: Any sustained VOC readings in worker BZs indicate an unanticipated condition requiring that site activities be suspended. Use safe lifting/carrying techniques. Inspect equipment prior to use. Ensure emergency stop devices are functional and test daily. Minimize contact with potentially contaminated media and assume soils/groundwater are contaminated. Use waterless hand cleaner products or disinfecting wipes on boat after sampling until access to proper hands washing facilities on shore can be reached. Heavy Equipment Inspection Checklist must be completed prior to beginning work.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
Block H SOIL BORING AND MONITORING/DEEP WELL INSTALLATION
LOCKHEED MARTIN MIDDLE RIVER COMPLEX
MIDDLE RIVER, MARYLAND

Permit No. Date: Time: From to

I. Work limited to the following (description, area, equipment used): Soil boring and monitoring well installation. Soil boring will generally be performed using DPT and HSA Rigs, while the monitoring wells will be installed via HSA. This task includes well development and the installation of vapor monitoring points and installation of membrane interface probes.

II. Primary Hazards: Contact and transfer of site contaminants; heavy equipment hazards; elevated noise; energized systems/utilities; heavy lifting; slip, trip and fall; cuts and lacerations; vehicular and foot traffic; ambient temperature extremes; flying projectiles; insect/animal bites and stings, poisonous plants, inclement weather, drowning.

III. Field Crew:

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____Tetra Tech
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____Tetra Tech

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐
Modifications/Exceptions:

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

VI. Chemicals of Concern (COCs) and Actions

COCs	Hazard Monitoring	Action Level(s)	Response Measures
VOCs	PID (except on boat/barge)	>10.00 ppm in BZ sustained 4 exp of 5 minutes	Screen BZ with Draeger tubes
Benzene	Draeger Tube 0.5/a	Up to 5 ppm/sustained 10 minutes/4 times/day	Evacuate site till background levels return
Dust	Visual –Visible dust	>2 mg/m3	Employ dust suppression –Wet it down

Primary Route(s) of Exposure/Hazard: Inhalation, ingestion and skin contact. Controls include monitoring instrument use, dust control, use of PPE, and following safe work practices. VOCs – irritating at all points of contact; CNS effects (blurred vision, narcotic effects, dizziness); Extremely high concentrations may result in Irregular heartbeats, possible cardiac arrest. Sand, bentonite, grout may cause mechanical irritation (eyes) as well as potential alkali burns; respiratory, eye, and mucous membrane irritation.

Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☒ Yes ☐ No	Hearing Protection (Plugs/Muffs)	☒ Yes ☐ No
Safety Glasses	☒ Yes ☐ No	Safety belt/harness	☐ Yes ☒ No
Chemical/splash goggles	☐ Yes ☒ No	Radio/Cellular Phone	☐ Yes ☐ No
Splash shield	☐ Yes ☒ No	Barricades	☐ Yes ☐ No
Splash suits/coveralls	☐ Yes ☐ No	Gloves (Type – nitrile/work)	☒ Yes ☐ No
Impermeable apron	☐ Yes ☒ No	Work/rest regimen	☐ Yes ☐ No
Steel toe work shoes or boots	☒Yes ☐ No	Chemical resistant boot covers	☐ Yes ☐ No
High visibility vest	☐Yes ☐ No	Tape up/use insect repellent	☐ Yes ☐ No
First Aid Kit	☐Yes ☐ No	Fire extinguisher	☐ Yes ☐ No
Safety Shower/Eyewash	☐Yes ☒ No	Other	☐ Yes ☐ No

Modifications/Exceptions: Coveralls if the potential for soiling work clothing exists. Other PPE is possible based on conditions (rain gear, rubber boots, etc.)

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☒ Yes ☐ No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090 (Excavation Permit is Required)

X. Special instructions, precautions: Any sustained VOC readings in worker BZs indicate an unanticipated condition requiring that site activities be suspended. Use safe lifting/carrying techniques. Inspect equipment prior to use. Ensure emergency stop devices are functional and test daily. Minimize contact with potentially contaminated media and assume soils/groundwater are contaminated. Use waterless hand cleaner products or disinfecting wipes on boat after sampling until access to proper hands washing facilities on shore can be reached. Heavy Equipment Inspection Checklist must be completed prior to beginning work.

Permit Issued by: Permit Accepted by:

SAFE WORK PERMIT
MARINE OPERATIONS (FROM WATER VESSEL)
LOCKHEED MARTIN MIDDLE RIVER COMPLEX
MIDDLE RIVER, MARYLAND

Permit No. _____ Date: _____ Time: From _____ to _____

I. Work limited to the following (description, area, equipment used): Collection of surface water and sediment samples. These sampling activities will be conducted from a small boat. Deep well installation via Rotosonic drill rig from a barge will be part of this activity.

II. Primary Hazards: Drowning. Suspend activities in the event of inclement weather (i.e., high winds, heavy rains, or electrical storms). Other hazards could include, small cuts/abrasions, and injury form slip, trip and fall events

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____ Tetra Tech
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____ Tetra Tech

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

Modifications/Exceptions: Coast Guard approved personal floatation device (pfd).

VI. VI. Chemicals of Concern (COCs) and Actions

COC's	Hazard Monitoring	Action Level(s)	Response Measures
VOCs	PID (except on boat/barge)	>1.75 ppm in BZ sustained 4 exp of 5 minutes	Screen BZ with Draeger tubes
Benzene	Draeger Tube 0.5/a	Up to 5 ppm/sustained 10 minutes/4 times/day	Stop site activity until background levels return to normal.

Primary Route(s) of Exposure/Hazard: incidental ingestion, direct contact with contaminated media.

(Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☐ Yes ☒ No	Hearing Protection (Plugs/Muffs)	☐ Yes ☒ No
Safety Glasses	☒ Yes ☐ No	Safety belt/harness	☐ Yes ☐ No
Chemical/splash goggles	☐ Yes ☒ No	Radio/Cellular Phone	☐ Yes ☐ No
Splash Shield	☐ Yes ☒ No	Barricades	☐ Yes ☒ No
Splash suits/coveralls	☐ Yes ☒ No	Gloves (Type – Work/nitrile)	☒ Yes ☐ No
Impermeable apron	☐ Yes ☒ No	Work/rest regimen	☐ Yes ☐ No
Steel toe work shoes or boots	☐ Yes ☒ No	Chemical Resistant Boot Covers	☐ Yes ☒ No
High Visibility vest	☐ Yes ☒ No	Tape up/use insect repellent	☐ Yes ☒ No
First Aid Kit	☒ Yes ☐ No	Fire Extinguisher	☒ Yes ☐ No
Safety Shower/Eyewash	☐ Yes ☒ No	Other	☒ Yes ☐ No

Modifications/Exceptions: Each person on the boat must be wearing a USCG-approved pfd, and the boat must be equipped with a tethered, throwable life saver device. Footwear equipped with slip-resistant soles. Hats and sunscreen for protection from UV rays.

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☒
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☒
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. Special instructions, precautions: Minimize contact with potentially contaminated media and sampling devices. Wash hands before performing any hand-to-mouth activities. Use waterless hand cleaner products or disinfecting wipes on boat after sampling until access to proper hands washing facilities on shore can be reached. Fire extinguisher and first aid kit to be maintained on boat at all times. The boat employed will meet the minimum safe vessel requirements including PFDs, fire extinguishers, and visual distress signals. Complete Boating Safety Checklist prior to beginning work. See Attachment VI for Tetra Tech Procedure for Working over or near Water.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
Block D MULTI MEDIA SAMPLING AND WELL DEVELOPMENT
LOCKHEED MARTIN MIDDLE RIVER COMPLEX
MIDDLE RIVER, MARYLAND

Permit No. _____ Date: _____ Time: From _____ to _____

I. Work limited to the following (description, area, equipment used): Multimedia sampling including surface and subsurface soils, groundwater, storm water, IDW. This task also includes soil vapor sampling and indoor air quality sampling.

II. Primary Hazards: Contact with site contaminants; transfer of contamination; heavy lifting; slip, trip and fall; cuts and lacerations; vehicular and foot traffic; ambient temperature extremes; insect/animal bites and stings, poisonous plants, inclement weather.

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____Tetra Tech
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____Tetra Tech

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

Modifications/Exceptions: _____

VI. Chemicals of Concern (COCs) and Actions

COCs	Hazard Monitoring	Action Level(s)	Response Measures
VOCs	PID (except on boat/barge)	>1.00 ppm in BZ sustained 4 exp of 5 minutes	Screen BZ with Draeger tubes
Benzene	Draeger Tube 0.5/a	Up to 5 ppm/sustained 10 minutes/4 times/day	Evacuate site till background levels return
Dust	Visual –Visible dust	>2 mg/m3	Employ dust suppression –Wet it down

Dust components may include metals, PCBs, PAHs, sand, grout. Encountering airborne concentrations above background levels in the breathing zone (BZ) during this activity is not anticipated based on historical source concentrations. SSO to take and record background levels at least daily.

