Blocks D, F, G, and H 2010 Data-Gap Soil-Sampling Work Plan
Lockheed Martin Middle River Complex
2323 Eastern Boulevard
Middle River, Maryland

Prepared for:

Lockheed Martin Corporation

Prepared by:

Tetra Tech, Inc.

September 14, 2010

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ACRONYMS

BaPEq	benzo(a)pyrene equivalent
bgs	below ground surface
COC	chain-of-custody
cPAH	carcinogenic polyaromatic-hydrocarbon
DPT	direct-push technology
DRO	diesel-range organics
EESH	energy, environment, safety, and health
EGIS	"Environmental Geographic Information System"
GPR	ground-penetrating radar
GPS	global positioning system
GRO	gasoline-range organics
HASP	*Health and Safety Plan*
IDW	investigation-derived waste
Lockheed Martin	Lockheed Martin Corporation
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
MRC	Middle River Complex
PAH	polyaromatic-hydrocarbon
PCBs	polychlorinated biphenyls
PID	photoionization detector
PPE	personal protective equipment
RAP	*Response Action Plan*
SAP	*Sampling and Analysis Plan*
SVOC	semivolatile organic compounds
TCLP	"Toxicity Characteristic Leaching Procedure"
Tetra Tech	Tetra Tech Inc.
TPH	total petroleum hydrocarbon
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 the following work plan for conducting data-gap soil sampling at tax Blocks D, F, G, and H at the Lockheed Martin Middle River Complex (MRC) in Middle River, Maryland (see Figure 1-1).

1.1 BACKGROUND

Soil characterization sampling to date has consisted of collecting soil samples from borings advanced to varying depths (i.e., variable vertical limits) at locations randomly distributed throughout the areas of concern. Contaminated soils at Blocks B, D, F, G, and H have been characterized by one or more constituents exceeding the cleanup goals, as defined in the previous sampling and analysis plans (SAPs). Supplemental soil-sampling in fall 2009 further delineated the horizontal and vertical limits of contaminated soil to be removed from Blocks B, D, F, G, and H. Characterization of Block B was deemed complete after the 2009 final delineation sampling event and it will not be sampled during this event.

Historical soil sampling results are summarized below:

- **Block D** — Contaminated soils at Block D contain mercury at concentrations greater than the cleanup goal of 1 milligram per kilogram (mg/kg) and carcinogenic polyaromatic-hydrocarbons (cPAHs) in excess of 150 microgram per kilogram (µg/kg) (benzo[a]pyrene equivalent [BaPEq]) (see Figure 1-2)

- **Block F** — Contaminated soils at Block F contain mercury at concentrations greater than the cleanup goal of 1 mg/kg, cPAHs in excess of 150 µg/kg (BaPEq), and polychlorinated biphenyls (PCBs) in excess of 320 µg/kg (Aroclor-1260) (see Figures 1-3 and 1-4)

- **Block G** — Contaminated soils at Block G contain arsenic at concentrations in excess of 12 mg/kg, total petroleum hydrocarbon (TPH)-gasoline-range organics (GRO) in excess of 230 µg/kg, and cPAHs in excess of 150 µg/kg (BaPEq) (see Figures 1-5 and 1-6)

- **Block H** — Contaminated soils at Block H contain mercury at concentrations greater than the cleanup goal of 1 mg/kg and cPAHs in excess of 150 µg/kg (BaPEq) (Figure 1-7)

Additional delineation sampling is necessary to more accurately fill data gaps and determine the extent of soil-removal areas in Blocks D, F, G, and H before the response action can be performed in these locations. In addition to the data gaps defined above, the southeast portion of Block D (hereafter referred to as the "panhandle") will have a planned sampling density of one sample per 50-foot × 50-foot grid.

1.2 OBJECTIVE

The objective of the data gap soil sampling described in this report is to define (by collecting soil samples at specific locations to fill identified data gaps) with greater accuracy the vertical and lateral boundaries of soil that must be excavated. The general principle for the data gap soil sampling is consistent with the protocols for post excavation verification sampling. Removal of contaminated soil is necessary to receive a "Certificate of Completion" under any future land use and restriction category based on potential residential development of these tax blocks.

The proposed response action is to remove soil with concentrations of contaminants of concern greater than the cleanup goals to the extent necessary to allow restricted residential or industrial use of Blocks D, F, G, and H. The data gap soil sampling aims to reduce the uncertainty of the excavation limits in each block before remediation begins. This sampling event is not intended to replace post excavation verification sampling, which will be completed as specified in each response action plan (RAP).

This work plan is organized as follows:

Section 2 — Investigation Approach and Methodology: Presents the technical approach to groundwater monitoring and a description of the field methodology to be used

Section 3 — Tax Block Methodology: Describes the sampling methodology to be used in each block

Section 4 — Project Deliverables: Describes the final report summarizing the findings of the investigation program

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

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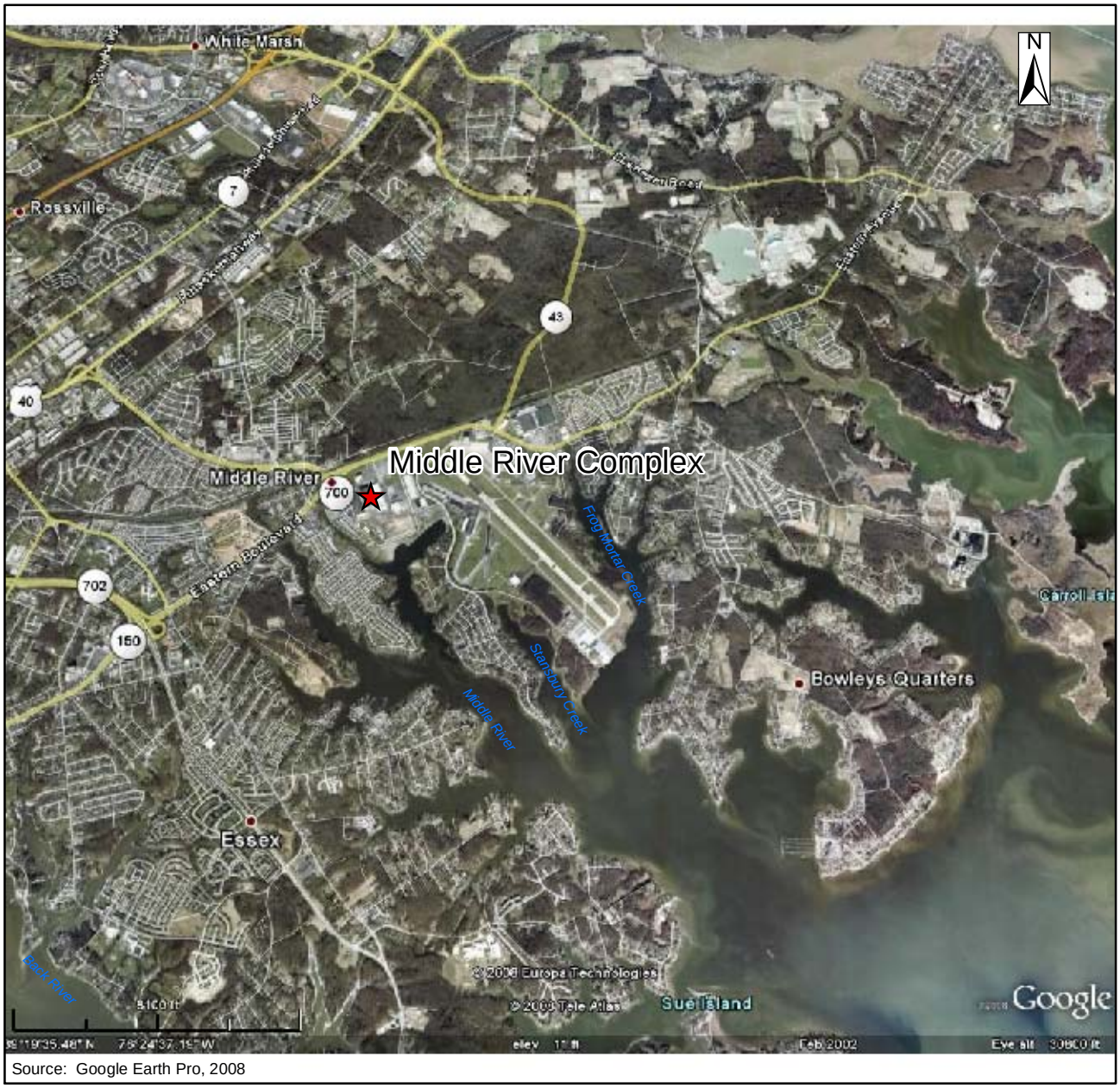

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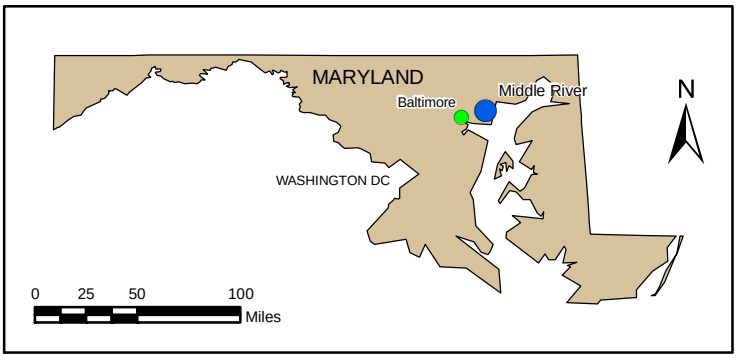

Figure 1-1

Middle River Complex Location Map

Lockheed Martin Middle River Complex
Middle River, Maryland

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12/15/08	JF

Tetra Tech, Inc.

Map Document: (K:\GProject\middle_river\Maps\GPS SOIL BORING LOC\Final RAP figures\Final RAP_Comments\Block D ProBorings 3D 03 04 2010 Fig 4-1.mxd) 7/23/2010 -- 3:47:46 PM

DARK HEAD COVE ROAD

PARKING LOT NO. 6

WILSON POINT ROAD

MARTIN STATE AIRPORT

DARK HEAD COVE

BLOCK 'D'

BLOCK 'E'

BLOCK 'F'

SB-61REA
BaPEq 153 (1')
BaPEq 168 (11')

SB-61RE
BaPEq 346 (10')
BaPEq 182 (13')
BaPEq 579 (14')

SB-242

SB-61REB
BaPEq 256 (9')
BaPEq 154 (11')
BaPEq 1078 (13')

SB-61RED
BaPEq 429 (13')

SB-60RE
BaPEq 22517 (1')
BaPEq 2034 (5')

SB-60REA
BaPEq 17997 (1')
BaPEq 361 (3')

SB-60RED
BaPEq 9774 (1')
BaPEq 203 (3')

SB-60REB

SB-32
MERCURY 1.7 (5')
BaPEq 237 (5')

SB-32A

SB-61REC
BaPEq 386 (1')
BaPEq 656 (9')

SB-66RE
BaPEq 1461 (2')

SB-66REA

SB-60REC
BaPEq 646 (1')

SB-66RED

SB-66REB

SB-66REC

SB-335
SB-334
SB-331
SB-244
SB-245
SB-330
SB-329
SB-332
SB-333
SB-246
SB-327
SB-328

SB-328-0203
BaPEq 170

SB-321-0203
BaPEq 940

SB-241
SB-323
SB-324
SB-322
SB-319
SB-320
SB-321
SB-318
SB-325
SB-326

SB-59
BaPEq 870 (5')
BaPEq 810 (10')
BaPEq 980 (15')

SB-240RED
BaPEq 5759 (5')
BaPEq 809 (9')
BaPEq 291 (11')
BaPEq 622 (13')

SB-240REA
BaPEq 372 (1')
BaPEq 326 (5')

SB-240REB
BaPEq 13461 (1')

SB-240RE
BaPEq 2378 (1')
BaPEq 203 (3')
BaPEq 187 (6')
BaPEq 5503 (7')
BaPEq 198 (11')
BaPEq 337 (13')

SB-240REC
BaPEq 4899 (5')

SB-67
BaPEq 183 (15')
BaPEq 571 (20')
BaPEq 231 (25')

SB-243RE
BaPEq 3300 (1.0')

SB-243REA

SB-243RED

SB-243REB

SB-243REC

SB-64

SB-33
MERCURY 3.3 (5')
BaPEq 731 (5')

SB-342
SB-341
SB-247
SB-344
SB-248
SB-337
SB-340
SB-336
SB-339
SB-343
SB-338
SB-249
SB-33A

SB-592A
BaPEq 623 (6')
BaPEq 239 (8')

SB-592D
BaPEq 510 (6')
BaPEq 208 (8')

SB-592
BaPEq 851 (3')
BaPEq 931 (4')
BaPEq 693 (5')

SB-592B
BaPEq 185 (4')
BaPEq 193 (6')

SB-63REA

SB-63RED

SB-63REB

SB-63REC

SB-63RE
BaPEq 379 (3')
BaPEq 157 (4')

SB-337-0506
BaPEq 700

SB-58
BaPEq 159 (5')
BaPEq 193 (20')

SB-58REA

SB-58REB
BaPEq 3019 (2')
BaPEq 498 (14')

SB-58RE
BaPEq 716 (1')
BaPEq 8602 (2')
BaPEq 159 (7')
BaPEq 439 (9')
BaPEq 1433 (12')

SB-58RED
BaPEq 475 (6')

SB-58REC
BaPEq 6424 (2')
BaPEq 263 (14')

SB-65RE

SB-62REA
BaPEq 4212 (5')
BaPEq 239 (7')
BaPEq 4863 (9')

SB-595

SB-593

SB-594

SB-62RED
BaPEq 16660 (1')

SB-239RE
BaPEq 297 (2')
BaPEq 208 (6')
BaPEq 417 (7')
BaPEq 367 (8')
BaPEq 1801 (9')
BaPEq 185 (11')

SB-239
BaPEq 340 (1.0')(SS)
BaPEq 537 (1.5')(SS)

SB-62REB
BaPEq 550 (1')
BaPEq 282 (5')
BaPEq 434 (7')

SB-62RE
BaPEq 6426 (1')
BaPEq 1065 (2')
BaPEq 154 (5')
BaPEq 215 (6')
BaPEq 1348 (9')
BaPEq 2215 (13')
BaPEq 480 (15')

SB-62REC
BaPEq 2613 (1')
BaPEq 174 (3')

SB-57

FIGURE 1-2

EXCEEDANCES OF CLEAN UP GOALS BLOCK D

LEGEND

- VERTICAL (INNER TIER) DELINEATION SAMPLE (SEPTEMBER/OCTOBER 2009)
- LATERAL (OUTER TIER) DELINEATION SAMPLE (OCTOBER 2009)
- PREVIOUS SOIL SAMPLING LOCATION
- FALL 2007 SOIL SAMPLE LOCATION
- TAX BLOCK
- PRE- 1950 SHORELINE

CLEANUP GOAL FOR MERCURY IS 1 mg/kg
CLEANUP GOAL FOR BENZO(A)PYRENE EQUIVALENTS (BaPEq) IS 150 ug/kg

BaPEq results are in units of ug/kg

Lockheed Martin Middle River Complex
Middle River, Maryland

0 25 50 100 Feet

N

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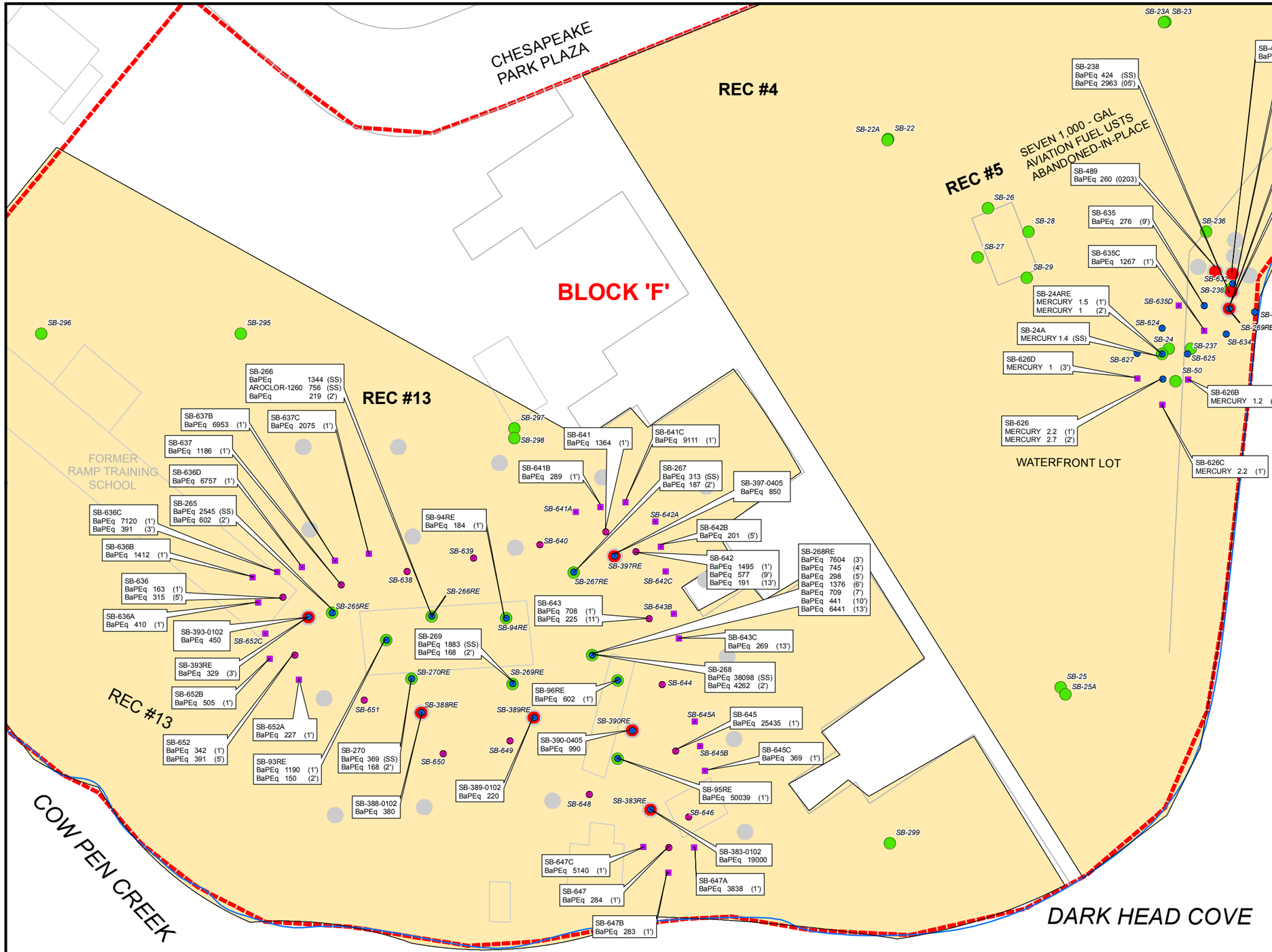

FIGURE 1-3

EXCEEDANCES OF CLEAN UP GOALS BLOCK F (1 OF 2)

LEGEND

- VERTICAL (INNER TIER) DELINEATION SAMPLE (SEPTEMBER/OCTOBER 2009)
- LATERAL (OUTER TIER) DELINEATION SAMPLE (OCTOBER 2009)
- SECOND ROUND LATERAL (OUTER TIER) DELINEATION SAMPLE (NOVEMBER 2009)
- PREVIOUS SOIL SAMPLING LOCATION
- FALL 2007 SOIL SAMPLING LOCATION
- TAX BLOCK
- STRUCTURE
- REC LOCATION APPROXIMATE

CLEANUP GOAL FOR BENZO(A)PYRENE EQUIVALENTS (BaPEq) IS 150 ug/kg
CLEANUP GOAL FOR PCBs IS 320 ug/kg
CLEANUP GOAL FOR MERCURY IS 1 mg/kg

BaPEq results are in units of ug/kg
Mercury results are in units of mg/kg

Lockheed Martin Middle River Complex
Middle River, Maryland

0 15 30 60 Feet

N

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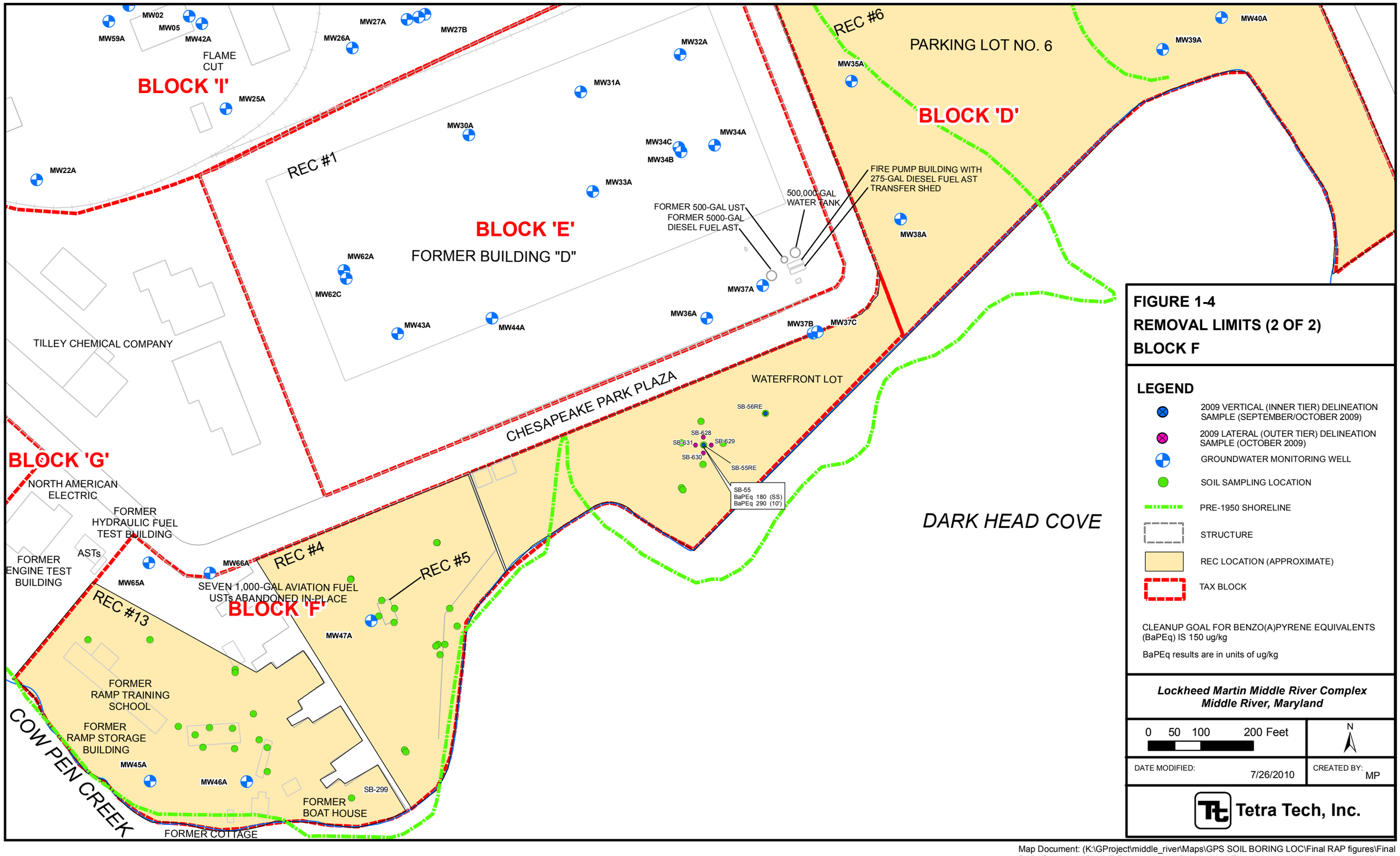

FIGURE 1-4
REMOVAL LIMITS (2 OF 2)
BLOCK F

LEGEND

- 2009 VERTICAL (INNER TIER) DELINEATION SAMPLE (SEPTEMBER/OCTOBER 2009)
- 2009 LATERAL (OUTER TIER) DELINEATION SAMPLE (OCTOBER 2009)
- GROUNDWATER MONITORING WELL
- SOIL SAMPLING LOCATION
- PRE-1950 SHORELINE
- STRUCTURE
- REC LOCATION (APPROXIMATE)
- TAX BLOCK

CLEANUP GOAL FOR BENZO(A)PYRENE EQUIVALENTS (BaPEq) IS 150 ug/kg

BaPEq results are in units of ug/kg

Lockheed Martin Middle River Complex
Middle River, Maryland

0 50 100 200 Feet

N

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FOR EXCEEDANCES OF CLEAN UP GOALS WITHIN BLOCK G SEE FIGURE 4-2

BLOCK 'G'

PARKING LOT NO. 3

REC #12

REC #11

2,000 GALLON FUEL OIL UST

10,000 GALLON FUEL OIL UST

COW PEN CREEK

SB-677D BaPEq 4746 (5')
SB-677A BaPEq 1193 (1') BaPEq 269 (5')
SB-680D BaPEq 2083 (7')
SB-677B BaPEq 204 (9')
SB-677 BaPEq 20437 (1') BaPEq 1978 (2') BaPEq 1811 (5')
SB-680 BaPEq 666 (1') BaPEq 449 (2') BaPEq 799 (4') BaPEq 1112 (5') BaPEq 24698 (6') BaPEq 604 (7')
SB-678B BaPEq 8306 (1') BaPEq 946 (9')
SB-255RE BaPEq 720 (1')
SB-678 BaPEq 208 (1') BaPEq 249 (2') BaPEq 1905 (5') BaPEq 379 (7')
SB-679C BaPEq 151 (1')
SB-679C BaPEq 424 (1')
SB-255 BaPEq 1339 (0.5')
SB-679 BaPEq 596 (1') BaPEq 222 (5')
SB-430-0102 BaPEq 2000
SB-456-0708 BaPEq 310
SB-92RED BaPEq 1364 (5') BaPEq 4718 (9') BaPEq 1450 (13') BaPEq 202 (15')
SB-457 BaPEq 300 (SS) BaPEq 260 (0102)
SB-91REA BaPEq 1727 (5') BaPEq 3684 (9')
SB-91REB BaPEq 360 (9') BaPEq 622 (13')
SB-92RE BaPEq 217 (3') BaPEq 9028 (5') BaPEq 988 (6') BaPEq 23492 (9') BaPEq 308 (13') BaPEq 951 (14') BaPEq 649 (15')
SB-92REC BaPEq 387 (5')
SB-91RE BaPEq 13342 (1) BaPEq 232 (3) BaPEq 288 (9) BaPEq 1458 (13)
SB-91REC BaPEq 229 (1') BaPEq 443 (9') BaPEq 205 (15')
SB-427 BaPEq 340 (0102) BaPEq 960 (0203)
SB-431-0102 BaPEq 390
SB-745 BaPEq 277 (2')
SB-745C BaPEq 2661 (2')
SB-736B BaPEq 1256 (1') BaPEq 1319 (3') BaPEq 319 (5')
SB-411-0506 BaPEq 820
SB-736C BaPEq 1513 (1') BaPEq 193 (5')
SB-259 BaPEq 461 (0.5') BaPEq 290 (1.0') BaPEq 400 (1.5')
SB-424-0102 BaPEq 990 (0102) BaPEq 4000 (0203) BaPEq 1600 (0304)
SB-736 BaPEq 572 (1') BaPEq 8497 (3')
SB-735C BaPEq 257 (1')
SB-258 BaPEq 1072 (0.5')
SB-416-0102 BaPEq 210
SB-724 BaPEq 3125 (3') BaPEq 844 (4')
SB-735 BaPEq 474 (1') BaPEq 211 (3') BaPEq 3808 (5') BaPEq 3534 (7') BaPEq 265 (9')
SB-735B BaPEq 6250 (1')
SB-728 TPH-GRO 980000 (4') TPH-GRO 780000 (5') TPH-GRO 440000 (6')
SB-735A BaPEq 2101 (1') BaPEq 2799 (3') BaPEq 57089 (5')
SB-412-0102 BaPEq 160
SB-84 BaPEq 4544 (SS) BaPEq 520 (5') TPH-GRO 266 (5')
SB-760 BaPEq 751 (1') BaPEq 1212 (3') BaPEq 444 (5')
SB-708 BaPEq 548 (3') BaPEq 2823 (4')
SB-759 BaPEq 1252 (1') BaPEq 1915 (3')
SB-415-0102 BaPEq 3000
SB-714 BaPEq 820 (3') BaPEq 2492 (4') BaPEq 4584 (5') BaPEq 53041 (6') BaPEq 2404 (7')
SB-734 BaPEq 538 (0-4') TPH-GRO 810000 (0-4')
SB-720 BaPEq 2381 (3') BaPEq 178 (4')
SB-414-0203 BaPEq 160
SB-260 BaPEq 2832 (0.5') BaPEq 296 (1.0') BaPEq 7481 (1.5')
SB-726 BaPEq 4263 (3') BaPEq 1041 (4')
SB-85 BaPEq 4314 (SS) TPH-GRO 240 (05') BaPEq 364 (05') BaPEq 349 (10') BaPEq 318 (12')
SB-757 BaPEq 3202 (2') BaPEq 3674 (4')
SB-261 BaPEq 180 (0.5') BaPEq 160 (1.0') BaPEq 2255 (1.5')
SB-727 BaPEq 578 (3')
SB-729 BaPEq 963 (3')
SB-755 BaPEq 6012 (2')
SB-732 BaPEq 761 (3')

SB-677, SB-680, SB-447, SB-451, SB-678C, SB-496, SB-450, SB-448, SB-257RE, SB-254RE, SB-436, SB-697, SB-494, SB-495, SB-698, SB-461, SB-699, SB-456RE, SB-449, SB-458, SB-460, SB-457RE, SB-700, SB-459, SB-701, SB-256, SB-435, SB-418, SB-429, SB-428, SB-741, SB-742, SB-430, SB-707, SB-419, SB-740, SB-743, SB-744, SB-431, SB-706, SB-713, SB-719, SB-739, SB-420, SB-81, SB-745A, SB-745B, SB-705, SB-718, SB-426, SB-738, SB-712, SB-746, SB-432, SB-192, SB-417, SB-717, SB-410, SB-737, SB-82, SB-704, SB-421, SB-747, SB-425, SB-433, SB-703, SB-710, SB-716, SB-748, SB-182, SB-83, SB-749, SB-422, SB-681, SB-424RE, SB-181, SB-184, SB-684, SB-682, SB-709, SB-702, SB-715, SB-722, SB-186, SB-750, SB-183, SB-185, SB-683, SB-262, SB-731, SB-725, SB-751, SB-423, SB-724, SB-188, SB-414, SB-752, SB-263, SB-727, SB-723, SB-730, SB-187, SB-87, SB-88, SB-86, SB-758, SB-264, SB-434, SB-753, SB-733, SB-189, SB-190, SB-754, SB-413, SB-89, SB-90, SB-756

Legend

- VERTICAL (INNER TIER) DELINEATION SAMPLE (SEPTEMBER/OCTOBER 2009)
- LATERAL (OUTER TIER) DELINEATION SAMPLE (OCTOBER 2009)
- SECOND ROUND LATERAL (OUTER TIER) DELINEATION SAMPLE (NOVEMBER 2009)
- PREVIOUS SOIL SAMPLING LOCATION
- FALL 2007 SOIL SAMPLING LOCATION
- TAX BLOCK
- STRUCTURE
- REC LOCATION APPROXIMATE

CLEANUP GOAL FOR ARSENIC IS 12 mg/kg
CLEANUP GOAL FOR BaPEq IS 150 ug/kg
CLEANUP GOAL FOR TPH-GRO AND DRO IS 230 mg/kg

BaPEq results are in units of ug/kg
TPH-GRO results are in units of mg/kg

FIGURE 1-5

EXCEEDANCES OF CLEAN UP GOALS BLOCK G (1 OF 2)

Lockheed Martin Middle River Complex
Middle River, Maryland

0 20 40 80 Feet

N

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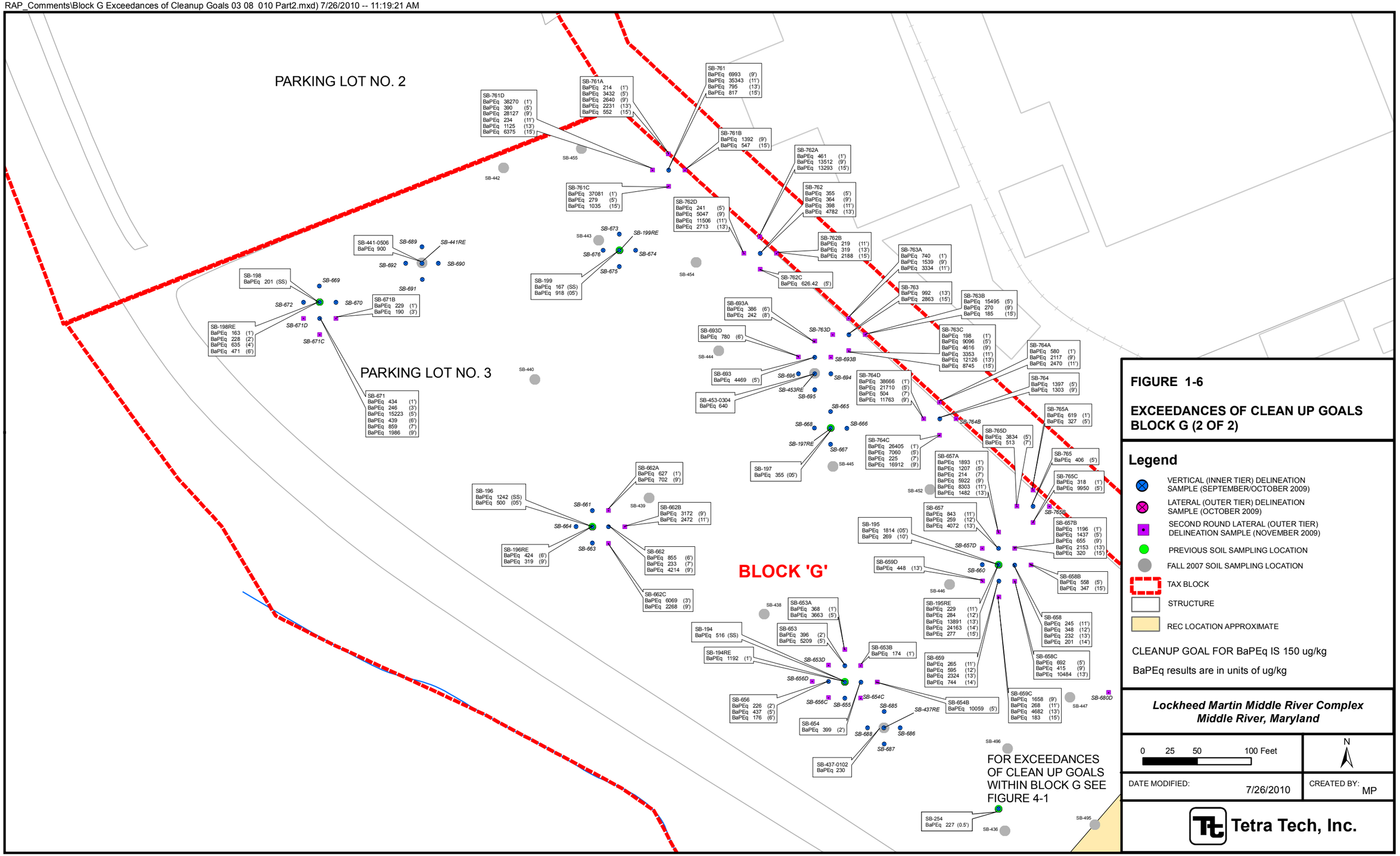

FIGURE 1-6

EXCEEDANCES OF CLEAN UP GOALS BLOCK G (2 OF 2)

Legend

- VERTICAL (INNER TIER) DELINEATION SAMPLE (SEPTEMBER/OCTOBER 2009)
- LATERAL (OUTER TIER) DELINEATION SAMPLE (OCTOBER 2009)
- SECOND ROUND LATERAL (OUTER TIER) DELINEATION SAMPLE (NOVEMBER 2009)
- PREVIOUS SOIL SAMPLING LOCATION
- FALL 2007 SOIL SAMPLING LOCATION
- TAX BLOCK
- STRUCTURE
- REC LOCATION APPROXIMATE

CLEANUP GOAL FOR BaPEq IS 150 ug/kg

BaPEq results are in units of ug/kg

Lockheed Martin Middle River Complex
Middle River, Maryland

0 25 50 100 Feet

N

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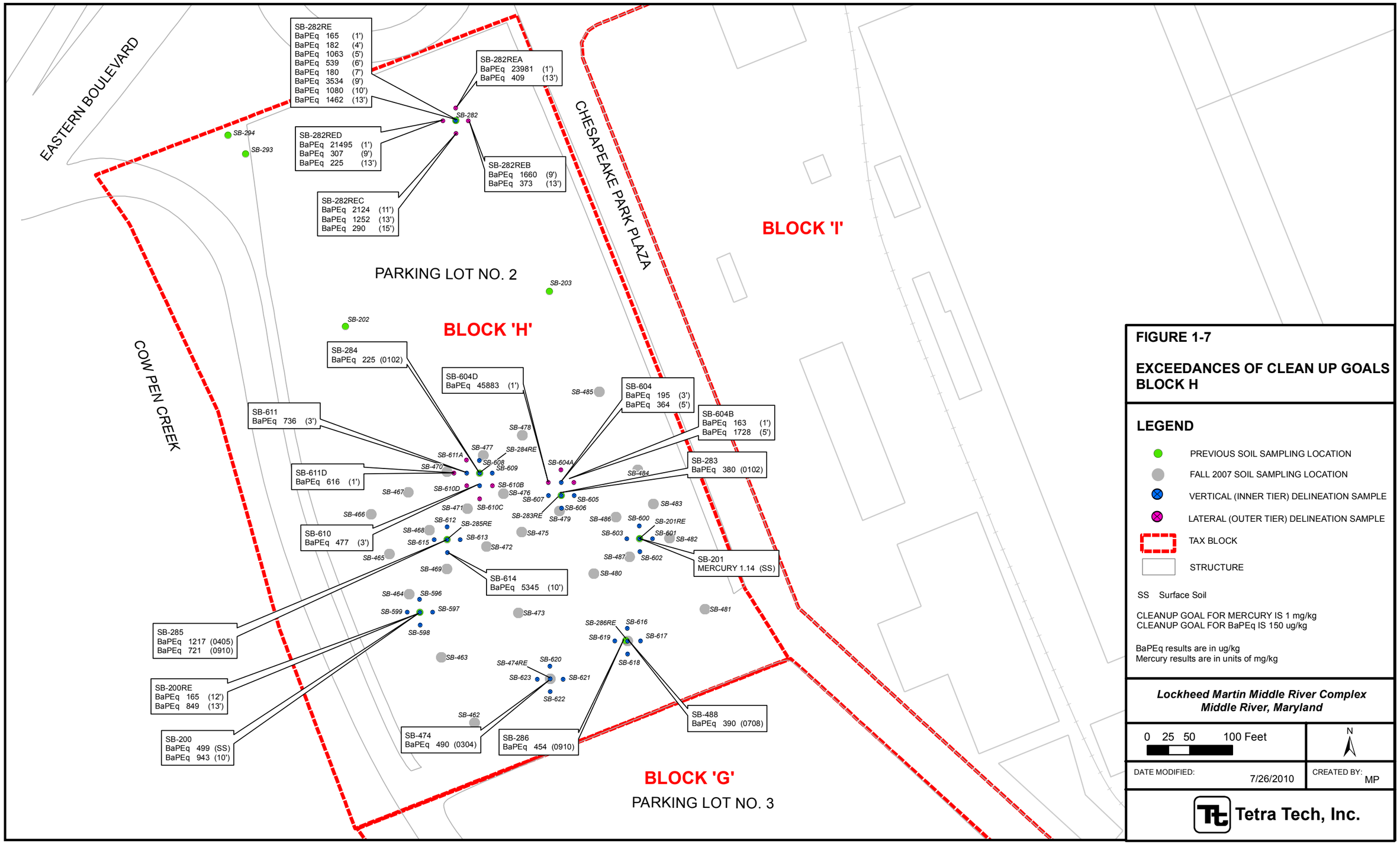

FIGURE 1-7

EXCEEDANCES OF CLEAN UP GOALS BLOCK H

LEGEND

- PREVIOUS SOIL SAMPLING LOCATION
- FALL 2007 SOIL SAMPLING LOCATION
- VERTICAL (INNER TIER) DELINEATION SAMPLE
- LATERAL (OUTER TIER) DELINEATION SAMPLE
- TAX BLOCK
- STRUCTURE

SS Surface Soil

CLEANUP GOAL FOR MERCURY IS 1 mg/kg
CLEANUP GOAL FOR BaPEq IS 150 ug/kg

BaPEq results are in ug/kg
Mercury results are in units of mg/kg

Lockheed Martin Middle River Complex
Middle River, Maryland

0 25 50 100 Feet

N

DATE MODIFIED: 7/26/2010

CREATED BY: MP

Tetra Tech, Inc.

Map Document: (K:\GProject\middle_river\Maps\GPS SOIL BORING LOC\Final RAP figures\Final RAP_Comments\Block H Exceedances of Cleanup Goals 03 12 010.mxd) 7/26/2010 -- 12:46:03 PM

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Section 2
Investigation Approach and Methodology

Before the soil investigation begins, the appropriate Tetra Tech personnel will become familiar with the site-specific *Health and Safety Plan* (HASP) and respective "Safe Work Permits" and "Emergency Response Plan" included therein. Tetra Tech personnel will conduct a daily mandatory health and safety tailgate-meeting before all field events. The Tetra Tech site health and safety officer will maintain documentation of pertinent topics covered and personnel in attendance. Safety requirements are addressed in greater detail in the site-specific Tetra Tech HASP included as Appendix A.

2.1 SITE ACCESS AND UTILITY CLEARANCE

Field activities planned for locations identified for data gap soil sampling in each investigation area will be coordinated with Lockheed Martin. Utility clearance work and documentation will conform to Lockheed Martin's *Remediation Contractor's ESH Handbook, Revision 1, June 10, 2009,* or latest update. Before beginning any intrusive field activities, each boring location will be cleared for subsurface utilities. In addition to calling in a "Miss Utility" ticket for each tax block, a third-party utility locating service (i.e., Enviroscan) will be used to mark any underground utilities and anomalies in accordance with Lockheed Martin's CS-28 protocol and other procedures for intrusive work. All utilities within a 30-foot radius of each designated drilling location will be located using the appropriate technology and marked on the surface with paint.

A geophysical survey will be conducted to locate and mark all underground utility lines at the proposed soil boring locations. A combination of electromagnetic resistivity/conductivity and line locating, and ground penetrating radar (GPR) will ensure that all proposed sampling locations will be free of underground utilities. Borings that require relocation due to subsurface obstructions will be positioned as close as possible to the original location identified.

2.2 DRILLING AND SAMPLING PROCEDURES

Fifty-two soil borings will be advanced using a direct-push technology (DPT) drill-rig in the tax blocks requiring additional investigation based on review of historic data and data collected during the September through November 2009 final soil-delineation effort. Soil borings will be drilled to approximately 15-feet below grade. Soil samples will be collected in two-foot intervals in each boring using a 1.5-inch diameter, four foot long stainless steel macro core sampler fitted with a disposable acetate liner. The probe sampler will be advanced in four foot increments and the samples will be collected.

The retrieved samples will then undergo soil screening, including lithologic characterization and visual observations. Soil samples will be screened with a photoionization detector (PID) using the zip top-bag screening technique. Soil samples will be collected for laboratory analysis based on field screening results and visual evidence of possible contamination, such as staining, discoloration, and odors. All pertinent information, including boring location, soil/lithology description, sample designation and depth, PID readings, sample collection time, etc., will be recorded on a "Soil-Sample Log Sheet" and "Boring Log" form. Section 3 details the intervals and analytical requirements for each block.

After lithologic logging and field screening are complete, soil from the designated sampling intervals will be collected and immediately placed in appropriate sampling containers. The collected sample jars will be labeled and placed on ice pending delivery to the analytical laboratory. Sample labels will include a unique sample number, date and time the sample was collected, name of the person handling the sample, and the specific analyses being requested from the laboratory. After soil sampling, completed borings will be backfilled with bentonite chips to within 0.5 feet of the surface and then completed to grade with like material (i.e., soil, gravel, asphalt, and concrete).

2.3 SAMPLE NOMENCLATURE AND HANDLING

Each soil sample collected during the study will be identified with a unique sample identification tag. The sample identification tag will consist of the block designation, followed by "SB," and then the boring number. Surface soils (0-1 foot below grade) will then be designated "SS," and samples at other depths will have a two-digit label indicating the bottom depth of the boring. For

example, D-SB-201-10 would be a sample collected from 9–10 feet below grade at soil boring location 201 in Block D. 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. Chain-of-custody (COC) protocols will be used throughout sample handling to establish the evidentiary integrity of sample containers. These protocols will be used to demonstrate that the samples were handled and transferred in a manner that would eliminate (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 responsible individual that maintains custody until the sample containers are transferred to the sampler(s). Transport containers returning to the laboratory will be sealed with strapping tape and a tamper-proof custody seal. The custody seal contains the signature of the individual releasing the transport container, along with the date and time.

2.4 DATA ANALYSIS

Task specific analytical requirements are outlined in Table 2-1 and as follows. Soil samples from soil borings will be analyzed for total PAHs and alkyl PAHs by SW846 Method 8270C, for volatile organic compounds (VOCs) by SW846 Method 8260B, for semivolatile organic compounds (SVOCs) and 1,4-dioxane by SW846 Method 8270, for TPH-GRO and –diesel-range organics (DRO) by SW 846 Method 8015, for total metals by SW846 Method 6010C (for mercury by Method 7471A), for hexavalent chromium by SW846 Method 7196A, and for pesticides/PCBs by SW846 Method 8081. Section 3 details the intervals and analytical requirements for each block. All samples will be analyzed within a 10-day turnaround time.

2.5 SURVEYING

Each boring location will be surveyed using a global positioning system (GPS) receiver with submeter accuracy. Final survey locations will be used for data reporting at the end of the field sampling program.

Table 2-1

Data Gap Sampling Investigation
Middle River Complex, Middle River, Maryland

Location	Number of Soil Boring Locations	Number of Samples Per Location	Total Number of Soil Samples	Number of Field Days	cPAH	Alkyl PAH	SVOC	1,4-dioxane	Metals	Mercury	VOCs	TPH-GRO and -DRO	PCB/Pesticides	Hexavalent Chromium
Block D	16	8	128	4	132	18								
Block D (Panhandle)	15	8	120	4		9	123	123	123	123	123	123	123	123
Block F	6	3	18	1	10	2				10				
Block G	11	8	88	3	91	19								
Block H	4	8	32	1	34	7								
	52		386	13	267	55	123	123	123	133	123	123	123	123

Notes:

Soil samples collected from soil borings will be analyzed for PAHs and Alkyl PAHs by SW846 Method 8270C, VOCs by SW846 Method 8260B, SVOCs and 1,4-dioxane by SW846 Method 8270C, TPH-GRO and -DRO by SW 846 Method 8015, total metals by SW846 Method 6010C (Hg by Method 7471A), Hexavalent Chromium by SW846 Method 7196A, and Pesticides/PCB by SW846 Method 8081.

The total estimated number of samples includes 5% samples for QA to support data quality for the project.

2.6 EQUIPMENT DECONTAMINATION

A decontamination area and a clean zone will be established at the perimeter of the restricted work zone to prepare and break down sampling equipment. The area will be established to contain decontamination rinsate solution for subsequent disposal. Reusable equipment (e.g., DPT rods, augers, scoops) will be decontaminated before and after each use. Decontamination of reusable small equipment will proceed as follows:

- Alconox and potable-water wash
- Potable-water rinse
- Reagent grade isopropanol rinse (to thoroughly wet the equipment with isopropanol)
- Analyte-free water rinse
- Air drying

Decontamination solutions will be collected for disposal. All downhole drilling equipment, including the rear of the DPT rig, will be steam cleaned before it arrives on-site, before beginning work, between drilling locations, any time the rig leaves and returns to a hole before completing a boring, any time the drill rig leaves the site, and at the conclusion of the drilling program.

2.7 WASTE MANAGEMENT

Investigation derived waste (IDW), consisting of soil cuttings, concrete and asphalt pavement fragments, decontamination-rinsate water, and personal protective equipment (PPE) will be generated during delineation sampling. PPE IDW will be placed in trash bags and placed in a facility trash-receptacle to be disposed of as general refuse. Soil cuttings (including pavement fragments) and decontamination water will be collected and stored in DOT approved 55-gallon drums. All drums will be appropriately labeled and logged on a drum-inventory form. Wastes will be characterized and disposed of in accordance with applicable state and federal regulations and the MRC *Waste Management Plan*. The drums of waste will be relocated to a drum-staging area identified by Lockheed Martin personnel.

IDW samples will be collected and submitted to the laboratory for "Toxicity Characteristic Leaching Procedure" (TCLP) organic and inorganic analyses. Upon receipt of the IDW analytical data, the IDW generated will be removed from the facility and properly disposed of in accordance

with federal, state, and local regulations. A *Waste Management Plan* conforming to Lockheed Martin "Energy, Environment, Safety, and Health (EESH) Remediation Waste Management Procedure No: EROP-03, Revision 4," effective April 17, 2009, is included as Appendix B.

2.8 DATA VALIDATION AND REPORTING

Upon receipt of data from the laboratory, data will be entered into a sample database and evaluated against the cleanup goals for preliminary review. Data will consist of soil samples intended to refine both the vertical and lateral limits of contaminated soil. This will be done as sequential data are recorded and clean samples are identified as per the project protocols. A limited data review, 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.

Both the laboratory results and the subsequent evaluation will be shared with Lockheed Martin as soon as they are available. Once the analytical data have been obtained from the laboratory, they will undergo 100% data validation for all of the above-mentioned analyses. Validation will be conducted using EPA's "Contract Laboratory Program" protocol, EPA Region III *Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses* (EPA, 1993), and EPA Region III *Modifications to National Functional Guidelines for Organic Data Review, Multi-Media, Multi-Concentration* (EPA, 1994), in conjunction with method-specific criteria. Results reported for the sampling event will be included in a report with data-summary tables.

Section 3
Tax Blocks

3.1 BLOCK D DATA-GAP SOIL-SAMPLING

This data-gap sampling effort seeks to refine the broad horizontal and vertical limits of soil removal proposed for Block D. Soil characterization to date has sufficiently identified general areas of concern and chemicals that are contributing to regulatorily unacceptable risk. However, historic soil-characterization data (presented in the *Site Characterization Report* and the *Block D Final-Delineation Summary Report*) for cPAHs do not sufficiently define the contamination limits to meet Lockheed Martin's objective to further reduce the uncertainty in proposed excavation volumes. Characterization activities completed during this data-gap investigation are intended to reduce the uncertainty of excavation limits before remediation begins. This sampling will not replace post excavation verification sampling, which will be completed as specified in the final soil RAP for Block D.

A DPT drill-rig will be used to advance 31 soil borings. Sixteen soil borings (D-SB-766 through D-SB-781) will be advanced in areas of Block D that have not been sampled during previous events. Soil borings will be advanced to a maximum depth of 15 feet. Soil samples will be collected in two-foot intervals in each boring using a 1.5 inch diameter, four foot long stainless steel macro core sampler fitted with a disposable acetate-liner. Eight samples (1-, 3-, 5-, 7-, 9-, 11-, 13-, and 15 feet below-ground-surface [bgs]) will be collected from each soil boring. All samples (128 plus four duplicates) will be analyzed for total PAHs by SW846 Method 8270C.

Eighteen samples will be analyzed for alkyl PAHs by SW846 Method 8270C. Three samples will be collected from six individual borings and analyzed for alkyl PAHs. Samples will be collected at intervals of 1-, 7-, and 15-feet bgs to determine the vertical profile of alkyl PAHs across Block D. Soil-boring locations are shown in Figure 3-1. Table 3-1 details the sample identifications and laboratory analyses to be performed for each boring location.

Fifteen soil borings (D-SB-782 through D-SB-796) will be advanced in the panhandle portion of Block D to determine if contamination is in this portion of Block D. Soil borings will be advanced to a maximum depth of 15 feet. Soil samples will be collected in two-foot intervals in each boring using a 1.5 inch-diameter, four foot long stainless steel macro core sampler fitted with a disposable acetate-liner. Eight samples (1-, 3-, 5-, 7-, 9-, 11-, 13-, and 15-feet bgs) will be collected from each soil boring. All samples (120 plus three duplicates) will be analyzed for VOCs by SW846 Method 8260B, for SVOCs and 1,4-dioxane by SW846 Method 8270, for TPH-GRO and -DRO by SW 846 Method 8015, for total metals by SW846 Method 6010C (for mercury by Method 7471A), for hexavalent chromium by SW846 Method 7196A, and for pesticides/PCBs by SW846 Method 8081.

Nine samples will be analyzed for alkyl PAHs by SW846 Method 8270C. Three samples will be collected from three individual borings and analyzed for alkyl PAHs. Samples will be collected at intervals of 1-, 7-, and 15-feet bgs to determine the vertical profile of alkyl PAHs across Block D. Soil-boring locations are shown in Figure 3-1. Table 3-1 details the sample identifications and laboratory analyses to be performed for each boring location.

3.2 BLOCK F DATA-GAP SOIL-SAMPLING

This data gap sampling investigation seeks to refine the broad horizontal and vertical limits of soil proposed for removal in Block F. Soil characterization completed to date has sufficiently identified general areas of concern and chemicals that are contributing to regulatorily unacceptable risk. However, historic soil-characterization data (presented in the *Site Characterization Report* and the *Block F Final Delineation Summary Report*) for cPAHs, PCBs, and mercury do not sufficiently define the contamination limits to meet Lockheed Martin's objective to further reduce the uncertainty in proposed excavation volumes. Characterization activities completed during this data gap investigation are intended to reduce the uncertainty of excavation limits before remediation begins. This sampling will not replace post excavation verification sampling, which will be completed as specified in the final soil RAP for Block F.

A DPT drill-rig will be used to advance six soil borings (F-SB-797 through F-SB-802) in areas of Block F that require additional delineation to determine the horizontal extent of the existing excavation footprints. Soil borings in Block F will be advanced to a maximum depth of 5-feet.

Soil samples will be collected in two-foot intervals in each boring using a 1.5-inch diameter, four foot long stainless steel macro core sampler fitted with a disposable acetate-liner. Three samples (1-, 3-, and 5-feet bgs) will be collected from each of the soil borings.

Nine samples plus one duplicate will be collected from soil borings F-SB-797 through F-SB-799 and analyzed for total PAHs by SW846 Method 8270C. Two samples will be analyzed for alkyl PAHs by SW846 Method 8270C. Samples will be collected at intervals of 1- and 5-feet bgs to determine the vertical profile of alkyl PAHs across Block F. Nine samples plus one duplicate collected from soil borings F-SB-800 through F-SB-802 will be analyzed for mercury by SW846 Method 7471A. Soil boring locations are shown in Figure 3-2. Table 3-2 details the sample identifications and laboratory analysis to be performed for each boring location.

3.3 BLOCK G DATA-GAP SOIL-SAMPLING

Data gap sampling seeks to refine the broad horizontal and vertical limits of soil removal proposed for Block G. Soil characterization to date has sufficiently identified general areas of concern and chemicals that are contributing to regulatorily unacceptable risk. However, historic soil characterization data (presented in the *Site-Characterization Report* and the *Block G Final Delineation Summary Report*) for cPAHs, arsenic, and TPH-GRO do not sufficiently define the contamination limits to meet Lockheed Martin's objective to further reduce uncertainty in proposed excavation volumes. Characterization activities during this data-gap investigation are intended to reduce the uncertainty of excavation limits before remediation begins. This sampling will not replace post excavation verification sampling, which will be completed as specified in the final soil RAP for Block G.

A DPT drill-rig will be used to advance 11 soil borings (G-SB-803 through G-SB-813) in Block G areas that require additional delineation to determine the horizontal extent of the existing excavation footprints and which have data gaps. Soil borings in Block G will be advanced to a maximum depth of 15-feet. Soil samples will be collected in two-foot intervals in each boring using a 1.5-inch-diameter, four foot long stainless steel macro core sampler fitted with a disposable acetate-liner.

Eight samples (1-, 3-, 5-, 7-, 9-, 11-, 13-, and 15-feet bgs) will be collected from each soil boring. Eighty-eight samples plus three duplicates will be collected from soil borings G-SB-803 through

G-SB-813 and analyzed for total PAHs by SW846 Method 8270C; 19 samples will be analyzed for alkyl PAHs by SW846 Method 8270C. The samples will be collected at intervals of 1-, 7-, and 15-feet bgs to determine the vertical profile of alkyl PAHs across Block G. Soil-boring locations are shown in Figure 3-3. Table 3-3 details the sample identifications and laboratory analyses to be performed for each boring location.

3.4 BLOCK H DATA-GAP SOIL-SAMPLING

This data-gap sampling seeks to refine the broad horizontal and vertical limits of soil removal proposed for Block H. Soil characterization to date has sufficiently identified general areas of concern and chemicals that are contributing to regulatorily unacceptable risk. However, historic soil-characterization data (presented in the *Site-Characterization Report* and the *Block H Final Delineation Summary Report*) for cPAHs do not sufficiently define the contamination limits to meet Lockheed Martin's objective to further reduce uncertainty in proposed excavation volumes. Characterization activities during this data-gap investigation are intended to reduce the uncertainty of excavation limits before remediation begins. This sampling will not replace post excavation verification sampling, which will be completed as specified in the final soil RAP for Block H.

A DPT drill-rig will be used to advance four soil borings (H-SB-814 through H-SB-817) in areas of Block H that require additional delineation to determine the horizontal extent of the existing excavation footprints and in areas of Block H with data gaps. Soil borings in Block H will be advanced to a maximum depth of 15-feet. Soil samples will be collected in two-foot intervals in each boring using a 1.5-inch diameter, four foot long stainless steel macro core sampler fitted with a disposable acetate-liner.

Eight samples (1-, 3-, 5-, 7-, 9-, 11-, 13-, and 15-feet bgs) will be collected from each soil boring. Thirty-two samples plus two duplicates will be collected from soil borings H-SB-815 through H-SB-818 and analyzed for total PAHs by SW846 Method 8270C; seven samples will be analyzed for alkyl PAHs by SW846 Method 8270C. Samples will be collected at intervals of 1-, 7-, and 15-feet bgs to determine the vertical profile of alkyl PAHs across Block H. Soil-boring locations are shown in Figure 3-4. Table 3-4 details the sample identifications and laboratory analyses to be performed for each boring location.

Table 3-1

Sampling Requirements
Block D
Middle River Complex, Middle River, Maryland

Sample Identification	Depth Intervals (feet)	Analysis	Analytical Method	Sample Containers	Preservation Requirements	Number of Samples Collected
D-SB-766	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs Alkyl PAHs (1-ft., 7-ft., 15-ft.)	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
D-SB-767	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
D-SB-768	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
D-SB-769	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
D-SB-770	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs Alkyl PAHs (1-ft., 7-ft., 15-ft.)	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
D-SB-771	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
D-SB-772	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
D-SB-773	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
D-SB-774	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs Alkyl PAHs (1-ft., 7-ft., 15-ft.)	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
D-SB-775	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs Alkyl PAHs (1-ft., 7-ft., 15-ft.)	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
D-SB-776	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
D-SB-777	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs Alkyl PAHs (1-ft., 7-ft., 15-ft.)	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
D-SB-778	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8

Table 3-1

Sampling Requirements
Block D
Middle River Complex, Middle River, Maryland
Page 2 of 7

Sample Identification	Depth Intervals (feet)	Analysis	Analytical Method	Sample Containers	Preservation Requirements	Number of Samples Collected
D-SB-779	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs Alkyl PAHs (1-ft., 7-ft., 15-ft.)	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
D-SB-780	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
D-SB-781	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
D-SB-782	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	VOCs TPH-GRO and -DRO SVOCs 1,4-dioxane Total Metals Mercury Hexavalent Chromium Pesticides/PCB	SW-846 8260B SW-846 8015 SW-846 8270 SW-846 8270 SW-846 6010C SW-846 7471A SW-846 7196A SW-846 8081	Terracore Kit 2- 40 mL, 1-40mL 2 oz. glass jars 8 oz. glass jars	 2 water, 1 methanol Cool to 4±2°C	8
D-SB-783	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	VOCs TPH-GRO and -DRO SVOCs 1,4-dioxane Total Metals Mercury Hexavalent Chromium Pesticides/PCB	SW-846 8260B SW-846 8015 SW-846 8270 SW-846 8270 SW-846 6010C SW-846 7471A SW-846 7196A SW-846 8081	Terracore Kit 2- 40 mL, 1-40mL 2 oz. glass jars 8 oz. glass jars	 2 water, 1 methanol Cool to 4±2°C	8

Table 3-1

Sampling Requirements
Block D
Middle River Complex, Middle River, Maryland

Sample Identification	Depth Intervals (feet)	Analysis	Analytical Method	Sample Containers	Preservation Requirements	Number of Samples Collected
D-SB-784	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	VOCs	SW-846 8260B	Terracore Kit		8
				2- 40 mL, 1-40mL	2 water, 1 methanol	
		TPH-GRO and -DRO	SW-846 8015	2 oz. glass jars	Cool to 4±2°C	
		SVOCs	SW-846 8270	8 oz. glass jars		
		1,4-dioxane	SW-846 8270			
		Total Metals	SW-846 6010C			
		Mercury	SW-846 7471A			
		Hexavalent Chromium	SW-846 7196A			
		Pesticides/PCB	SW-846 8081			
D-SB-785	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	VOCs	SW-846 8260B	Terracore Kit		8
				2- 40 mL, 1-40mL	2 water, 1 methanol	
		TPH-GRO and -DRO	SW-846 8015	2 oz. glass jars	Cool to 4±2°C	
		SVOCs	SW-846 8270	8 oz. glass jars		
		1,4-dioxane	SW-846 8270			
		Total Metals	SW-846 6010C			
		Mercury	SW-846 7471A			
		Hexavalent Chromium	SW-846 7196A			
		Pesticides/PCB	SW-846 8081			
D-SB-786	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	VOCs	SW-846 8260B	Terracore Kit		8
				2- 40 mL, 1-40mL	2 water, 1 methanol	
		TPH-GRO and -DRO	SW-846 8015	2 oz. glass jars	Cool to 4±2°C	
		SVOCs	SW-846 8270	8 oz. glass jars		
		1,4-dioxane	SW-846 8270			
		Total Metals	SW-846 6010C			
		Mercury	SW-846 7471A			
		Hexavalent Chromium	SW-846 7196A			
		Pesticides/PCB	SW-846 8081			

Table 3-1

Sampling Requirements
Block D
Middle River Complex, Middle River, Maryland

Sample Identification	Depth Intervals (feet)	Analysis	Analytical Method	Sample Containers	Preservation Requirements	Number of Samples Collected
D-SB-787	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	VOCs	SW-846 8260B	Terracore Kit		8
				2- 40 mL, 1-40mL	2 water, 1 methanol	
		TPH-GRO and -DRO	SW-846 8015	2 oz. glass jars	Cool to 4±2°C	
		SVOCs	SW-846 8270	8 oz. glass jars		
		1,4-dioxane	SW-846 8270			
		Total Metals	SW-846 6010C			
		Mercury	SW-846 7471A			
		Hexavalent Chromium	SW-846 7196A			
		Pesticides/PCB	SW-846 8081			
D-SB-788	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	VOCs	SW-846 8260B	Terracore Kit		8
				2- 40 mL, 1-40mL	2 water, 1 methanol	
		TPH-GRO and -DRO	SW-846 8015	2 oz. glass jars	Cool to 4±2°C	
		SVOCs	SW-846 8270	8 oz. glass jars		
		1,4-dioxane	SW-846 8270			
		Total Metals	SW-846 6010C			
		Mercury	SW-846 7471A			
		Hexavalent Chromium	SW-846 7196A			
		Pesticides/PCB	SW-846 8081			
D-SB-789	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	VOCs	SW-846 8260B	Terracore Kit		8
				2- 40 mL, 1-40mL	2 water, 1 methanol	
		TPH-GRO and -DRO	SW-846 8015	2 oz. glass jars	Cool to 4±2°C	
		SVOCs	SW-846 8270	8 oz. glass jars		
		1,4-dioxane	SW-846 8270			
		Total Metals	SW-846 6010C			
		Mercury	SW-846 7471A			
		Hexavalent Chromium	SW-846 7196A			
		Pesticides/PCB	SW-846 8081			

Table 3-1

Sampling Requirements
Block D
Middle River Complex, Middle River, Maryland
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Sample Identification	Depth Intervals (feet)	Analysis	Analytical Method	Sample Containers	Preservation Requirements	Number of Samples Collected
D-SB-790	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	VOCs TPH-GRO and -DRO SVOCs 1,4-dioxane Total Metals Mercury Hexavalent Chromium Pesticides/PCB	SW-846 8260B SW-846 8015 SW-846 8270 SW-846 8270 SW-846 6010C SW-846 7471A SW-846 7196A SW-846 8081	Terracore Kit 2- 40 mL, 1-40mL 2 oz. glass jars 8 oz. glass jars	 2 water, 1 methanol Cool to 4±2°C	8
D-SB-791	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	VOCs TPH-GRO and -DRO SVOCs 1,4-dioxane Total Metals Mercury Hexavalent Chromium Pesticides/PCB	SW-846 8260B SW-846 8015 SW-846 8270 SW-846 8270 SW-846 6010C SW-846 7471A SW-846 7196A SW-846 8081	Terracore Kit 2- 40 mL, 1-40mL 2 oz. glass jars 8 oz. glass jars	 2 water, 1 methanol Cool to 4±2°C	8
D-SB-792	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	VOCs TPH-GRO and -DRO SVOCs 1,4-dioxane Total Metals Mercury Hexavalent Chromium Pesticides/PCB	SW-846 8260B SW-846 8015 SW-846 8270 SW-846 8270 SW-846 6010C SW-846 7471A SW-846 7196A SW-846 8081	Terracore Kit 2- 40 mL, 1-40mL 2 oz. glass jars 8 oz. glass jars	 2 water, 1 methanol Cool to 4±2°C	8

Table 3-1

Sampling Requirements
Block D
Middle River Complex, Middle River, Maryland

Sample Identification	Depth Intervals (feet)	Analysis	Analytical Method	Sample Containers	Preservation Requirements	Number of Samples Collected
D-SB-793	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	VOCs TPH-GRO and -DRO SVOCs 1,4-dioxane Total Metals Mercury Hexavalent Chromium Pesticides/PCB	SW-846 8260B SW-846 8015 SW-846 8270 SW-846 8270 SW-846 6010C SW-846 7471A SW-846 7196A SW-846 8081	Terracore Kit 2- 40 mL, 1-40mL 2 oz. glass jars 8 oz. glass jars	 2 water, 1 methanol Cool to 4±2°C	8
D-SB-794	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	VOCs TPH-GRO and -DRO SVOCs 1,4-dioxane Total Metals Mercury Hexavalent Chromium Pesticides/PCB	SW-846 8260B SW-846 8015 SW-846 8270 SW-846 8270 SW-846 6010C SW-846 7471A SW-846 7196A SW-846 8081	Terracore Kit 2- 40 mL, 1-40mL 2 oz. glass jars 8 oz. glass jars	 2 water, 1 methanol Cool to 4±2°C	8
D-SB-795	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	VOCs TPH-GRO and -DRO SVOCs 1,4-dioxane Total Metals Mercury Hexavalent Chromium Pesticides/PCB	SW-846 8260B SW-846 8015 SW-846 8270 SW-846 8270 SW-846 6010C SW-846 7471A SW-846 7196A SW-846 8081	Terracore Kit 2- 40 mL, 1-40mL 2 oz. glass jars 8 oz. glass jars	 2 water, 1 methanol Cool to 4±2°C	8

Table 3-1

Sampling Requirements
Block D
Middle River Complex, Middle River, Maryland

Sample Identification	Depth Intervals (feet)	Analysis	Analytical Method	Sample Containers	Preservation Requirements	Number of Samples Collected
D-SB-796	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	VOCs	SW-846 8260B	Terracore Kit 2- 40 mL, 1-40mL	2 water, 1 methanol	8
		TPH-GRO and -DRO	SW-846 8015	2 oz. glass jars	Cool to 4±2°C	
		SVOCs	SW-846 8270	8 oz. glass jars		
		1,4-dioxane	SW-846 8270			
		Total Metals	SW-846 6010C			
		Mercury	SW-846 7471A			
		Hexavalent Chromium	SW-846 7196A			
		Pesticides/PCB	SW-846 8081			

Table 3-2

Sampling Requirements
Block F
Middle River Complex, Middle River, Maryland

Sample Identification	Depth Intervals (feet)	Analysis	Analytical Method	Sample Containers	Preservation Requirements	Number of Samples Collected
F-SB-797	1-5 at two foot intervals (1, 3, 5-ft.)	Total PAHs Alkyl PAHs (1- and 5-ft.)	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	3
F-SB-798	1-5 at two foot intervals (1, 3, 5-ft.)	Total PAH	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	3
F-SB-799	1-5 at two foot intervals (1, 3, 5-ft.)	Total PAHs	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	3
F-SB-800	1-5 at two foot intervals (1, 3, 5-ft.)	Mercury	SW-846 7471A	8 oz. glass jars	Cool to 4±2°C	3
F-SB-801	1-5 at two foot intervals (1, 3, 5-ft.)	Mercury	SW-846 7471A	8 oz. glass jars	Cool to 4±2°C	3
F-SB-802	1-5 at two foot intervals (1, 3, 5-ft.)	Mercury	SW-846 7471A	8 oz. glass jars	Cool to 4±2°C	3

Table 3-3

Sampling Requirements
Block G
Middle River Complex, Middle River, Maryland

Sample Identification	Depth Intervals (feet)	Analysis	Analytical Method	Sample Containers	Preservation Requirements	Number of Samples Collected
G-SB-803	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
G-SB-804	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
G-SB-805	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs Alkyl PAHs (1-ft., 7-ft, 15-ft.)	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
G-SB-806	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
G-SB-807	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs Alkyl PAHs (1-ft., 7-ft, 15-ft.)	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
G-SB-808	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
G-SB-809	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs Alkyl PAHs (1-ft., 7-ft, 15-ft.)	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
G-SB-810	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs Alkyl PAHs (1-ft., 7-ft, 15-ft.)	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
G-SB-811	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
G-SB-812	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs Alkyl PAHs (1-ft., 7-ft, 15-ft.)	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
G-SB-813	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs Alkyl PAHs (1-ft., 7-ft, 15-ft.)	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8

Table 3-4

Sampling Requirements
Block H
Middle River Complex, Middle River, Maryland

Sample Identification	Depth Intervals (feet)	Analysis	Analytical Method	Sample Containers	Preservation Requirements	Number of Samples Collected
H-SB-814	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs Alkyl PAHs (1-ft., 7-ft., 15-ft.)	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
H-SB-815	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
H-SB-816	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs Alkyl PAHs (1-ft., 7-ft., 15-ft.)	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8
H-SB-817	1-15 at two foot intervals (1, 3, 5, 7, 9, 11, 13, 15-ft.)	Total PAHs	SW-846 8270C	8 oz. glass jars	Cool to 4±2°C	8