Primary Route(s) of Exposure/Hazard: Inhalation, ingestion and skin contact. Controls include monitoring instrument use, dust control, use of PPE, and following safe work practices. VOCs – irritating at all points of contact; CNS effects (blurred vision, narcotic effects, dizziness); Extremely high concentrations may result in Irregular heartbeats, possible cardiac arrest. Sand, bentonite, grout may cause mechanical irritation (eyes) as well as potential alkali burns; respiratory, eye, and mucous membrane irritation.

(Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☐ Yes ☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes ☐ No
Safety Glasses	☒ Yes ☐ No	Safety Belt/Harness	☐ Yes ☒ No
Chemical/Splash Goggles	☐ Yes ☒ No	Radio/Cellular Phone	☐ Yes ☐ No
Splash Shield	☐ Yes ☒ No	Barricades	☐ Yes ☐ No
Splash Suits/Coveralls	☐ Yes ☐ No	Gloves (Type – Nitrile)	☒ Yes ☐ No
Impermeable Apron	☐ Yes ☒ No	Work/rest regimen	☐ Yes ☐ No
Steel Toe Work Shoes or Boots	☒ Yes ☐ No	Chemical Resistant Boot Covers	☐ Yes ☒ No
High Visibility Vest	☐ Yes ☐ No	Tape/Insect Repellent	☐ Yes ☐ No
First Aid Kit	☐ Yes ☐ No	Fire Extinguisher	☐ Yes ☐ No
Safety Shower/Eyewash	☐ Yes ☐ No	Other	☐ Yes ☐ No

Modifications/Exceptions: _____

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.) ☒ Yes ☐ No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. Special instructions, precautions: VOCs are most likely to be present at REC 1, 11, and 12. Any sustained readings in worker breathing zones will suggest an unanticipated condition that will require that site activities be suspended until the source of elevated readings is determined. Use safe lifting/carrying techniques. Assume media is contaminated and avoid contact through the use of safe work practices, PPE and decontamination. As this activity may occur at night Ensure lighting within the work area are at least 5 foot candles. Prior to placing Summa Canisters ventilate indoor area if elevated readings (>10 ppm) are encountered upon entering building to achieve readings less than 10 ppm.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
BLOCK E AND G MULTI MEDIA SAMPLING AND WELL DEVELOPMENT
LOCKHEED MARTIN MIDDLE RIVER COMPLEX
MIDDLE RIVER, MARYLAND

Permit No. _____ Date: _____ Time: From _____ to _____

I. **Work limited to the following (description, area, equipment used):** Multimedia sampling including surface and subsurface soils, groundwater, storm water, IDW. This task also includes soil vapor sampling and indoor air quality sampling.

II. **Primary Hazards:** Contact with site contaminants; transfer of contamination; heavy lifting; slip, trip and fall; cuts and lacerations; vehicular and foot traffic; ambient temperature extremes; insect/animal bites and stings, poisonous plants, inclement weather.

III. **Field Crew:** _____

IV. **On-site Inspection conducted** ☐ Yes ☐ No Initials of Inspector _____ Tetra Tech
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____ Tetra Tech

V. **Protective equipment required**
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

Modifications/Exceptions: _____

VI. **Chemicals of Concern (COCs) and Actions**

COCs	Hazard Monitoring	Action Level(s)	Response Measures
VOCs	PID (except on boat/barge)	>7.00 ppm in BZ sustained 4 exp of 5 minutes	Screen BZ with Draeger tubes
Benzene	Draeger Tube 0.5/a	Up to 5 ppm/sustained 10 minutes/4 times/day	Evacuate site till background levels return
Dust	Visual –Visible dust	>2 mg/m3	Employ dust suppression –Wet it down

Dust components may include metals, PCBs, PAHs, sand, grout. Encountering airborne concentrations above background levels in the breathing zone (BZ) during this activity is not anticipated based on historical source concentrations. SSO to take and record background levels at least daily.

Primary Route(s) of Exposure/Hazard: Inhalation, ingestion and skin contact. Controls include monitoring instrument use, dust control, use of PPE, and following safe work practices. VOCs – irritating at all points of contact; CNS effects (blurred vision, narcotic effects, dizziness); Extremely high concentrations may result in Irregular heartbeats, possible cardiac arrest. Sand, bentonite, grout may cause mechanical irritation (eyes) as well as potential alkali burns; respiratory, eye, and mucous membrane irritation.

(Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. **Additional Safety Equipment/Procedures**

Hard-hat	☐ Yes ☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes ☐ No
Safety Glasses	☒ Yes ☐ No	Safety Belt/Harness	☐ Yes ☒ No
Chemical/Splash Goggles	☐ Yes ☒ No	Radio/Cellular Phone	☐ Yes ☐ No
Splash Shield	☐ Yes ☒ No	Barricades	☐ Yes ☐ No
Splash Suits/Coveralls	☐ Yes ☐ No	Gloves (Type – Nitrile)	☒ Yes ☐ No
Impermeable Apron	☐ Yes ☒ No	Work/rest regimen	☐ Yes ☐ No
Steel Toe Work Shoes or Boots	☒ Yes ☐ No	Chemical Resistant Boot Covers	☐ Yes ☒ No
High Visibility Vest	☐ Yes ☐ No	Tape/Insect Repellent	☐ Yes ☐ No
First Aid Kit	☐ Yes ☐ No	Fire Extinguisher	☐ Yes ☐ No
Safety Shower/Eyewash	☐ Yes ☐ No	Other	☐ Yes ☐ No

Modifications/Exceptions: _____

VIII. **Site Preparation**

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. **Additional Permits required** (Hot work, confined space entry, excavation etc.) ☒ Yes ☐ No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. **Special instructions, precautions:** VOCs are most likely to be present at REC 1, 11, and 12. Any sustained readings in worker breathing zones will suggest an unanticipated condition that will require that site activities be suspended until the source of elevated readings is determined. Use safe lifting/carrying techniques. Assume media is contaminated and avoid contact through the use of safe work practices, PPE and decontamination. As this activity may occur at night Ensure lighting within the work area are at least 5 foot candles. Prior to placing Summa Canisters ventilate indoor area if elevated readings (>10 ppm) are encountered upon entering building to achieve readings less than 10 ppm.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
BLOCK F MULTI MEDIA SAMPLING AND WELL DEVELOPMENT
LOCKHEED MARTIN MIDDLE RIVER COMPLEX
MIDDLE RIVER, MARYLAND

Permit No. _____ Date: _____ Time: From _____ to _____

I. Work limited to the following (description, area, equipment used): Multimedia sampling including surface and subsurface soils, groundwater, storm water, IDW. This task also includes soil vapor sampling and indoor air quality sampling.

II. Primary Hazards: Contact with site contaminants; transfer of contamination; heavy lifting; slip, trip and fall; cuts and lacerations; vehicular and foot traffic; ambient temperature extremes; insect/animal bites and stings, poisonous plants, inclement weather.

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____ Tetra Tech
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____ Tetra Tech

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

Modifications/Exceptions: _____

VI. Chemicals of Concern (COCs) and Actions

COCs	Hazard Monitoring	Action Level(s)	Response Measures
VOCs	PID (except on boat/barge)	>1,000 ppm in BZ sustained 4 exp of 5 minutes	Screen BZ with Draeger tubes
Benzene	Draeger Tube 0.5/a	Up to 5 ppm/sustained 10 minutes/4 times/day	Evacuate site till background levels return
Dust	Visual –Visible dust	>2 mg/m3	Employ dust suppression –Wet it down

Dust components may include metals, PCBs, PAHs, sand, grout. Encountering airborne concentrations above background levels in the breathing zone (BZ) during this activity is not anticipated based on historical source concentrations. SSO to take and record background levels at least daily.

Primary Route(s) of Exposure/Hazard: Inhalation, ingestion and skin contact. Controls include monitoring instrument use, dust control, use of PPE, and following safe work practices. VOCs – irritating at all points of contact; CNS effects (blurred vision, narcotic effects, dizziness); Extremely high concentrations may result in Irregular heartbeats, possible cardiac arrest. Sand, bentonite, grout may cause mechanical irritation (eyes) as well as potential alkali burns; respiratory, eye, and mucous membrane irritation.

(Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☐ Yes ☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes ☐ No
Safety Glasses	☒ Yes ☐ No	Safety Belt/Harness	☐ Yes ☒ No
Chemical/Splash Goggles	☐ Yes ☒ No	Radio/Cellular Phone	☐ Yes ☐ No
Splash Shield	☐ Yes ☒ No	Barricades	☐ Yes ☐ No
Splash Suits/Coveralls	☐ Yes ☐ No	Gloves (Type – Nitrile)	☒ Yes ☐ No
Impermeable Apron	☐ Yes ☒ No	Work/rest regimen	☐ Yes ☐ No
Steel Toe Work Shoes or Boots	☒ Yes ☐ No	Chemical Resistant Boot Covers	☐ Yes ☒ No
High Visibility Vest	☐ Yes ☐ No	Tape/Insect Repellent	☐ Yes ☐ No
First Aid Kit	☐ Yes ☐ No	Fire Extinguisher	☐ Yes ☐ No
Safety Shower/Eyewash	☐ Yes ☐ No	Other	☐ Yes ☐ No

Modifications/Exceptions: _____

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.) ☒ Yes ☐ No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. Special instructions, precautions: VOCs are most likely to be present at REC 1, 11, and 12. Any sustained readings in worker breathing zones will suggest an unanticipated condition that will require that site activities be suspended until the source of elevated readings is determined. Use safe lifting/carrying techniques. Assume media is contaminated and avoid contact through the use of safe work practices, PPE and decontamination. As this activity may occur at night Ensure lighting within the work area are at least 5 foot candles. Prior to placing Summa Canisters ventilate indoor area if elevated readings (>10 ppm) are encountered upon entering building to achieve readings less than 10 ppm.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
BLOCK H MULTI MEDIA SAMPLING AND WELL DEVELOPMENT
LOCKHEED MARTIN MIDDLE RIVER COMPLEX
MIDDLE RIVER, MARYLAND

Permit No. _____ Date: _____ Time: From _____ to _____

I. Work limited to the following (description, area, equipment used): Multimedia sampling including surface and subsurface soils, groundwater, storm water, IDW. This task also includes soil vapor sampling and indoor air quality sampling.

II. Primary Hazards: Contact with site contaminants; transfer of contamination; heavy lifting; slip, trip and fall; cuts and lacerations; vehicular and foot traffic; ambient temperature extremes; insect/animal bites and stings, poisonous plants, inclement weather.

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____Tetra Tech
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____Tetra Tech

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

Modifications/Exceptions: _____

VI. Chemicals of Concern (COCs) and Actions

COCs	Hazard Monitoring	Action Level(s)	Response Measures
VOCs	PID (except on boat/barge)	>10.00 ppm in BZ sustained 4 exp of 5 minutes	Screen BZ with Draeger tubes
Benzene	Draeger Tube 0.5/a	Up to 5 ppm/sustained 10 minutes/4 times/day	Evacuate site till background levels return
Dust	Visual –Visible dust	>2 mg/m3	Employ dust suppression –Wet it down

Dust components may include metals, PCBs, PAHs, sand, grout. Encountering airborne concentrations above background levels in the breathing zone (BZ) during this activity is not anticipated based on historical source concentrations. SSO to take and record background levels at least daily.

Primary Route(s) of Exposure/Hazard: Inhalation, ingestion and skin contact. Controls include monitoring instrument use, dust control, use of PPE, and following safe work practices. VOCs – irritating at all points of contact; CNS effects (blurred vision, narcotic effects, dizziness); Extremely high concentrations may result in Irregular heartbeats, possible cardiac arrest. Sand, bentonite, grout may cause mechanical irritation (eyes) as well as potential alkali burns; respiratory, eye, and mucous membrane irritation.

(Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☐ Yes ☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes ☐ No
Safety Glasses	☒ Yes ☐ No	Safety Belt/Harness	☐ Yes ☒ No
Chemical/Splash Goggles	☐ Yes ☒ No	Radio/Cellular Phone	☐ Yes ☐ No
Splash Shield	☐ Yes ☒ No	Barricades	☐ Yes ☐ No
Splash Suits/Coveralls	☐ Yes ☐ No	Gloves (Type – Nitrile)	☒ Yes ☐ No
Impermeable Apron	☐ Yes ☒ No	Work/rest regimen	☐ Yes ☐ No
Steel Toe Work Shoes or Boots	☒ Yes ☐ No	Chemical Resistant Boot Covers	☐ Yes ☒ No
High Visibility Vest	☐ Yes ☐ No	Tape/Insect Repellent	☐ Yes ☐ No
First Aid Kit	☐ Yes ☐ No	Fire Extinguisher	☐ Yes ☐ No
Safety Shower/Eyewash	☐ Yes ☐ No	Other	☐ Yes ☐ No

Modifications/Exceptions: _____

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.) ☒ Yes ☐ No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. Special instructions, precautions: VOCs are most likely to be present at REC 1, 11, and 12. Any sustained readings in worker breathing zones will suggest an unanticipated condition that will require that site activities be suspended until the source of elevated readings is determined. Use safe lifting/carrying techniques. Assume media is contaminated and avoid contact through the use of safe work practices, PPE and decontamination. As this activity may occur at night Ensure lighting within the work area are at least 5 foot candles. Prior to placing Summa Canisters ventilate indoor area if elevated readings (>10 ppm) are encountered upon entering building to achieve readings less than 10 ppm.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
SITE IDW MANAGEMENT
LOCKHEED MARTIN MIDDLE RIVER COMPLEX
MIDDLE RIVER, MARYLAND

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope

I. **Work limited to the following (description, area, equipment used):** IDW management activities includes containerization, staging, monitoring for leaks of IDW accumulated wastes. Wastes types include soil cutting, purge and decontamination wash waters.

II. **Primary Hazards:** Lifting, pinches and compressions; flying projectiles; slips, trips, and falls and chemical contamination.

III. **Field Crew:** _____

IV. **On-site Inspection conducted** ☐ Yes ☐ No Initials of Inspector _____Tetra Tech
Equipment Inspection required ☐ Yes ☒ No Initials of Inspector _____Tetra Tech

SECTION II: General Safety Requirements (To be filled in by permit issuer)

V. **Protective equipment required**
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ See Reverse
No ☒

Modifications/Exceptions: None anticipated

VI. **Chemicals of Concern**: None anticipated
Hazard Monitoring /Action Level(s): N/A
Response Measures: N/A

Primary Route of Exposure/Hazard: inhalation, dermal, ingestion

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes or No)

VII. **Additional Safety Equipment/Procedures**

Hard-hat	☐ Yes ☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes ☒ No
Safety Glasses	☐ Yes ☐ No	Safety belt/harness	☐ Yes ☒ No
Chemical/splash goggles	☐ Yes ☒ No	Radio/Cellular Phone	☐ Yes ☐ No
Splash Shield	☐ Yes ☒ No	Barricades	☐ Yes ☐ No
Splash suits/coveralls	☐ Yes ☒ No	Gloves (Type – Leather/Cotton)	☒ Yes ☐ No
Impermeable apron	☐ Yes ☒ No	Work/rest regimen	☐ Yes ☒ No
Steel toe work shoes/boots	☒ Yes ☐ No	Chemical Resistant Boot Covers	☐ Yes ☒ No
High visibility vest	☐ Yes ☐ No	Tape up/use insect repellent	☐ Yes ☐ No
First Aid Kit	☒ Yes ☐ No	Fire Extinguisher	☐ Yes ☐ No
Safety Shower/Eyewash	☐ Yes ☒ No	Other	☐ Yes ☐ No

Modifications/Exceptions: If using pneumatic/electric power to open drums – Safety glasses are required. If power equipment is used to move drums or you are working near operating equipment hard hats will be worn. Tyvek coverall to protect against natural hazards (e.g., ticks) if working/walking through areas of high grass. Use insect repellants containing at least 10% DEET if necessary. Follow manufacturer's recommendations for proper application and reapplication. If working in areas where snakes are a threat, wear snake chaps to protect against bites. High visibility vest if near active traffic areas.

VIII. **Site Preparation**

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☒
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. **Additional Permits required** (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, SHSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. **Special instructions, precautions:** Suspend site activities in the event of inclement weather. Employ proper lifting techniques. When/where possible use heavy equipment to move and place containers. When placing drums – Place the label and retention ring nut on the outside where it is readily visible. Place 4-drums to a pallet. Maintain a minimum distance of 4-feet between pallet rows. An IDW inventory shall be generated to provide the number of drums, contents, and volumes. This inventory should be provided to the facility contact. Inspect equipment prior to use.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
SITE DECONTAMINATION ACTIVITIES
LOCKHEED MARTIN MIDDLE RIVER COMPLEX
MIDDLE RIVER, MARYLAND

Permit No. _____ Date: _____ Time: From _____ to _____

I. Work limited to the following (description, area, equipment used): Decontamination of sampling equipment (i.e., reusable stainless steel trowels, etc.). Brushes and spray bottles will be used to decontaminate small sampling equipment.

II. Primary Hazards: Chemical exposure, transfer of contamination, inclement weather, noise.

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____ Tetra Tech
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____ Tetra Tech

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety glasses, safety footwear, and nitrile gloves. Impermeable aprons are preferred protection against soiling work clothes when lifting auger flights because of the need to carry close to the body. If it (impermeable apron) does not offer adequate protection, PVC rain suits or PE or PVC coated Tyvek should be employed. Chemical resistant boot covers if excessive liquids are generated or to protected footwear. PID with 10.6eV lamp [Note: This instrument will be used to determine if any volatile contaminants have been removed. It will not be used for purposes of monitoring exposure.