Map Document: (K:\GProject\middle_river\Maps\GPS SOIL BORING LOC\Final RAP figures\Final RAP_Comments\Block D ProBorings 3D 4 13 2010 Fig 3-1.mxd)
7/13/2010 -- 9:43:49 AM

DARK HEAD COVE ROAD

PARKING LOT NO. 6

WILSON POINT ROAD

DARK HEAD COVE

BLOCK 'D'

BLOCK 'E'

BLOCK 'F'

D-SB-766
D-SB-767
D-SB-768
D-SB-769
D-SB-770
D-SB-771
D-SB-772
D-SB-773
D-SB-774
D-SB-775
D-SB-776
D-SB-777
D-SB-778
D-SB-779
D-SB-780
D-SB-781
D-SB-782
D-SB-783
D-SB-784
D-SB-785
D-SB-786
D-SB-787
D-SB-788
D-SB-789
D-SB-790
D-SB-791
D-SB-792
D-SB-793
D-SB-794
D-SB-795
D-SB-796

SB-61REA BaPEq 153 (1') BaPEq 168 (11')
SB-61RE BaPEq 346 (10') BaPEq 182 (13') BaPEq 579 (14')
SB-242
SB-61REB BaPEq 256 (9') BaPEq 154 (11') BaPEq 1078 (13')
SB-61RED BaPEq 429 (13')
(15')
SB-61REC BaPEq 386 (1') BaPEq 656 (9')
SB-60RE BaPEq 22517 (1') BaPEq 2034 (5')
SB-60REA BaPEq 17997 (1') BaPEq 361 (3')
(5.5')
SB-60RED BaPEq 9774 (1') BaPEq 203 (3')
SB-60REB
SB-32 MERCURY 1.7 (5') BaPEq 237 (5')
SB-32A
SB-66RE BaPEq 1461 (2')
(10.5')
SB-66REA
SB-66RED
SB-66REB
SB-66REC
SB-60REC BaPEq 646 (1')
SB-335
SB-244
SB-331
SB-245
SB-330
SB-329
SB-332
SB-327
SB-328
SB-333
SB-246
SB-328-0203 BaPEq 170
SB-321-0203 BaPEq 940
(3.5')
SB-241
SB-323
SB-322
SB-324
SB-321
SB-319
SB-320
SB-318
SB-325
SB-326
SB-240REA BaPEq 372 (1') BaPEq 326 (5')
SB-240RED BaPEq 5759 (5') BaPEq 809 (9') BaPEq 291 (11') BaPEq 622 (13')
SB-240REB BaPEq 13461 (1')
SB-243RE BaPEq 3300 (1.0')
SB-243REA
SB-243RED
SB-243REB
SB-243REC
SB-64
SB-33 MERCURY 3.3 (5') BaPEq 731 (5')
SB-59 BaPEq 870 (5') BaPEq 810 (10') BaPEq 980 (15')
(10.5')
SB-240RE BaPEq 2378 (1') BaPEq 203 (3') BaPEq 187 (6') BaPEq 5503 (7') BaPEq 198 (11') BaPEq 337 (13')
SB-240REC BaPEq 4899 (5')
(4.5')
SB-592A BaPEq 623 (6') BaPEq 239 (8')
SB-67 BaPEq 183 (15') BaPEq 571 (20') BaPEq 231 (25')
SB-63REA
SB-63RED
SB-63REB
SB-63REC
SB-592D BaPEq 510 (6') BaPEq 208 (8')
SB-592 BaPEq 851 (3') BaPEq 931 (4') BaPEq 693 (5')
(15.5')
SB-63RE BaPEq 379 (3') BaPEq 157 (4')
SB-58 BaPEq 159 (5') BaPEq 193 (20')
SB-592B BaPEq 185 (4') BaPEq 193 (6')
SB-58REA
SB-58REB BaPEq 3019 (2') BaPEq 498 (14')
SB-58RE BaPEq 716 (1') BaPEq 8602 (2') BaPEq 159 (7') BaPEq 439 (9') BaPEq 1433 (12')
SB-62REA BaPEq 4212 (5') BaPEq 239 (7') BaPEq 4863 (9')
SB-595
SB-593
SB-594
SB-62RED BaPEq 16660 (1')
SB-239RE BaPEq 297 (2') BaPEq 208 (6') BaPEq 417 (7') BaPEq 367 (8') BaPEq 1801 (9') BaPEq 185 (11')
SB-58RED BaPEq 475 (6')
SB-62REB BaPEq 550 (1') BaPEq 282 (5') BaPEq 434 (7')
SB-239 BaPEq 340 (1.0')(SS) BaPEq 537 (1.5')(SS)
SB-62RE BaPEq 6426 (1') BaPEq 1065 (2') BaPEq 154 (5') BaPEq 215 (6') BaPEq 1348 (9') BaPEq 2215 (13') BaPEq 480 (15')
SB-62REC BaPEq 2613 (1') BaPEq 174 (3')
SB-58REC BaPEq 6424 (2') BaPEq 263 (14')
SB-57
SB-337-0506 BaPEq 700
SB-65RE
SB-342
SB-341
SB-344
SB-247
SB-248
(6.5')
SB-337
SB-340
SB-336
SB-339
SB-343
SB-338
SB-249
SB-33A

MARTIN STATE AIRPORT

FIGURE 3-1

Block D
Sample Locations

LEGEND

- 2009 VERTICAL (INNER TIER) DELINEATION SAMPLE
- 2009 LATERAL (OUTER TIER) DELINEATION SAMPLE
- PREVIOUS SOIL SAMPLING LOCATION
- 2010 Proposed Sample
- FALL 2007 SOIL SAMPLE LOCATION
- TAX BLOCK
- 2.5 FT REMOVAL DEPTH
- 3.5 FT REMOVAL DEPTH
- 4.5 FT REMOVAL DEPTH
- 5.5 FT REMOVAL DEPTH
- 6.5 FT REMOVAL DEPTH
- >= 10 FT REMOVAL DEPTH
- PRE- 1950 SHORELINE

CLEANUP GOAL FOR MERCURY IS 1 mg/kg
CLEANUP GOAL FOR BENZO(A)PYRENE EQUIVALENTS (BaPEq) IS 150 ug/kg

Lockheed Martin Middle River Complex
Middle River, Maryland

0 25 50 100 Feet

N

DATE MODIFIED: 04/13/2010

CREATED BY: MP

Tetra Tech, Inc.

CHESAPEAKE PARK PLAZA

REC #4

BLOCK 'F'

REC #5

SEVEN 1,000 - GAL AVIATION FUEL USTS ABANDONED-IN-PLACE

REC #13

FORMER RAMP TRAINING SCHOOL

WATERFRONT LOT

COW PEN CREEK

DARK HEAD COVE

FOR LIMITS WITHIN REC #6 SEE FIGURE 5-2

SB-296 SB-295 SB-297 SB-298 SB-22A SB-22 SB-23A SB-23 SB-26 SB-28 SB-27 SB-29 SB-24 SB-24A SB-24ARE SB-635D SB-624 SB-627 SB-626D SB-625 SB-50 SB-236 SB-238 SB-633 SB-269RE SB-634 SB-237 SB-25 SB-25A SB-299 SB-641A SB-642A SB-640 SB-639 SB-638 SB-265RE SB-266RE SB-94RE SB-267RE SB-397RE SB-642C SB-643B SB-652C SB-270RE SB-269RE SB-644 SB-651 SB-388RE SB-389RE SB-390RE SB-645A SB-645B SB-649 SB-650 SB-648 SB-383RE SB-646

SB-266 BaPEq 1344 (SS) AROCLOR-1260 756 (SS) BaPEq 219 (2')

SB-637B BaPEq 6953 (1')

SB-637C BaPEq 2075 (1')

SB-637 BaPEq 1186 (1')

SB-636D BaPEq 6757 (1')

F-SB-797

SB-265 BaPEq 2545 (SS) BaPEq 602 (2')

SB-636C BaPEq 7120 (1') BaPEq 391 (3')

SB-636B BaPEq 1412 (1')

SB-636 BaPEq 163 (1') BaPEq 315 (5')

SB-636A BaPEq 410 (1')

SB-393-0102 BaPEq 450

F-SB-798

SB-393RE BaPEq 329 (3')

SB-652B BaPEq 505 (1')

SB-652 BaPEq 342 (1') BaPEq 391 (5')

SB-652A BaPEq 227 (1')

F-SB-799

SB-93RE BaPEq 1190 (1') BaPEq 150 (2')

SB-641 BaPEq 1364 (1')

SB-641C BaPEq 9111 (1')

SB-641B BaPEq 289 (1')

SB-267 BaPEq 313 (SS) BaPEq 187 (2')

SB-397-0405 BaPEq 850

SB-94RE BaPEq 184 (1')

SB-642B BaPEq 201 (5')

SB-642 BaPEq 1495 (1') BaPEq 577 (9') BaPEq 191 (13')

SB-268RE BaPEq 7604 (3') BaPEq 745 (4') BaPEq 298 (5') BaPEq 1376 (6') BaPEq 709 (7') BaPEq 441 (10') BaPEq 6441 (13')

SB-643 BaPEq 708 (1') BaPEq 225 (11')

SB-269 BaPEq 1883 (SS) BaPEq 168 (2')

SB-643C BaPEq 269 (13')

SB-268 BaPEq 38098 (SS) BaPEq 4262 (2')

SB-96RE BaPEq 602 (1')

SB-270 BaPEq 369 (SS) BaPEq 168 (2')

SB-390-0405 BaPEq 990

SB-645 BaPEq 25435 (1')

SB-645C BaPEq 369 (1')

SB-95RE BaPEq 50039 (1')

SB-389-0102 BaPEq 220

SB-388-0102 BaPEq 380

SB-383-0102 BaPEq 19000

SB-647C BaPEq 5140 (1')

SB-647A BaPEq 3838 (1')

SB-647 BaPEq 284 (1')

SB-647B BaPEq 283 (1')

SB-238 BaPEq 424 (SS) BaPEq 2963 (05')

SB-407 BaPEq 190 (0203)

SB-406 BaPEq 510 (0102) BaPEq 320 (0203)

SB-405RE BaPEq 2586 (9')

SB-405 BaPEq 330 (0405) BaPEq 230 (0708)

SB-489 BaPEq 260 (0203)

SB-635 BaPEq 276 (9')

SB-635C BaPEq 1267 (1')

SB-24ARE MERCURY 1.5 (1') MERCURY 1 (2')

SB-24A MERCURY 1.4 (SS)

SB-626D MERCURY 1 (3')

SB-626 MERCURY 2.2 (1') MERCURY 2.7 (2')

F-SB-800

F-SB-801

F-SB-802

SB-626B MERCURY 1.2 (1-4')

SB-626C MERCURY 2.2 (1')

(1.5') (2.5') (3.5') (4.5') (5.5') (9.5') (13.5')

FIGURE 3-2

Block F Sample Locations

LEGEND

- 2009 VERTICAL (INNER TIER) DELINEATION SAMPLE
- 2009 LATERAL (OUTER TIER) DELINEATION SAMPLE
- 2009 SECOND ROUND LATERAL DELINEATION SAMPLE
- PREVIOUS SOIL SAMPLING LOCATION
- FALL 2007 SOIL SAMPLING LOCATION
- 2010 PROPOSED SAMPLE
- PRE-1950 SHORELINE
- TAX BLOCK
- STRUCTURE
- REC LOCATION APPROXIMATE
- 1.5 FT REMOVAL DEPTH
- 2.5 FT REMOVAL DEPTH
- 3.5 FT REMOVAL DEPTH
- 4.5 FT REMOVAL DEPTH
- 5.5 FT REMOVAL DEPTH
- 9.5 FT REMOVAL DEPTH
- >= 10 FT REMOVAL DEPTH

CLEANUP GOAL FOR BENZO(A)PYRENE EQUIVALENTS (BaPEq) IS 150 ug/kg
CLEANUP GOAL FOR PCBs IS 320 ug/kg
CLEANUP GOAL FOR MERCURY IS 1 mg/kg

Lockheed Martin Middle River Complex
Middle River, Maryland

0 15 30 60 Feet

N

DATE MODIFIED: 04/13/2010

CREATED BY: MP

Tetra Tech, Inc.

Map Document: (K:\GProject\middle_river\Maps\GPS SOIL BORING LOC\Final RAP figures\Final RAP_Comments\
Block F Removal Limits 04 13 2010 Fig 3-2.mxd) 7/13/2010 -- 10:39:01 AM

Map Document: (K:\GProject\middle_river\Maps\GPS SOIL BORING LOC\Final RAP figures\Final RAP_Comments\Block G Removal Limits 04 13 2010 Fig 3-3.mxd) 7/13/2010 -- 10:59:30 AM

PARKING LOT NO. 2

PARKING LOT NO. 3

BLOCK 'G'

G-SB-803
G-SB-804
G-SB-805
G-SB-806
G-SB-807
G-SB-808
G-SB-809
G-SB-810
G-SB-811
G-SB-812
G-SB-813

SB-761D
BaPEq 38270 (1')
BaPEq 390 (5')
BaPEq 28127 (9')
BaPEq 234 (11')
BaPEq 1125 (13')
BaPEq 6375 (15')

SB-761A
BaPEq 214 (1')
BaPEq 3432 (5')
BaPEq 2640 (9')
BaPEq 2231 (13')
BaPEq 552 (15')

SB-761
BaPEq 6993 (9')
BaPEq 35343 (11')
BaPEq 795 (13')
BaPEq 817 (15')

SB-761B
BaPEq 1392 (9')
BaPEq 547 (15')

SB-762A
BaPEq 461 (1')
BaPEq 13512 (9')
BaPEq 13293 (15')

SB-761C
BaPEq 37081 (1')
BaPEq 279 (5')
BaPEq 1035 (15')

SB-762D
BaPEq 241 (5')
BaPEq 5047 (9')
BaPEq 11506 (11')
BaPEq 2713 (13')

SB-762
BaPEq 355 (5')
BaPEq 364 (9')
BaPEq 398 (11')
BaPEq 4782 (13')

SB-762B
BaPEq 219 (11')
BaPEq 319 (13')
BaPEq 2188 (15')

SB-763A
BaPEq 740 (1')
BaPEq 1539 (9')
BaPEq 3334 (11')

SB-762C
BaPEq 626.42 (5')

SB-763
BaPEq 992 (13')
BaPEq 2863 (15')

SB-763B
BaPEq 15495 (5')
BaPEq 270 (9')
BaPEq 185 (15')

SB-763C
BaPEq 198 (1')
BaPEq 9096 (5')
BaPEq 4616 (9')
BaPEq 3353 (11')
BaPEq 12126 (13')
BaPEq 8745 (15')

SB-764A
BaPEq 580 (1')
BaPEq 2117 (9')
BaPEq 2470 (11')

SB-764
BaPEq 1397 (5')
BaPEq 1303 (9')

SB-765A
BaPEq 619 (1')
BaPEq 327 (5')

SB-765
BaPEq 406 (5')

SB-765C
BaPEq 318 (1')
BaPEq 9950 (5')

SB-765B

SB-765D
BaPEq 3834 (5')
BaPEq 513 (7')

SB-764D
BaPEq 38666 (1')
BaPEq 21710 (5')
BaPEq 504 (7')
BaPEq 11763 (9')

SB-764B

SB-764C
BaPEq 26405 (1')
BaPEq 7060 (5')
BaPEq 225 (7')
BaPEq 16912 (9')

SB-657A
BaPEq 1893 (1')
BaPEq 1207 (5')
BaPEq 214 (7')
BaPEq 5922 (9')
BaPEq 8303 (11')
BaPEq 1482 (13')

SB-657
BaPEq 843 (11')
BaPEq 259 (12')
BaPEq 4072 (13')

SB-657B
BaPEq 1196 (1')
BaPEq 1437 (5')
BaPEq 655 (9')
BaPEq 2153 (13')
BaPEq 320 (15')

SB-657D

SB-659D
BaPEq 448 (13')

SB-660

SB-658B
BaPEq 558 (5')
BaPEq 347 (15')

SB-658
BaPEq 245 (11')
BaPEq 348 (12')
BaPEq 232 (13')
BaPEq 201 (14')

SB-658C
BaPEq 692 (5')
BaPEq 415 (9')
BaPEq 10484 (13')

SB-659
BaPEq 265 (11')
BaPEq 595 (12')
BaPEq 2324 (13')
BaPEq 744 (14')

SB-659C
BaPEq 1658 (9')
BaPEq 268 (11')
BaPEq 4682 (13')
BaPEq 183 (15')

SB-195
BaPEq 1814 (05')
BaPEq 269 (10')

SB-195RE
BaPEq 229 (11')
BaPEq 284 (12')
BaPEq 13891 (13')
BaPEq 24163 (14')
BaPEq 277 (15')

SB-693A
BaPEq 386 (6')
BaPEq 242 (8')

SB-693D
BaPEq 780 (6')

SB-693
BaPEq 4469 (5')

SB-693B

SB-453-0304
BaPEq 640

SB-453RE

SB-694

SB-695

SB-696

SB-763D

(>=15.5')

(8.5')

(5.5')

SB-665

SB-668

(5.5')

SB-666

SB-197RE

SB-667

SB-197
BaPEq 355 (05')

SB-199RE

SB-673

SB-676

(5.5')

SB-674

SB-675

SB-199
BaPEq 167 (SS)
BaPEq 918 (05')

SB-441-0506
BaPEq 900

SB-689

SB-441RE

SB-692

SB-690

(6.5')

SB-198
BaPEq 201 (SS)

SB-669

SB-691

SB-672

SB-670

SB-671B
BaPEq 229 (1')
BaPEq 190 (3')

SB-198RE
BaPEq 163 (1')
BaPEq 228 (2')
BaPEq 635 (4')
BaPEq 471 (6')

SB-671D

(9.5')

SB-671C

SB-671
BaPEq 434 (1')
BaPEq 246 (3')
BaPEq 15223 (5')
BaPEq 439 (6')
BaPEq 859 (7')
BaPEq 1986 (9')

SB-196
BaPEq 1242 (SS)
BaPEq 500 (05')

SB-662A
BaPEq 627 (1')
BaPEq 702 (9')

SB-661

SB-662B
BaPEq 3172 (9')
BaPEq 2472 (11')

(11.5')

SB-664

SB-663

SB-196RE
BaPEq 424 (6')
BaPEq 319 (9')

SB-662
BaPEq 855 (6')
BaPEq 233 (7')
BaPEq 4214 (9')

SB-662C
BaPEq 6069 (3')
BaPEq 2268 (9')

SB-194
BaPEq 516 (SS)

SB-653
BaPEq 396 (2')
BaPEq 5209 (5')

SB-653A
BaPEq 368 (1')
BaPEq 3663 (5')

SB-653B
BaPEq 174 (1')

SB-194RE
BaPEq 1192 (1')

SB-653D

SB-656D

(6.5')

(5.5')

SB-656
BaPEq 226 (2')
BaPEq 437 (5')
BaPEq 176 (6')

SB-656C

SB-655

SB-654C

SB-685

(2.5')

SB-437RE

SB-654B
BaPEq 10059 (5')

SB-654
BaPEq 399 (2')

SB-688

SB-686

SB-687

SB-437-0102
BaPEq 230

FIGURE 3-3

Block G
Sample Locations

Legend

- 2009 LATERAL (OUTER TIER) DELINEATION SAMPLE
- 2009 VERTICAL (INNER TIER) DELINEATION SAMPLE
- 2009 SECOND ROUND LATERAL DELINEATION SAMPLE
- PREVIOUS SOIL SAMPLING LOCATION
- 2010 PROPOSED SAMPLE
- FALL 2007 SOIL SAMPLING LOCATION
- TAX BLOCK
- STRUCTURE
- REC LOCATION APPROXIMATE
- 2.5 FT REMOVAL DEPTH
- 3.5 FT REMOVAL DEPTH
- 5.5 FT REMOVAL DEPTH
- 6.5 FT REMOVAL DEPTH
- 8.5 FT REMOVAL DEPTH
- 9.5 FT REMOVAL DEPTH
- >= 10 FT REMOVAL DEPTH

CLEANUP GOAL FOR BaPEq IS 150 ug/kg

Lockheed Martin Middle River Complex
Middle River, Maryland

0 25 50 100 Feet

N

DATE MODIFIED: 04/13/2010

CREATED BY: MP

Tetra Tech, Inc.

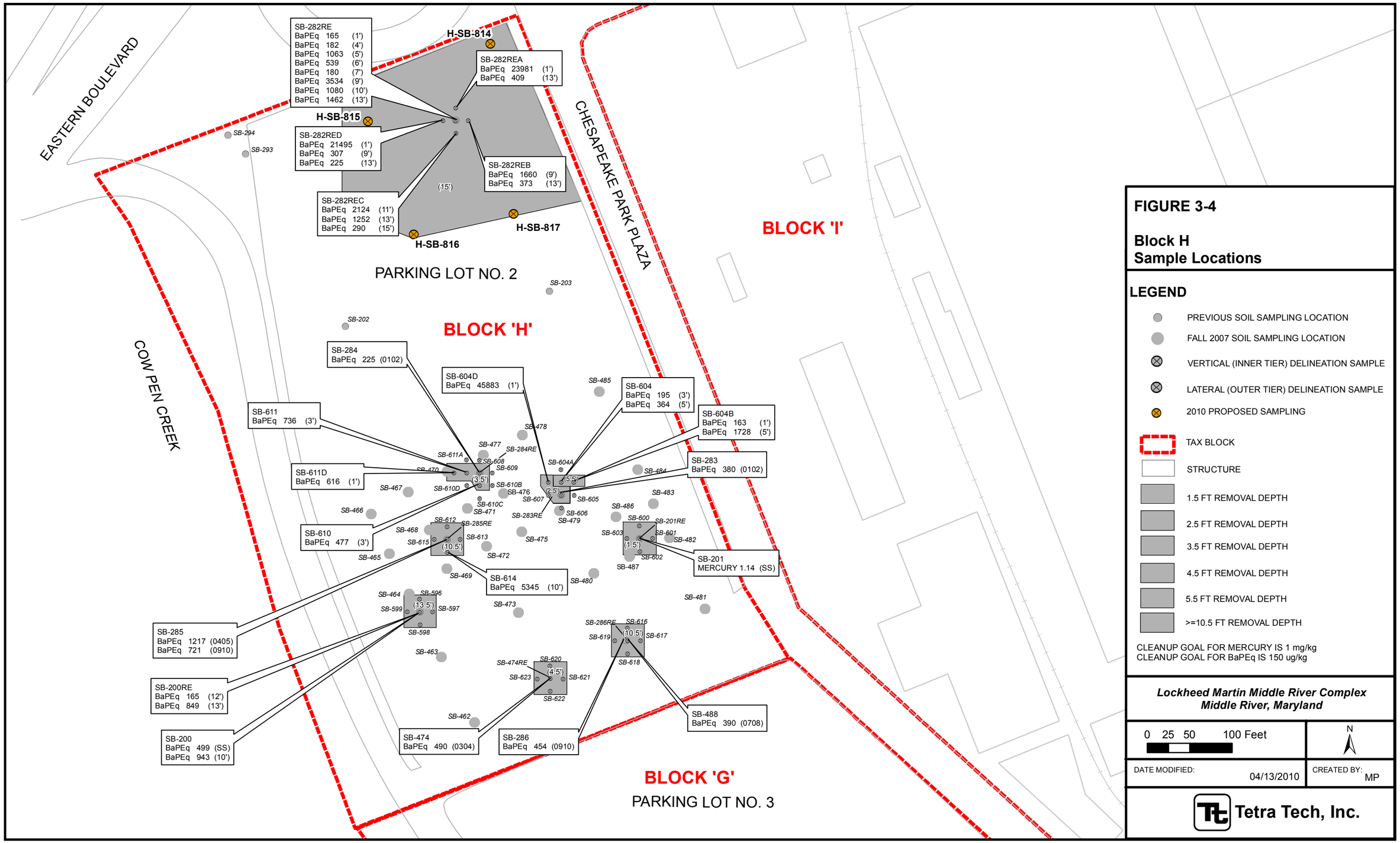

FIGURE 3-4

Block H
Sample Locations

LEGEND

- PREVIOUS SOIL SAMPLING LOCATION
- FALL 2007 SOIL SAMPLING LOCATION
- VERTICAL (INNER TIER) DELINEATION SAMPLE
- LATERAL (OUTER TIER) DELINEATION SAMPLE
- 2010 PROPOSED SAMPLING
- TAX BLOCK
- STRUCTURE
- 1.5 FT REMOVAL DEPTH
- 2.5 FT REMOVAL DEPTH
- 3.5 FT REMOVAL DEPTH
- 4.5 FT REMOVAL DEPTH
- 5.5 FT REMOVAL DEPTH
- >=10.5 FT REMOVAL DEPTH

CLEANUP GOAL FOR MERCURY IS 1 mg/kg
CLEANUP GOAL FOR BaPEq IS 150 ug/kg

Lockheed Martin Middle River Complex
Middle River, Maryland

0 25 50 100 Feet

N

DATE MODIFIED: 04/13/2010

CREATED BY: MP

Tetra Tech, Inc.

Map Document: (K:\GProject\middle_river\Maps\GPS SOIL BORING LOC\Final RAP figures\Final RAP_Comments\Block H Removal Limits B 04 13 2010 Fig 3-4.mxd)
7/13/2010 -- 11:34:59 AM

Section 4
Project Deliverables

A report summarizing the results of the data-gap investigation will be prepared. It will, at a minimum, include: a summary and description of the investigation (including field procedures), figures illustrating sampling locations, laboratory reports, summary tables of laboratory analytical results, field documentation, documentation of an appropriate level of data-validation and data usability assessment, a plan showing proposed excavation limits based on data collected in this and all previous data-gap sampling events, estimates of the total volume of soil to be removed from each excavation area, documentation of waste handling and disposal, and other relevant documentation. Recommendations will be provided in the conclusion section of the summary report.

The sampling and analysis report will be submitted to Lockheed Martin and its representatives for review and comment. Comments will be incorporated as appropriate to meet the needs of the project. Tetra Tech assumes that no more than one round of comments will be necessary and that any comments will be minimal. Additional rounds of comments may require additional funding and may delay the schedule. Tetra Tech will also update the "Environmental Geographic Information System" (EGIS) system under this item with groundwater analytical-data.

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Section 5
References

1. U.S. Environmental Protection Agency (USEPA), Region III, 1993. *Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses,* April.

2. USEPA Region III, 1994. *Region III Modifications to the National Functional Guidelines for Organic Data Review*. September.

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APPENDIX A — *HEALTH AND SAFETY PLAN*

SITE-SPECIFIC
HEALTH AND SAFETY PLAN
FOR
SOIL RESPONSE ACTION
AT
LOCKHEED MARTIN CORPORATION
LOCKHEED MARTIN MIDDLE RIVER COMPLEX

2323 EASTERN BOULEVARD
MIDDLE RIVER, MARYLAND

Submitted to:
Lockheed Martin Corporation
Lockheed Martin Middle River Complex

Submitted by:
Tetra Tech NUS, Inc.
Foster Plaza 7
661 Andersen Drive
Pittsburgh, Pennsylvania 15220

OCTOBER 2010

PREPARED UNDER THE SUPERVISION OF:

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1.0 INTRODUCTION

The objective of this Site Specific Health and Safety Plan (SSHASP) is to provide (Tetra Tech) and subcontractor personnel working under Tetra Tech direction safety and health requirements, restrictions, practices and procedures while participating in field activities at the Lockheed Martin (LM) Middle River Complex (MRC) in Middle River, Maryland.

1.1 SITE SPECIFIC HEALTH AND SAFETY PLAN (SSHASP)

The SSHASP was constructed on the framework of a Master Health and Safety Plan (MHASP). This SSHASP 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. This SSHASP and where referenced the contents of the HSGM 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). Therefore both documents including the LM Remediation Contractors ESH Handbook must be onsite to achieve regulatory and local requirements.

1.2 LM REMEDIATION CONTRACTORS ESH HANDBOOK

In addition, all contractor responsibilities stipulated in Section 1 of the LM Remediation Contractor's ESH Handbook (LM Handbook) will be adhered to. The LM Handbook can be found in Attachment I of this SSHASP. A copy of this must also be maintained onsite and available to all personnel.

Copies of all pertinent environmental, safety and health (ESH) records must be maintained at the job site. This includes, but is not limited to:

- SSHASP for each site where work is being conducted, and
- The HSGM,
- Personnel training documentation,
- Evidence of enrollment in a medical surveillance program,
- Accident/injury reporting procedures,
- Equipment and work area inspections,
- Documentation of Tail Gate Safety meetings,
- Chemical inventory List and associated MSDS's,
- Air monitoring data – This includes calibration and real time monitoring results, as well as air sampling data,

- Waste materials inventory and container inspections, etc.

These records must also be provided electronically to the LM Project Lead.

This SSHASP 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 SSHASP 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:

- Notify to the LM Project Lead
- Suspend work to assess changes to the work plan(s) and the SSHASP-A.

Changes to the work plan(s) and the SSHASP shall be reviewed and approved by the Project Lead before work can commence. Procedures addressing changes to this SSHASP as described in Section 6 of the LM Handbook (Attachment I) will be followed.

1.3 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. Personnel assigned to the following positions 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 the MHASP and this SSHASP, and in an overall manner that protects their personal safety and health and that of their co-workers, property and the environment. The following persons are the primary point of contact and have the primary responsibility for observing and implementing this MHASP and SSHASP when issued in order to achieve the intended goals for the Tetra Tech Health and Safety Program.

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

- 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 SSHASP 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 MHASP, 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 MHASP, or other applicable health and safety associated documents as per site-specific requirements.
  - Monitors compliance with the requirements of this MHASP and SSHASP.
  - Coordinates with Corporate Health and Safety Manager (HSM) as needed.

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.

1.4 STOP WORK AUTHORITY

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 PM and the HSM. 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.

1.5 SITE INFORMATION AND PERSONNEL ASSIGNMENTS

Site Name: LM Middle River Complex **Address:** Middle River, Maryland

LMC Contact: Tom Blackman **Phone Number:** (301) 214-9958

Purpose of Site Visit: Remedial excavation, transportation, and disposal of contaminated soils from identified real estate parcel (Block B) located on the boundary of the LMC Middle River Complex.

Proposed Dates of Work: October 2010 until completion

Project Team:

Tetra Tech Management Personnel:	Discipline/Tasks Assigned:	Telephone
Scott Nesbit	Project Manager (PM)	(412) 921-7134
Michael Martin, PG	Project Coordinator	(301) 528-3022
Jay Santa	Field Operations Leader (FOL)	(412) 921-8896
Michelle Gillie, CIH, CSP	Site Safety Officer (SSO)	
Matthew M. Soltis, CIH, CSP	Health and Safety Manager	(412) 921-8912
Thomas M. Dickson, CSP	Project Health and Safety Officer (PHSOs)	(412) 921-8457

Lockheed Martin Personnel	Affiliation/Discipline/Tasks Assigned	Telephone
Steve Thompson	Facilities Manager	(410) 682-1304
Mike Musheno	Environment Safety & Health/Projects	(484) 875-2819
Tom Ambrose	Facilities Supervisor	(410) 682-1308
Chief Philip Johnston	Site Security - LMC Security Office	(410) 682-1050
Jimmy Yeager	LM ESH Manager	(301) 873-1444

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

Prepared by: Thomas M. Dickson, CSP

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 LM 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 play a role in detecting potential exposure events to some chemical hazards as well as physical 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 SSHASP. 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.

Daily site surveys will be another method site personnel will employ to support early recognition of hazards. Hazards detected will be eliminated/isolated that could predispose site personnel property or the environment to an emergency situation or condition.

While the FOL and/or the SSO will be tasked and exercise primary responsibility for performing surveys of work areas prior to initiating site operations and periodically while operations are being conducted all personnel will play an active role in this activity supporting Tetra Tech health and safety policy.

Survey findings are documented by the FOL and/or the SSO in the Site Health and Safety or field 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. Based on the planned scope of work the following sections discuss potential emergencies that could arise and are recognized to be outside of field personnel to control if realized.

2.3.1.1 Excavation/Drilling

Potential Emergency: Damaging an underground utility or striking an overhead utility.

Planned Control Measure: Utility location and clearance in accordance with Section 7.0 of the HSGM and with the local One Call system. Within this procedure direction is provided to the field crew concerning passive detection methods to identify subsurface structures. These will include but not limited to:

- Utilization of Enviroscan – This is a subcontracted utility locate and clearance service.

- All mechanized drilling activities will proceed in accordance with the Utility Locating and Excavation Clearance utilizing the areas One-Call system and identified passive detection methods identified in Section 7.0 of the HSGM.

  - All utility clearances will be obtained, in writing, and locations identified and marked, prior to activities. If it is not obtainable/unknown or you location infringes within 3-feet of an underground utility advancement must proceed by hand to confirm the utility location. Pot-holing will be conducted to verify the location of the utility prior to excavating/drilling in that area.

  - DPT/Excavation operations will be conducted at a safe distance from overhead power lines.
    - 10 ft from any line ≤ 50 kV;
    - 20 ft from any line > 50 kV but ≤ 345 kV; or
    - 34 ft from any line > 345 kV.

- The typical timeline for marking and providing clearances is 2 days. A ticket or ticket number will be provided referring to your clearance. Problems arise due to site personnel allowing the tickets to expire, then accidentally encounter a utility. Tickets must be maintained valid by asking for a re-issue or extension, when necessary, prior to expiration.

- Problem that occurs with time is utility location markings on the ground may not remain visible. The FOL is responsible for ensuring that utility locations/marks on the ground are maintained so they remain visible (repaint, pin flags, etc.), and to annotate maps with these locations so they may be incorporated into the Site map.

- Once marks are placed on the ground and have been cleared, only limited leeway (3-feet) exists to stray from the planned and approved intrusive locations.

☛**Remember:** Once issued a ticket, you are not done. In many cases utility owners are too busy to respond. On your status page will be listed those owners who responded and those who did not. Always contact those owners who did not respond. Record these efforts. Make sure at a minimum you cover electrical and gas. Striking these can result in injury, death, and in some cases significant property damage.

Planned Control Measure – Jobsite Hazard Evaluation Site Surveys - As part of early recognition the FOL and/or the SSO will conduct the following activities:

- An initial site walk through will be conducted prior to the commitment of personnel or equipment. The purpose of this walk through will be to:

  - Examine the site for conditions that may predispose field personnel to potential hazards including
    - The existence of overhead power sources near where equipment will operate.
    - Surface monuments indicating the existence of underground utilities in the area (manhole covers, valve boxes, etc.).
    - Areas that may require alterations of traffic patterns or scheduling when the work will be conducted.
    - Physical hazards within the work area.
    - Terrain challenges.

- Periodic operations surveys – FOL and/or the SSO will conduct these surveys for the purpose of:

  - Ensuring field personnel are following protective measures specified within the SSHASP (as specifically stated in the Safe Work Permits).
  - Review the initial hazard assessments to insure they reflect the hazards as it may pertain to site specific conditions.
  - Prepare for Emergencies. This includes staging emergency equipment, adequate site control measures, identifying site personnel who will engage incidental response measures and reviewing what measures will be taken and when and by who prior to declaring an emergency.

These surveys should be documented within the project logbook. The results of these surveys are not intended to be disciplinary in nature however identify areas of need improvement, where applicable. The results of these surveys are to be discussed with the field personnel as part of the Tail gate Safety meetings.