VI.

Chemicals of Concern	Hazard Monitoring / Action Level(s)	Response Measures
Decontamination Fluids	Refer to MSDS	refer to MSDS

Primary Route(s) of Exposure/Hazard: Inhalation and direct contact and ingestion

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☐ Yes ☒ No	Hearing Protection (Plugs/Muffs)	☐ Yes ☒ No
Safety Glasses	☒ Yes ☐ No	Safety belt/harness	☐ Yes ☒ No
Chemical/splash goggles	☐ Yes ☒ No	Radio/Cellular Phone	☐ Yes ☒ No
Splash Shield	☒ Yes ☐ No	Barricades	☐ Yes ☒ No
Splash suits/coveralls	☐ Yes ☒ No	Gloves (Type – Nitrile)	☒ Yes ☐ No
Impermeable apron	☐ Yes ☐ No	Work/rest regimen	☐ Yes ☒ No
Steel toe Work shoes or boots	☒ Yes ☐ No	Chemical Resistant Boot Covers	☐ Yes ☐ No
High Visibility vest	☐ Yes ☐ No	Tape up/use insect repellent	☐ Yes ☐ No
First Aid Kit	☐ Yes ☐ No	Fire Extinguisher	☐ Yes ☐ No
Safety Shower/Eyewash	☐ Yes ☐ No	Other	☐ Yes ☐ No

Modifications/Exceptions: Chemical resistant boot covers if excessive liquids are generated or to protect footwear.

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☒
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, SHSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. Special instructions, precautions: Suspend site activities in the event of inclement weather. Employ proper lifting techniques. When/where possible use heavy equipment to move and place containers.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT FOR
BLOCK E FORMER BUILDING D MULTI-MEDIA SAMPLING / RADIOLOGICAL SURVEYING
LOCKHEED MARTIN MIDDLE RIVER COMPLEX
MIDDLE RIVER, MARYLAND

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): Radiological survey activities and soil sampling at Sites 10 and 14.

II. Required Monitoring Instrument(s): beta/gamma detectors (Micro R meter and frisker such as the Ludlum Model 19)

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____ Tetra Tech
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____ Tetra Tech

SECTION II: General Safety Requirements (To be filled in by permit issuer)

V. Protective equipment required

Level D ☒ Level B ☐
Level C ☐ Level A ☐
Detailed on Reverse

Respiratory equipment required

Full face APR	☐	Escape Pack	☐
Half face APR	☐	SCBA	☐
PAPR	☐	Bottle Trailer	☐
Skid Rig	☐	None	☒

Modifications/Exceptions: None anticipated

VI. Chemicals of Concern / Action Level(s) / Response Measures

Chemicals of Concern	Action Level(s)	Response Measures
Alpha, Beta, Gamma Radiation	Dose rates above 50 μR/hr	Exit work area and evaluate control measures

VII. Additional Safety Equipment/Procedures

Hard-hat	☐ Yes	☒ No	Hearing Protection (Plugs/Muffs)	☐ Yes	☐ No
Safety Glasses	☒ Yes	☐ No	Safety belt/harness	☐ Yes	☒ No
Chemical/splash goggles	☐ Yes	☒ No	Radio	☐ Yes	☒ No
Splash Shield	☐ Yes	☒ No	Barricades	☐ Yes	☒ No
Splash suits/coveralls	☐ Yes	☐ No	Gloves (Type – Surgical Style)	☒ Yes	☐ No
Steel toe Work shoes or boots	☒ Yes	☐ No	Work/rest regimen	☐ Yes	☒ No

Modifications/Exceptions: Gloves required during sampling activities or whenever contact with potentially contaminated media exists.

VIII. Procedure review with permit acceptors

	Yes	NA		Yes	NA
Safety shower/eyewash (Location & Use)	☐	☐	Emergency alarms	☐	☐
Procedure for safe job completion	☐	☐	Evacuation routes	☐	☐
Contractor tools/equipment/PPE inspected	☐	☐	Assembly points	☐	☐

IX Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Cleared and Established	☐	☐	☐
Physical Hazards Barricaded and Isolated	☐	☐	☐
Emergency Equipment Staged	☐	☐	☐

X. Additional Permits required (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, Complete Permit Required or Contact Health Sciences, Pittsburgh Office (412)921-7090

XI. Special Instructions, Precautions: It is anticipated that remedial action activities have resulted in the removal of contaminated soils. This sampling effort is being conducted to evaluate the effectiveness of the remediation effort. However, contact with potentially contaminated media will be minimized through the use of avoidance practices and the use of ppe. Site workers must wash hands and face before performing any hand to mouth activities. Avoid inhalation of any airborne dusts, however, soil sampling activities are unlikely to generate dusts. First aid kits will be available at all remote sampling locations. Avoid insect/animal nesting areas. Sampling areas may be tick, gnat, wasp, and mosquito infested. Maintain a means to contact emergency services (cell phone) and verify they are functional.

Permit Issued by: _____ Permit Accepted by: _____

ATTACHMENT V
EQUIPMENT INSPECTION CHECKLIST
FOR DRILL/DPT RIGS

Equipment Inspection Checklist for Drill/DPT Rigs

Company: _____ **Unit/Serial No#:** _____

Inspection Date: ____/____/____ **Time:** _____:_____ **Equipment Type:** _____
(e.g., Drill Rigs Hollow Stem, Mud Rotary, Direct Push, HDD)

Project Name: _____ **Project No#:** _____

Yes	No	NA	Requirement	Comments
			Emergency Stop Devices	
☐	☐	☐	• Emergency Stop Devices (At points of operation)	
☐	☐	☐	• Have all emergency shut offs identified been communicated to the field crew?	
☐	☐	☐	• Has a person been designated as the Emergency Stop Device Operator?	
			Highway Use	
☐	☐	☐	• Cab, mirrors, safety glass?	
☐	☐	☐	• Turn signals, lights, brake lights, etc. (front/rear) for equipment approved for highway use?	
☐	☐	☐	• Seat Belts?	
☐	☐	☐	• Is the equipment equipped with audible back-up alarms and back-up lights?	
☐	☐	☐	• Horn and gauges	
☐	☐	☐	• Brake condition (dynamic, park, etc.)	
☐	☐	☐	• Tires (Tread) or tracks	
☐	☐	☐	• Windshield wipers	
☐	☐	☐	• Exhaust system	
☐	☐	☐	• Steering (standard and emergency)	
☐	☐	☐	• Wheel Chocks?	
☐	☐	☐	• Are tools and material secured to prevent movement during transport? Especially those within the cab?	
☐	☐	☐	• Are there flammables or solvents or other prohibited substances stored within the cab?	
☐	☐	☐	• Are tools or debris in the cab that may adversely influence operation of the vehicle (in and around brakes, clutch, gas pedals)	

Unit/Serial No#:_____ **Inspection Date:** ____/____/____

Yes	No	NA	Requirement	Comments
			Fluid Levels:	
☐	☐	☐	• Engine oil	
☐	☐	☐	• Transmission fluid	
☐	☐	☐	• Brake fluid	
☐	☐	☐	• Cooling system fluid	
☐	☐	☐	• Hoses and belts	
☐	☐	☐	• Hydraulic oil	
			High Pressure Hydraulic Lines	
☐	☐	☐	• Obvious damage	
☐	☐	☐	• Operator protected from accidental release	
☐	☐	☐	• Coupling devices, connectors, retention cables/pins are in good condition and in place	
			Mast Condition	
☐	☐	☐	• Structural components/tubing	
☐	☐	☐	• Connection points	
☐	☐	☐	• Pins	
☐	☐	☐	• Welds	
☐	☐	☐	• Outriggers	
☐	☐	☐	• Operational	
☐	☐	☐	• Plumb (when raised)	
			Hooks	
☐	☐	☐	• Are the hooks equipped with Safety Latches?	
☐	☐	☐	• Does it appear that the hook is showing signs of wear in excess of 10% original dimension?	
☐	☐	☐	• Is there a bend or twist exceeding 10% from the plane of an unbent hook?	
☐	☐	☐	• Increase in throat opening exceeding 15% from new condition	
☐	☐	☐	• Excessive nicks and/or gouges	
☐	☐	☐	• Clips	
☐	☐	☐	• Number of U-Type (Crosby) Clips (cable size 5/16 – 5/8 = 3 clips minimum) (cable size 3/4 – 1 inch = 4 clips minimum) (cable size 1 1/8 – 1 3/8 inch = 5 clips minimum)	

Unit/Serial No#:_____ **Inspection Date:** ____/____/____

Yes	No	NA	Requirement	Comments
☐	☐	☐	Power cable and/or hoist cable • Reduction in Rope diameter π (5/16 wire rope>1/64 reduction nominal size -replace) (3/8 to 1/2 wire rope>1/32 reduction nominal size-replace) (9/16 to 3/4 wire rope>3/64 reduction nominal size-replace)	
☐	☐	☐	• Number of broken wires (6 randomly broken wires in one rope lay) (3 broken wires in one strand)	
☐	☐	☐	• Number of wire rope wraps left on the Running Drum at nominal use (≥3 required)	
☐	☐	☐	- Lead (primary) sheave is centered on the running drum	
☐	☐	☐	• Lubrication of wire rope (adequate?)	
☐	☐	☐	• Kinks, bends – Flattened to > 50% diameter	
☐	☐	☐	Hemp/Fiber rope (Cathead/Split Spoon Hammer) • Minimum ¾; maximum 1 inch rope diameter (Inspect for physical damage)	
☐	☐	☐	• Rope to hammer is securely fastened	
☐	☐	☐	Safety Guards – • Around rotating apparatus (belts, pulleys, sprockets, spindles, drums, flywheels, chains) all points of operations protected from accidental contact?	
☐	☐	☐	• Hot pipes and surfaces exposed to accidental contact?	
☐	☐	☐	• High pressure lines	
☐	☐	☐	• Nip/pinch points	
☐	☐	☐	Operator Qualifications • Does the operator have proper licensing where applicable, (e.g., CDL)?	
☐	☐	☐	• Does the operator, understand the equipment's operating instructions?	
☐	☐	☐	• Is the operator experienced with this equipment?	
☐	☐	☐	• Is the operator 21 years of age or more?	

Unit/Serial No#:_____ **Inspection Date:** ____/____/____

Yes	No	NA	Requirement	Comments
☐	☐	☐	PPE Required for Drill Rig Exclusion Zone • Hardhat	
☐	☐	☐	• Safety glasses	
☐	☐	☐	• Work gloves	
☐	☐	☐	• Chemical resistant gloves_____	
☐	☐	☐	• Steel toed Work Boots	
☐	☐	☐	• Chemical resistant Boot Covers	
☐	☐	☐	• Apron	
☐	☐	☐	• Coveralls Tyvek, Saranex, cotton)_____	
☐	☐	☐	Other Hazards • Excessive Noise Levels? _____dBA	
☐	☐	☐	• Chemical hazards (Drilling supplies - Sand, bentonite, grout, fuel, etc.)	
☐	☐	☐	- MSDSs available?	
☐	☐	☐	• Will On-site fueling occur	
☐	☐	☐	- Safety cans available?	
☐	☐	☐	- Fire extinguisher (Type/Rating -_____ _)	

Approved for Use ☐ Yes ☐ No ☐ See Comments

_____ _____

Site Health and Safety Officer Operator

ATTACHMENT VI

TETRA TECH SWP 5-6 SAFE WORKING PRACTICES FOR WORKING OVER OR NEAR WATER

The following sections discuss general procedures for working over or near water, underwater work, and cold water procedures.

1.0 SCOPE

This safe work practice (SWP) provides guidelines for all Tetra Tech employees and subcontractors who work over or near bodies of water three (3) or more feet deep or swiftly moving water. This SWP was developed in accordance with the Occupational Safety and Health Administration (OSHA) standard specified in Title 29 of the *Code of Federal Regulations* (CFR), Part 1926.106, "Working Over or Near Water."

2.0 RESPONSIBILITIES

The project manager (PM) is responsible for identifying all health and safety requirements of each project, including all tasks that may involve worker exposure to hazards or working in or near bodies of water. The PM will appoint a site safety coordinator (SSC) to ensure that this SWP is followed in the field. Workers will follow this SWP whenever working near or in any body of water that is over three (3) feet deep or swiftly moving.

3.0 GENERAL PROCEDURES

When working over or near water, the following precautions will be taken:

- All staff and team members must wear a personal flotation device (PFD) when working within 15 feet of a water body. Personnel will be provided with U.S. Coast Guard (USCG)-approved life jackets or work vests. The PFD should be Class III, which will support the head of an unconscious person above water.
- Life jackets and work vests will be inspected before and after each use.
- Ring buoys with at least 90 feet of line shall be provided and readily available for employee rescue operations.
- The distance between ring buoys shall not exceed 200 feet.

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- A USCG-approved life-saving skiff will be available.
- Under no circumstances will team members enter water bodies without protective clothing such as rubber boots or waders.
- At least one person will remain on shore as a look-out.

If a team member falls into the water, a ring buoy, branch, paddle, pole, or other floating object should be extended to the person in the water. Resist the impulse to dive in; employees should not attempt a deep water rescue unless they have been trained in water lifesaving skills. When the person in the water grabs the extended item, the worker should be pulled toward the shore or boat. If the person is unconscious, the PFD, clothing, or hair should be hooked to pull the person toward the shore or boat. Once the person has been safely retrieved, necessary emergency medical procedures should be performed by qualified personnel. If none are necessary, the retrieved team member should change into dry clothing as soon as possible after any necessary personal decontamination.

4.0 UNDERWATER WORK

Underwater work should be performed in accordance with the procedures and guidelines of the Diving Safety Program (Document Control No. 2-15).

5.0 COLD WATER PROCEDURES

When the water temperature is below 45 °F, hypothermia is a serious risk. A person can loose feeling in the extremities within 5 minutes. Additional protective equipment such as cold water immersion suits may be required. All field staff members should be familiar with cold water survival techniques or should receive training from an American Red Cross-certified swimming instructor in cold water survival techniques when site conditions warrant such knowledge. Cold water safe work practices must be addressed in site specific safety documents.

After a person has been rescued from cold water, he or she should change into dry clothes as soon as possible. If the person who has fallen into the water displays hypothermia symptoms, he or she should be treated immediately and taken to a medical facility. Under no circumstances should the hypothermia victim be given hot liquids because this could

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accelerate shock. Drinks no warmer than normal body temperature are acceptable. If symptoms are severe and evacuation to a medical facility cannot be quickly conducted, any wet clothing should be removed, the victim should be placed in blankets or sleeping bags in a sheltered location, and the rescuer should climb into the blankets or sleeping bag with victim to provide additional warmth. The victim should also be treated continuously for shock, elevating feet and monitoring the victim's pulse and breathing rate.

If a team member falls into cold water, he or she should not remove any clothing while in the water because clothing provides additional insulation. Although clothing creates an added drag while swimming, the insulation outweighs the disadvantage of the additional drag. Each team member should carry a wool hat to place on his or her head in case he or she falls into the water. A wool hat, even when wet, provides good insulation for the head, where a large amount of body heat is lost.

Disclaimer: This safe work practice (SWP) is the property of Tetra Tech, Inc. (Tetra Tech). Any reuse of the SWP without Tetra Tech's permission is at the sole risk of the user. The user will hold harmless Tetra Tech for any damages that result from unauthorized reuse of this SWP. Authorized users are responsible for obtaining proper training and qualification from their employer before performing operations described in this SWP.

Revision Date	Document Authorizer	Revision Details
10/1/2008	Chris McClain	Update from 1998 format

ATTACHMENT VII

BOAT SAFETY CHECKLIST

TETRA TECH, INC.

SAFE BOATING CHECKLIST

Owner/Operator Name:_____

Registration Number_____

Location _____ County: _____State: _____HIN:_____

Length of Boat: <16 ❑ 16-25 ❑ 26-39 ❑ 40-65 ❑ > 65 ❑

Area of Operations: Inland ❑ Coastal ❑

Powered by: Gas ❑ Diesel ❑ Sail ❑ Other ❑

Type: PWC ❑ Open ❑ Cabin ❑ Other ❑

VESSEL SAFETY CHECK REQUIREMENTS					**RECOMMENDED AND DISCUSSION ITEMS**			
Item	Yes	No	NA		*Item*	Yes	No	NA
1. Display of Numbers					**(While encouraged, items below are not requirements)**			
2. Registration / Documentation					**I.** Marine Radio			
3. Personal Flotation Devices (PFD)					**II.** Dewatering Device & Backup			
4. Visual Distress Signals (VDS)					**III.** Mounted Fire Extinguishers			
5. Fire Extinguishers					**IV.** Anchor & Line for Area			
6. Ventilation					**V.** First Aid and PIW Kits (**over)			
7. Backfire Flame Control					**VI.** Inland Visual Distress Signals			
8. Sound Producing Devices / Bell					**VII.** Capacity / Cert. of Compliance			
9. Navigation Lights					**VIII.** Discussion Items: (as applies)			
10. Pollution Placard					a. Accident reporting / owner responsibility			
11. MARPOL Trash Placard					b. Offshore operations			
12. Marine Sanitation Devices					c. Nautical charts / navigation aids			
13. Navigation Rules					d. Survival tips / first Aid			
14. State and/ or Local Requirements					e. Fueling / fuel management			
15. Overall Vessel Condition: (as applies)					f. Float plan / weather & sea conditions			
a. Deck free of hazards / clean bilge					g. Insurance considerations			
b. Electrical / fuel systems					h. Boating check list			
c. Galley / heating systems					i. Safe boating classes			

This checklist has been modified for use from the United States Coast Guard Auxiliary Vessel Safety Check (VSC) Program. USCG AUX. Form 204 (7-2000)

Explanation of Required Items

- ❑ **1. NUMBERING:** The boat's registration number must be permanently attached to each side of the forward half of the boat. Characters must be plain, vertical, block style, not less than three (3) inches high, and in a color contrasting with the background. A space or hyphen must separate the letters from the numbers.