2.3.1.2 Excavation Hazards – Struck By

Potential Emergency: Excavation Hazards/Equipment Movement hazards - The potential emergencies that could result during this activity are primarily physical in nature. They include struck by equipment, trapped between operating equipment and/or immovable objects, associated traffic hazards, falling into the open excavation(s), and excavation collapse taking equipment or personnel into the excavation(s) as a result of the collapse. The control measures to be put in place to minimize these occurrences are as follows:

- **Traffic Patterns in and around the dig areas** – Traffic for heavy equipment and pedestrians shall be separated by flow patterns. All heavy equipment (excavator, dump trucks, etc.) shall be routed in a singular direction. To the extent possible the pattern will minimize backing, U-turns and other maneuvers that could result in an accident. A demarcation area shall be placed in plain view, so all personnel recognize the extent of the swing pattern of the excavator and shall be directed to stand clear. No operation shall permit the swing of the bucket over persons, when engaged in loading or positioning of the equipment. Excavations left open overnight will be demarcated by construction fencing and low intensity blinking lights

- **Falling into the open excavation** – The following control measures shall be instituted to protect against the potential for persons or equipment to fall in an open excavation where equipment or structural supports have been removed. The control measures employed will be as follows:

  - Signage; Fences/barricades; sloping; and means of exit will be established to restrict approaching excavation boundaries closer than 5-feet.
  - Traffic control blocks shall be placed to prevent trucks and other (than the excavator digging) heavy equipment from approaching closer than 5-feet to the open excavation.
  - All excavations left open will be physically delineated using fences, barricade tape and posting or blinking emergency warning lights placed on all sides will access can be facilitated.

- **Struck By/Caught Between** – A number of incidents and fatalities have occurred on construction sites as a result of personnel caught between operating equipment and immovable objects. In addition, a number of these fatalities were due to personnel being run over. A couple of simple principles will be applied to prevent this from happening. These are as follows:
  - Always approach the operator from the front. Remain within the operator's field of vision.
  - Always assume he/she does NOT see you. Do not approach until they have signaled they see you and have placed the bucket on the ground.
  - Always have an escape pathway. Never place yourself between a truck or piece of operating equipment and an immovable object.

- Where personnel and heavy equipment must work within close quarters a noise producing device should be provided to ground personnel to alert operators when and where necessary.

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

General methods of prevention have been discussed above for situations that could quickly degrade into an emergency situation. Through following elements described in this SSHASP-A and those on the Safe Work Permits, conducting periodic site surveys, will minimize the potential for a situation to escalate into an emergency condition. Preparation through acquiring and placing emergency equipment in the areas it will be needed will also aid in controlling an incidental situation from escalating into an emergency situation.

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 following provisions will be established:

- Motorized vehicles must be shut off during refueling.
- Smoking will only be permitted in designated areas.
- A 10A:120:BC fire extinguisher must be maintained onsite within 50-feet of the fueling station or activity.
- During fueling all equipment will be bonded to the fuel supply delivery system to control static charge. If the fuel hose is not equipment with a bonding wire a separate independent bonding wire must be established. These connections will be periodically checked for continuity.
- All flammable and combustible liquids must be stored, dispensed and used in accordance with OSHA regulations and the Uniform Fire Code. We will have either temporary storage (approximately 100 gallons) or a fuel service. Bonding and grounding of containers containing flammable liquids will be required when transferring over 50 gallons.
- Fuel containers will not be stored within 10’ of the unit motor, heat or ignition source.
- Fuel will be stored only in appropriate UL approved safety containers with contents clearly labeled.

The LM Project Lead will be notified as soon as possible of any fire, if Tetra Tech or subcontractor personnel use a LM fire extinguisher, and of any and all fires that are extinguished. In case of fire, Tetra Tech will expend one fire extinguisher in an incidental response measure. If that fails to extinguish the fire, the FOL and/or the SSO will call 9-1-1.

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, property, or the environment. 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.
- Utility strike
- Injury requiring medical transport and care.

In the event of an emergency requiring evacuation, personnel will:

- Immediately stop activities
- Call 911 dispatch emergency services (See Section 2.7)
- Establish site security
- Non-essential personnel report to the designated safe place of refuge or an alternate place of refuge should access be blocked. These will be identified on the site map posted in the trailer and discussed during the morning Tail Gate Safety meeting or issuance of the Safe Work permit.

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.

In all cases, severe weather evacuation will be to a place of shelter determined before project start. The LM Contact – Mr. Tom Blackman will identify severe weather shelters that can be accessed in this case.

Evacuation Routes

To support emergency response access all emergency routes will be kept clear of staged or parked equipment.

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 LM 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 LM. 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
WorkCare	(800) 229-3674
Steve Thompson, Facilities Manager	(410) 682-1304
Mike Musheno, ESH/ Projects	(484) 875-2819
Tom Ambrose, Facilities Supervisor	(410) 682-1308
LM Security Chief Philip Johnston	(410) 682-1050
PM, Scott Nesbitt	(412) 921-7134
Project Coordinator Michael Martin	(301) 528-3022
HSM, Matthew M. Soltis, CIH, CSP	(412) 921-8912
PHSO, Tom Dickson	(412) 921-8457

2.6 EMERGENCY ROUTE TO HOSPITAL

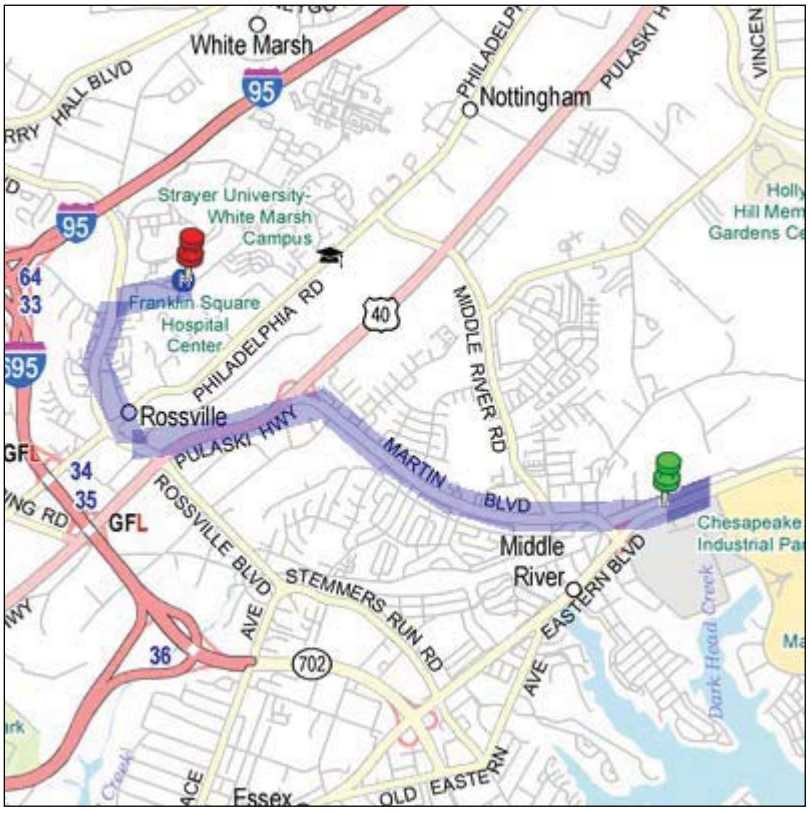
Franklin Square Hospital
9000 Franklin Square Drive
Baltimore, Maryland 21237
(410) 682-7000

Distance: 4.9 miles

Head East on Eastern Boulevard E.	0.3 miles
Make a U-turn at MD-150 E.	0.3 miles
Take exit on Right towards MD-700 / Martin Blvd / US-40.	0.2 miles
Go Straight on MD-700 W.	1.6 miles
Take US-40 W on Left.	1.0 mile
Turn Right onto Rossville Boulevard	1.0 mile
Turn Right onto Franklin Square Drive.	0.4 miles
Hospital is on the Left.	

FIGURE 2-1

ROUTE TO HOSPITAL



2.7 EMERGENCY ALERTING AND ACTION/RESPONSE PROCEDURES

Tetra Tech personnel will be working in close proximity to each other at LM Middle River Complex (LM/MRC). As a result, hand signals, voice commands, line of site communication, and cell phones will comprise the methods to be employed to alert site personnel of an emergency.

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

- Alert site personnel of the incident.
- Initiate incipient response measures for fire, spill, injury (first aid).

If these initial measures fail to control the incident, the FOL and/or the SSO will contact emergency services.

- 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.
- All personnel shall report to the designated refuge point where the FOL will account for all personnel
- Once all personnel are accounted for the FOL and/or the SSO may disperse personnel to control access points to provide perimeter security until emergency services arrive.
- Describe to the FOL (FOL will serve as the Incident Coordinator) pertinent incident details.

2.8 PERSONAL PROTECTIVE EQUIPMENT (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. Each truck transporting soils will have a portable extinguisher; each piece of excavating equipment will have a portable extinguisher (at least 2A:10B:C). This equipment will be located in the field office as well as in each site vehicle. All first aid kits should be 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.

The following represents the minimum PPE for all Block B activities:

- Hard hat meeting the ANSI Z89.1
- Safety eyewear meeting ANSI Z87.1 requirements
- Field Attire – Long sleeves and long pants

- Steel toed work boots which meet the ANSI Z41 Standard shall be provided when impact and/or compression hazards exist.
- Variations in this level of protection will be identified on the safe Work permit issued for that task.

Reduction in levels of protection will require PHSO and SSO concurrence.

- 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). During this filed work
- 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.

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

Tetra Tech maintains a PPE program. The level of protection required at each active job site will be addressed in this SSHASP and also provided on the Safe Work Permit based on the work activity, associated site hazards and the contaminants of concern. Conditions at the site may change; therefore, the on-going level of personal protection will be evaluated using criteria described in Section 7.2. Any change in the level of protection will be approved by the PHSO and documented by the SSO on Safe Work Permits and in the daily log or Daily Activities Record.

The PPE elements identified represents those available to respond to an emergency incident.

2.8.1 Emergency Equipment

The following equipment will be maintained on-site and be immediately accessible to support incidental response measures:

2.8.1.1 First-aid kit

The SSO will determine the number of kits necessary based on the number of segregated operations. At least one first-aid kit will be centrally maintained for every twenty-five employees/personnel. If a person has to travel greater than 500-feet to obtain a first-aid kit an additional kit will be required.

2.8.1.2 Eye wash units

The SSO will determine the number of eye wash units based on the number of segregated operations. Currently, at a minimum eye wash units will be required during monitoring well installation (because the personnel will be using grout in the well construction and cement during pad construction).

As indicated before this will be determined on a case by case scenario and identified in the SSHASP-A based on the nature of the task.

2.8.1.3 Fire Extinguishers

A minimum of one fire extinguisher will be maintained at project operations and be immediately available for use in the event of an emergency. Based on the initial hazard assessment the PHSO will also identify the number and placement of fire extinguishers. Again as above, the SSO will make a determination if additional units are required based on activities requiring this type of support. A Type ABC fire extinguisher must be maintained onsite and on associated motorized equipment. Fuel containers will not be stored within 10' of the unit motor. Fuel will be stored only in appropriate UL approved safety containers with contents clearly labeled.

2.8.1.4 Spill Prevention Equipment

General spill prevention items that will be maintained onsite to respond to any spill would include the following:

- Shovel/rake/broom
- 55-gallon, unused, DOT drum UN 1A2
- Adsorbent material (such as kitty litter or oil-dry)
- PPE
- Nitrile outer gloves
- Splash Shield
- Impermeable over-boots
- Rain suit or impermeable apron

The SSHASP will identify site-specific materials based on the nature of the task to be performed.

2.8.2 Levels of Protection

The individual components of clothing and other protective equipment must be assembled to protect the worker from chemical hazards and to minimize the hazards and drawbacks of the PPE. OSHA has

established four basic levels of PPE based primarily on respiratory protection and secondarily on skin protection. These levels are described in Appendix B to 29 CFR 19 10.120. It is expected that the majority of investigation-related work at the eight sites will entail a modified Level D PPE, with Level C being available at all times. Specific PPE requirements/combinations will be presented in the SSHASP.

The majority of the work is anticipated to be in a Modified Level D protection. This is of course contingent on site specific information (contaminant levels and monitoring instrument results). Modified Level D as anticipated for this project would consist of:

- Hard hat
- Safety glasses equipped with side shields or wrap around
- Standard field attire to meet ambient conditions (long sleeve shirt and full length pants.
- Safety Shoes
- Standard work gloves
- High Visibility Vest to increase visual recognition when working near traffic patterns.
- Hearing protection NRR of 25dB will be available for use during high noise operations

Modifications to this level of protection, **Level D+** includes provisions when functions present the possibility of splash or incidental contact with site contaminant:

- Tyvek for incidental contact with soils
- Tychem or Rainsuits for handling liquids or during decontamination activities
- Face shield
- Chemical splash safety goggles
- Chemical resistant boot covers
- Chemical resistant gloves – Nitrile Outer gloves over layered as necessary nitrile surgeons gloves. During cold weather a cotton glove line is recommended to absorb the sweat and provide warmth. Gloves get changed out each time personnel exit the exclusion zone.

2.8.3 Selection of Levels of Protection

Initial PPE selection will be made by the PHSO during the development of the SSHASP based on historical information regarding concentrations of site contaminants provided as well as task based hazards anticipated. PPE selected must be adequate to protect employees from the specific hazards which they are likely to encounter during their work onsite for the duration they are likely to encounter these hazards. PPE will be selected based on the tasks to be performed, the anticipated physical and chemical hazards associated with the site, and the condition of the work site. Selection of appropriate PPE is a complex process which needs to take into consideration a variety of factors. Key factors

involved in this process are identification of the hazards, or suspected hazards; routes of potential exposure (inhalation, skin absorption, ingestion, and eye or skin contact); and the performance of the PPE material in providing a barrier to these hazards. The amount of protection provided by a particular type of PPE material is dependent upon the type of contaminant of concern and the work that is going to be performed. The durability of PPE materials, such as tear strength and seam strength as well as breakthrough time must be considered in relation to the employee's task. Additionally, the effects of PPE in relation to heat stress and task duration are factors in selecting and using PPE.

The SSO will conduct site-specific monitoring to evaluate conditions that may allow the refinement of the level of PPE required at a site. As conditions at the site may change, therefore the on-going level of personal protection will be evaluated on a regular basis to determine the need for change and the extent or level of that change. All changes made to the defined levels of protection will be made through the PHSP and PM. For additional information concerning selection of PPE, see Section 8.0 in the HSGM.

2.8.4 Respiratory Protection Plan

It is anticipated that the majority of site activities will be performed using either Level D or Modified Level D Protection. However, should it be necessary to employ respiratory protection, Section 9.0 of the Tetra Tech HSGM contains the Tetra Tech Respiratory Protection Plan which complies with 29 CFR 1910.134. Within this section there is also a site-specific program to be completed by the SSO. Appropriate MSHA/NIOSH-approved respiratory protective devices must be worn when the PHSO based on initial determination that employees may be exposed to contaminants identified above applicable state and/or federal action levels or OSHA permissible exposure levels are exceeded. These assessments will be determined through mathematical calculation based on source concentrations and monitoring results. 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. The use of respiratory protection will be further discussed in the SSHASP if the use of respirators is determined to be necessary based on the proposed site tasks and hazards.

2.9 HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE

Tetra Tech and subcontractor personnel conducting work at LM/MRC 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 by the SSO and available to LM 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. In addition, given the anticipated levels of protection simple removal of these PPE items is not considered problematic. They will be removed and the attending facility will be notified. The selection of the medical provider was incumbent on their resources and ability to man a full decontamination unit.

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 Cardio Pulmonary Resuscitation (CPR), and only within the limits of training obtained by site personnel.

2.10.1 Emergency Medical Treatment

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/CPR 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. **If the emergency involves personnel exposures to chemicals, follow the steps provided in Figure 2-2.**

Emergency medical treatment will be initiated under the following guarded restrictions:

- Scene safety – Evaluate the scene make sure it is safe to enter and provide assistance.
- Notify the FOL and/or the SSO of the incident.
- Take the necessary precautions to prevent direct contamination with the injured person's body fluids. Recommended practices include, but not limited to the following:
  - Use surgeon's gloves when handling cuts, abrasions, bites, punctures, etc. or any part of the injured person.
  - Use safety glasses and surgeon's masks when necessary, if there is the potential for uncontrolled spread of body fluids.

- In situations where contact occurs with non-intact skin, eyes, mouth, or other mucous membranes should be immediately reported to the PHSO.
- Should Cardio-Pulmonary Resuscitation (CPR) be required, use a CPR Micro-Shield mouthpiece when administering CPR to prevent contact with the injured party's body fluids.

In order to engage these protective measures the FOL or the SSO shall insure that these items are part of their first-aid kit.

2.11 INJURY/ILLNESS REPORTING

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

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. 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**.** The following represents reporting protocol:

- Secure emergency situation, care for any injured personnel, and secure the site. Send one person to the hospital with the MHASP/SSHASP-A with the injured person. This person will notify Work Care.

- Notify the PM, HSM of the incident, Begin the onsite investigation through the completion of the applicable sections of Attachment II and III.

- Based on the directions received from the PM, the PM can contact the POC of the facility or the FOL may do so upon receiving the approval from the PM.

- DO NOT speculate, complete applicable sections of Attachment II and III to define cause and effect.

The Tetra Tech PM will be notified and 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. 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. Injuries that may require medical care also have to be reported within 24-hours to Human Resources.

2.11.1 TOTAL Incident Reporting System

TOTAL is Tetra Tech's new online incident reporting system. Site employees can 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 for us all.

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

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

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 property also includes:

- Identified 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,
- A vacant waterfront lot.

The site is bounded by Eastern Boulevard (Route 150) to the north, Dark Head Creek to the south, and 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.

3.1.1 BLOCK B

Block B is approximately 18 acres in size with two areas which require remediation, the larger area being under asphalt and one area within the grass portion of the baseball field. The larger excavation area lies within Parking Lot No. 4. Parking Lot No. 4 is used on a very limited basis for overflow employee parking, and the asphalt pavement is in good condition. The eastern removal limit in the parking lot is in proximity to a 42-inch diameter storm drain. In addition, light standards with below-ground electric conduit are present within Parking Lot No. 4. Other possible utilities will be identified by utility clearance activities prior to initiation of intrusive activities.

All utilities identified will be protected as necessary to complete the excavations. Excavations will be terminated a sufficient distance from the utility so as not to impact the integrity of the utility. The distance will vary depending upon the size and integrity of the utility. Given the uncertainty regarding the size and

condition of the utilities, the specific setbacks will be made during the progress of the work. Decisions regarding excavation in the areas of utilities will be made in consultation with LMCPI. Tetra Tech will not replace or relocate the utilities during the construction activities.

Also in Block B, light standards with below-ground electric are present within Parking Lot No. 4. The utility pole will be protected and supported in coordination with BG&E and the EMCOR plant electrical lead. A utility truck will be used to support the light standards throughout the excavation activities.

Elevated levels of mercury, lead and carcinogenic polycyclic aromatic hydrocarbon (cPAH) are present within Block B.

The sequence of construction for each tax block is provided within the work plan.

4.0 SCOPE OF WORK

This MHASP addresses health and safety issues related to general investigation and remedial actions that could be performed by Tetra Tech and selected subcontractors at LM-MRC. General site activities at any of the LM-MRC locations may include the following:

- Mobilization/demobilization activities
  - Office set up
  - Erosion and sediment control construction
  - Utility locate
- Saw cut asphalt within the identified excavation plots
  - Slope and/or benchwhere necessary to maintain bank stability.
- Excavation of contaminated media
  - Excavate contaminated media directly into trucks
  - Excavate and dewater contaminated media
  - Confirmation soil sampling
  - LMCPI personnel will de-energize power supply to the identified light pole currently within the Parking Lot #4. The pole will be removed if the excavation proceeds in that direction. The pole then will be replaced at the completion of excavation, backfilling, site restoration.
- Decontamination
- IDW Management

This SSHASP discusses many of the inherent hazards associated with these task/operations as well as safe work practices that will be used to mitigate the hazards and to protect site personnel, the environment, and property as general reference. This information is presented in Section 5.0. For more detailed description of the planned tasks associated with LM/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 PM and the HSM, so that any appropriate modifications to this SSHASP 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 when the permits are issued. 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 situation, not requiring calling 9-1-1, LM facility personnel will 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. Lead is one of the primary contaminants of concern. Lead is a bioaccumulative substance. In this scenario, the primary route of exposure is often hand to mouth activities and poor work hygiene practices.

  - Wash hands and face thoroughly upon leaving a contaminated or suspected contaminated area. It is recommended that D-Lead hand sanitizer be used for washing hands and face as it binds the lead. In addition, D-lead wipes should be used for hands and face when a potable water source is not available of for wiping down hard surfaces (such as the excavator controls).

- Site control provisions will be used to isolate contaminated materials. These include construction entrances, erosion and sediment control and berms to isolate the spread of contaminants. However, when in contaminated areas, 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.
  - 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 safety zones including support, contamination reduction, and exclusion zones.
  - Establish appropriate decontamination procedures for leaving the site.

- 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.

- 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.

There are a number of safe work practice categories provided in Section 13.0 of the Tetra Tech HSGM that maybe utilized in constructing the SSHASP as well as training tools for Tail Gate Training Sessions. It is recommended that FOLs, SSOs, take advantage of these to educate site personnel.

5.2 HAND AND POWER TOOL SAFE WORK PRACTICES

There will be a number of hand tools employed to construct, barriers (earthen berms, silt fences); site control boundaries. The following safe work practices will be employed during hand and power tool usage to prevent injury from faulty tools or improper practices:

- All hand and power tools will be maintained in a safe condition. This includes shovel or hammer handles; outer insulating casing (electrical tools); guards will be in place covering high temperature or rotating apparatus. All hand and power tools will be inspected before use to ensure structural integrity and guarding is in place where applicable.

- Electrical power tools shall be grounded or double insulated with proper assured equipment grounding inspections or Ground Fault Circuit Interrupter (GFCI) circuit protection provided. The GFCI pigtail will be used at all electrical connection points. The GFCIs will be tested and the test documented weekly. All electrical power tools will

  - Not be used in wet or damp locations unless otherwise approved for such activity.
  - Not be lowered and raised by their cords.
  - Use spider boxes when multiple plugs are required.
  - Examine cords and wires for frays and/or damage in the insulation.

- Pneumatic power tools shall be secured to the hose or whip by some positive means to secure an accidental released line from falling.

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

- All grinding machines shall conform to OSHA and ANSI requirements. This includes

  - All grinders will be inspected before use.
  - All grinding wheels will be rung before installation.
  - All portable grinders will be equipped with a 180˚ guard and adjusted properly to contain any grinding wheel components released during grinding.

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

5.3 HOUSEKEEPING

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 LM.

5.4 EXCAVATION – GENERAL SAFE WORK PRACTICES

5.4.1 Before Excavation Activities

- Identify underground utilities, buried structures, and aboveground utility lines before drilling. Tetra Tech NUS, Inc. personnel will use the Utility Locating and Excavation Clearance Standard Operating Procedure provided in the Tetra Tech Health and Safety Guidance Manual, Section 7.0, as well as an Approved contractor and coordination with LM/MRC facilities to identify all subsurface utilities. Section 5.7 and the LM/MRC Handbook defines requirements to be executed prior to intrusive activities.

- All excavation boundaries and roads leading into the area will be demarcated with appropriated signage warning of construction activities in progress. Signs shall be used also for informational purposes as well to direct personnel, as well as directing PPE requirements.

- All 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 SSHASP.

- Establish traffic patterns for foot and small vehicular traffic out of the pattern for heavy equipment.

- All traffic patterns for heavy equipment will be constructed to maintain traffic flow a minimum of 5-feet from unsupported walls regardless of the depth of the excavation (excavation boundaries)

  Note: The standard (29 CFR 1926 Subpart P) stipulates 2 feet distance from unsupported walls for resource staging. However, a maintenance distance of 5-feet will be maintained until soil classification is complete supporting a closer distance. This distance has been selected based on the intended depth of the excavation.

- Excavation along thoroughfares will require the use of signage, barricades and flag-persons for alteration of traffic patterns, as necessary. A modification in traffic plan will be issued in accordance with Department of Transportation (DOT) requirements for Manual on Uniform Traffic Control Devices (MUTCD).
  - Anytime environmental investigation or construction remediation will impact traffic flow pattern, a Traffic Control Plan (TCP) must be submitted to ensure the safety of the workers as well as efficient movement of traffic.
  - Drawings will be provided defining elements including but not limited to:
    a. Definition of the work space, buffer zone, placement of Caution Signs within the Advanced Warning area and Warning Signs in the Taper area, as well as control points and speed limits.
    b. Taper areas as well as detours will be defined in the TCP.
    c. OSHA has adopted Part VI Standards and Guides for Traffic Control for Street and Highway Construction and Maintenance Utility and Incident Management Operations. These guidelines will be used to construct the TCP.

- Unless weight scales are used the operator loading trucks will need to calculate load limits based on the types of materials and level of saturation.

- Saturated or wet earth will weigh approximately 100 pounds per cubic foot or 2700 pounds per cubic yard. (e.g. a 24-ton dump truck will take approximately 15 one-yard buckets before it is overloaded).

- It is critical not to overload the trucks as they have to move over public roads and property. This is a public safety and structural (roadway) restriction.

- The ground personnel will be provided with reflective vests to increase visibility and based on the traffic level carry air horns to signal heavy equipment during operation.

The loaded trucks leaving the site will be evaluated by the FOL or the SSO or designee using the Load Inspection Report provided in Attachment V.

5.4.2 During Excavation Activities

- Ground activities shall be supported with the use of a designated ground spotter to control the actions of the heavy equipment.

- During operations, the operators are to follow only instructions as provided by the ground spotter unless another individual is otherwise authorized.

- The Ground Spotter must not place themselves between pieces of operating equipment or trucks and/or immovable objects.

- Due to the potential for entrapment and crushing, operators and truck drivers will be informed of the necessity to assist each other in tracking and identifying the location of ground personnel in the work area.

- All excavations, regardless of depth, shall be constructed in accordance with OSHA regulations. Where necessary sloping or benching will be utilized to maintain excavation wall stability.

- No one is permitted to enter any unsupported excavation. All confirmation sampling will be done from the excavator bucket or using extended tools.

- Soil media samples collected from the excavator bucket will be conducted in the following manner:
  - Signal the operator regarding you intent to approach. Always do so from the front in plain view.
  - The operator will collected the bucket from the directed location and depth swing from the location and set the bucket on flat and stable ground.
  - The operator will disengage controls and signal the sampler it is safe to approach.
  - The sampler will collect their sample and move from the swing pattern of the excavator and signal the operator it is safe to re-engage the controls.
  - At this point the excavation work may continue.

5.4.3 After Excavation Activities

- Open and unattended excavations shall be properly secured during non-working hours.

- Safety fence shall demarcate excavation boundaries along traffic thoroughfares.

- Where necessary, low intensity lights will be placed along the boundaries.

- The Operator will ensure ramps are cut in where possible to allow escape should someone accidentally or through purpose violate site control protocol and end up in the excavation.

- Where ramps are not possible the FOL and/or the SSO shall place ladders and secure them in the excavation to support emergency escape.

5.5 LM MINIMUM REQUIREMENTS FOR INTRUSIVE FIELDWORK WORK PLANS

5.5.1 Purpose

The purpose of these requirements is to prevent damage to subsurface and overhead utilities and structures and unexpected chemical releases during ground disturbance activities such as drilling, augering, direct-push technologies, excavation, trenching, chemical injection, grading or other similar operations.

5.5.2 Scope

The minimum requirements for subsurface clearance activities, which must be followed prior to and during ground disturbance activities at any LM remediation project sites are listed below. After completing the subsurface clearance activities in this procedure, all ground disturbance activities shall proceed with caution.

This includes requirements on implementing in situ chemical injection programs, and/or managing significant field changes in field work plans and worksite housekeeping.

The LM Project Lead (PL), the managing contractor, and the performing contractor will be responsible for fulfilling the objectives of this document ensuring that the requirements are carried out by the performing contractor's employees, sub-contractors and their employees and any other persons involved in the intrusive activity. The work requirements outlined below shall be incorporated into the work plan.

5.5.3 Work Requirements

General

The performing contractor's project manager and the supervisor of the intrusive field work subcontractor must review the LM Corporate Staff Procedure EO-28 Digging Projects and the Risk Handling Checklist in Attachment VI and VII, and complete Dig Permit and Invasive Fieldwork Clearance and Authorization Form found in Attachments VIII and IX. Requirements and questions within the Risk Handling Checklist including identification of potential failure modes and hazards, traffic control, and excavation requirements shall be addressed in the work plan. In addition to the provisions of CS-28, relevant state, local and facility requirements must be identified in the work plan and in place before initiating any work. CS-28, the Risk Handling Checklist and the Dig Permit are included in Attachment VII and VIII of this MHASP.

The permit and the checklist shall be completed and approved by the PL before initiating any ground disturbance activities. The PL shall forward these items to the Environment, Safety and Health (ESH) professional, the performing contractor responsible for oversight, and the facility manager, as necessary, for their review.

Utility and Underground Structure Clearance

A utility and underground structure location survey which includes, but is not limited to records research, consultation with site facilities personnel, site inspection to locate physical evidence of underground or overhead utilities or structures and geophysical or other appropriate remote sensing techniques must be performed by a qualified utility location firm at least two weeks prior to initiating any intrusive activities. The survey shall include the appropriate equipment necessary to detect buried foundations and slabs, piping, direct-bury cables and other buried conduits and structures using the technologies appropriate to the anticipated utilities such as electromagnetic detector; ground penetrating radar; acoustic plastic pipe locator; probe, beacon, or trace wire; or cesium magnetometer. A table summarizing applicability of technologies for detecting various utilities is presented in Attachment X.

Because undocumented or inactive utilities can result in problems as severe as or more severe than documented utilities, utility location work must include, at minimum, ground penetrating radar as a screening tool to identify objects that may not be documented on utility record plans and other records.

The utility location/survey firm operators shall have at least 2 years of experience on industrial sites and preferably direct experience on the site under review. The utility survey firm shall be approved by the LM PL.

In addition to the utility survey, the state or other legally-mandated utility clearing organization ("Dig Safe," "U-Dig" or other such organization) having jurisdiction over the region in which the work is to occur, shall be notified within the time period required by that organization, state and local regulations. Even if all of the work is conducted entirely on LM or other private property, the utility clearing organization shall be contacted.

All aboveground indicators of subsurface and overhead utilities/services that may be leading to or from buildings and structures within the planned intrusive work area must be located and marked out in the field. Locations of utilities and structures detected by remote sensing equipment shall also be marked out in the field. Public utility mark-outs by for all exterior locations must be identified within required time period. Physical evidence of underground or overhead utilities may include, but is not limited to lights, signs, telephone systems, drains, electrical junction boxes, manhole covers, valve boxes, hand holes, pavement patching or other evidence of prior excavations, and natural gas meters.

The contractor shall make all efforts to avoid known or observed utilities in planning the work. If, however, subsurface structures are known or observed by geophysical survey within five feet of the work area and the work area cannot be moved, the performing contractor and/or its subcontractor shall carefully excavate to within two vertical feet of the expected top of the utility, then hand dig, air lance or otherwise gently remove the remaining soil to expose the utility. Additional precautions shall be described in the work plan if the intrusive work is to be performed in frozen soils.

The performing contractor must witness the utility clearance work to verify that the expected scope is performed and be available to work with the utility location contractor to answer questions and facilitate additional research or discussions with site facilities personnel.

The utility clearance contractor's report must include details concerning the methods used to locate utilities and documentation of how specific utilities were located in plan and depth, including a copy of instrument output when instruments producing output are used. It is not sufficient for the report to merely state that the utilities on the site plan were verified or that no utilities were found without providing supporting documentation.

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 two areas associated with Block B have been fully characterized. Site contaminants that exist under Parking Lot #4 and within the Ball Field across the street from parking Lot #4 at the Middle River Complex include the following:

- Polynuclear Aromatic Hydrocarbons (PAHs) – These identified PAHs are carcinogenic.
- Metals – These include lead and mercury as the primary contaminants of concern.

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 AND CURRENT OCCUPATIONAL EXPOSURE LIMITS

Contaminant of Concern (example metals)	Current OSHA PEL And ACGIH TLV
Lead	OSHA: 0.05 mg/m^3 TWA_8 ACGIH: 0.5 mg/m^3 TWA_8
Mercury	OSHA: 0.01 mg/m3 Ceiling ACGIH: 0.025 mg/m3 TWA_8
Contaminant of Concern	**Current OSHA PEL and/or ACGIH TLV**
Napthalene (PAH)	OSHA: 10 ppm, TWA_8 ACGIH: 10 ppm TWA_8 15 ppm STEL
General PAHs	OSHA limit: 0.2 mg/m^3 OSHA PEL (mineral oil mist containing PAHs): 5 mg/m^3 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

6.1.1 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.

6.1.1.1 Lead

During the initial exposure assessment, the source numbers (contaminant concentrations in the soils) representing potential lead exposure were subjected to a mathematical spreadsheet to determine the worst case scenario in achieving airborne lead sufficient to present an over exposure problem to the Occupational Exposure Limits (OELs). During this assessment it was determine that insufficient source contaminant exists to prevent such an acute overexposure situation.

As indicated previously, lead is a bioaccumulative substance and measures will be taken to reduce if not eliminate all potential exposure.

Lead - Although children are primarily at risk, lead poisoning is also dangerous for adults. Even exposure to amounts of lead too low to cause symptoms in the short term may increase the risk of high blood pressure and mental decline in the future. Symptoms in adults may include:

- Pain, numbness or tingling of the extremities
- Muscular weakness
- Headache
- Abdominal pain
- Memory loss
- Mood disorders
- Reduced sperm count, abnormal sperm
- Miscarriage or premature birth in pregnant women
- Fatigue

In general, lead has a soft ductile gray appearance. Further more it has no odor. So detection using physical senses are unlikely in this scenario.

During the excavation activities it is unlikely that you would recognize lead in the soils unless it was a manufactured item such as batteries or something related to a process such as paint chips and black beauty a sand blasting grit indicating lead based paints may also be encountered.

As lead is a particulate or will be bound to particulates efforts will be directed to minimize dust evolution through area wetting. Airborne monitoring will also be conducted to monitor total dust and particulate size.

6.1.1.2 Mercury

During the initial exposure assessment, the source numbers (contaminant concentrations in the soils) representing potential mercury exposure were subjected to a mathematical spreadsheet to determine the worst case scenario in achieving airborne mercury sufficient to present an over exposure problem to the Occupational Exposure Limits (OELs). During this assessment it was determine that insufficient source contaminant exists to cause such an acute overexposure situation.

Mercury is used primarily for the manufacture of industrial chemicals or for electrical and electronic applications. It is used in some thermometers, especially ones which are used to measure high temperatures. A still increasing amount is used as gaseous mercury in fluorescent lamps, while most of the other applications are slowly phased out due to health and safety and environmental regulations.

Elemental mercury will remain a liquid at room temperature, however depending on the source, the various isomers may exist also in solid forms.

During the Occupational exposure has resulted in broad-ranging functional disturbance, including irritability, excitability, excessive shyness, and insomnia. With continuing exposure, a fine tremor develops and may escalate to violent muscular spasms. Tremor initially involves the hands and later spreads to the eyelids, lips, and tongue. Long-term, low-level exposure has been associated with more subtle symptoms of erethism, including fatigue, irritability, loss of memory, vivid dreams, and depression.

Again, exposure to this substance based on source concentrations are extremely unlikely.

6.1.2 Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

Exposure to polycyclic aromatic hydrocarbons usually occurs by breathing air contaminated by wild fires or coal tar, or by eating foods that have been grilled. PAHs have been found in at least 600 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency.

PAHs have the potential to cause harmful effects on the skin, body fluids, and ability to fight disease after both short- and long-term exposure.

6.1.3 Inhalation

As indicated in the table above, from a worst-case scenario, COC concentrations immediately above a captured air phase above contaminated groundwater (such as in the head space of a monitoring well) 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 COCs through dilution and dispersion,

- Area wetting will be employed during all excavation or dust generating activities to further minimize mobility and hence exposure.
- Real time air monitoring and air sampling will be conducted to monitor airborne particulates. As a result of these factors, it is very unlikely that workers participating in this activity will encounter any airborne concentrations of COCs that would represent an occupational exposure concern. To monitor this route, real-time direct reading monitoring instruments will be used (as described in section 7.0). This will be performed during intrusive tasks, as these tasks are the most likely to involve encountering/releasing any COCs into the air phase.

During excavation activities the HEPA filter leading into the cab of earth moving equipment will be inspected prior to the commencement of operations and replaced if needed. The filter will be monitored and changed periodically as needed. If periodic maintenance is provided by the rental company, provisions for periodic inspection and change out will be identified. Contaminated filters will be disposed of with the contaminated soil matrix.

6.1.4 Ingestion and Skin Contact

Potential exposure concerns to the COCs may also occur through ingestion, or coming into direct skin contact. The likelihood of worker exposure concerns through these two routes are also considered very unlikely, provided that workers follow good personal hygiene and standard good sample collection/sample handling practices, and wear appropriate PPE as specified in this SSHASP. Examples 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 using D-lead wipes or hand wash 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.
- Wiping down common surfaces with D-Lead wipes to minimize transfer.

6.2 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.

- Subsurface hazards and contact with utilities/electrical safety
- Aboveground hazards

- Suspended loads
- Noise
- Slips, trips, and falls
- Heavy lifting (strain/muscle pulls)
- Vehicular and foot traffic
- Heavy equipment hazards (rotating equipment, hydraulic lines, etc.)
- Drum handling
- Inclement weather
- Heat/cold stress
- Fire
- Pinches and compressions
- Natural hazards

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

6.2.1 Subsurface Hazards and 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 Section 7.0 will be employed. In addition, Enviroscan, a Utility detection services and support from LM PFI will be utilized to detect identify subsurface utility structures.

- 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.

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.

Hazardous energy work is currently not authorized 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.

If after all measures have been used to avoid utility contact and damage, the following will be conducted in the event of utility contact and/or damage.

6.2.1.1 Electrical

If contact is made, it is important not to contact the ground surface and the equipment at the same time. Cease all operations, remain in the truck and/or excavator. Contact the SSO. The SSO will contact the utility authority, provide security surrounding the truck and/or excavator until the power source can be de-energized. Do not leave the excavator unless imminent danger exists. When exiting, do not make contact with the ground and the excavator at the same time. Jump away from the excavator and any down power sources. This is only in conditions of imminent danger. There are electrical conduit lines in the area that run to lighting poles for the parking lot.

6.2.1.2 Natural Gas

Immediately shut down all operations; eliminate all ignition sources; contact 911 and the area contact or authority; move to designated assembly point; conduct a head count provide area security at all approach routes.

6.2.1.3 Plumbing (water/sanitary/storm)

There is a reported 42-inch stromwater line also in the excavation area. If struck, immediately shut down all operations; contact the area contact or authority; provide perimeter security until the authorities arrive; move to designated assembly point; conduct a head count.

6.2.2 Aboveground Hazards

Precautions will be exercised when moving or operating heavy equipment, or drilling in the vicinity of any overhead electrical lines. The minimum clearance between overhead electrical lines and operating or moving equipment will be no less than the following:

- 10 ft from any line ≤ 50 kV;
- 20 ft from any line > 50 kV but ≤ 345 kV; or
- 34 ft from any line > 345 kV.

Clearances, and reductions thereof, shall be in accordance with 29 CFR 1926.955. The aforementioned clearance distances would be any point within a right angle to the mast.

When lightning is within five miles of the work site; personnel will terminate work and move into a protected area.

6.2.2.1 Electrical Cords

Using portable electrical driven equipment the FOL/SSO will ensure:

- If using electrically driven tools drills the following provisions will be necessary
  - All plug in devices will be routed through a Ground Fault Circuit Interrupter (GFCI) to reduce the potential for electrocution.
  - All portable power tools will be double insulated or equipped with a grounding plug.
  - Extension cords will be inspected for physical defects.
  - Extension cords from portable generator or provided power outlets will be rated for outdoor use and will be of significant wire gage to carry intended amperage. The longer the distance the heavier gauge of wire will be required.

	Distance (feet)	Gauge
Tool 10 Amps	0-25	16
Tool 15 Amps	0-25	14
Tool 10 Amps	25-50	16
Tool 15 Amps	25-50	14
Tool 10 Amps	50-75	16
Tool 15 Amps	50-75	12
Tool 10 Amps	75-100	16
Tool 15 Amps	75-100	12

  When in doubt use a heavier gauge.

- Extension cords will be kept from standing water.
- Employees will not plug or unplug cords with wet gloves.

Portable Generators

The following are safety measures to be employed when working with portable generators.

- Portable generators will not be fueled while running or the engine is still hot.
- GFCIs (for units less than 5000w) will be tested each day to ensure its operational status.
- Grounding will be employed when directed by the SSO as conditions dictate.

6.2.3 Suspended Loads

Suspended loads present another area of concern. Since suspended load may drop without warning, personnel will not be permitted to walk beneath a suspended load. In addition, loads which are to be chained, tied, or rigged shall be inspected prior to being lifted or suspended. Field personnel shall perform the following safety checks:

- Chains shall be checked for wear, cuts, kinks, and proper attachment prior to hoisting. All chains to be used for hoisting and rigging will be measured at the initiation of the project. That way if the chains show an increased length potential failure can be assessed. If any changes are noted contact the PHSO for further direction.

- Wire ropes and cables shall be checked for fraying, wear, kinks, and knotting prior to hoisting.

- Equipment exhibiting any of the above characteristics shall be replaced prior to conducting any hoisting activities.

- In all cases, the weight of the load will be known as well as the working load limit of the hoisting appliance to be used. Hoisting equipment must be rated for greater than two times the estimated weight of the load. These pieces of equipment will be tagged indicating their capacity utilizing various hitches.

- Chains, straps, ropes or cables designated for securing loads during shipping shall not be used for hoisting and rigging purposes.

- Harnessing or rigging methodologies will be approved within standard industry use.

- Hoisting and rigging activities greater than 50% critical lift capabilities will be evaluated by the PHSO prior to conducting these lifts.

When extensive Hoisting and rigging activities are anticipated, the Tetra Tech Hoisting and Rigging Program will be attached to the SSHASP. Within this program rigging inspection guidelines, requirements for critical lifts and “Competent Person” requirements are posted.

Excavation Activities

During excavation activities the potential for suspended load hazards are also recognized. The following measures will be incorporated to ensure the safety of all personnel during loading/off-loading operations.

- All trucks employed to haul contaminated soils will be equipped with a cab shield or canopy adequate to protect the operator during loading.

- All drivers will remain in the cab during loading operations. If they leave the cab they will employ the minimum PPE required by all personnel and will move to a location deemed safe by the SSO. In no cases, will they be permitted to climb onto the bed to direct the operator while loading.

- At no point will personnel on the ground including Ground Spotter or sampler be permitted to walk under and elevated excavator or loader bucket.

Excavation Equipment Maintenance Activities

Trucks, excavators, loaders will be equipped with a positive means to support the accidental lowering of the body, boom or bucket during maintenance activities.

6.2.4 Noise

Site activities may involve the use of heavy equipment such as heavy haulage equipment, excavators, loaders, etc. Exposure to noise equal to or exceeding the OSHA 8-hour time-weighted average sound level (85 dBA) could result in hearing loss. The SSO will ensure that appropriate hearing protection is made available to all personnel working near sources of high intensity noise, in accordance with 29 CFR 1910.95. In addition, only personnel necessary to perform a specific function will be stationed near excessively noisy equipment. Historical data from noise monitoring conducted during previous Tetra Tech projects, indicates

DPT; air rotary; rotosonic:	92 to 97dBA
Pressure washers; steam cleaners:	92 to 95dBA
Heavy Equipment operations:	80 to 85dBA (Enclosed cab)

Note: However, noise levels vary depending on the type and condition of the drill rig or excavator, the matrix of the soil or material being drilled or dug, and distance from the noise producing equipment or reflective surfaces.

The general rule of thumb:

If a worker must raise their voice to be heard by someone standing next to them, noise levels exceed 85 dBA and hearing protection will be required.

In all cases when Hearing protection is employed the site specific Hearing Conservation Program, provided in the Tetra Tech HSGM (Section 6.0) will be completed by the SSO.

6.2.5 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.

Planned activities (all operations) associated with hazardous waste operations/site investigations may bring field personnel into areas where slip, trip and fall hazard exists. Activities such as:

- Dilapidated buildings, floor openings, stairs
- River banks, muddy slippery embankments, steep terrain
- Excavation boundaries and test pits,
- Uneven terrain (due to excavation); loose and shifting ground cover of landfill areas,
- Plastic protective cover (temporary decontamination pads)
- Work place clutter (entangle hoses)

Hazards of this nature and the potential consequences are magnified when you are maneuvering and carrying equipment to these work sites.

6.2.6 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.

6.2.6.1 Lifting Hazards and Control Measures

This hazard becomes more predominant in the early morning hours (prior to muscles becoming limber) and later in the day (as a result of fatigue). The following provisions shall be incorporated in order to minimize hazards of this nature:

- Use machinery, lifting assist devices (dollies) or multiple personnel for heavy lifts, where possible.

- Use proper lifting techniques:
  - Lift with your legs, not your back; bend your knees and move as close to the load as possible, and ensure good hand holds are obtainable. Wear gloves where necessary to improve handholds.
  - Minimize the horizontal distance to the center of the lift to your center of gravity (i.e., torso).
  - Avoid turning and twisting when lifting, carrying, or depositing loads as the lower back is especially vulnerable at this time.
  - Break lifts into steps if the vertical distance (from the start point to the placement of the lift) is excessive.
  - Plan your lifts – Place heavy items on shelves between the waist and chest; lighter items on higher shelves. Also, if the load must be carried to another location, plan and inspect the route to ensure that slipping/tripping hazards are absent.
  - Periods of high frequency lifts or extended duration lifts should provide sufficient breaks to guard against fatigue and injury.
  - Stretch and limber muscles prior to and after extended periods/frequent lifts.

- Other considerations associated with lifting injuries and muscle strains include:
  - Area available to maneuver the lift – Rearrange the area, remove clutter, and minimize the necessity of twisting and turning.
  - Area of the lift – Work place clutter, slippery surfaces. This aspect may magnify the hazard when transporting sampling supplies/equipment over rough or uneven terrain.
  - Your overall physical condition – Report previous injuries (bad backs, etc.) on your Medical Data Sheet; DO NOT attempt to lift items that will put you at risk; Break loads that you must carry into smaller manageable loads. Get assistance whenever significant lifting tasks are involved.

By evaluating applicable contributing factors, planning your lifts, and incorporating feasible control measures you can minimize the potential for injury. See Section 4.4 of the HSGM regarding additional safe lifting practices.

6.2.7 Vehicular and Equipment 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. See Section 5.4 of this SSHASP concerning safe work practices as it pertains to these activities.
Some common practices to be employed

- **DO NOT place obstructions along the sides of the road**. These obstructions may cause employees to move into the flow of traffic to avoid your activities or equipment.
- **Provide a required Free Space of Travel.** Your movement may startle a motorist or an operator and cause an accident.
- **Required "Free Space":** Maintain at least 6-feet of space between you and moving traffic. Where this is not possible, use flaggers and/or signs to warn oncoming traffic of activities near or within the travel lanes.
- **Face Traffic:** Whenever feasible, if you must move within the 6-feet of required space, or into traffic attempt to face moving traffic at all times. Always leave yourself an escape route.
- **Do not rely on the operator's visibility, judgment, or ability.** Make eye contact with the driver or operator. Carefully and deliberately use hand signals so they will not startle or confuse motorists or operators that maybe mistaken for a flagger's or ground spotters direction before moving into traffic.
- **Move Deliberately:** Do not make sudden movements that might confuse a motorist or an operator.
- **Avoid where possible interrupting Traffic Flow:** Minimize crossing traffic lanes.
- **Rubbernecking:** People can't stand it they have to look to see what is going on, what you are doing. As a result many fender benders occur within work areas. Where possible move traffic through the work area but keep them separated to the extent possible that they do not collide with the car in front of them.
- **Control speed through the work area during site operations.**

6.2.8 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 SSHASP. 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 or parts exhibiting elevated temperatures are guarded if such parts are exposed. Check/test all emergency stop controls. Use escort vehicles with flashing lights to warn 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.

Working with large motor vehicles and heavy equipment poses unique hazards. Injuries can result from malfunctioning equipment or improper operation. Personnel will receive regular reminders to avoid being injured by heavy equipment and to be aware of the potential for failing equipment. Drill rig clamps and ropes must be inspected in accordance with 29 CFR 1926.251. Motor vehicles and heavy equipment design and operation will be according to 29 CFR 1926.600 through 1926.602. In particular, the following precautions will be used to help prevent injuries and accidents:

- Brakes, hydraulic lines, light signals, fire extinguisher, fluid levels, steering, tires, horn, and other safety devices will be checked at the beginning of each week or ten-day work period.
- Drill rigs or other large equipment will not be backed up unless equipped with a reverse signal alarm, audible above the surrounding noise level, backup warning lights or the vehicle is backed up only when an observer signals it is safe to do so.
- Motor vehicle cabs will be kept free of all non-essential items and all loose items including equipment and/or samples will be secured.
- The parking brake will be set before shutting off any vehicle.
- Wearing of seat belts is mandatory.
- During periods of rain, fog, or other adverse weather conditions, the use of headlights is mandatory.
- All posted traffic signs and directions from flagmen will be observed.
- Personnel will not place themselves between operating equipment and immovable objects.
- Personnel will wear High Visibility vests to increase visual recognition.
- Efforts will be directed to minimize the number of personnel within an area. If you don't need to be there because of your job function then remove yourself.

These items have been consolidated into an Equipment Inspection Checklist provided in Attachment V.

Heavy equipment operators have a limited field of vision and therefore may not be aware that someone is near the equipment being operated. While heavy equipment is required to be equipped with warning devices such as back-up alarms, and the operator is required to operate with caution, it is incumbent upon personnel in the area to maintain sufficient distance from the equipment. For example, a sufficient distance is beyond the reach of a backhoe turning a full 360 degrees with its bucket and boom fully extended + 10-feet. It is also incumbent upon personnel in the area to ensure that they have made eye

contact with the operator prior to moving within the reach of the backhoe or other mechanical equipment. The operator must cease operations and rest the bucket (or other extension) on the ground before personnel approach. Caution will be exercised at all times. NEVER place yourself between operating heavy equipment and immovable objects due to the potential for crushing injuries and death.

6.2.9 Drum/Container Handling/Staging Areas

Drum handling will fall into two separate categories. The first is handling Investigative Derived Waste (IDW) drums or drums we have filled with water or soils, etc. General IDW handling guidelines include:

- Use only drums and containers that meet the appropriate U.S. Department of Transportation (DOT) or UN certification standards. It is our general practices to use UN1A2 55-gallon drums.
- Label and identify drums and containers when moved to the staging areas onto the drum caddies. Segregate incompatible drums and media.
- Staging areas shall be provided with adequate ingress and egress routes.
- Inspect the integrity of the drum or container before filling and/or moving. Suspect containers will be removed from service and the contents transferred into acceptable containers.
- Never fill a drum greater than 80%. If drum handling equipment is not available place the drums on the drum caddies and fill using smaller more manageable containers.

The second is the investigation of unknown drums. The following general guidelines shall be followed:

- Be aware of the potential hazards of the contents of drums or containers before handling. Only trained personnel should open drums containing unknown materials.
- Bulging drums or containers are an indication of pressure buildup. Open all drums or bungs extremely slowly to determine the presence of vapors or pressure inside the drum. If the possibility of fire or explosion exists, a protective shield and/or remote opening devices should be used.
- Consider any unlabeled drum or container as containing a hazardous substance and leave it alone until contents are properly identified and labeled. Do not assume that exterior labeling properly identifies the contents or potential hazards of drums and containers.
- Staging areas shall be provided with adequate ingress and egress routes.
- Inspect the integrity of the drum or container before moving. Any drum or container lacking integrity shall be overpacked.
- Organize site operations to minimize the amount of drum or container movement. Have a clear view of the available pathway when moving drums. If needed, an additional person should be available to provide guidance.

- Utilize drum container handling equipment whenever possible. The equipment utilized should have a sufficiently rated load capacity, and should be able to operate smoothly on the available surface.
- Use proper lifting and moving techniques to prevent back injuries, if handling equipment is not available.
- Never stand on drums or containers.
- Use non-sparking tools.
- Cease site operations immediately if site activities uncover buried drums or containers. The SSO must be notified. The SSO will evacuate the area. All unknown situations must be evaluated before site activities are resumed. The services of a specialized contractor trained in handling unknown contaminants may be needed. If, after evaluating the situation, only a portion of the site is affected, that area shall be barricaded and work may continue at other portions of the site.

In these situations, upgraded levels of personal protection will be incorporated into the SSHASP as well as Section 11.0 from the Tetra Tech HSGM Drum and Container Management Program, if necessary.

Dewatering Areas/Excavation Dewatering

Some of the excavated contaminated soils will be from below the soil/groundwater interface. This will necessitate the need for dewatering. In addition, dewatering maybe required within deeper areas of the excavations maybe necessary.

Dewatering Areas

These areas will be surrounded by a berm and silt fence to control water migration. Water will be collected using sump pumps within sumps constructed at the dewatering area. Water will be pumped through a pre-treatment consisting of sand and carbon filters to remove contaminants. From the pretreatment system the water will be pumped into a 20,000-gallon Frac tank. Eventually this pretreated water will be moved the POTW for final treatment.

These areas will be demarcated using construction fencing and signs. The sediments and saturated soils will be covered using visqueen or tarps to prevent resaturation or potentially minimize dispersal.

6.2.10 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, 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.

Adverse weather is defined as winds in excess of 35 knots (40.3 mph), heavy rain, hail, or the potential for lightning within 5 nautical miles that could affect the site within 30 minutes.

When lightning is within five miles of the work site, personnel will terminate work and move into a protected area. If a supported means for weather predication is not available then site personnel will utilize the NOAA 30/30 Rule, which is:

If there is less than 30 seconds between lightning and thunder,
go inside or to a protected area and stay inside until 30 minutes after the last thunder.

It is recommended when working in areas plagued by storms during certain times of the year that lightning warning devices be used. If necessary, the SSO or FOL will regularly check weather status, particularly if the weather changes.

6.2.11 Heat and Cold Stress

Because of the length of planned project activities, it is unlikely that 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.

6.2.12 Fire

All personnel will be knowledgeable of fire prevention procedures, firefighting techniques, and essential precautions to prevent injury. This includes knowledge of the classes of fires and the operation of fire extinguishers. All personnel shall:

- Keep fire extinguishers in a ready condition and accessible at all times. Access to or visibility of extinguishers shall not be obstructed.
- Store only the minimum required supply of paints, solvents, or other flammables from storage. At no time shall the quantity removed exceed one day's working supply.
- Do not allow combustible products of rubbish, waste or other residues to accumulate, oil-soaked rags and material subject to spontaneous combustion shall only be stored in non-combustible containers with self-closing lids.

- Do not store gasoline, flammable solvents, and liquids inside a building unless the structure has been approved for flammable storage containers. Only OSHA-approved storage cabinets shall be used for all flammable liquids, paints or solvents.
- Flammable liquids shall be stored in locations that will not interfere with evacuation of the area in case of a fire.
- Do not permit smoking, striking of matches, or other sources of ignition outside of designated "SMOKING" areas.
- Discard cigarette butts, matches or other similar materials in non-combustible containers.
- Do not stop to get anything out of a building or area if evacuation is required. JUST GET OUT - and assemble in the predetermined evacuation assembly points.
- Conduct hot work in accordance with Hot Work Permit and LM/MRC procedures (See Section 12.0).

6.2.13 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 remove hands and fingers from these pinch/compression points when completing these activities.

Common sense should be applied when working with hand tools. For instance when applying torque of force on a wrench towards and immovable object.

In all cases, personnel shall evaluate machine and associated structural components during maintenance and construction for the necessity to employ Lock Out/Tagout for energy isolation purposes.

Remember – Kinetic and potential energy must be addressed.

6.3 NATURAL HAZARDS

Natural hazards such as poisonous plants, bites from poisonous or disease carrying animals or insects (e.g., snakes, ticks, mosquitoes) are not anticipated at this work site as it is within a relative maintained area.

As with any medical condition or allergy, information regarding the condition must be listed on the Medical Data Sheet (see Attachment III of this SSHASP), and the FOL or SSO notified.

7.0 AIR MONITORING/SAMPLING

This section will discuss air monitoring methods as well as air sampling that may be using during investigatory or remedial site activities at Block B. Air monitoring/air sampling will be performed to evaluate airborne concentrations of site contaminants at source points, (sampling locations, excavation boundaries, loading/off-loading operations, etc.) worker breathing zones, general work areas, and perimeter boundaries as well as downwind points to document criteria for worker safety including potential exposures, determine protective measures for the site personnel, as well as ascertaining emission levels that could have an impact on the surrounding public. To accomplish this, it is necessary for an effective air monitoring /air sampling program to be tailored to meet the conditions found at each work site.

Historical information regarding potential contaminant levels at this site have been reviewed to determine contaminant identification and concentrations as well as physical properties. Based on this information mathematical calculations performed it is unlikely that overexposure will occur to persons working with or handling this media given the source concentrations. Nonetheless real time monitoring along with air sampling will be conducted to confirm this assessment.

The primary COCs associated with Block B are

Compound	Soil concentration (mg/kg)	Airborne Concentration (mg/m3) (necessary to achieve overexposure)
Lead	468	32.05
Mercury	13	954.2
PAHs	0.42	$2.38x10^{5}$

The concentrations provided in column 3 are the airborne concentrations that would have to be reached in the air that could present an inhalation hazard during planned site activities without regards to respirator use.

Real time monitoring instrument will be employed to monitor airborne particulate levels and particulate sizes. The results from these instruments will also be used to evaluate exposure potential as well as assess PPE levels or the necessity to upgrade based on reaching a predetermined action level(s). Based on the airborne concentration necessary to exceed OELs exposure is highly unlikely.

7.1 DUST MONITORS

Dust will be monitored during the construction activities, including excavation, stockpiling, load-out, backfilling, and compaction to avoid dispersion or inhalation of contaminated dusts or particulates. In

addition to visual observation of the working conditions, a field operated mini respirable aerosol monitor will be used to monitor the airborne dust concentrations during soil work. Dust (or aerosol) monitors are occasionally used when airborne particulates may be generated as a result of site activities and pose a potential for exposure via inhalation. These instruments measure real time concentrations of airborne particulates such as dust, smoke, mists, and fumes within a range of 0.01 to 100 mg/m3. These instruments also provide gradient measures based on the size of the particulates. In addition, to monitoring dust concentrations visual observations will be utilized to determine if a corrective measure needs to be put in place. Airborne dust concentrations become visible at a concentration of approximately 2.5 mg/m^3. Therefore, visual assessment will be utilized as a determination when to apply water to control emissions through area wetting.

Area Wetting

To control airborne particulates, area wetting will be utilized to knock down particulates generated during excavation, stockpiling, load-out and backfilling. This will be done in response to visual indications of airborne dust and as it pertains to particulate measurements using the Mini-Ram Dust Monitor. The action level is 3.0mg/m^3

If the action level 3.0mg/m^3 are reached, area wetting methods will be employed to reduce particle and/or dust levels. Water will be applied by the means of trucks, hoses, and/or sprinklers at a sufficient frequency and quantity to limit dust generation. Additional dust control measure to be employed during the project will include the use of tarps or plastic as temporary covers, limiting work during periods of high winds, and emptying or loading haul vehicles slowly and covering loads for haulage.

If area wetting techniques are ineffective and if dust levels are greater than 3.0 mg/m^3 site workers will discontinued work until sufficient water may be applied to control dust generation and the readings or visual indications subside. Once elevated readings subside site workers may continue at the direction of the SSO. If sustained readings are observes, contact the PSHO for additional guidance on air monitoring procedures and levels of protection.

7.2 AIR SAMPLING

Monitoring with Direct Reading Instruments (DRIs) will often serve as a precursor to air sampling. An air sampling plan has been generated to monitor onsite emissions, sample collection points along perimeters and at down and upwind locations. The following equipment will be employed for that purpose:

- Thermo MIE pDR-1000 Dust Monitor
- Thermo MIE pDR-1000 Dust Monitor Battery Recharger

- TE-6070 PM10 Hi Vol Sampler (PM10/Pb) (1 month min)
- PM10 Hi Vol Sample Calibration Kit (1 month min)
- Portable Generator (5KW)
- SKC DPS 10µm Portable Particulate Sampler
- SKC DCS Portable Cartridge Sampler (PAHs)
- SKC Defender Calibrator
- PM10 8 x 10 Hi Vol Quartz Filters (included in Lab Cost)
- SKC PM10 47mm Quartz Filters (25 pack)
- SKC DCS Sorbent Cartridges (PAHs)
- Sampler Substrates (25/pack)
- SKC Mercury Passive Sampler (30/pack)
- Passive Sampler Capsule Holder

For additional information, please see the Air Sampling strategy plan.

7.3 AIR MONITORING RESULTS

Observed readings within worker breathing zones are compared to established action levels that will ultimately direct field personnel to implement additional exposure control methods (area wetting, etc.), or site activity alteration.

The SSO may decide to increase the frequency of air monitoring based on instrument responses and site observations. The frequency in which monitoring is performed will not be reduced without the prior consent of the PHSO or HSM.

The results accumulated will be shared with personnel during Tail Gate/Safety meetings as well as posting these results after they have been validated through pre and post calibration. In situations where air sampling has been conducted the SSO will discuss the validated results with those sampled and post these results as a mechanism intended to share these results with field personnel.

Perimeter monitoring points should be identified so the results may be linked to a location.

7.4 INSTRUMENTS AND USE

Instruments will be used primarily to monitor source points, worker breathing zone areas, and fence line or boundary perimeter while observing instrument action levels.

The action levels will incorporate the contaminants of concern, concentration, correction factor, and instruments level of accuracy.

The action levels will be compared to a background reading for the site. The SSO shall obtain and document the daily background (BG) reading at an upwind, unaffected area and observe for readings above that BG level.

It should be noted that baseline monitoring and sampling results shall be obtained prior to the start of excavation activities to ensure pre-existing conditions are not incorporated as activity based results.

The SSO shall monitor source areas (e.g., monitoring wells, excavation boundaries, perimeter boundaries and downwind locations at 100 and 300 meters) for the presence of any reading above the daily-established BG level. If elevated readings are observed at the source location, the SSO shall monitor the workers breathing zone (BZ) areas of affected workers especially those considered high risk (working in the areas of the highest concentrations. If the appropriate instrument Action Level is exceeded (see below), the following process will be followed:

- The SSO shall order area wetting or increased water application. Work activity will be delayed until visual indications and monitoring results are below action levels 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.

7.5 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

7.6 DOCUMENTING INSTRUMENT READINGS

The SSO is responsible for ensuring that air monitoring instruments are used in accordance with the specifications of the MHASP and with manufacturer's specifications/recommendations. In addition, the SSO 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 SSO 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, FID, etc.)
- Personnel present at the area where the reading was noted
- Other conditions that are considered relevant to the SSO (such as weather conditions, possible instrument interferences, etc.)

All Air monitoring instruments will be calibrated in accordance with the manufacturer requirements.

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 and subcontractor personnel working under the direction of Tetra Tech personnel onsite. Tetra Tech and identified personnel must complete 40 hours of introductory hazardous waste site training prior to performing work at the LM/MRC. Tetra Tech and subcontractor 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 and refresher 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. LM/MRC shall be provided with electronic copies of the training certificates upon request.

Documentation of Tetra Tech and subcontractor personnel 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 and subcontractor personnel 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 conduct a pre-activities training session Tailgate Safety meeting 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. This will be at the discretion of the FOL and/or the SSO. Figure 8-2 will be used to document these safety meetings.

8.3 MEDICAL SURVEILLANCE

Tetra Tech and subcontractor personnel participating in project field activities will have had a physical examination meeting the requirements of paragraph (f) 29 CFR 1910.120 Medical surveillance program requirements. Documentation for medical clearances will be maintained on the project site and be made available upon request.

LM 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 also be followed.

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.

- Site visitors wishing to enter the exclusion zone will be required to produce the necessary information supporting clearance to the site, including information attesting to training and medical surveillance.

- Site visitors will be required to first go through site-specific training covering the topics stipulated in Section 8.2 of this MHASP.

- A visitor log will be kept to document the visitors onsite as well as the provision of orientation training where determined to be necessary.

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 LM/MRC POC or local law enforcement or security personnel should it be necessary.

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 LC/MRC, Block B 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

Instructor(s):_____

_____

FIGURE 8-2

TAILGATE/SAFETY MEETING ATTENDANCE FORM

Facility Name: _____ Date: _____

Project Number: _____

Project/Task Order Manager: _____

Field Operations Leader/Superintendent: _____

Site Safety and Health Officer: _____

Type of Tasks Being Conducted Today: _____

Topics Discussed: _____

_____

_____

ATTENDEE'S NAME	JOB TITLE	AFFILIATION	SIGNATURE

Instructor(s): _____

_____

Action Items/Due Dates/Responsibilities: _____

_____

_____

_____

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 and good work hygiene 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.

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 or where active construction operations are in progress. These areas will be demarcated using construction fencing and signs to warn personnel to maintain safe distances. Once active/intrusive activities have been completed, the site restored, the fencing will be removed to allow open access.

9.1.1 Exclusion Zone Boundary Clearances

Personnel working in the exclusion zone are required to wear the required level of PPE as indicated in this SSHASP. An entry and exit checkpoint will be identified at the periphery of the exclusion zone to regulate movement of personnel and equipment into and out of the zone. Some general Exclusion Zone dimensions are as follows:

- Drilling operations - The height of the mast plus 10-feet, or 35-feet whichever is most conservative is used for drilling operations. This distance removes personnel from not only potential chemical hazards but also physical hazards potentially associated with this operation including structural component failure, noise, high pressure lines, etc.

- Excavation Operations/Loading and off loading – The excavation area will be fenced with a 6’ chain link fence to demarcate the general boundary. Within this area, personnel on the ground will maintain 50-feet surrounding the Excavation/Loading operation. Area surrounding and on top of the truck is restricted. Personnel may approach these areas only when the operator has placed the bucket on the ground has disengaged the controls. During excavation activities, no ground personnel are permitted within the length of a fully extend boom plus 10-feet. Ground personnel will signal the

operator who will place the bucket on the ground and disengage the controls. At this time ground personnel can approach. Fences will be used to mark the excavation boundary showing how close personnel will be permitted to approach.

- At least 50-feet from truck loading operations. The operator or a designated ground control person will regulate trucks into the loading zone. This person will remain in clear site of the driver and will not place themselves between trucks, heavy equipment or other immovable objects.

- 25 feet surrounding trenching operation (installation of sediment control/silt fence).

- 10-feet (soil disruption – soil coring, hand augering and sediment sample collection)

- 10-feet low pressure decontamination activities

- 35-Feet surrounding High Pressure Truck washing and heavy decontamination operations

- IDW Storage area – Authorized personnel only

Exclusion zones inside the construction fencing may be delineated using signs, barrier tape, cones and/or drive poles, and other postings to inform and direct facility site personnel and visitors, as necessary. Physical barriers will be at the PHSO and the SSO determination based on site the tasks to be conducted and the necessity for complete control due to adjacent operations. In the event that exclusion zone cannot be adequately marked given the configuration work area, Tetra Tech site personnel will be responsible for policing the area and keeping unauthorized personnel from areas where potential exposure concerns may exist. Signs will also be used to alert other site personnel or visitors of the hazardous nature of the work being performed. Signs will instruct personnel to stay out of the area.

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) in some instances 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. Strict adherence to access/egress and decontamination within this area must be adhered to, to prevent the potential migration of contamination.

Decontamination will be conducted at a central location. Portable equipment potentially contaminated will be bagged and taken to that location for decontamination.

In some instances the CRZ will be separated from the exclusion zone such as having an isolated truck wash or when the drill rig and components are transported to a centralized decontamination area. The FOL and/or the SSO will determine which scenario best supports site activities.

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.

9.3.1 Sanitation and Break Areas

This section will address the following items:

- Toilets
- Potable water
- Showers and change rooms
- Break Areas

9.3.1.1 Toilets

One toilet will be provided for every 20 people. All toilets will be unisex and will have locking doors. The toilet provided will either be a chemical toilet and service provider or the flush toilet readily accessible at a predetermined approved location.

9.3.1.2 Potable Water

Potable water as well as electrolyte balance sports drinks such as Gatorade will be provided to the field crews for fluid replacement, as it is necessary under conditions of ambient temperature extremes. Storage and dispensing will proceed as follows:

- All containers will be clean and replenished daily.

- All containers will clearly marked as to their contents (Potable Water – Drinking Water Only; Gatorade, etc.).

- Dispensing locations will be placed in identified break areas within the support zone. The most likely location will be at a support vehicle staged near the work area. This will serve as an area for cooling or warming as well as an identified food and drink consumption area.

- If larger containers are used, dispensing cups will be provided.

- The coolers used for storage of potable drinks and cups will be stored in plastic bags away from potentially contaminating materials when not in use.

As it is undetermined when this field activity will be conducted, Fluid intake recommendations will not be made but determined as necessary based on ambient conditions. Control measures concerning heat and cold stress provide fluid intake recommendations in those section of the 4.0HSGM should it be necessary in controlling heat stress and/or hypothermia.

9.3.1.3 Showers and Change Rooms

Based on this scope and duration of this project shower facilities and locker rooms will not be required.

9.3.1.4 Break Areas

Given the location and the time of the year structured suitable locations for work breaks and warming/cooling regimens will utilize the office shelter for warming and to remove themselves from severe ambient conditions.

9.3.2 Administration Area

Support zones will vary from various projects from a site vehicle to trailers, office areas and storage and staging areas. When the Support office area is semi permanent and well established this area, the following will be identified as follows:

The Tetra Tech SSO will ensure that a Safety and Health Bulletin Board is erected and maintained on site in an area that is commonly accessed by site workers. This bulletin board will be maintained with current information, in clear view of onsite workers, and will be protected against the elements and against unauthorized removal. At a minimum, the following information shall be maintained on the bulletin board:

- Map depicting the route to the nearest medical care facility (This will also be provide for all site vehicles).
- Site map depicting access routes/entry and exit points; possible dispersion routes; utilities; sediment and erosion control, etc.
- Emergency phone numbers (This will also be provide for all site vehicles).
- Current copy of the OSHA Form 300A (as applicable) (February to March)
- Copy of a Safety and Health deficiency tracking log (optional)
- Safety and Health promotional posters (optional)
- Date of last workday injury (optional)
- OSHA Safety and Health Poster.
- Tetra Tech NUS, Inc. Health and Safety Policy.
- DRIs results

9.3.3 Marking of Temporary Structures and Trailers.

All structures and/or trailers used on site will be marked as follows:

- Contractor's Name (Tetra Tech NUS, Inc.)
- Emergency Telephone Numbers and points of contact.
- All trailers as well as any equipment and/or supplies that could become airborne will be tied down or otherwise secured.

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 SSHASP. 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.

Safe work permits should be re-issued when moving to other site locations where control measures and hazards may change.

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 NUS 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 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.

9.7 BUDDY SYSTEM

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

9.8 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 LM/MRC, the FOL will determine and arrange for telephone communications.

9.9 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 LM/MRC POC 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 LM/MRC Project Lead.

FIGURE 9-1
EXAMPLE 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 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 –)	☐ 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, SSO 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

As potentially bulk hazardous materials (over 55-gallons) will be generated or handled at any given time as part of this scope of work. Therefore, this Spill Containment Program was generated to support responding to such spillage would constitute a danger to human health or the environment.