- ❑ **2. REGISTRATION / DOCUMENTATION:** Registration or Documentation papers must be on board and available. Documentation numbers must be permanently marked on a visible part of the interior structure. The documented boat's name and hailing port must be displayed on the exterior hull in letters not less than 4 inches in height.

- ❑ **3. PERSONAL FLOTATION DEVICES (PFDs):** Acceptable PFDs (also known as Life Jackets) must be U.S. Coast Guard approved and in good, serviceable condition. A wearable PFD of suitable size is required for the each person on the boat. Wearable PFDs shall be *"readily accessible*." Boats 16 Feet or longer, must also have one Type IV (throwable) device, which shall be " *immediately available*." PFDs shall NOT be stored in unopened plastic packaging.

- ❑ **4. VISUAL DISTRESS SIGNALS:** Boats 16 feet and over are required to carry a minimum of either:
  1) three day and three night pyrotechnic devices
  2) one day non-pyrotechnic device (flag) and one night non-pyrotechnic device (auto SOS light)
  3) a combination of 1) and 2).

  Boats less than 16 feet need only carry night visual distress signals when operating from sunset to sunrise. It is recommended, but not required, that boats operating on inland waters should have some means of making a suitable day and night distress signal. The number and type of signals is best judged by considering conditions under which the boat will be operating.

- ❑ **5. FIRE EXTINGUISHERS:** Fire extinguishers are required if one of the following conditions exists:
  1) Inboard engine(s)
  2) Double bottom hulls not completely sealed or not completely filled with flotation materials
  3) Closed living space
  4) Closed stowage compartments that contain flammable materials or
  5) Permanently installed fuel tanks. Boats less than 26 feet, and propelled by outboard motors are NOT required to have fire extinguishers unless one or more of the conditions (2-5) listed above applies.

Coast Guard Classification of Fire Extinguishers		
Classification (type size)	**B-I**	**B-II**
Foam (minimum gallons)	1.25	2.5
Carbon Dioxide (minimum lbs.)	4	15
Dry Chemical (minimum lbs.)	2	10
Halon (minimum lbs.)	2.5	10

NOTE: Fire extinguishers must be readily accessible and verified as serviceable.

Minimum Number of Extinguishers Required		
Boat Length	*No Fixed System*	*With Fixed System*
Less than 26'	one B-1	0
26' to less than 40'	two B-1 or one B-2	one B-1
40' to 65'	three B-1 or one B-1 & one B-2	two B-1 or one B-2

- ❑ **6. VENTILATION:** Boats with gasoline engines in closed compartments, built after 1 August 1980 must have a powered ventilation system. Those built prior to that date must have natural or powered ventilation. Boats with closed fuel tank compartments built after 1 August 1978 must

meet requirements by displaying a "certificate of compliance." Boats built before that date must have either natural or powered ventilation in the fuel tank compartment.

- ❑ **7. BACKFIRE FLAME ARRESTER:** Gasoline powered inboard/outboard or inboard motor boats must be equipped with an approved backfire flame control device.

- ❑ **8. SOUND PRODUCING DEVICES:** To comply with Navigation Rules and for distress signaling purposes boats must carry a sound producing device (whistle, horn, siren, etc.) capable of a 4-second blast audible for ½ mile. Boats larger than 39.4 ft. are also required to have a bell (see Navigation Rules.)

- ❑ **9. NAVIGATION LIGHTS: B**oats must be able to display navigation lights between sunset and sunrise and in conditions of reduced visibility. Boats 16 feet or more in length must have properly installed, working navigation lights and an all-around anchor light capable of being lit independently from the red/green/white "running" lights.

- ❑ **10. POLLUTION PLACARD:** Boats 26 feet and over with a machinery compartment must display an oily waste "pollution" placard.

- ❑ **11. MARPOL TRASH PLACARD:** Boats 26 feet and over in length, operating in U.S. navigable waters, must display a "MARPOL" trash placard. Oceangoing boats 40 feet and over must also have a written trash disposal plan available onboard.

- ❑ **12. MARINE SANITATION DEVICE:** Any installed toilet must be a Coast Guard approved device. Overboard discharge outlets must be capable of being sealed.

- ❑ **13. NAVIGATION RULES:** Boats 39.4 feet and over must have on board a current copy of the Navigation Rules.

- ❑ **14. STATE AND LOCAL REQUIREMENTS:** A boat must meet the requirements of the state in which it is being examined.

- ❑ **15. OVERALL BOAT CONDITION: As it applies to this Vessel. Including, but not limited to:**

    a. **Deck free of hazards and clean bilge -** The boat must be free from fire hazards, in good overall condition, with bilges reasonably clean and visible hull structure generally sound. The use of automobile parts on boat engines is not acceptable. The engine horsepower must not exceed that shown on the capacity plate.

    b. **Electrical and Fuel Systems:** The electrical system must be protected by fuses or manual reset circuit breakers. Switches and fuse panels must be protected from rain or water spray. Wiring must be in good condition, properly installed and with no exposed areas or deteriorated insulation. Batteries must be secured and terminals covered to prevent accidental arcing. If installed, self-circling or kill switch mechanism must be in proper working order.

    c. **Fuel Systems -** Portable fuel tanks (normally 7 gallon capacity or less) must be constructed of non-breakable material and free of corrosion and leaks. Vents must be capable of being closed. The tank must be secured and have a vapor-tight, leak-proof cap. Each permanent fuel tank must be properly ventilated.

    d. **Galley and Heating Systems -** System and fuel tanks must be properly secured with no flammable materials nearby.

ATTACHMENT VIII

TETRA TECH SWP 5-15 HEAT STRESS AND 5-26 PREVENTION OF SUN EXPOSURE

This safe work practice (SWP) describes situations where heat stress is likely to occur and provides procedures for the prevention and treatment of heat-related injuries and illnesses. Wearing personal protective equipment (PPE), especially during warm weather, puts employees at considerable risk of developing heat-related illness. Health effects from heat stress may range from transient heat fatigue or rashes to serious illness or death.

Many factors contribute to heat stress, including PPE, ambient temperature and humidity, workload, and the physical condition of the employee, as well as predisposing medical conditions. However, the primary factors are elevated ambient temperatures in combination with fluid loss. Because heat stress is one of the more common health concerns that may be encountered during field activities, employees must be familiar with the signs, symptoms, and various treatment methods of each form of heat stress. Heat stroke is the most serious heat-related illness—it is a threat to life and has a 20 percent mortality rate. Direct exposure to sun, poor air circulation, poor physical condition, and advanced age directly affect the tendency to heat stroke. Table 1 lists the most serious heat conditions, their causes, signs and symptoms, and treatment.

Training is an important component of heat stress prevention. Employees are instructed to recognize and treat heat-related illnesses during 8-hour health and safety refresher and first aid training courses. When working in hot environments, specific steps should be taken to lessen the chances of heat-related illnesses. These include the following:

- Ensuring that all employees drink plenty of fluids (Gatorade® or its equivalent)
- Ensuring that frequent breaks are scheduled so overheating does not occur
- Revising work schedules, when necessary, to take advantage of the cooler parts of the day (such as working from 5:00 a.m. to 11:00 a.m. and 6:00 p.m. to nightfall).

When PPE must be worn (especially Levels A and B), suggested guidelines relating to ambient temperature and maximum wearing time per excursion are as shown in Table 2.

TABLE 1
HEAT STRESS CONDITIONS

Condition	Causes	Signs and Symptoms	Treatment
Heat cramps	Fluid loss and electrolyte imbalance from dehydration	• Painful muscle cramps, especially in legs and abdomen • Faintness • Profuse perspiration	• Move affected worker to cool location • Provide sips of liquid such as Gatorade® • Stretch cramped muscles • Transport affected worker to hospital if condition worsens
Heat Exhaustion	Blood transport to skin to dissipate excessive body heat, resulting in blood pooling in the skin with inadequate return to the heart	• Weak pulse • Rapid and shallow breathing • General weakness • Pale, clammy skin • Profuse perspiration • Dizziness • Unconsciousness	• Move affected worker to cool area • Remove as much clothing as possible • Provide sips of cool liquid or Gatorade® (only if conscious) • Fan the person but do not overcool or chill • Treat for shock • Transport to hospital if condition worsens
Heat Stroke	Life threatening condition from profound disturbance of body's heat-regulating mechanism	• Dry, hot, and flushed skin • Constricted pupils • Early loss of consciousness • Rapid pulse • Deep breathing at first, and then shallow breathing • Muscle twitching leading to convulsions • Body temperature reaching 105 or 106 °F or higher	• Immediately transport victim to medical facility • Move victim to cool area • Remove as much clothing as possible • Reduce body heat promptly by dousing with water or wrapping in wet cloth • Place ice packs under arms, around neck, at ankles, and wherever blood vessels are close to skin surface • Protect patient during convulsions

TABLE 2
SUGGESTED GUIDELINES WHEN WEARING PPE

Ambient Temperature	Maximum PPE Wearing Time per Excursion
Above 90 °F	15 minutes
85 to 90 °F	30 minutes
80 to 85 °F	60 minutes
70 to 80 °F	90 minutes
60 to 70 °F	120 minutes
50 to 60 °F	180 minutes

Source: National Institute for Occupational Safety and Health (NIOSH). 1985. Memorandum Regarding Recommended Personal Protective Equipment Wearing Times at Different Temperatures. From Austin Henschel. To Sheldon Rabinovitz. June 20.