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:

- Exclusion zones/Resource deployment
- Waste transfer – Truck loading
- Central staging

10.2.1 Exclusion Zone/Resource Deployment

To control the potential for spills in excavation and drilling areas measures will be taken to respond quickly. These include:

- One of the greatest potential for release during excavation and drilling is due to hydraulic line rupturing. To combat this potential hazards, the following mechanisms shall be employed:
  - Equipment inspections (preventative)
  - Having spill pads readily available at the equipment being used.

- Personnel will man all resource deployment more specifically during fueling operations. In addition, fire extinguisher will be maintained at the fueling location. For static fueling locations the fire extinguisher will be positioned 50-feet from the fuel dispensing location. In addition, oil pads and absorbent materials will be maintained at the dispensing location to respond to spills immediately.

10.2.2 Waste Transfer/Loading

To minimize spills and the spread of contamination the following measures will be taken:

- Incidental loose materials will be removed from the sides truck bodies using brooms or other mechanisms while in the exclusion zone to prevent the spread by dropping from the truck as it moves down the road. Operators will exercise care to prevent spilling during loading.
- All trucks will be equipped with tarps to control the release during transport. The operator will knock down above the bed spoils in the truck as well as compact soils to minimize release during transport.
- Operators loading trucks will insure that wet materials are mixed adequately with dry materials to prevent the separation of waters from the soils. This condition will result in the water on top of the load sloshing out during transport.
- Drilling and sampling operations using a centralized decontamination station will wrap these tooling in plastic for transport to the centralized decontamination area.
- Berms, silt fences will be constructed and maintain to ensure over surface migrastion does not occur.
- Trucks will be decontaminated prior to leaving the site control boundaries and entering public thoroughfares.
- All gates will be sealable or liners will be employed to insure no leakage can or will occur.
- After trucks are decontaminated, the Load Inspection will be conducted prior to signing the manifest and releasing the truck from the site.
- Trucks failing to meet equipment or operational requirements will not be used.

10.2.3 Central Staging

In order to facilitate leak and spill inspection and response, and to minimize potential hazards which may impact the integrity of the storage containers, the staging area for these substances will be structured as follows.

10.2.4 IDW

- If used for incidental storage - 55 Gallon Drums (United Nations 1A2 configurations) – 4 Drums to a Spill Pallet; labels and the retaining ring bolt and nut on the outside of each drum to facilitate easy access; Minimum 4 feet between each row of pallets.

Note: The decision to construct a bermed and lined area will be the decision of project management. Size and dimensions will be restricted to the estimated volume plus 10 percent for rain water and container displacement.

- Storage Tank – Polyethylene Construction – Frac Tanks shall be placed into a bermed enclosure of sufficient size to accommodate 110% of anticipated volume (largest container plus 10% for rainwater and container displacement). These containers will be used for dewatering storage and decontamination waters after they have been run through the Temporary Water Treatment Plant.

Regardless of container types selected, the staging area will be identified as a Satellite Storage Area with proper signage, points of contact in the event of an emergency, alternate contacts, and identification of stored material (i.e., purge or decontamination waters, soil cuttings, etc.).

An Inventory Log will be maintained by the FOL or the SSO regarding types of IDW and volumes generated. An updated Inventory List will be provided by to the designated LM/MRC POC during days off and between shifts or phases of operations as directed by the PM.

10.2.5 Flammable/POL Storage

Flammable Storage [i.e., fuels, decontamination solvents (Isopropanol)] and Petroleum/oil/lubricants (POL) will require proper dispensing containers. Storage and dispensing will comply with the following requirements:

- Fuels, which will be stored and dispensed from portable containers, will utilize safety cans.
- Portable hand held storage containers will be labeled per OSHA Hazard Communication standard requirements.
- Larger volumes stored for fueling equipment will be stored in approved mobile Above Ground Storage Tanks with secondary containment capable of holding the tank volume plus 10%.
- Portable flammable liquid storage tanks will be properly grounded and will have bonding capabilities through the hose or via a separate connection for the transfer of loading and off-loading of its contents.
- Dispensing locations will be supported by a fire extinguisher positioned no closer than 50 feet from the storage tank, properly mounted and identified.
- The storage location will be well marked with proper signage, protective bumper poles and will have straight through access/egress for vehicles.
- These areas will be supported by fire extinguishment services and spill response materials.
- Selection and placement of the area will be away from transportation pathways and bodies of water.

10.3 LEAK AND SPILL DETECTION

To establish an early detection of potential spills or leaks, a periodic walk-around by the personnel treating water or facilitating the transferred of accumulated water to the Public Operated Treatment Works

(POTW) 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 or patched to control the release.

POLs – All petroleum leaks will be collected and contained using absorbents such as Oil-Dry, or sand, and will be placed in a conspicuously marked drum. This used material, too, will be containerized for disposal pending analysis. Inspections will be documented in the project logbook.

Decontamination/Dewatering Fluids – All dewatering materials released to the environment will require the affected area to be scraped removing affected soils. These materials will be added and mixed in with the contaminated soils for disposal.

In case of a spill or release of hazardous chemicals, Tetra Tech shall immediately notify the LM 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.

- Sand, clean fill, or other non combustible absorbent (Oil-dry)
- Drums (55-gallon U.S. DOT 1A1 or 1A2)
- Shovels, rakes, and brooms
- 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.

- Employ incidental response measures to control the spill as soon as possible.

- 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 if the spill containment measures are determined to be greater than the capabilities of the field staff and resources.

- 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 where possible; collect and containerize the absorbent material. Label the new container appropriately. Await analyses for treatment and disposal options. POLs and Remedial and Investigative derived wastes will be handled separately.

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

- If we spill anything the following information shall be collected:
  - Identity of the material spilled;
  - The amount spilled;
  - Where it was spilled;
  - If it is currently controlled;
  - If it accessed any transportation pathways (i.e., storm water, bodies of water, etc.)

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 MHASP.

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 (Sections 11.0 and 12.0) and the Tetra Tech Decontamination of Field Equipment and Waste Handling Standard Operating Procedure (Attachment XI).

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 MHASP are not allowed, under any circumstances, to enter confined spaces**.

A confined space is defined as a space that:

- 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 is a confined space that has 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 identification contact 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 MHASP 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

While no hot work activities are planned based on the scope of work, inevitably the necessity to conduct hot work will be required.

Within the construction remediation component there are greater opportunities for performing hot work. At LM/MRC Hot Work Permit requests are directed through the Fire Department. It is ask that when requesting a Hot Work Permit allow for 2-days. While it seldom takes this long it is requested that this amount of time be scheduled into the planning component.

A Hot work permit will be required when you are employing:

- Open flames (oxy/acetylene; tar buggies, etc.) or
- Heat producing devices or
- Welding cutting operations
- Flammable Materials storage

In support of Fire prevention the following measures will be required when requesting a Hot Work Permit:

- Are fire prevention control measures in place?
- Have combustibles been removed from the area (at least 35-feet from the ignition source)where the work will be conducted?
- Has a Fire Watch been assigned to the activity? Will the fire watch remain after the termination of the activity for at least 30 minutes?
- Have the correct extinguishing media been placed in the area of the hot work?
- Are all persons assigned to this tasked trained in Fire Extinguisher use?
- Have adequate shielding been installed to protect adjacent workers and drivers on adjacent roadways?

In order to answer these questions in each application Tetra Tech employs a Hot Work Permit. See Figure 12-1, Hot Work Permit.

See also Section 3.4 of the LM Handbook for additional information. (Attachment I).

FIGURE 12-1
HOT WORK PERMIT

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

SECTION I: General Job Scope (To be filled in by person performing work)

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

II. Names: _____

III. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____ _____ Tetra Tech

Equipment Preparation

IV. Equipment Preparation Checklist

	Yes	NA
Equipment drained/depressured	☐	☐
Equipment purged/cleaned	☐	☐
Atmosphere Inerted (Inerting Gas -)	☐	☐
Isolation checklist completed	☐	☐
Electrical lockout required/field switch tested	☐	☐
Blinds/misalignments/blocks & bleeds in place	☐	☐
Hazardous materials on walls/behind liners considered	☐	☐
Paints and/or Coatings	☐	☐

Chemicals of Concern

V. Chemicals of Concern | LEL – UEL (Range) | Correction Factor | Instrument Response Reading

_____ | _____ | _____ | _____

_____ | _____ | _____ | _____

_____ | _____ | _____ | _____

Atmospheric Testing

Hazard Tested	Acceptable Range	Reading	Acceptable?
% Oxygen	19.5 - 23.5%	_____	Yes ☐ No ☐
% LEL/LFL	Less than 10 %	_____	Yes ☐ No ☐
Toxic_____	PEL/TLV = _____ppm	_____	Yes ☐ No ☐

Fire Prevention/Protection

Method	Type/Rating		Acceptable?
Fire Extinguisher	_____		Yes ☐ No ☐
Water Hose	None Required		Yes ☐ No ☐
Flammable Liquid Storage	UL Approved Safety Cans		Yes ☐ No ☐
Shielding/Heat Barriers	Maintain minimum 50-feet from flammable stores	Yes ☐ No ☐	
Area Wetting (Dry grasses/timber)	None Required	Yes ☐ No ☐	

SECTION II: General Safety Requirements (To be filled in by permit issuer)

VI. 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 ☐
SKA-PAC SAR ☐ Bottle Trailer ☐
Skid Rig ☐ None ☐

Modifications/Exceptions: _____

VII. Additional Safety Equipment/Procedures

Hardhat	☐ Yes ☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes ☐ No ☐ N/A
Safety Glasses	☐ Yes ☐ No	Safety belt/harness	☐ Yes ☐ No ☐ N/A
Chemical/splash goggles	☐ Yes ☐ No	Radio	☐ Yes ☐ No ☐ N/A
Splash Shield	☐ Yes ☐ No	Barricades	☐ Yes ☐ No ☐ N/A
Splash suite/coveralls	☐ Yes ☐No	Gloves (Type)	☐ Yes ☐ No ☐ N/A
Steel toe/shank Workboots	☐ Yes ☐ No	Work/rest regimen	☐ Yes ☐ No ☐ N/A
Welding Hood (F.R.=)	☐ Yes ☐ No	Burning Goggles (F.R.=)	☐ Yes ☐ No ☐ N/A
Welding Screens/shields	☐ Yes ☐ No	Heat Resistant Aprons( )	☐ Yes ☐ No ☐ N/A
Heat Resistant Jacket or Sleeves)	☐ Yes ☐ No	Blow back Protection/Flash Arrestors	☐ Yes ☐ No ☐ N/A

Modifications/Exceptions: _____

VIII. Procedure review with permit acceptors

	Yes	NA		Yes	NA
Safety shower/eyewash (Location & Use)	☐	☐	Emergency alarms	☐	☐
Procedure for safe job completion per MHASP	☐	☐	Evacuation routes	☐	☐
Contractor tools/equipment inspected	☐	☐	Assembly points	☐	☐

IX. Special instructions, precautions: Attach Cylinder Safety Requirements as applicable.

Permit Issued by: _____ Permit Accepted by: _____

13.0 USE OF LM MATERIALS AND EQUIPMENT

LM materials, tools, equipment, PPE are not authorized for use unless specifically authorized by LM.

Tetra Tech personnel are not authorized to start, stop, relocate, or adjust any LM process or production equipment without expressed approval of the LM Project Lead. Details of these requirements are described in section 3.6 of the LM Handbook.

14.0 ELEVATED LOCATIONS / LADDERS / SCAFFOLDS

Elevated location work, ladder work, or scaffolding activities may be conducted as part of this operation. It may be necessary to use ladders during tarping operations or the have drive through work platforms again to service, decontaminate or line trucks as it is determined to be necessary. The following provisions will be employed.

LADDERS

All ladders to be used will be inspected prior to use by a Competent Person (CP), See Figure 14-1. All ladders in which are defective will require the ladder to be removed from service and tagged “DO NOT USE”. Ladders will

Minimum Requirements - At a minimum, Fiber glass step ladders (Type 1A) will be employed. This selection is intended to meet the necessary working weight. Ladders that have capacity in excess of this are acceptable.

- Read and follow all labels/markings on the ladder.
- Avoid electrical hazards! – Look for overhead power lines/sources before handling a ladder. Avoid using a metal ladder near power lines or exposed energized electrical equipment. Clearance distance will be at least 20-feet from overhead power lines.
- The SSO will inspect all ladders before use. If the ladder is damaged, it must be removed from service and tagged until repaired or discarded.
- Do not use a self-supporting ladder (e.g., step ladder) as a single ladder or in a partially closed position.
- Do not use the top step/rung of a ladder as a step/rung unless it was designed for that purpose.
- Always maintain a 3-point (two hands and a foot, or two feet and a hand) contact on the ladder when climbing. Keep your body near the middle of the step and always face the ladder while climbing (see diagram).

- Only use ladders and appropriate accessories (ladder levelers, jacks or hooks) for their designed purposes.
- Ladders must be free of any slippery material on the rungs, steps or feet.
- Do not use the top step/rung of a ladder as a step/rung unless it was designed for that purpose.
- Use a ladder only on a stable and level surface, unless it has been secured (top or bottom) to prevent displacement.
- Do not place a ladder on boxes, barrels or other unstable bases to obtain additional height.

- Do not move or shift a ladder while a person or equipment is on the ladder.
- A ladder placed in any location where it can be displaced by other work activities must be secured to prevent displacement or a barricade must be erected to keep traffic away from the ladder.
- Be sure that all locks on an extension ladder are properly engaged.
- Do not exceed the maximum load rating of a ladder. Be aware of the ladder's load rating and of the weight it is supporting, including the weight of any tools or equipment. (*Source OSHA Ladder Safety Tips*)

Rolling Scaffolds

- All rolling self contained work platforms will be equipped with hand rails and full planking.
- Each unit will be inspected by the SSO "Competent Person" each day prior to use.
- Load calculations are based on persons, tools and equipment.
- The platform will be equipped with locking castors or otherwise secured to prevent tipping or displacement.
- The platform will be capable of carrying 4 times its working load.
- Base width will be at least 20-inches or greater.
- Loads on the platform will be uniformly applied.
- Signs will be placed in the approach routes to the platform indicating overhead work occurring.

Scaffolding

Scaffolding shall be inspected prior to being erected to ensure that all parts are available and operable. The following minimum requirements will pertain to the use of scaffolding.

- All employees erecting or working on scaffolds shall be trained by a qualified person. Basic safety information must be provided prior to use. When conditions change, re-training must occur.
- The footing for scaffolds shall be sound, rigid and capable of carrying the maximum intended load without settling. Unstable objects such as barrels, boxes, or bricks shall not be used as supports or placed under scaffolding footings.
- Guardrails and toeboards shall be installed on all open sides and ends when the work performed is 10 feet or more above ground or floor level. Guardrails shall be set at 42 inches high. Supports should be at intervals not to exceed 10 feet. All working platforms shall overlap at least 12 inches or be secured. Scaffold planks shall extend at least six (6) inches and not more than 12 inches over end supports. Personal Fall Arrest Systems (PFAS) must be employed when the scaffold decking is greater than 10-feet, persons are required to extend over the guard rail.
- Scaffolding shall be capable of supporting at least 4 times its intended load. Scaffolding shall have an access ladder.
- Personnel are not permitted to work under scaffolding during use.

- A Tag shall be attached to the scaffolding. A Competent Person (CP) shall complete the scaffold inspection daily, prior to use. If the tag is not signed off by the CP the scaffolding will not be used. Figure 14-2 will be completed and retained by the FOL and/or the SSO.
- Defective items shall be tagged as unusable by the CP and removed from the site.

It is recommended that Systems type scaffolding be employed. Through the use of this scaffolding placing midrails, guardrails and toeboards are removed from the equation.

See Sections 3.10, 3.11, and 3.12 of the LM Handbook (Attachment I) for additional requirements.

FIGURE 14-1

LADDER INSPECTION CHECKLIST

Subject	YES	NO	N/A	Comment
1. Are ladders or stairways provided at all points of access that are elevated 19 inches or more, and no ramp, runway, sloped embankment, or personnel hoist is provided? [29 CFR 1926.1051(a)]				
2. Does a competent person provide ladder training that teaches users how to recognize hazards and procedures for minimizing these hazards? [29 CFR 1926.1060(a)]				
3. Is ladder retraining provided when necessary? [29 CFR 1926.1060(b)]				
4. Can ladders support the load they are expected to carry? [29 CFR 1926.1053(a)(1)(i),(ii),and(iii)]				
5. Are ladder rungs, **cleats**, and steps parallel, level, and uniformly spaced when the ladder is in position for use? [29 CFR 1926.1053(a)(2)]				
6. Are rungs, **cleats**, and steps of **portable ladders** (other than **step stools** and **extension trestle ladders**) spaced at least 10 but not more than 14 inches apart (as measured between center lines of the rungs, **cleats**, and steps)? [29 CFR 1926.1053(a)(3)(i)]				
7. Are rungs, **cleats**, and steps of **step stools** at least 8 but not more than 12 inches apart (as measured between center lines of the rungs, **cleats**, and steps)? [29 CFR 1926.1053(a)(3)(ii)]				
8. Are rungs, **cleats**, and steps of the base section of **extension trestle ladders** at least 8 but not more than 18 inches apart (as measured between center lines of the rungs, **cleats**, and steps)? [29 CFR 1926.1053(a)(3)(iii)]				
9. Are rungs, **cleats**, and steps of the extension section of **extension trestle ladders** at least 6 but not more than 12 inches apart (as measured between center lines of the rungs, **cleats**, and steps)? [29 CFR 1926.1053(a)(3)(iii)]				
10. Is the clear distance between side rails for all **portable ladders** at least 11-1/2 inches? [29 CFR 1926.1053(a)(4)(ii)]				
11. Are the rungs and steps of portable metal ladders corrugated, knurled, dimpled, coated with skid-resistant material, or otherwise treated to minimize slipping? [29 CFR 1926.1053(a)(6)(ii)]				
12. Are ladders prohibited from being tied or fastened together to provide longer sections (unless they are designed for such use)? [29 CFR 1926.1053(a)(7)]				
13. Is a metal spreader or locking device provided on each stepladder to hold the front and back sections in an open position when the ladder is being used? [29 CFR 1926.1053(a)(8)]				
14. Are ladder surfaced to prevent injury from punctures or lacerations, and to prevent snagging of clothing? [29 CFR 1926.1053(a)(11)]				
15. Is it prohibited to coat wood ladders with any opaque covering, except for identification or warning labels that are placed on only one face of a side rail? [29 CFR 1926.1053(a)(12)]				

Subject	YES	NO	N/A	Comment
16. Do **portable ladders** extend at least 3 feet above the upper landing surface for which the ladder is used to gain access? [29 CFR 1926.1053(b)(1)] **Note:** As an alternative, secure the ladder at its top to a rigid support that will not deflect. Use a grasping device (such as a grabrail) to mount and dismount the ladder. The extension should never be such that the ladder deflection under load would, by itself, cause the ladder to slip off its support.				
17. Are ladders maintained free of oil, grease, and other slipping hazards? [29 CFR 1926.1053(b)(2)]				
18. Are ladders loaded at or below the maximum intended load for which they were built, or at or below the manufacturer's rated capacity? [29 CFR 1926.1053(b)(3)]				
19. Are ladders only used for the purpose for which they were designed? [29 CFR 1926.1053(b)(4)]				
20. Are non-self-supporting ladders used at an angle such that the horizontal distance from the top support to the foot of the ladder is approximately 1/4 of the working length of the ladder (the distance along the ladder between the foot and the top support)? [29 CFR 1926.1053(b)(5)(i)]				
21. Are ladders used only on stable and level surfaces, unless secured to prevent displacement? [29 CFR 1926.1053(b)(6)]				
22. Are ladders used on slippery surfaces ONLY when they are secured or provided with slip-resistant feet to prevent displacement? [29 CFR 1926.1053(b)(7)] **Note:** Do not use slip-resistant feet as a substitute for care in placing, lashing, or holding a ladder on surfaces such as flat metal or concrete that cannot be prevented from becoming slippery.				
23. Are ladders secured to prevent displacement, especially in busy, high-traffic areas? [29 CFR 1926.1053(b)(8)] **Note:** As an alternative, a barricade may be used to keep the activities or traffic away from the ladder.				
24. Is the area around the top and bottom of ladders kept clear? [29 CFR 1926.1053(b)(9)]				
25. Is the top of a non-self-supporting ladder placed with the two rails supported equally, unless it has a single support attachment? [29 CFR 1926.1053(b)(10)]				
26. Is it prohibited to move, shift, or extend ladders while they are occupied? [29 CFR 1926.1053(b)(11)]				
27. Do ladders have nonconductive siderails if they are used where they could contact exposed energized electrical equipment? [29 CFR 1926.1053(b)(12)]				
28. Is standing on the top or top step of a stepladder prohibited? [29 CFR 1926.1053(b)(13)]				
29. Is climbing on the cross-bracing on the rear section of stepladders prohibited? [29 CFR 1926.1053(b)(14)] **Note:** This is allowed IF the ladder is designed and provided with steps for climbing on both front and rear sections.				

Subject	YES	NO	N/A	Comment
30. Are ladders inspected periodically by a competent person and after any incident that could affect their safe use? [29 CFR 1926.1053(b)(15)]				
31. Are portable ladders with structural defects (a) immediately marked in a manner that readily identifies them as defective, (b) tagged with **DO NOT USE** or similar language, or (c) withdrawn from service until repaired? [29 CFR 1926.1053(b)(16)] **Note:** Structural defects include broken or missing rails, corroded components, or other faulty or defective components.				
32. Does a ladder that is repaired meet its original design criteria, before it is returned to use? [29 CFR 1926.1053(b)(18)]				
33. Do all students and employees face the ladder when moving up or down the ladder? [29 CFR 1926.1053(b)(20)]				
34. Do all employees use at least one hand to grasp the ladder when moving up or down the ladder? [29 CFR 1926.1053(b)(21)]				
35. Is it prohibited to carry any object or load that could cause a person to lose balance and fall? [29 CFR 1926.1053(b)(22)]				

Source (NIOSH Ladder Inspection Safety Checklist)

FIGURE 14-2

SCAFFOLD INSPECTION FORM

Project Location:_____ Date:_____

Erected By:_____ FOL/SSO:_____

This scaffolding must be inspected prior to use.

		Yes	No	Comments
1.	Is scaffold set up on proper base supports?	☐	☐	_____
1.	Is scaffolding set up level?	☐	☐	_____
2.	Is guardrail in place? 42 inches in height.	☐	☐	_____
3.	Are all open sides protected – Gates for access?	☐	☐	_____
4.	Are ladders positioned to allow safe access?	☐	☐	_____
5.	Are toe boards in place? 4 inches high (For scaffolds >10-feet in height).	☐	☐	_____
6.	Have follow object hazards been otherwise eliminated?	☐	☐	_____
7.	Is a mid rail needed and in place?	☐	☐	_____
8.	Are work platforms planked completely between guardrails?	☐	☐	_____
9.	Is deck material secured?	☐	☐	_____
10.	Are additional protective measures, such as netting, required around scaffold platform?	☐	☐	_____
11.	Is all required bracing installed and secure?	☐	☐	_____
12.	Are all personnel trained to recognize scaffolding hazards?	☐	☐	_____

Competent Person - Inspected by:_____Date:_____

15.0 DANGEROUS OPERATIONS

Tetra Tech and subcontractor personnel will isolate their work areas from LM 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 LM/MRC 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 is part of the field activities are being conducted under this work. All requirements stipulated in Section 3.8 of the LM Handbook (Attachment I) and Section 5.4 of this SSHASP will be adhered to. A trained, competent person will be designated to oversee the activities.

17.0 ASBESTOS

Asbestos abatement work is not authorized as part of this field effort. Should it be required, this SSHASP will be amended/updated as necessary to include the requirements stipulated in Section 3.19 of the LM Handbook (Attachment I).

It is not anticipated during this field effort, but should asbestos containing material (ACM) or presumed asbestos containing material (PACM) be disrupted, Tetra Tech and/or subcontractor personnel shall immediately report to the LM Project Lead and to other employers of employees working at the job site any discovery, disturbance, and/or spill of ACM and/or PACM. All operations will cease in the immediate area of the suspect ACM and/or PACM and demarcate the area. The approval of the LM 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 LM 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

Nanotechnology work is not authorized as part of this field effort. Should it be required, the SSHASP will address as necessary to include the requirements stipulated in Section 3.21 of the LM Handbook (Attachment I).

19.0 WORK INVOLVING AIR EMISSIONS

It is possible that dust emissions will be generated as part of this field task. Realtime monitoring and air sampling will be conducted to qualify and quantify these emissions. Efforts will be directed to control these emissions through area wetting during excavation, loading/off loading, and backfilling and site restoration. See Section 7.0 and the Air Sampling Plan for additional details.

Work involving air emissions not authorized as part of this field effort. Should it be required, the SSHASP-See also Section 4.3 of the LM Handbook (Attachment I).

20.0 WORK INVOLVING WATER DISCHARGES

Dewatering of excavations and of excavated materials will occur along with the generation of decontamination water. All waters collected will be sent through a portable onsite waste water treatment plant and then into Frac Tanks for storage. This material will be sampled then piped to the facility POTW from the identified work area Block B. See the Work plan and Section 4.4 of the LM Handbook (Attachment I) for additional requirements.

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 SSHASP
- 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 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 XII)** - 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 MHASP (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

All hazardous substance (as defined by OSHA) brought onto LM remediation sites must be accompanied by a MSDS and the containers labeled in accordance with the OSHA Hazard Communication Standard, 29 CFR 1910.1200. 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 LM Project Lead shall be notified prior to bringing ay quantity of hazardous materials onto LM 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
FID	Flame Ionization Detector
FOL	Field Operations Leader
MHASP	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)
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
VC	Vinyl Chloride
VOCs	Volatile Organic Compounds

ATTACHMENT I

LM'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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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

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.

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.

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 ☐ Did the individual die? Yes ☐ No ☐ If yes, date: _____ Will a worker’s compensation claim be filed? Yes ☐ No ☐
Telephone Number	

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.

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.

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**	

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 field trailer 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 in 1996 and was amended in 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
MOBILIZATION AND DEMOBILIZATION ACTIVITIES
LOCKHEED MARTIN MIDDLE RIVER COMPLEX

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

I. Work limited to the following (description, area, equipment used): Mobilization and demobilization activities including site specific training, area survey to identify potential physical hazards; demarcation of excavation boundaries; utility location and clearance; site control measures installation including berms and construction fencing and signs; Erosion and sediment control provisions.

II. Primary Hazards: lifting, pinches and compressions, flying projectiles, slip, trips and falls, vehicular and foot traffic, natural hazards, 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 hard hat, safety glasses, sleeved shirt and long pants, or coveralls, steel toed work boots.

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
None anticipated	NA	NA	NA

Primary Route(s) of Exposure/Hazard: The hazards anticipated during some of the mobilization/ demobilization activities are physical in nature. Exposure to chemical hazards are not anticipated during this activity. It is incumbent on the SSO to establish the site-specific Hazard Communication Program (See Section 5.0 of the HSGM) for all chemicals brought onsite.

(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
Safety 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: High Visibility Vest will be worn when working near traffic patterns. Use hearing protection during high noise activities or in high noise areas. See Section 6.0 of the HSGM for additional information.

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: 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.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT FOR
CONFIRMATION SOIL SAMPLING **ACTIVITIES**
LOCKHEED MARTIN MIDDLE RIVER COMPLEX

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

I. **Work limited to the following (description, area, equipment used):** Subsurface soil sampling, Remote sampling from excavation via excavator bucket or hand auger with extensions. Six samples will be collected for each lot as a composite sample. Should this fail chemical analysis to reach residential levels resampling will be conducted as grab samples to determine the direction in which the excavation is to be extended.

II. **Primary Hazards:** Chemical exposure, transfer of contamination, pinches and compressions, slip, trips and falls, excavation safety, vehicular and foot traffic, natural hazards, and 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 Hard Hat, safety glasses, sleeved shirt and long pants, and high visibility vests when working near operating equipment of truck traffic.

VI. **Chemicals of Concern**

Hazard Monitoring	Action Level(s)	Response Measures
Metals specifically Lead dust, mercury and PAHs	Visible dust/ Mini-Ram 3.0mg/m^3	Use area wetting to control dust emissions

Primary Route(s) of Exposure/Hazard: * See site Air Monitoring Plan for specific procedures. Inhalation and dermal and skin contact are the main exposure hazard. Minimize hand to mouth contact, be diligent in personal decontamination; use D-Lead wipes of hand wash to remove trace metals from the hands and face prior to breaks or other hand to mouth activities. Employ good work hygiene practices including good housekeeping to minimizing contact dispersion and potential exposure to these low level contaminants.

(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
Safety 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: Nitrile surgeons gloves when sampling. Reflective vests will be worn when working near operating equipment or near established traffic patterns. Chemical resistant boot covers should be worn when moving over saturated soils to prevent saturation of foot wear.

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:** Prevent access of unauthorized personnel into exclusion zone. Site visitors shall be escorted by Tetra Tech personnel or other authorized personnel (direct to Tetra Tech FOL). When retrieving samples from the excavator bucket, the operator will obtain a bucket of soil from the location indicated by the sampler. The operator will swing the bucket to a stable flat area and set it on the ground and disengage the controls. At this point the operator will signal the sampler to approach and to collect the sample. The sample will be collected from the middle of the bucket to avoid potential cross contamination. Upon completion of the

sampling, the sampler will step away and signal the operator that he may resume excavation activities. When using extension tools exercise care in the approach to the excavation boundary. Where possible maintain 2-foot clearance. The sampler should maintain a ladder near the boundary for emergency extraction should he fall in. If the depth of the excavation is greater than 6-feet on the leading edge, the sampler is required to employ fall protection and a restraining device to prevent falling into the excavation. Do not over-stress tools as they may collapse resulting in injury. Upon completion of sampling, the sampler should wash hands with D-Lead or use D-Lead wipes to remove residual or trace metals. Tooling should be wrapped and transported to the central decontamination between locations.

Permit Issued by:_____ Permit Accepted by:_____

SAFE WORK PERMIT
SAW CUTTING ASPHALT
LOCKHEED MARTIN MIDDLE RIVER COMPLEX

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

I. Work limited to the following (description, area, equipment used): Prior to beginning excavation activities, the boundaries of the excavation in Parking Lot#4 will be painted out using white lines. A walk behind concrete/asphalt wet saw will be used to cut these boundary lines. The asphalt will be collected using onsite equipment and the asphalt will be mixed and disposed of in the contaminated soils.

II. Primary Hazards: Heavy lifting, equipment operations, noise, energized systems, lifting, slips, trips, and falls, ambient temp extremes, stings, and 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 PPE requirement include hard hat, safety glasses, sleeved shirt and long pants, work gloves, and hearing protection.

VI. Chemicals of Concern

Hazard Monitoring	Action Level(s)	Response Measures
Metals specifically Lead dust, mercury and PAHs	Visible dust/ Mini-Ram 3.0mg/m^3	Use area wetting to control dust emissions
_____	_____	_____ allow dust to settle

Primary Route(s) of Exposure/Hazard: * See site Air Monitoring Plan for specific procedures. Inhalation and dermal and skin contact are the main 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
Safety 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: Reflective or High visibility vests within 15-feet of established traffic areas this includes barricades to alert traffic of ongoing operations; Heavy Equipment Inspection Checklist must be completed. Other: Emergency Equipment will be maintained onsite accessible to nearby operations. The SSO will determine the number of units necessary.

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 site activities in the event of inclement weather. Use proper lifting techniques. Inspect equipment prior to use. This is a wet cut operation to minimize dust generation. The following safety measures should be incorporated: Make sure the operator knows how to operate that saw; inspect prior to use; Insure all guarding is in place to protect the operator from the blade; make sure the blade is sharp; set the depth necessary to get through the asphalt but not too deep; allow the saw to reach maximum rotating speed before lowering onto the pavement; make sure the water supply is adequate to eliminate dust and cool the blade. If it binds stop the cut and repeat the start procedure. Practice good housekeeping to minimize slips, trips, and falls on hoses and uneven pavement, clear the area where cutting will occur. Do not fuel hot saws, allow the motor to cool adequately before fueling.

Permit Issued by:_____ Permit Accepted by:_____

SAFE WORK PERMIT
DECONTAMINATION
LOCKHEED MARTIN MIDDLE RIVER COMPLEX

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

SECTION I: General Job Scope

I. **Work limited to the following (description, area, equipment used):** Decontamination of heavy equipment and sampling equipment.

II. **Primary Hazards:** Lifting; flying projectiles; noise; lacerations; falling hazards; slips, trips, and falls

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 ☐Yes
Level C ☐ Level A ☐No

Respiratory equipment required
☐ Specify on the reverse
☒

Modifications/Exceptions: Minimum PPE – Hard hat, safety glasses; sleeved shirts long pants; safety shoes or boots

VI. **Chemicals of Concern** | **Hazard Monitoring** | **Action Level(s)** | **Response Measures**
igh pressure water; Phosphate detergent | | refer to MSDS | refer to MSDS

Primary Route of Exposure/Hazard: Water lacerations or penetrations through direct contact

(Note to FOL and/or SSO: 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 – Nitrile)	☒ Yes ☐ No
Impermeable apron	☐ Yes ☐ No	Work/rest regimen	☐ Yes ☒ No
Safety 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: If contact with overspray is likely, Impermeable aprons may be used at SSO's discretion. Another option is to use rainsuit or PE coated Tyvek. Splash shield, hearing protection will be worn for pressure washer/steam cleaner operation. Gloves – Nitrile (surgeons style) or outer for deconning sampling (hand) tools, nitrile supported for steam cleaner/pressure washer operation. Overboots will be used when working in the temporary decon pad. A decon pad will be construced to perform heavy equipment decontamination. The pad will be constructed using heavy plastic sheeting and bermed to prevent run-off of contaminants and decon waters. All equipment will be inspected prior to leaving the site. Contaminated vehicles will be decontaminated prior to leaving the site and re-inspected.

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 site activities in the event of inclement weather. Employ proper lifting techniques for this task. Construct pad for Decontamination. Use drying racks to secure heavy equipment to prevent items from falling during washing and drying. In addition, do NOT point the wand at other people or place it against any part of your body. Accidental compression of the trigger can cause water lacerations or burns. All hoses and fittings will be inspected to insure structural integrity prior to use. For pressure washers or steam cleaners in excess of 3,000 psi, a fan tip of 25° or greater will be used to control potential for water cuts or lacerations. A light coating of sand should be applied to the plastic liner should the surface becomes too slippery to prevent slips. Keep hoses gathered to prevent trips and falls. A site control boundary for this activity is 35-feet surrounding the point of operation. Follow MSDS for any decontamination solutions/solvents used.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
INVESTIGATIVE DERIVED WASTE
LOCKHEED MARTIN MIDDLE RIVER COMPLEX

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

I. Work limited to the following (description, area, equipment used): Accumulating Investigative derived Waste (IDW) including excavated soils, containerization of decon waters and water from the dewatering of excavated soils. This activity will include pumping from open excavations, poly storage tanks to the Temporary Water Treatment operation. At this location, water generated during dewatering or decontamination will be pumped through the water treatment toa storage tank for sampling and eventual disposal in the facility POTW. All soils and sediments will be collected and disposed of in the contaminated soils shipments.

II. Primary Hazards:: Slip, trip and fall; heavy equipment hazards, high noise, vehicular and foot traffic; temperature extremes; inclement weather; insect /animal bites or stings, poisonous plants

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 hard Hat, safety glasses, sleeved shirt and long pants, or coveralls, and safety footwear. Hearing protection will be worn when working near operating equipment.

VI. Chemicals of Concern

Hazard Monitoring	Action Level(s)		Response Measures
Metals specifically	None; visible dust		Use area wetting
Lead dust and			Retreat upwind and
Mercury			allow dust to settle

Primary Route(s) of Exposure/Hazard: The potential may exist during pump or treatment facility maintenance for inhalation skin contact and potential ingestion.

(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/lifeline	☐ 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
Safety 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: Chemical resistant suits (rainsuits) maybe necessary during maintenance operations of the water treatment components.

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. Excavated soils will be placed in tight sealed roll-offs or lined to prevent leakage of soils or water. All loaded roll-offs will be covered during storage and transport. If the water treatment components are electrically driven, test GFCIs and extension cords. Keep out of standing water. Flush pumps and hoses with clean water.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
EXCAVATION TRANSPORTATION AND SOIL CONFIRMATION SAMPLING ACTIVITIES
LOCKHEED MARTIN, MIDDLE RIVER COMPLEX

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

I. Work limited to the following (description, area, equipment used): This activity includes the excavation and removal of contaminated soils; Direct loading and dewatering and loading will be conducted. Back filling, compaction; site restoration will be included in this activity. These activities include initial site surveys including identifying, eliminating or barricading hazards in the work area; establishing traffic patterns for the site including truck staging, loading position as well as hauling in back fill. Heavy equipment includes tracked excavator, loader and back-hoe.

II. Confirmation soil sampling – Six samples per lot will be obtained using the excavator bucket or hand tools such as a hand auger with extensions added to avoid entering the excavation.

II. Primary Hazards: Physical/natural hazards - Lifting; slips, trips and falls; vehicular and foot traffic; struck by; 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, hearing protection, and High Visibility Vests will be worn when working near operating equipment. Chemical resistant over boots will be worn during muddy conditions.

VI. Chemicals of Concern

Hazard Monitoring	Action Level(s)	Response Measures
Metals specifically Lead dust, mercury and PAHs	Visible dust/ Mini-Ram 3.0mg/m^3	Use area wetting to control dust emissions allow dust to settle

Primary Route(s) of Exposure/Hazard: * See site Air Monitoring Plan for specific procedures. Skin contact and ingestion through hand to mouth activities are the primary 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/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: Hard hat, safety glasses, steel toed work booted will be worn in all cases as minimum PPE. Equipment operators and truck drivers are not required to employ hard hats as long as they remain in the cab. Hearing protection (>25dB NRR) for activities generating high noise levels. High Visibility Vests when working along traffic patterns or near operating equipment.

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 – Utility locating Excavation Clearance Permit and Ticket will be applied for from the Local One-Call

X. Special instructions, precautions: Preview work locations to identify potential hazards (slips, trips, and falls, natural hazards, etc.) Suspend site activities in the event of inclement weather. Establish Site Control boundaries as well as Free Space of Travel along vehicle patterns. For this activity the clearance exists around the excavator (fully extended boom length + 5-feet and maintain at least 4-feet from excavation edge. Cut excavation in shallow intervals. Ground personnel will use passive methods to evaluate the next cut depth (6-inch intervals). The excavator should be equipped with a sand bar to avoid snagging subsurface utilities. Ground personnel will also direct truck movement and loading activities. Confirm utility clearance status. Call those who have not responded to One Call request, confirm utility absence. Utilities within 5-feet of the subsurface investigation point will be potholed (hand dug) to confirm location. Excavation activities will be conducted in accordance with 29 CFR 1926.650-.652. concerning sloping, shoring, storage, and movement on or over excavations. Equipment, personnel, and machinery will be kept away from the edges of open excavations (> 3 feet). Personnel will not be permitted to enter an excavation greater than 4 feet deep with out the use of shoring, benching or trench boxes. Excavations which cross sidewalks or streets will provide crossovers of adequate construction for anticipated traffic loads. Flag persons and traffic control barricades and signs will be used where excavation encroaches streets and passageways. All excavation activities will be supported by a "Competent Person". Do not overload transport vehicles. Calculate weight based on bucket capacity and the number of buckets loaded into each truck or roll off. Typical weight for wet earthen soils is 100lbs per cubic foot or 2700 lbs per cubic yard. The use of a spotter/ground man during excavation activities and motor vehicle/heavy equipment use will be employed.

Permit Issued by:_____ Permit Accepted by:_____

ATTACHMENT V
EQUIPMENT INSPECTION CHECKLIST

Heavy Equipment Inspection Checklist

Company:_____ **Unit/Serial No#:**_____

Inspection Date: ____/____/____ **Time:**_____:____ **Equipment Type:**_____
(e.g., earthmoving equipment - tractors backhoes, bulldozers, etc.)

Project Name:_____ **Project No#:**_____

Yes	No	NA	Requirements	Comments
☐ ☐	☐ ☐	☐ ☐	Seat Belts • Are available for intended operator and passengers (where applicable) • Seat Belts are operational?	
☐	☐	☐	Roll-Over Protection (ROPS) • Roll-over protection structures (ROPS) are provided on vehicles and heavy equipment (including scrapers, tractors, loaders, bulldozers, carryalls, etc.)	
☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	Brakes • Brake systems capable of stopping and holding fully loaded equipment • Parking Brake functions properly • Wheel Chocks available (where and as applicable)	
☐ ☐	☐ ☐	☐ ☐	Access • Non-slip steps • Grab Handles (3-Point Grab/Step Mounting Points)	

Unit/Serial No#:_____ **Inspection Date:** ____/____/____

Yes	No	NA	Requirements	Comments
☐	☐	☐	Audible Alarms • Audible alarms – All bidirectional machines, such as rollers, compacters, front-end loaders, bulldozers, and similar equipment, shall be equipped with a horn, distinguishable from the surrounding noise level, which shall be operated as needed when the machine is moving in either direction. - Back up Alarms – All self propelled equipment with an obstructed view to the rear will be equipped with a reverse gear signal alarm distinguishable from the surrounding noise level. • Horn functioning properly	
☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	Highway Use • Fenders for equipment that can exceed 15mph • Fire Extinguisher • Are exhaust emissions directed away from the Operator? • Cab - Clean, free from debris, tools or equipment that can interfere with foot Control. - Free from storage of flammable material/solvents • Mirrors, • Safety glass - Equipped with defrosters - Windshield wipers • Turn signals, lights, brake lights, etc. (front/rear) for equipment approved for highway use? • Gauges functioning properly • Tires (Tread) or tracks • Steering (standard and emergency) • Are tools and material secured to prevent movement during transport?	

Unit/Serial No#:_____ **Inspection Date:** ____/____/____

Yes	No	NA	Requirements	Comments
☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐	Fluid Levels: • Engine oil • Transmission fluid • Brake fluid • Cooling system fluid • Hoses and belts • Hydraulic oil	
☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐	Fueling • Fueling of vehicles and heavy equipment is done with the engine off. • No smoking is permitted at or near the fuel storage or refueling area. A sign is posted stating: NO SMOKING WITHIN 50 FEET. • No sources of ignition are present near the fuel storage or refueling area. • A dry chemical or carbon dioxide fire extinguisher (rated 6:BC or larger) is in a location accessible to the fueling area, no closer than 50-feet. • Safety cans available?	
☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	Safety Guards – • Around rotating apparatus (belts, pulleys, sprockets, spindles, drums, flywheels, chains) all points of operations protected from accidental contact? • Hot pipes and surfaces are protected from accidental contact? • High pressure pneumatic lines have safety cable to prevent thrashing should it become disconnected?	
☐	☐	☐	Attachments • Have the attachments designed for use (as per manufacturer's recommendation) with this equipment been inspected and are considered suitable for use?	

Unit/Serial No#:_____ **Inspection Date:** ____/____/____

Yes	No	NA	Requirements	Comments
☐	☐	☐	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?	
			PPE Required	
☐	☐	☐	• Hardhat	
☐	☐	☐	• Safety glasses	
☐	☐	☐	• Work gloves	
☐	☐	☐	• Chemical resistant gloves_____	
☐	☐	☐	• Steel toed Work Boots	
☐	☐	☐	• Chemical resistant Boot Covers	
☐	☐	☐	• Apron	
☐	☐	☐	• Coveralls Tyvek, Saranex, cotton)_____	
☐	☐	☐	Key(s)?	
☐	☐	☐	Operating Manual?	
			Other Hazards	
☐	☐	☐	• Excessive Noise Levels _____ dBA	
☐	☐	☐	• Chemical hazards (Drilling supplies - Sand, bentonite, grout, fuel, etc.)	
☐	☐	☐	- MSDSs available?	

Approved for Use ☐ Yes ☐ No ☐ See Comments

_____ _____

Site Health and Safety Officer Operator

Hand and Power Tool Checklist

Yes	No	NA	Requirement	Comments
☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	Are all tools and equipment (both company and employee owned) used by employees at their workplace in good condition? Any loose parts? Missing pins and/or bolts?	
☐	☐	☐	Are broken or fractured handles on hammers, axes and similar equipment replaced promptly?	
☐	☐	☐	Are hand tools such as chisels and punches, which develop mushroomed heads during use, reconditioned or replaced as necessary?	
☐	☐	☐	Are worn or bent wrenches replaced regularly?	
☐	☐	☐	Are appropriate handles used on files and similar tools?	
☐	☐	☐	Are employees made aware of the hazards caused by faulty or improperly used hand tools?	
☐	☐	☐	Are jacks checked periodically to ensure they are in good operating condition?	
☐	☐	☐	Are tool handles wedged tightly in the head of all tools?	
☐	☐	☐	Are tool cutting edges kept sharp so the tool will move smoothly without binding or skipping?	
☐	☐	☐	Are tools stored in dry, secure locations where they won't be tampered with?	
☐	☐	☐	Are appropriate safety glasses, face shields, etc. used while using hand tools or equipment which might produce flying materials or be subject to breakage?	
Power Tool Inspection Checklist				
Yes	**No**	**NA**	**Requirement**	**Comments**
☐	☐	☐	Are grinders, saws and similar equipment provided with appropriate safety guards?	
☐	☐	☐	Are power tools used with the correct shield, guard, or attachment, recommended by the manufacturer?	
☐	☐	☐	Are portable circular saws equipped with guards above and below the base shoe? Are circular saw guards checked to assure they are not wedged up, thus leaving the lower portion of the blade unguarded?	
☐	☐	☐	Are rotating or moving parts of equipment guarded to prevent physical contact?	
☐	☐	☐	Are all cord-connected, electrically operated tools and equipment effectively grounded or of the approved double insulated type?	
☐	☐	☐	Are effective guards in place over belts, pulleys, chains, sprockets, on equipment such as concrete mixers, and air compressors?	

Hand and Power Tool Checklist (Continued)

Yes	No	NA	Requirement	Comments
☐	☐	☐	Are portable fans provided with full guards or screens having openings ½ inch or less?	
☐	☐	☐	Is hoisting equipment available and used for lifting heavy objects, and are hoist ratings and characteristics appropriate for the task?	
☐	☐	☐	Are ground-fault circuit interrupters provided on all temporary electrical 15 and 20 ampere circuits, used during periods of construction?	
☐	☐	☐	Are pneumatic and hydraulic hoses on power operated tools checked regularly for deterioration or damage?	
☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	Air compressor: • Is the air compressor equipped with a Surge Check Valve? • Pressure regulator gauge and valve? • Pressure relief valve? • Water trap and filter?	
Chainsaws				
Yes	**No**	**NA**	**Requirement**	**Comments**
☐	☐	☐	Is the chain sharp, well oiled, and properly adjusted (Chain tension)?	
☐	☐	☐	Is the Bar straight? • Are there indications of excessive wear?	
☐ ☐	☐ ☐	☐ ☐	Does the chain brake lever move freely? Does chain brake stop the chain when applied?	
☐	☐	☐	Does the chain move when idling?	
☐	☐	☐	Are the cans used to fuel the chainsaw safety cans?	
☐	☐	☐	Does the on/off switch function properly?	
☐ ☐	☐ ☐	☐ ☐	Does the throttle lock function properly? Is the chainsaw equipped with continuous pressure throttle control?	
☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	PPE: Is the following PPE in serviceable condition? Hardhat with mesh visor and ear muffs? Safety glasses? Chainsaw chaps? Gloves with protection also on the hack of the hands?	

Hand and Power Tool Checklist (Continued)

Yes	No	NA	Requirement	Comments
☐ ☐	☐ ☐	☐ ☐	Emergency Equipment: Is a Fire extinguisher (3A:B:C) available for immediate use? Is a First-Aid Kit immediately available for use? Does it contain the minimum content as required in the MHASP?	
☐	☐	☐	Communication – Is an acceptable means of communication available (Hand signals, radios, air horns, etc.) that will support communication over the engine noise? Type?	
☐	☐	☐	Are MSDSs available for the fuels, fuel additives, and lubricating oils?	
☐ ☐	☐ ☐	☐ ☐	Is the operator trained in proper operation of the chainsaw? Does the operator demonstrate knowledgeable operation?	

ATTACHMENT VI

LOCKHEED MARTIN CORPORATE STAFF PROCEDURE EO-28 DIGGING PROJECTS

Enterprise Operations Procedure EO-28
Revision No: Original
Effective: January 26, 2009
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Digging Projects

Form EO-28-1, Dig Permit | Form EO-28-2, Risk Handling Checklist

1.0 Applicability

This procedure applies to digging projects at facilities operated by Corporate Headquarters or Enterprise Business Services (collectively, "Enterprise Operations"). A “digging project” or “dig” is any subsurface excavation, including trenching. Small areas of hand excavation (less than four inches deep), where the excavated material is put back in the same location, are not considered digs and are excluded from this procedure.

2.0 Purpose

To prevent facility damage, minimize disruptions to operations, provide for the proper handling of environmental issues, and ensure that digs are properly coordinated and safely performed.

3.0 Implementation

3.1 The Project Manager (the Lockheed Martin employee responsible for the dig) will complete the activities below before the dig begins:

- Coordinate with Enterprise Operations Environment, Safety & Health (ESH), who will review the project plans for environmental risk and develop handling plans as required, obtain any environmental permits required by law or regulation, and determine the method of soil disposal when part of the project.
- Have the local utility identification service and Lockheed Martin organizations such as Telecommunications identify and mark underground utilities/obstacles within 10 feet of the dig area.
- Prepare and sign form EO-28-1, Dig Permit. Obtain signatures from the Building/Facility Manager, local internal customers, Telecommunications, and ESH.
- Review and sign form EO-28-2, Risk Handling Checklist.
- Meet with the contractor or Lockheed Martin organization that will perform the dig to communicate the location of underground utilities/obstacles; ensure that appropriate safety precautions such as those in EO-20, Contractor Requirements, have been taken; and identify any state or local requirements, customer direction such as launch lock-down periods, or other conditions that will affect the dig.
- Inform Industrial Security of the dig and support requirements such as traffic control.
- Put barricades around the excavation site to prevent unauthorized persons from approaching. Put warning lights around the site if the excavation will remain uncovered at night, unless the dig location does not warrant warning lights.

3.2 Lockheed Martin employees must not dig or enter any excavation that is more than four feet deep.

3.3 As applicable, ESH will monitor the dig for environmental compliance, and oversee the implementation of risk handling plans, and disposal of soil.

3.4 When the dig is complete, the Project Manager will inform the individuals who signed the Dig Permit.

4.0 Responsibilities

Building/Facility Manager

4.1 Have overall approval authority and responsibility for dig projects.

Project Manager

4.2 Ensure that the dig complies with this procedure.

4.3 Retain the Dig Permit and Risk Handling Checklist until the project is complete. Any other permits related to the dig must be retained in accordance with RM-001, Corporate Records Retention Schedule.

Contractors

4.4 Are responsible for ensuring that their work complies with OSHA regulations.

5.0 Deviation

Any deviation from this procedure requires the prior approval of the Vice President Human Resources Enterprise Operations or designee.

//s// Kimberly S. Adams
Vice President Human Resources Enterprise Operations

ATTACHMENT VII

LM RISK HANDLING CHECKLIST

LOCKHEED MARTIN

Risk Handling Checklist

Project Manager: Use this checklist to develop risk handling plans before the dig starts. You must also review Enterprise Operations Procedure EO-28, Digging Projects.

General Questions	☐ What Lockheed Martin processes could be affected by the dig?
	☐ What are the safety hazards?
	☐ What could fail?
	☐ How could it fail?
	☐ Does the area need to be returned to its normal state when the work is complete?
	☐ How could the dig affect operations/test/production?
	☐ Have potential risks been addressed with area management?
	☐ Am I comfortable with any risk handling plans, understanding the potential impact?
Traffic Control	☐ Ensure proper signage and communication.
	☐ Coordinate road or access closures through Industrial Security before starting the dig.
	☐ Ensure the work area is isolated from foot traffic by placing barriers and warning lights as required by EO-28.
	☐ Ensure that vehicle traffic will be safe.
	☐ Ensure that product transport will be safe.
Excavation	☐ Review facility drawings to identify utilities. Research old drawings as necessary.
	☐ Discuss the project with Facility Engineering/Maintenance staff who may have unique knowledge about the construction area not documented in facility drawings.
	☐ Process form EO-28-1, Dig Permit. Use this opportunity to explain the process and relate expectations to the contractor/LM organization that will perform the dig.
	☐ Have LM Telecommunications and the local utility identification service locate and mark utilities/underground obstacles.
	☐ Coordinate with other ongoing projects in the affected area.
	☐ Make every effort not to excavate around live utilities in service. Schedule an outage in advance or have Maintenance temporarily shut down and isolate the utilities while excavating.
	☐ If live utilities cannot be shut down while excavating, know where to isolate or shut them down if they are damaged while excavating.
	☐ Have a spotter(s) work with the equipment operator. Hand dig when necessary.
	☐ Excavate along the side of the utility; not on top.
	☐ Weather may affect the dig. Ensure water pipes are protected during freezing weather, especially if the trench will be left open over night. Rain may cause the side of the trench to slough, which can undermine and break pipes/conduit.
	☐ Ensure care when moving trench boxes in and out of trenches so pipes/conduit aren't damaged by the boxes.
	☐ Ensure surface drainage is controlled so that water doesn't get into the excavation and undermine soil supporting utilities.
	☐ Ensure stocked material is kept far enough back (minimum 2 feet) so that material and rocks don't fall on utilities in the open hole.
	☐ Ensure backfilling is done carefully: Re-bed utilities with proper material, filling all voids below. Keep inappropriate material from falling on or being placed in the trench. Be careful when compacting backfill in the two feet directly above the utility.
	☐ Keep the as-built utility drawing in the field while the excavation site is open. Take pictures if possible (horizontal alignment and elevations), if known utilities deviate from facility drawings or if utilities are found that are not on facility drawings. Give the modified as-built drawings to the Building/Facility Manager, who will update the drawing database.
	☐ Ensure that the equipment operator digs slowly and remains in control.
Personal Safety	☐ Ensure that trenching and shoring methods comply with the applicable OSHA regulations and are overseen by a "Competent Person," as defined in those regulations.
	☐ Regularly inspect methods to prevent violations.
	☐ Ensure LM employees do not dig or enter any excavation that is more than four feet deep.

Project Manager signature indicating completion of checklist review	Date

ATTACHMENT VIII

LM DIG PERMIT

LOCKHEED MARTIN

Dig Permit

See Enterprise Operations Procedure EO-28, Digging Projects, for instructions.

Date	Project Manager
Building/Location	
Purpose of excavation	
Company/LM organization performing dig	

Planned dig date	Duration	Start time
Expected depth	Width	Length

Underground utilities identified?	Overhead utilities?	Electrical lines?	Gas lines?
☐ Yes ☐ No	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No	☐ Yes ☐ No
Sewer?	Water?	Telecommunications?	Other? Specify:
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

Site-specific or customer utility locating requirements completed?

☐ Yes ☐ No ☐ N/A

Sketch of dig project (or attach drawing)

Project Manager	Date	Customer	Date
Telecommunications	Date	Customer	Date
ESH	Date	Customer	Date
Building/Facility Manager			Date

ATTACHMENT IX

LM INVASIVE FIELDWORK AUTHORIZATION

Lockheed Martin Invasive Fieldwork

Project: _____
Fieldwork Description:
_____

By signing this form, you are indicting that you have reviewed the field work plan, utility location survey data, and Health and Safety Plan relevant to the project listed above.

	Name:	Date:
1.		
2.		
3.		
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12.		
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15.		
16.		

This form shall be scanned and electronically submitted to the Lockheed Martin Project Lead.

ATTACHMENT X

UTILITY/UNDERGROUND STRUCTURE CLEARANCE

NOTE: Each project may have unique conditions, therefore do not use this chart as the sole decision criteria for technology selection. Use the chart as a starting point to assess available technology(s) applicable.

KEY	Description
Green	Generally and applicable technology
Yellow	May or may not be applicable
Red	Not generally applicable
*	Indicates best technology for given object. Site structures, rebar in concrete, etc. can significantly affect performance and reliability of any electromagnetic method.
□	Metallic lines that have power running through them or can be connected to a tracer signal generator.
♦	Natural gas pipeline locating technicians must be trained/certified. US requires DOT, Office of Pipeline Safety Standards.
∇	Most sensitive to interpretation; the skill, training, and experience of the operator are critical.
≡	Emerging technology with limited availability.
+	Access: induce unique electronic signature, apply acoustical impulse, or insert probe/beacon/sonde.

Subsurface Mark-out Technology Application Chart

Object ↓ / Technology →	Electro-Magnetic Detector	Ground Pentrating Radar (GPR) ∇	Acoustic Plastic Pile Locator	Probe, Beacon Sonde, or Trace Wire	Cesium Magnetometer ≡
Power/Instrument Line (Energized/Signaled □)	* G	Y	R	R	Y
Power Line (Non-energized)	Y	* Y	R	R	Y
Sewer/Water Line (Metalllic)	* G	> 12" diameter G < 12" diameter Y	Y	G	Y
Sewer/Water Line (Non-metallic)	R	> 12" diameter G < 12" diameter Y	G	* G	Y
Instrument/Telecomm Lines (non-energized)	R	R	R	R	R
Natural Gas Line (Pipeline) ♦	* G	> 12" diameter G < 12" diameter Y	R	R	G
Metallic/Non-metallic Line (w/ Tracer Wire)	* G	> 12" diameter G < 12" diameter Y	Y	Y	Y
Metallic/Non-metallic Line (w/o Tracer Wire)	R	> 12" * diameter G < 12" * diameter Y	Y	Y	R
Metal UST	* G	* G	R	R	G
Fiberglass UST	R	* G	R	R	Y

Additional Considerations

Variable ↓ / Technology →	Electro-Magnetic Detector	Ground Pentrating Radar (GPR) ∇	Acoustic Plastic Pile Locator	Probe, Beacon Sonde, or Trace Wire	Cesium Magnetometer ≡
Moist Soil	G	Y	G	G	Y
Dry Soil	Y	G	Y	G	G
Clay	Y	R	G	G	Y
Concrete w/Rebar	R	Y	G	G	R
Long Horizontal Profile	G	G	G	G	G
Short Horizontal but Deep Vertical Profile	Y	G	R	R	G
Access to Line +	G	N/A	G	G	N/A
No Access to Line +	Y	G	R	R	G
Ferrous Metal	G	G	G	G	G
Non-Ferrous Metal	Y	G	G	G	Y

ATTACHMENT XI

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.

- 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 XII

OSHA POSTER

and Health

t's the law!

Occupational Safety and Health Administration
U.S. Department of Labor

MPLOYEES:

u have the right to notify your employer or OSHA out workplace hazards. You may ask OSHA to keep ur name confidential.

u have the right to request an OSHA inspection if you lieve that there are unsafe and unhealthful conditions your workplace. You or your representative may rticipate in that inspection.

u can file a complaint with OSHA within 30 days retaliation or discrimination by your employer for aking safety and health complaints or for exercising ur rights under the *OSH Act*.

u have the right to see OSHA citations issued to your nployer. Your employer must post the citations at or ar the place of the alleged violations.

ur employer must correct workplace hazards by the te indicated on the citation and must certify that ese hazards have been reduced or eliminated.

u have the right to copies of your medical records d records of your exposures to toxic and harmful bstances or conditions.

ur employer must post this notice in your workplace.

u must comply with all occupational safety and health andards issued under the *OSH Act* that apply to your vn actions and conduct on the job.

MPLOYERS:

u must furnish your employees a place of employment e from recognized hazards.

u must comply with the occupational safety and health andards issued under the *OSH Act*.

Free assistance in identifying and correcting hazards or complying wit standards is available to employers, without citation or penalty, through OSHA-supported consultation programs in each state.

APPENDIX B — *WASTE MANAGEMENT PLAN*

Waste Management Plan Middle River Complex Middle River, Maryland

Prepared for:

Lockheed Martin Corporation

Prepared by:

Tetra Tech, Inc.

February 2010

Michael Martin, P.G.
East Coast Regional Manager

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APPENDIX A - WASTE IDENTIFICATION AND CLASSIFICATION FORM

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ACRONYMS

CFR	*Code of Federal Regulations*
EESH	Energy, Environment, Safety, and Health
HAZWOPER	hazardous waste operations
IDW	Investigation-derived waste
LMCPI	Lockheed Martin Corporation Properties, Inc.
Lockheed Martin	Lockheed Martin Corporation
MDOT	Maryland Department of Transportation
MRC	Middle River Complex
OERR	Office of Emergency Remedial Response
OSHA	Occupational Safety and Health Administration
PPE	personal protective equipment
Tetra Tech	Tetra Tech, Inc.
TSD	treatment, storage, and disposal
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency

Section 1
Purpose

On behalf of Lockheed Martin Corporation (Lockheed Martin), Tetra Tech, Inc. (Tetra Tech) has prepared this *Waste Management Plan* to address management of the potentially contaminated nature of the waste that will be generated as part of field investigations at the Lockheed Martin Middle River Complex (MRC) (Figure 1-1). Both solid- and liquid-waste will be generated and handled as investigation-derived waste (IDW). Following proper IDW procedures, the IDW generated will be collected in U.S. Department of Transportation- (USDOT)-approved steel drums, stored at a designated on-site location (considered a temporary satellite-accumulation area), sampled for waste profiling and characterization and, once characterized, disposed of off-site at a Lockheed Martin-approved facility. The IDW generated during these field investigations will include but is not limited to soil, sediment, and water (surface, groundwater, purge and/or decontamination water).

A Tetra Tech geologist will be on-site for all MRC field activities. All work by any subcontractor will be directed by the Tetra Tech geologist and will fully comply with Maryland Department of Transportation (MDOT) and other local, state, and federal regulations, including the federal Resource Conservation Recovery Act, Toxic Substances Control Act, Occupational Safety and Health Administration (OSHA) regulation 1910.120, and Lockheed Martin's EROP-03 procedure. In addition, IDW will be handled in accordance with the U.S. Environmental Protection Agency (USEPA) guidance *Management of Investigation-Derived Wastes During Site Inspections* [USEPA Office of Emergency Remedial Response (OERR) directive 9345.3-02, May 1991].

This plan is organized as follows:

Section 2 - Responsibilities and Training Requirements: Presents the requirements and responsibilities of Tetra Tech and their appointed subcontractor,

Section 3 - Hazardous Waste Determinations: Briefly describes how the determination of waste characterization is completed, and

Section 4 - Shipping Requirements: Details pre-shipment, shipping, and post-shipping requirements.

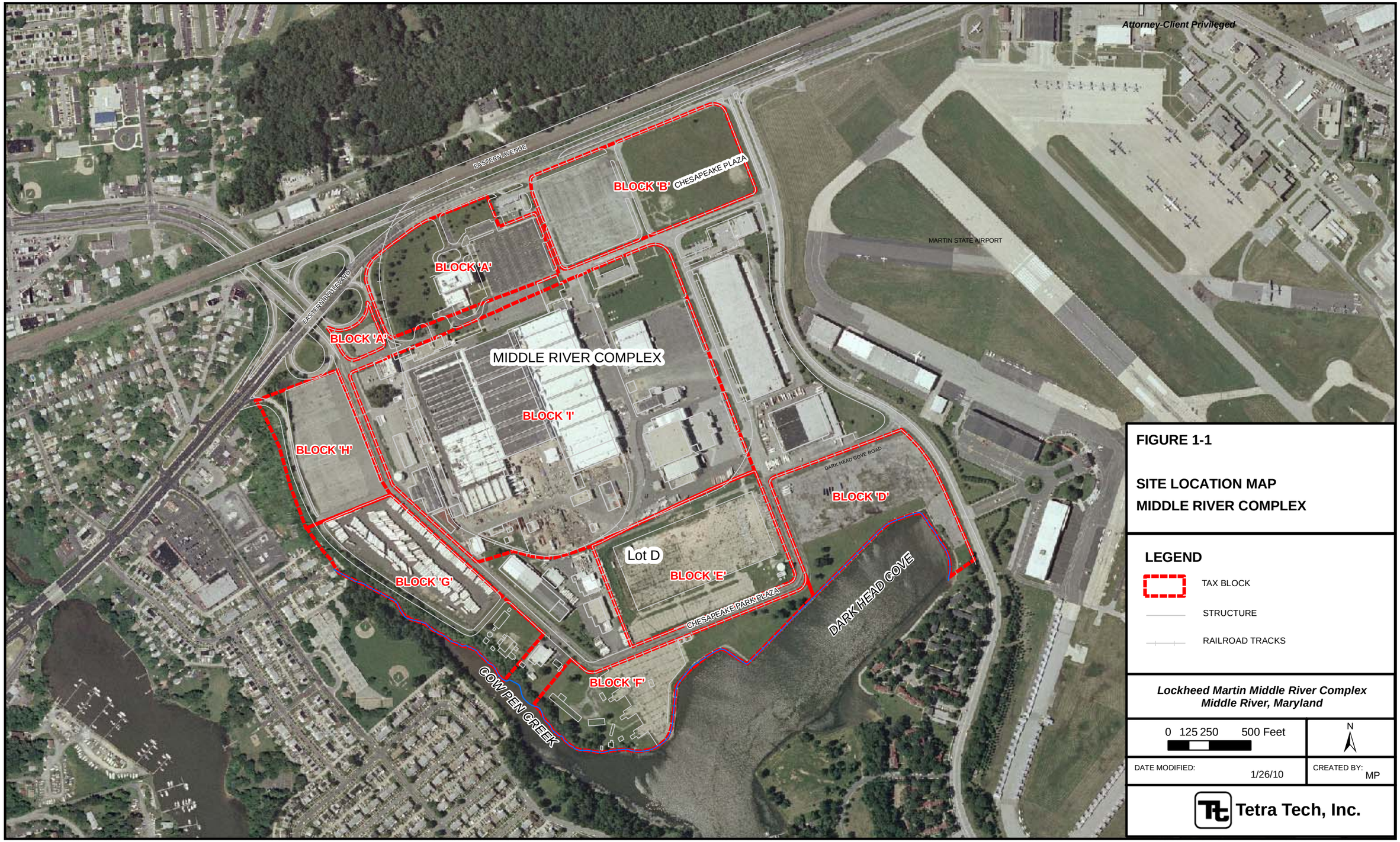

FIGURE 1-1

SITE LOCATION MAP
MIDDLE RIVER COMPLEX

LEGEND

- TAX BLOCK
- STRUCTURE
- RAILROAD TRACKS

Lockheed Martin Middle River Complex
Middle River, Maryland

0 125 250 500 Feet

N

DATE MODIFIED: 1/26/10

CREATED BY: MP

Tetra Tech, Inc.

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Section 2
Responsibilities and Training Requirements

All Tetra Tech personnel and subcontractors must be trained in accordance with all state and federal protocols. All personnel will complete the appropriate OSHA hazardous-waste operations (HAZWOPER) training and annual refresher training, as specified in 29 *Code of Federal Regulations* (CFR) §1910.120. All subcontractor training-certifications shall be provided electronically to the Lockheed Martin project lead. Certificates for Tetra Tech personnel are maintained internally and can be provided to Lockheed Martin upon request.

U.S. Department of Transportation "HAZMAT Employee" training is required for anyone involved in the shipment, preparation, offering for transport, and transportation of hazardous waste, including signing hazardous-waste manifests (see 49 CFR 172, Subpart H). The waste-management subcontractor will have completed HAZMAT employee training and will renew the training as necessary to meet USDOT requirements for transporting hazardous waste. Facilities that generate more than 1,000 kilograms per month of hazardous waste must comply with the emergency preparedness and personnel training requirements outlined in 40 CFR §265.16 (see 40 CFR §262.34(a)(4)). This training is intended for the waste generator's (i.e., Lockheed Martin) contractors (i.e., Tetra Tech) and includes training by a person qualified in hazardous-waste management and emergency-response procedures.

Section 3
Hazardous Waste Determination and Process

Hazardous-waste determinations shall be made in accordance with 40 CFR 262.11, combining process knowledge and/or analytical evaluation of waste samples. Hazardous-waste determinations shall be reevaluated whenever any of the following occurs:

- The process that produces the waste changes (e.g. a new chemical constituent is discovered, the treatment process changes)
- The treatment media changes (e.g., new media vendor or media type)
- Waste was tainted by inadvertent mixing with another waste, or
- A change occurs in the hazardous-waste regulations

Waste generated during field investigations will include, but is not limited to, soil, sediment, water (surface, groundwater, purge, and/or decontamination water), and/or disposable personal protective equipment (PPE). PPE IDW will be brushed off, placed in trash bags, and disposed of in a facility trash-receptacle designated by MRC personnel. IDW generated during field activities will be segregated into drums based upon historical data (as applicable), labeled to indicate the wells and/or locations from which the waste was generated, and the generation date. IDW generated during this activity will be further characterized and disposed of in accordance with the state regulations, unless state requirements are less stringent than federal requirements, in which case the federal requirements will apply.

When available, analytical data obtained during the investigations will be provided to the subcontractor for IDW classification (i.e., non-hazardous versus hazardous). IDW materials that will be generated at the MRC during future sampling events are not expected to be characterized as hazardous, since IDW generated during previous sampling events was classified as non-hazardous. All analytical data shall be presented to the IDW subcontractor for them to classify

the IDW generated from the field project. Based on the analytical data, the IDW subcontractor will determine whether additional IDW sampling is required to complete the waste profiles. If additional sampling is required for waste characterization parameters, Tetra Tech will schedule a site visit and oversee the sampling conducted by the IDW subcontractor.

Following receipt of the approved analytical data, the IDW subcontractor shall develop a waste profile. Waste profiles are to be sent to the Tetra Tech project manager for initial review. The Tetra Tech project manager will review them and forward the waste-profile forms to the appropriate site contact. All forms related to IDW from the MRC will be signed and approved by Mr. Mike Musheno of Lockheed Martin Corporation Properties, Inc. (LMCPI) at the MRC.

The "Waste-Listing Assessment" form is presented in Appendix A. The Tetra Tech project manager will complete this form as the first step in IDW classification/removal process. This form is the first notification and is presented to the managing contractor for review. The form presents pertinent information such as the project name, waste description, generation date, type, and classification information.

Lockheed Martin may choose to issue a Lockheed Martin "Hazardous-Waste Manifest Signatory-Authorization Form" (see Appendix B). This form authorizes a Lockheed Martin subcontractor to sign for the IDW. The authorization certifies that the representative signing on behalf of Lockheed Martin has completed the appropriate USDOT training (as delineated at 49 CFR Part 172, *et seq.*) to sign hazardous-waste manifests and is in compliance with all state and federal requirements for hazardous-waste manifesting. Lockheed Martin shall remain responsible and liable for the hazardous waste being disposed of, regardless of the signatory authorization on the form.

After Lockheed Martin or an authorized representative signs the waste-profile forms, the IDW is scheduled for removal from the site. The Tetra Tech project manager will coordinate the IDW removal with the appropriate Lockheed Martin site-contact. The Lockheed Martin site-contact (or their authorized representative) shall be on-site to sign bills of lading (for non-hazardous IDW) or hazardous-waste manifests (for hazardous IDW). Signed copies of the returned bills of lading and hazardous-waste manifests will be kept on file for a minimum of three years. The signed

documentation for transporting the waste off-site will be properly filed and available for review upon request.