To monitor the level of an employee's heat stress, the following should be measured:

- Heart Rate: Count the radial (wrist) pulse during a 30-second period as early as possible in the rest period; if heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same.

  If the heart rate still exceeds 110 beats per minute at the next period, shorten the following work cycle by one-third.

- Oral Temperature: Use a clinical thermometer (3 minutes under the tongue) to measure the oral temperature at the end of the work period. If oral temperature exceeds 99.6 °F (37.6 °C), shorten the next work cycle by one-third without changing the rest period. If oral temperature still exceeds 99.6 °F at the beginning of the next rest period, shorten the following work cycle by one-third. Do not permit a worker to wear impermeable PPE when his or her oral temperature exceeds 100.6 °F (38.1 °C).

Disclaimer: This safe work practice (SWP) is the property of Tetra Tech, Inc. (Tetra Tech). Any reuse of the SWP without Tetra Tech's permission is at the sole risk of the user. The user will hold harmless Tetra Tech for any damages that result from unauthorized reuse of this SWP. Authorized users are responsible for obtaining proper training and qualification from their employer before performing operations described in this SWP.

Revision Date	Document Authorizer	Revision Details
10/1/2008	Chris McClain	Update from 1998 format

The online version of this document supersedes all other versions. Paper copies of this document are uncontrolled.
The controlled version of this document can be found on the Tetra Tech Intranet.

ATTACHMENT IX
TETRA TECH DECONTAMINATION OF FIELD EQUIPMENT AND WASTE HANDLING STANDARD OPERATING PROCEDURE

TETRA TECH NUS, INC.	STANDARD OPERATING PROCEDURES	Number SA-7.1	Page 1 of 8
		Effective Date 09/03	Revision 3
		Applicability Tetra Tech NUS, Inc.	
		Prepared Earth Sciences Department	
Subject DECONTAMINATION OF FIELD EQUIPMENT		Approved D. Senovich	

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1.0 PURPOSE

Decontamination is the process of removing and/or neutralizing site contaminants that have contacted and/or accumulated on equipment. The objective/purpose of this SOP is intended to protect site personnel, general public, and the sample integrity through the prevention of cross contamination onto unaffected persons or areas. It is further intended through this procedure to provide guidelines regarding the appropriate procedures to be followed when decontaminating drilling equipment, monitoring well materials, chemical sampling equipment and field analytical equipment.

2.0 SCOPE

This procedure applies to all equipment including drilling equipment, heavy equipment, monitoring well materials, as well as chemical sampling and field analytical equipment decontamination that may be used to provide access/acquire environmental samples. Where technologically and economically feasible, single use sealed disposable equipment will be employed to minimize the potential for cross contamination. This procedure also provides general reference information on the control of contaminated materials.

3.0 GLOSSARY

Acid - For decontamination of equipment when sampling for trace levels of inorganics, a 10% solution of nitric acid in deionized water should be used. Due to the leaching ability of nitric acid, it should not be used on stainless steel.

Alconox/Liquinox - A brand of phosphate-free laboratory-grade detergent.

Decontamination Solution - Is a solution selected/identified within the Health and Safety Plan or Project-Specific Quality Assurance Plan. The solution is selected and employed as directed by the project chemist/health and safety professional.

Deionized Water (DI) - Deionized water is tap water that has been treated by passing through a standard deionizing resin column. This water may also pass through additional filtering media to attain various levels of analyte-free status. The DI water should meet CAP and NCCLS specifications for reagent grade, Type I water.

Potable Water - Tap water used from any municipal water treatment system. Use of an untreated potable water supply is not an acceptable substitute for tap water.

Pressure Washing - Employs high pressure pumps and nozzle configuration to create a high pressure spray of potable water. High pressure spray is employed to remove solids.

Solvent - The solvent of choice is pesticide-grade Isopropanol. Use of other solvents (methanol, acetone, pesticide-grade hexane, or petroleum ether) may be required for particular projects or for a particular purpose (e.g. for the removal of concentrated waste) and must be justified in the project planning documents. As an example, it may be necessary to use hexane when analyzing for trace levels of pesticides, PCBs, or fuels. In addition, because many of these solvents are not miscible in water, the equipment should be air dried prior to use. Solvents should not be used on PVC equipment or well construction materials.

Steam Pressure Washing - This method employs a high pressure spray of heated potable water. This method through the application of heat provides for the removal of various organic/inorganic compounds.

4.0 RESPONSIBILITIES

Project Manager - Responsible for ensuring that all field activities are conducted in accordance with approved project plan(s) requirements.

Field Operations Leader (FOL) - Responsible for the onsite verification that all field activities are performed in compliance with approved Standards Operating Procedures or as otherwise dictated by the approved project plan(s).

Site Health and Safety Officer (SHSO) - The SHSO exercises shared responsibility with the FOL concerning decontamination effectiveness. All equipment arriving on-site (as part of the equipment inspection), leaving the site, moving between locations are required to go through a decontamination evaluation. This is accomplished through visual examination and/or instrument screening to determine the effectiveness of the decontamination process. Failure to meet these objectives are sufficient to restrict equipment from entering the site/exiting the site/ or moving to a new location on the site until the objectives are successfully completed.

5.0 PROCEDURES

The process of decontamination is accomplished through the removal of contaminants, neutralization of contaminants, or the isolation of contaminants. In order to accomplish this activity a level of preparation is required. This includes site preparation, equipment selection, and evaluation of the process. Site contaminant types, concentrations, media types, are primary drivers in the selection of the types of decontamination as well as where it will be conducted. For purposes of this SOP discussion will be provided concerning general environmental investigation procedures.

The decontamination processes are typically employed at:

- Temporary Decontamination Pads/Facilities
- Sample Locations
- Centralized Decontamination Pad/Facilities
- Combination of some or all of the above

The following discussion represents recommended site preparation in support of the decontamination process.

5.1 Decontamination Design/Constructions Considerations

5.1.1 Temporary Decontamination Pads

Temporary decontamination pads are constructed at satellite locations in support of temporary work sites. These structures are generally constructed to support the decontamination of heavy equipment such as drill rigs and earth moving equipment but can be employed for smaller articles.

The purpose of the decontamination pad is to contain wash waters and potentially contaminated soils generated during decontamination procedures. Therefore, construction of these pads should take into account the following considerations

- Site Location – The site selected should be within a reasonable distance from the work site but should avoid:

  - Pedestrian/Vehicle thoroughfares
  - Areas where control/custody cannot be maintained
  - Areas where a potential releases may be compounded through access to storm water transport systems, streams or other potentially sensitive areas.
  - Areas potentially contaminated.

- Pad – The pad should be constructed to provide the following characteristics

  - Size – The size of the pad should be sufficient to accept the equipment to be decontaminated as well as permitting free movement around the equipment by the personnel conducting the decontamination.

  - Slope – An adequate slope will be constructed to permit the collection of the water and potentially contaminated soils within a trough or sump constructed at one end. The collection point for wash waters should be of adequate distance that the decontamination workers do not have to walk through the wash waters while completing their tasks.

  - Sidewalls – The sidewalls should be a minimum of 6-inches in height to provide adequate containment for wash waters and soils. If splash represents a potential problem, splash guards should be constructed to control overspray. Sidewalls maybe constructed of wood, inflatables, sand bags, etc. to permit containment.

  - Liner – Depending on the types of equipment and the decontamination method the liner should be of sufficient thickness to provide a puncture resistant barrier between the decontamination operation and the unprotected environment. Care should be taken to examine the surface area prior to placing the liner to remove sharp articles (sticks, stones, debris) that could puncture the liner. Liners are intended to form an impermeable barrier. The thickness may vary from a minimum recommended thickness of 10 mil to 30 mil. Achieving the desired thickness maybe achieved through layering lighter constructed materials. It should be noted that various materials (rubber, polyethylene sheeting) become slippery when wet. To minimize this potential hazard associated with a sloped liner a light coating of sand maybe applied to provide traction as necessary.

  - Wash/drying Racks – Auger flights, drill/drive rods require racks positioned off of the ground to permit these articles to be washed, drained, and dried while secured from falling during this process. A minimum ground clearance of 2-feet is recommended.

  - Maintenance – The work area should be periodically cleared of standing water, soils, and debris. This action will aid in eliminating slip, trip, and fall hazards. In addition, these articles will reduce potential backsplash and cross contamination. Hoses should be gathered when not in use to eliminate potential tripping hazards.

5.1.2 Decontamination Activities at Drill Rigs/DPT Units

During subsurface sampling activities including drilling and direct push activities decontamination of drive rods, Macro Core Samplers, split spoons, etc. are typically conducted at an area adjacent to the operation. Decontamination is generally accomplished using a soap/water wash and rinse utilizing buckets and brushes. This area requires sufficient preparation to accomplish the decontamination objectives.

Buckets shall be placed within mortar tubs or similar secondary containment tubs to prevent splash and spills from reaching unprotected media. Drying racks will be employed as directed for temporary pads to permit parts to dry and be evaluated prior to use/re-use.

5.1.3 Decontamination Activities at Remote Sample Locations

When sampling at remote locations sampling devices such as trowels, pumps/tubing should be evacuated of potentially contaminated media to the extent possible. This equipment should be wrapped in plastic for transport to the temporary/centralized decontamination location for final cleaning and disposition.

5.2 Equipment Decontamination Procedures

The following represents procedures to be employed for the decontamination of equipment that may have contacted and/or accumulated contamination through site investigation activities.

5.2.1 Monitoring Well Sampling Equipment

5.2.1.1 Groundwater sampling pumps – This includes pumps inserted into the monitoring well such as Bladder pumps, Whale pumps, Redi-Flo, reusable bailers, etc.

1) Evacuate to the extent possible, any purge water within the pump.

2) Scrub using soap and water and/or steam clean the outside of the pump and tubing, where applicable.

3) Insert the pump and tubing into a clean container of soapy water. Pump a sufficient amount of soapy water through the pump to flush any residual purge water. Once flushed, circulate soapy water through the pump to ensure the internal components are thoroughly flushed.

4) Remove the pump and tubing from the container, rinse external components using tap water. Insert the pump and tubing into a clean container of tap water. Pump a sufficient amount of tap water through the pump to evacuate all of the soapy water (until clear).

5) Rinse equipment with pesticide grade isopropanol

6) Repeat item #4 using deionized water through the hose to flush out the tap water and solvent residue as applicable*.

7) Drain residual deionized water to the extent possible, allow components to air dry.

8) Wrap pump in aluminum foil or a clear clean plastic bag for storage.

5.2.1.2 Electronic Water Level Indicators/Sounders/Tapes

During water level measurements, rinsing with the extracted tape and probe with deionized water and wiping the surface of the extracted tape is acceptable. However, periodic full decontamination should be conducted as indicated below.

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* - The solvent should be employed when samples contain oil, grease, PAHs, PCBs, and other hard to remove materials. If these are not of primary concern, the solvent step may be omitted. In addition, do not rinse PE, PVC, and associated tubing with solvents.

1) Wash with soap and water
2) Rinse with tap water
3) Rinse with deionized water

Note: In situations where oil, grease, free product, other hard to remove materials are encountered probes and exposed tapes should be washed in hot soapy water.

5.2.1.3 Miscellaneous Equipment

Miscellaneous equipment including analytical equipment (water quality testing equipment) should be cleaned per manufacturer's instructions. This generally includes wiping down the sensor housing and rinsing with tap and deionized water.

Coolers/Shipping Containers employed to ship samples are received from the lab in a variety of conditions from marginal to extremely poor. Coolers should be evaluated prior to use for

- Structural integrity – Coolers missing handles or having breaks within the outer housing should be removed and not used. Notify the laboratory that the risk of shipping samples will not be attempted and request a replacement unit.

- Cleanliness – As per protocol only volatile organic samples are accompanied by a trip blank. If a cooler's cleanliness is in question (visibly dirty/stained) or associated with noticeable odors it should be decontaminated prior to use.

  1) Wash with soap and water
  2) Rinse with tap water
  3) Dry

If these measures fail to clean the cooler to an acceptable level, remove the unit from use as a shipping container and notify the laboratory to provide a replacement unit.

5.2.2 Down-Hole Drilling Equipment

This includes any portion of the drill rig that is over the borehole including auger flights, drill stems, rods, and associated tooling that would extend over the borehole. This procedure is to be employed prior to initiating the drilling/sampling activity, then between locations.

1) Remove all soils to the extent possible using shovels, scrapers, etc. to remove loose soils.
2) Through a combination of scrubbing using soap and water and/or steam cleaning remove visible dirt/soils.
3) Rinse with tap water.
4) Rinse equipment with pesticide grade isopropanol
5) To the extent possible allow components to air dry.
6) Wrap or cover equipment in clear plastic until it is time to be used.

5.2.3 Soil/Sediment Sampling Equipment

This consists of soil sampling equipment including but not limited to hand augers, stainless steel trowels/spoons, bowls, dredges, scoops, split spoons, Macro Core samplers, etc.

1) Remove all soils to the extent possible.

2) Through a combination of scrubbing using soap and water and/or steam cleaning remove visible dirt/soils.

3) Rinse with tap water.

4) Rinse equipment with pesticide grade isopropanol

5) Rinse with deionized water

6) To the extent possible allow components to air dry.

7) If the device is to be used immediately, screen with a PID/FID to insure all solvents (if they were used) and trace contaminants have been adequately removed.

8) Once these devices have been dried wrap in aluminum foil for storage until it is time to be used.

5.3 Contact Waste/Materials

During the course of field investigations disposable/single use equipment becomes contaminated. These items include tubing, trowels, PPE (gloves, overboots, splash suits, etc.) broken sample containers.

With the exception of the broken glass, single use articles should be cleaned (washed and rinsed) of visible materials and disposed of as normal refuse. The exception to this rule is that extremely soiled materials that cannot be cleaned should be containerized for disposal in accordance with applicable federal state and local regulations.

5.3.1 Decontamination Solutions

All waste decontamination solutions and rinses must be assumed to contain the hazardous chemicals associated with the site unless there are analytical or other data to the contrary. The waste solution volumes could vary from a few gallons to several hundred gallons in cases where large equipment required cleaning.

Containerized waste rinse solutions are best stored in 55-gallon drums (or equivalent containers) that can be sealed until ultimate disposal at an approved facility. These containers must be appropriately labeled.

5.4 Decontamination Evaluation

Determining the effectiveness of the decontamination process will be accomplished in the following manner

- Visual Evaluation – A visual evaluation will be conducted to insure the removal of particulate matter. This will be done to insure that the washing/rinsing process is working as intended.

- Instrument Screening – A PID and/or an FID should be used to evaluate the presence of the contaminants or solvents used in the cleaning process. The air intake of the instrument should be passed over the article to be evaluated. A positive detection requires a repeat the decontamination process. It should be noted that the instrument scan is only viable if the contaminants are detectable within the instruments capabilities.

- Rinsate Blanks – It is recommended that Rinsate samples be collected to

  - Evaluate the decontamination procedure representing different equipment applications (pumps versus drilling equipment) and different decontamination applications.

  - Single use disposable equipment – The number of samples should represent different types of equipment as well as different Lot Numbers of single use articles.

The collection and the frequency of collection of rinsate samples are as follows:

- Per decontamination method
- Per disposable article/Batch number of disposable articles

It is recommended that an initial rinsate sample be collected early in the project to ensure that the decontamination process is functioning properly and in an effort to avoid using a contaminated batch of single use articles. It is recommended that a follow up sample be collected during the execution of the project to insure those conditions do not change. Lastly, rinsate samples collection may be driven by types of and/or contaminant levels. Hard to remove contaminants, oils/greases, some PAHs/PCBs, etc. may also support the collection of additional rinsates due to the obvious challenges to the decontamination process. This is a field consideration to be determined by the FOL.

ATTACHMENT X

OSHA POSTER

Job Safety and Health

It's the law!

OSHA

Occupational Safety and Health Administration
U.S. Department of Labor

EMPLOYEES:

- You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.
- You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in that inspection.
- You can file a complaint with OSHA within 30 days of retaliation or discrimination by your employer for making safety and health complaints or for exercising your rights under the *OSH Act*.
- You have the right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violations.
- Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.
- You have the right to copies of your medical records and records of your exposures to toxic and harmful substances or conditions.
- Your employer must post this notice in your workplace.
- You must comply with all occupational safety and health standards issued under the *OSH Act* that apply to your own actions and conduct on the job.

EMPLOYERS:

- You must furnish your employees a place of employment free from recognized hazards.
- You must comply with the occupational safety and health standards issued under the *OSH Act*.

This free poster available from OSHA –
The Best Resource for Safety and Health

Free assistance in identifying and correcting hazards or complying with standards is available to employers, without citation or penalty, through OSHA-supported consultation programs in each state.

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