Before IDW leaves the site, the Lockheed Martin site-contact or their authorized representative will complete a waste-shipment checklist. The "Hazardous-Material/Waste-Shipment Checklist" is presented in Appendix C for reference. Completion of the checklist assures that all protocols, standards, and requirements have been adhered to and the waste can be properly removed from the site. The checklist covers various items to ensure the truck is fitted with the proper waste placards, is properly constructed with double-walled containment, and the waste manifests and bills of lading contain the proper information. IDW is removed from the site subsequent to the Lockheed Martin representative completing the checklist. Both the Lockheed Martin representative and the Tetra Tech geologist then receive a copy of the associated paperwork. Tetra Tech will record the drums on a master "Drum Inventory" form for each site (see Appendix D).

A "Site Contact List" is presented in Appendix E as a reference in case of an emergency, or if questions arise with regards to IDW disposal. The emergency contingency-plan has been incorporated into the on-site health and safety plan and will comply with all current and applicable regulations and requirements including, but not limited, to OSHA e29 CFR 1903, 1904, 1910, and 1926. Lockheed Martin Corporation will be listed as the waste generator on all paperwork, including the waste-profile sheets on which the generator was initially listed as "Middle River Complex." The areas of Lockheed Martin investigations at MRC, including the "Tax Block" sites, are identified for purposes of waste disposal by USEPA ID number MDD985381318.

Section 4
Shipping Requirements

4.1 PRE-SHIPMENT REQUIREMENTS

Waste generated during the field investigation will include, but is not limited to soil, sediment, and water (groundwater, surface, purge, and/or decontamination water). IDW generated during previous investigations has been characterized as non-hazardous. Pre-shipping requirements were discussed in detail in Section 3.0.

4.1.1 Packing

All waste materials will be collected in new or reconditioned USDOT-approved 55-gallon drums that will be sealed at the end of each day's sampling activities. Special consideration will be given to manage certain wastes (e.g., bentonite grout) separately from other IDW, to avoid increasing the volume of material that may be classified as hazardous due to elevated pH.

4.1.2 Labeling

Drums will be marked with the appropriate "Hazardous" or "Nonhazardous" labels containing the following information:

- **Site** will list the name of the site where waste was generated (i.e., Middle River Complex)
- **Location** will list the location where the waste was generated (i.e., well identification, soil boring, test pit, sediment and surface water location number)
- **Date** will include the date when waste materials accumulation began
- **Drum Number** will list the number of the drum in the series of drums from this sampling event
- **Contents** will list the waste that was generated (i.e., sediment, soil, and water)
- **Volume** will list an estimated volume not to exceed three quarters of the drum capacity and
- **Site Contact and Emergency Contact Information** will list the contact information for the designated authorized Lockheed Martin representative for the site and the telephone number of the local fire department.

4.1.3 Storing

Investigation derived waste storage areas will meet the following specifications to permit access to the drums and conduct spill/leak monitoring, sampling, and extraction (once the disposal route is determined):

- A temporary spill-containment system, constructed of polyethylene sheeting and 2-inch × 6-inch boards creating a bermed edge, will be placed under the container(s) to contain spilled or leaked materials. The dimensions of the temporary spill-containment area will depend on the number of 55-gallon drums at the site. For most jobs, the spill-containment area is estimated to be 10-feet × 20-feet. Containment-system integrity will be monitored periodically.
- Store 55-gallon drums on self-containing pallets with four (or fewer) drums per pallet. Self-containing pallets will be stored on a hard flat surface covered with polyethylene sheeting.
- Keep the retaining bolt and label readily visible on the outside of storage containers.
- Provide at least four feet between each row of pallets/drums to allow access to the containers for sampling, drum removal, and spill response.
- Caution tape and/or temporary fencing will be placed around the drums to identify and secure the area.
- Signs will be posted in front of the IDW storage area identifying the site, location, collection date, number of drums, drum contents, volume of contents, site and emergency contact information, and the location of spill-control materials for the wastes.
- Inform appropriate authorities/organizations of hazardous waste on-site and emergency response procedures. Identify the emergency coordinator and document emergency planning for the site.
- Maintain on-site a copy of work plans, waste disposal forms, and the IDW inventory list, and provide this information to the project manager at the end of each shift.
- Maintain spill-response equipment at the site in case it is required.
- Whenever possible, use appropriate equipment for moving containers to avoid injury to the worker or damage to the container. When that is not possible, obtain help to manipulate containers.
- Monitor and maintain all storage containers weekly to ensure that the containers remain in their original condition and that no leaks or spills have occurred. Weekly inspections should be documented in a dedicated field-notebook and should include photographs of the containers and storage area.

The MRC's IDW drum-storage area is on a flat concrete area in Lot D (Figure 4-1), inside the secured facility boundary. An alternate IDW storage area may be used to minimize transportation

of drums on site, due to the dispersed nature of sampling locations throughout the MRC. MRC IDW-storage areas will be determined by Lockheed Martin personnel at the start of field activities. Drums will be temporarily staged on a hard flat surface overlain by polyethylene sheeting and will sit on self containing plastic pallets that act as secondary containment. These pallets must be capable of containing the entire contents of one 55-gallon drum. All IDW drums will be stored on secondary containment until they can be removed from the site. Lockheed Martin has 90 days to remove the non-hazardous- and/or hazardous-waste drums from the facility. Access for the subcontractor's representative and IDW transport carrier will be coordinated by Tetra Tech.

4.1.4 Material Identification and Classification

All waste materials shall be identified and classified per USDOT requirements.

4.1.5 Waste Shipment

Tetra Tech will subcontract all IDW removal to an approved vendor(s). In the event hazardous waste is encountered, Tetra Tech will ensure the use of Lockheed Martin Corporate "Purchasing Agreements" and the associated list of "Corporate Approved Waste-Management Vendors, to ensure that the waste is transported by an approved vendor to a treatment, storage, and disposal (TSD) facility listed on the "Lockheed Martin Corporate Hazardous Waste Approved-Vendors List." Non-hazardous waste shall be transported to an approved industrial-waste disposal facility, but it does not have to be managed by corporate-approved waste-management vendors. Attachment D is the Lockheed Martin "Hazardous-Waste-Manifest Signatory-Authorization Form," which must be filled out by the Lockheed Martin project lead in coordination with the Tetra Tech project manager if the IDW is hazardous.

4.1.5.1 Hazardous-Waste-Generator Identification Number

The Lockheed Martin USEPA identification number for hazardous-waste generation at MRC is MDD985381318. All IDW will be removed from the site by a subcontractor adhering to the shipping requirements in Section 4.2.

4.2 SHIPPING REQUIREMENTS

United States Department of Transportation "HAZMAT Employee" training is required for anyone involved in shipment preparation, offering for transport, and transportation of hazardous waste, including signing hazardous waste manifests (see 49 CFR 172, Subpart H).

Certification and accuracy-verification of the physical waste-shipment against the manifested waste-shipment must be provided. Non-hazardous materials do not require the signature of a USDOT HAZMAT-trained individual. A bill of lading will be signed for all non-hazardous waste. A hazardous waste manifest will be signed for all hazardous waste.

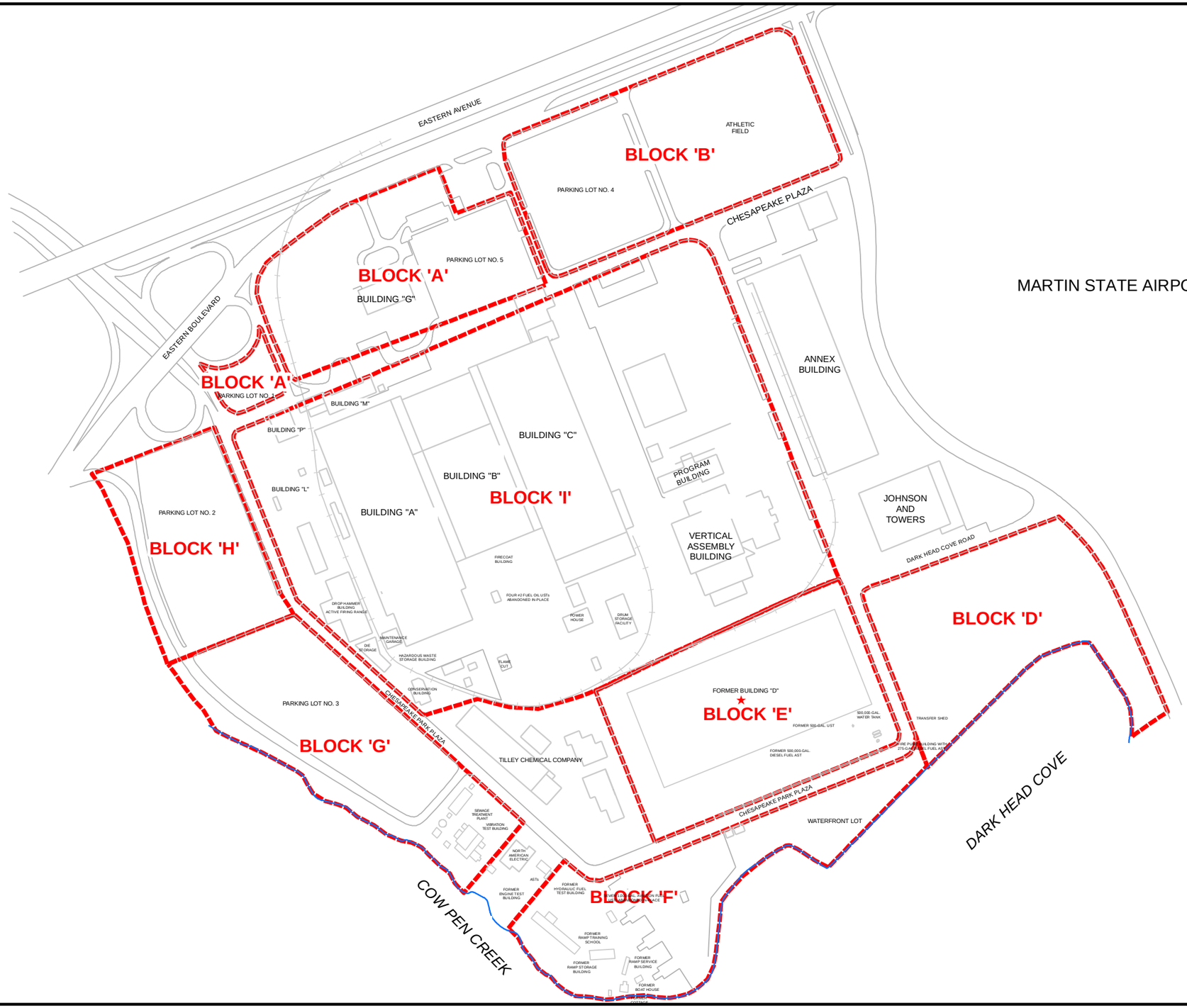
For non-hazardous waste, Tetra Tech will use Lockheed Martin's "Hazardous-Material/Waste-Shipment Checklist" (see Appendix B) during the preparation and pre-transport review of waste shipments, and will submit a completed electronic copy to the Lockheed Martin project lead along with the shipping documentation. Detailed records of authorized work will be maintained by the subcontractor including:

- all manifests of waste transported to the approved off-site disposal facility,
- receipts that the waste has been accepted by the approved treatment/disposal facility,
- certification that the waste has been disposed of at the approved facility,
- receipts that waste containers have been received by the approved disposal facility,
- certification of the disposal of waste containers by the approved disposal facility,
- weigh slips, and
- any other documentation required by local, state, or federal requirements**.**

4.3 POST-SHIPMENT REQUIREMENTS

Records of waste characterization, chain of custody, transportation, and destruction will be scanned and electronically submitted to the Lockheed Martin project lead for records-retention. This includes profile sheets, the "Hazardous-Material/Waste Checklist," the generator's copy of the waste manifest, a copy of the signed TSD-manifest, "Land Disposal Restriction" forms, and certificates of waste destruction (where applicable). All records of monitoring events will be submitted for each year's waste generation activities in the first quarter of the following year, or per the project lead's direction.

The documentation noted above must be retained for three years. All documents should be properly stored and available for review upon request.



MARTIN STATE AIRPORT

FIGURE 4-1
MIDDLE RIVER COMPLEX
INVESTIGATION DERIVED
WASTE STORAGE AREA

LEGEND

- ★ INVESTIGATION DERIVED WASTE STORAGE AREA
- TAX BLOCK
- STRUCTURE
- RAILROAD TRACKS

Lockheed Martin Middle River Complex
Middle River, Maryland

0 100 200 400 Feet

N

DATE MODIFIED: 02/17/2010

CREATED BY: BJ

Tetra Tech, Inc.

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APPENDIX A — WASTE IDENTIFICATION AND CLASSIFICATION FORM

Waste Identification and Classification Form

LMC Remediation Project		**State Generated**	
Description of Waste			
Generic Name		**Solid, Liquid, Gas**	
		Additional Info.	
Date of Waste Generation		**Ongoing (Y/N)?**	

Description of Process Generating Waste

Listed Waste ? (Y/N)		**F,K, P or U Codes, if applicable**	

Justification for Waste Classification (attach support documentation)

Completed by	
Company	
Date	

APPENDIX B — HAZARDOUS-WASTE MANIFEST SIGNATURE-AUTHORIZATION FORM

Lockheed Martin Hazardous Waste Manifest Signatory Authorization

This Authorization Agreement, effective for the remediation site and period of performance written below, is entered into by and between:

LOCKHEED MARTIN CORPORATION (hereinafter "Lockheed Martin"), having a business office at 6801 Rockledge Drive, Bethesda, Maryland 20817 USA, and incorporated in the State of Maryland, and

_____

(hereinafter "_____")

having a business office at_____

_____.

WHEREAS, _____ (company representative) of _____ (company) will sign Hazardous Waste Manifests on behalf of Lockheed Martin for the project and hazardous waste, as defined at 40 CFR Pt. 261 *et seq.* indicated below.

Remediation Site: _____
Site Address: _____
Period of Performance: _____
Hazardous Waste Description:
_____
_____
Hazardous Waste Disposal Facility and Location: _____
_____
_____

This Authorization Agreement certifies that the representative signing on behalf of Lockheed Martin has taken the appropriate Department of Transportation training, as delineated at 49 CFR Part 172 *t seq.* to sign Hazardous Waste Manifests and is in compliance with all state and federal requirements for hazardous waste manifesting.

Lockheed Martin shall remain responsible and liable for the hazardous waste being disposed regardless of the Signatory Authorization provided herein.

LOCKHEED MARTIN CORPORATION	_____
By:_____	By:_____
Name:_____	Name:_____
Title:_____	Title:_____
Date:_____	Date:_____

APPENDIX C —
HAZARDOUS-MATERIAL/WASTE-SHIPMENT CHECKLIST

Lockheed Martin Hazardous Material/Waste Shipment Checklist

Date:
Project Site Name:
Shipping Document No.:

A. DESCRIPTION

A1._____ UN/NA Identification Number, Proper Shipping Name, Hazard Class/Division Number, Packing Group
A2._____ Subsidiary hazard class(es) or division number(s), if any, in parenthesis
A3._____ Total Quantity of Material
A4._____ 24-Hour Emergency Phone Number and Response Information ERG No.: _____
A5._____ Page of Pages, *for multiple shipping papers/EPA Manifest/Air Decs.*
A6._____ Shipper's Certification, *as applicable*
A7._____ Small Quantity Exception/Dangerous Goods In Excepted Quantities/Diagnostic Specimen/Sample

B. ADDITIONAL DESCRIPTIONS - GENERAL

B1._____ Exemptions "DOT-E-*ex.#"*
B2._____ "Limited Quantity" (*not to exceed 66 lb gross weight*)
B3._____ "X" or "RQ" (if RQ, Hazardous Substance Contact @ 1-800-424-8802)
B4._____ "Waste" for RCRA regulated material
B5._____ "Mixture" or "Solution" - as appropriate.
B6._____ *(technical names), for poisons/mixtures/n.o.s./generic proper shipping names*
B7._____ "Marine Pollutant" and constituent in ( ), *for bulk shipments only*
B8._____ *(hazardous substance names) per 172.101 appendix if not contained in proper shipping name*
B9._____ *(EPA waste identification numbers)- used to identify the hazardous substance*
B10._____ "Poison" - *if not identified in proper shipping name or hazard class*
B11._____ "Poison-Inhalation Hazard" & Zone A, Zone B, Zone C, or Zone D, as appropriate*****
(*******Note Special Provisions 1-6 and 13 in Column 7 of 172.101)*

C. MARKING FOR NON-BULK PACKAGINGS

C1._____ Proper Shipping Name, UN/NA Identification Number
C2._____ (*technical name)*
C3._____ (*EPA waste identification number)*
C4._____ "RQ"
C5._____ Exemption Packagings "DOT-E-*ex.#*"
C6._____ Consignee's Name & Address
C7._____ Net or Gross quantity for non-rad Dangerous Goods (adjacent to PSN & UN#)
C8._____ Ltd. Qty - PSN only *per 172.301(a)(1) or* UN ID# placed in square-on-point border *per 172.315*
C9._____ Package Orientation Arrows, *for liquids in inner packagings*
C10._____ "Inhalation Hazard", unless these words appear on the label prescribed in *172.416* or *172.429*
C11._____ "Overpack" adjacent to proper shipping name marking [*see 173.25(a)(4)*]
C12._____ TSCA PCB Marking (*for actual or source concentration greater than or equal to 50 ppm **)
(* Note Potential Vehicle Marking Requirements in *40 CFR 761.40*)

D. MARKING FOR BULK PACKAGINGS (DUMP TRUCKS OR ROLL-OFFS)

D1._____ UN/NA Identification Number on orange panel or placard or white square-on-point display configuration as prescribed by 172.302 and 172.332

E. LABELING

E1._____ Primary Hazard Label(s): _____
E2._____ Subsidiary Hazard Label(s) with class/division: _____
E3._____ Hazardous Wastes Label(s)

F. PLACARDING

F1. 172.504 Table 1 Materials - Any Amount

F1.1._____ Dangerous When Wet (4.3)
F1.2._____ Poison (6.1, Inhalation Hazard, Zone A or B)***** (Primary or Subsidiary _____

*(******Materials subject to the "Poison-Inhalation Hazard" notation must be placarded with a POISON INHALATION HAZARD or POISON GAS placard , as appropriate, and also placarded for any other hazard class required for that material in 172.504)*

F1.3._____ Radioactive (7, LSA/SCO Exclusive Use Shipments)

F2. 172.504 Table 2 Materials - 1,001 lb:

G. PACKAGING

G1._____ Container Type: (Inner Pkg)_____
G2._____ Container Type: (Outer Pkg)_____
G3._____ Container Type: (Bulk Pkg)_____
G4._____ Loaded and Closed As Required_____

H. PAPERWORK AND MISCELLANEOUS ITEMS

H1._____ Shipping Paper/Hazardous Waste Manifest/Bill of Lading/Airway Bill/Shipper's Declaration
H2._____ Instructions for Maintenance of Exclusive Use Shipments
H3._____ Small Quantity/Excepted Quantity Statement on Package, *for 173.4 shipments* / **DGEQ** statement per *2.7.7.2* noted on Airway Bill
H4._____ Photograph, *if applicable*
H5._____ Vehicle Inspection
H6._____ Check Driver's Qualifications
H7._____ Emergency Telephone Number Notification, if required, see 172.604(b)
H8._____ LMC Notification Instructions

I. ADDITIONAL REQUREMENTS FOR RADIOACTIVE MATERIAL SHIPMENTS

I1. SHIPPING PAPER DESCRIPTIONS
- I1.1.____ Radionuclide Symbol(s), *per 173.435*
- I1.2.____ Physical & Chemical Form, *if not special form*
- I1.3.____ Activity per Package
- I1.4 ____ Radioactive Labels
- I1.5.____ Fissile Excepted, *if applicable*
- I1.6.____ "Exclusive Use Shipment"

I2. MARKING FOR NON-BULK PACKAGINGS
- I2.1.____Gross Weight, *for radioactive material packages in excess of 110 lb*
- I2.2.____ "Radioactive"; "Radioactive – LSA" ; "Radioactive – SCO"
- I2.3.____ Package Certification Number, *for radioactive material packages, as appropriate*
- I2.4.____ IP-1, IP-2, IP-3 markings
- I2.5.____ "USA" on all IP and Type A packagings
- I2.6.____ Packaging manufacturer marking on Type A

I3. LABELING
- I3.1.____ Radioactive Labels
- I3.2.____ "EMPTY" Label
- I3.3.____ "Radioactive Material, Excepted Package" handling label

I4. PLACARDING (172.504 TABLE 1 MATERIALS - ANY AMOUNT)
- I4.1.____ Radioactive (7, LSA/SCO Exclusive Use Shipments)

I5. PAPERWORK AND MISCELLANEOUS ITEMS
- H1._____ Instructions for Maintenance of Exclusive Use Shipments
- H2._____ Radioactive Excepted Package statement per *10.8.8.3.3* on Airway Bill
- H3._____Limited Quantity Radioactive Material *for multiple hazard limited quantity Class 7*.
- H4._____Health Physics Information
- H5._____NRC Manifest #540 for radioactive waste shipment for land disposal.

Completed By: **Company:** **Date:**

APPENDIX D — DRUM INVENTORY FORM

Tetra Tech NUS, Inc.

DRUM INVENTORY

PROJECT NAME: **PROJECT NUMBER:**

CLIENT: **LOCATION:**

Tt NUS PERSONNEL: **DATE (START):**

IDW CONTRACTOR: **DATE (END):**

DRUM ID	GENERATION LOCATION	DATE GENERATED	AMOUNT (gal.)	STORAGE LOCATION	COMMENTS

COMMENTS: _____

APPENDIX E— SITE CONTACT SHEET

Site Contact List

1)	Tom Ambrose: Facilities Supervisor:	Office: 410-682-1308
2)	Steve Thompson: Facilities Manager:	Office: 410-682-1304
3)	Scott Lapp: Maintenance:	Office: 410-682-0365 Cell: 410-967-8745
4)	Mike Musheno: ESH / Projects:	Office: 484-875-2819
5)	John Wells: Lead Facilities Electrician:	Work: 410-682-1307
6)	Tom McVickers: Facilities Electrician:	Office: 410-682-1307
7)	A&A Environmental / Spill Response:	1-800-404-8037
8)	Tony Apanavage: Project Manager:	Office: 1-301-528-3021 Cell: 1-301-233-8230
9)	Michael Martin: Program Manager:	Office: 1-301-528-3022 Cell: 1-410-707-5259

10) Baltimore County Police & Fire Department: 911

11) State of Maryland Emergency Response Center: (410-974-3551)

APPENDIX F— EESH-REMEDIATION OPERATING PROCEDURE NO. EROP-03, “EESH-REMEDIATION WASTE MANAGEMENT”

Subject: EESH Remediation Waste Management

Ref:
1. Code of Federal Regulations, Title 40, Parts 260, 261, 262, 264, 265, 268, 761, and 763
2. Code Federal Regulations, Title 49, Parts 100 through 180
3. Corporate Functional Procedure No: ESH-06
4. Corporate Functional Procedure No: ESH-08
4. Corporate Policy Statement 527

1.0 Purpose

This procedure establishes practices for management and transportation of solid and hazardous waste (waste in this context also refers to DOT hazardous materials) generated at remediation project sites in a manner that complies with Subtitle C of the. Resource Conservation and Recovery Act (RCRA), Department of Transportation (DOT) regulations, and similar state and/or host country waste regulations. Additionally, this procedure ensures waste disposal is managed in accordance with Corporate Functional Procedure ESH-06 and ESH-08, and records retained in accordance with Corporate Policy Statement 527.

2.0 Applicability

This procedure applies to the Energy, Environment, Safety and Health (EESH) Remediation Organization (the Organization) and to the remediation projects for which the Organization has waste management responsibility. Each member of the Organization, including IWTA, contractor staff and, where applicable, support organizations (e.g. Global Supply Chain Management), is responsible for execution of this procedure.

The materials to which this practice applies are solid wastes generated as a result of remediation project activities, including such things as investigation derived waste, environmental sampling, treatment of contaminated media, and routine operations and maintenance, unless such solid waste is exempt under applicable regulations.

3.0 Key National Agreement

Waste management requirements shall be included within the EESH Key National Agreements (KNA). The KNA establishes the requirements under which Remediation Contractors perform work for Lockheed Martin.

The KNA will stipulate that the Remediation Contractor shall comply with Lockheed Martin waste management, transportation, and disposal requirements and all applicable state, federal, and/or host country laws and regulations.

4.0 Statement of Work Requirements

4.1 Waste Management Plan

All remediation project statements of work that include the generation of solid waste, excluding office trash (e.g. food wastes, consumer packaging) that may be disposed of at a municipal solid waste facility, shall include a requirement for the waste management contractors (i.e. Remediation Contractors and/or Corporate Approved Waste Management Vendors) to submit a waste management plan to Lockheed Martin. A site specific waste management plan shall be prepared that identifies all potential solid waste streams that may reasonably be expected to be generated or discovered during project activities. The plan will address the required elements listed below; however, if the waste is determined to be non-hazardous following completion of Element A, then only the additions of Elements D and E are required.

Element A) Hazardous Waste Determination

i) Listing assessment (See Attachment #1 – Waste Listing Assessment Form)
ii) Characteristic determination

Hazardous waste determinations shall be made in accordance with 40 CFR 262.11 using a combination of process knowledge and/or analytical evaluation of waste sampling. Hazardous waste determinations shall be reevaluated whenever any of the following circumstances occur:

- A change in the process that produces the waste (e.g. a new chemical constituent is discovered, the treatment process changes);
- A change in the treatment media is made (e.g. new media vendor or media type);
- A waste was tainted by inadvertent mixing with another waste; or
- A change occurred to the hazardous waste regulations that apply to that waste.

Characteristic waste determinations based on analytical sampling shall be reevaluated at some reasonable frequency to verify the accuracy of the initial waste determination. The waste determination reevaluation frequency for ongoing remediation or treatment operations should be specified in the waste management plan and be profiled at least once a year.

Element B) Responsibilities and Training Requirements

i) Contractor staff responsibilities with regard to waste management and training requirements necessary to comply with Section 6.0 and all state, federal, and/or host country laws and regulations. Contractor training certifications shall be provided electronically to the Lockheed Martin Project Lead.

Element C) Pre-Shipment Requirements

i) Material identification and classification per DOT requirements
ii) Packaging, storage, segregation, marking, labeling, and accumulation of waste
iii) Waste shipment documentation
(1) Hazardous Waste Generator Identification Number

iv) Hazardous Material Transportation Plan
   (1) Hazardous material transportation risk identification, prioritization, and mitigation plan
   (2) Emergency Response (material information to be provided with shipments, actions to be taken in the event of an incident, staffing the emergency response phone number)
   (3) Hazmat Security Plan (as required based on thresholds outlined in 49 CFR §172.800)
   (4) Transportation and disposal logistics

Lockheed Martin Project Leads shall ensure the use of the Lockheed Martin Corporate Purchasing Agreements and the associated Corporate Approved Waste Management Vendors (WMV) for hazardous waste management and ensure that waste is transported to a treatment, storage, and disposal (TSD) facility on the Lockheed Martin Corporate Hazardous Waste Approved Vendors List as outlined in the ESH-06. Remediation contractors can contract directly with the WMV.

Additionally, hazardous waste manifests shall be signed only by a DOT trained and qualified Lockheed Martin employee or authorized designee (See Attachment #2 – Hazardous Waste Manifest Authorization Form). In addition to completing the Authorization Form, Project Leads shall verify that the designee is DOT trained and qualified to sign manifests and has adequate DOT experience. It is preferable to have contractors designated to sign that are involved in the waste characterization and oversight. For contractor personnel handling hazardous waste, appropriate hazardous waste handling training shall be provided by the contractor as outlined in Section 6.0 and complying with all state, federal, and/or host country laws and regulations.

Non-hazardous waste is not required to be managed by Corporate Approved Waste Management Vendors but shall be transported to an approved industrial waste disposal facility as outlined in ESH-06.

Within the United States, waste shall be characterized and disposed in accordance with the state regulations where it was generated unless the state requirements are less stringent than the federal requirements. For instance, California non-RCRA hazardous waste cannot be disposed of in a non-hazardous waste facility. Within a host country, waste shall be managed in accordance with the host country regulations; however, if the host country standards are less stringent than those of the US Environmental Protection Agency (EPA), than the EPA standards shall apply.

Element D) Shipping Requirements

i) Manifest certification and accuracy verification of physical waste shipment against manifested waste shipment (for non-hazardous waste this may not be applicable)
   (1) For hazardous waste, the contractor responsible for waste shipment shall utilize the Lockheed Martin Hazardous Material/Waste Shipment Checklist (see Attachment #3) during the preparation and pre-transport review of waste shipments and submit a completed electronic copy to the Lockheed Martin Project Lead with the shipping documentation.

ii) For non-specification bulk containers (e.g. dump trucks and roll-offs), the contractor responsible for waste shipment shall adhere to the Lockheed Martin requirements for packing and closing (see Attachment #4). These requirements are meant to supplement the applicable regulations.

Element E) Post Shipment Requirements - Records

i) Waste characterization, chain of custody, transportation, and destruction records shall be scanned and electronically submitted to the Lockheed Martin Project Lead for records retention. This shall include profile sheets, the Hazardous Material/Waste Checklist, the generator copy of the waste manifest, a copy of the TSD signed waste manifest, Land Disposal Restriction forms, and certificates of waste destruction where applicable. For finite-duration remediation projects, waste transportation and disposal records shall be submitted to the project lead at the completion of the project unless submittals are required by regulatory agencies on a more frequent basis. For recurring remediation project activities such as annual groundwater monitoring or groundwater treatment, these records shall be submitted for each year's waste generation activities in the first quarter of the following year or per the Project Lead's direction.

The waste management plan shall be submitted in a phased approach. The first section of the waste management plan will provide the hazardous listing assessment and the characteristic determination methodology (addressing Element A). This section of the plan shall be submitted in a timeframe that allows for Lockheed Martin's review prior to waste generation. Upon approval to proceed, the second section will document the waste profiling results and must be signed off on by a Lockheed Martin Project Lead. Additionally, it shall outline the logistics for waste handling, transportation and disposal (addressing Elements B through E). This section of the plan shall specify a reevaluation frequency for waste generated as a result of ongoing remediation or treatment operations.

Following the approval of the second section by the Lockheed Martin Project Lead, the waste management contractor shall implement the waste management plan. This plan shall be updated when the remedial treatment system process, waste stream, media, or regulations change.

4.2 Health and Safety Plan

For remediation sites managing waste, a section shall be included in the site Safety and Health Plan to address the safety and health requirements for managing the site specific waste.

4.3 Electronics and Scrap Metal Recycling

Where applicable and feasible, electronics and scrap metals shall be recycled or refurbished to the extent possible in accordance with ESH-06.

5.0 Responsibilities

5.1 Project Lead

The Project Lead shall:

- Ensure that all remediation projects for which they have responsibility have a waste management plan as outlined in Section 4.0. Review and ensure updates are completed as necessary. Plans must also be submitted to the Records Manager for upload to the Document Management System (DMS).

- Consult with Corporate EESH Legal as needed to verify the listing determination.

- Ensure that the Contractor has outlined the applicable training requirements and provided a training plan or statement of completion within the waste management plan.

- Verify that the site has a Hazardous Waste Generator Identification Number prior to hazardous waste shipments, where applicable.

- Ensure that all hazardous waste manifests are signed and certified by a Lockheed Martin employee or authorized designee. For non-hazardous waste, there are no signatory requirements for waste manifests.

- Ensure that non-hazardous or hazardous waste is shipped to an approved facility per ESH-06 and that the Corporate Approved Waste Management Vendors are being used for hazardous waste transportation, storage, and/or disposal services.

- Ensure receipt of the waste characterization, chain of custody, transportation, and destruction records, where applicable, and submit them to the Records Manager for upload to the DMS.

- Ensure that the required regulatory and state hazardous waste reports are submitted (e.g. biennial waste reports).

5.2 Remediation Global Supply Chain Management Representative

The Global Supply Chain Representative shall:

- Ensure that the KNA includes the requirements defined in Section 3.0.

- Send the Remediation Contractors an updated version of the approved non-hazardous facility list quarterly.

- Send the Corporate Approved Waste Management Vendors an updated version of the Lockheed Martin Corporate Hazardous Waste Approved Vendors List quarterly.

5.3 Corporate EESH Legal

The Corporate EESH Legal Counsel shall:

- Provide the Project Lead with support when making listed waste determinations.
- Notify the Project Leads of regulation changes that would affect prior listing determinations.

6.0 Training Requirements

The EESH remediation staff training requirements are summarized in Table 1.

6.1 RCRA Hazardous Waste Handling and Emergency Procedures

RCRA Generator Status Facilities
Generators who generate more than 1,000 kg/month of hazardous waste (or more than 1 kg/month of acutely hazardous waste) must comply with the emergency preparedness and personnel training requirements outlined in 40 CFR §265.16 (see 40 CFR §262.34(a)(4)). This training is intended for all facility personnel including the generator's contractors and includes training by a qualified person on hazardous waste management and emergency response procedures. Personnel shall receive an annual refresher. Project Leads are responsible for ensuring this training is provided to contractor staff on remediation projects that meet this generator criterion. Contractor personnel training records must also be maintained by the Project Lead.

"Small quantity generators" who generate greater than 100 kg but less than 1000 kg/month of hazardous waste, must comply with the emergency preparedness and personnel training requirements at 40 CFR §262.34(d)(5). These generators "must ensure that all employees are thoroughly familiar with proper waste handling and emergency procedures, relevant to their responsibilities during normal facility operations and emergencies" (40 CFR §262.34 (d)(5)(iii)). Project Leads shall ensure that all contractor staff has had the appropriate hazardous waste handling and emergency procedure training on remediation projects that meet this generator criterion.

Federal training requirements do not apply to remediation projects that generate less than 100 kg/month of hazardous waste. However, Project Leads shall ensure that the contractor staff is familiar with hazardous waste handling and emergency procedure training appropriate for waste management.

RCRA Permitted or Interim Status Facilities
Permitted or interim status facilities must follow training requirements in accordance with 40 CFR §264.16 and 40 CFR §265.16, respectively (the same requirements apply as outlined in the first paragraph under Section 6.1).

Additional training may be required by state and/or host country hazardous waste regulations. Any such additional training shall be verified and implemented by the Project Lead.

6.2 Department of Transportation Training

Department of Transportation (DOT) Hazmat Employee training is required for a person involved in shipment preparation, offering for transport and transportation of hazardous waste, including signing of hazardous waste manifests (see 49 CFR 172, Subpart H). All Lockheed Martin Remediation representatives, designees, and/or waste management contractors shall complete the hazmat employee training and renew the training as necessary to meet DOT requirements for hazardous waste transportation.

6.3 OSHA HAZWOPER Training

All contractors working on Lockheed Martin remediation sites shall complete the appropriate OSHA hazardous waste operations (HAZWOPER) training and annual refresher training specified in 29 CFR §1910.120. Lockheed Martin employees managing projects where hazardous waste is generated shall complete the 24 hour OSHA HAZWOPER training and annual refresher training.

7.0 Deviations

All deviations from this procedure must have prior approval by the Director of Environmental Remediation. The approval shall be documented and uploaded to the DMS.

Table 1

EESH Remediation Staff Waste Management Training Matrix			
Function	Task	Training Required	Requirements
EESH Remediation Employees (including IWTA and managing contractor staff (where the task description matches responsibilities))	Completing / Approving Waste Determinations	RCRA Generator Training	Refresher every 5 years
	Managing Remediation Sites where Hazardous Waste is Generated	OSHA HAZWOPER 24 HR	8 hr refresher annually
	Managing Hazardous Waste Shipments	DOT HazMat Certification (see Table 2)	Refresher every 3 years

The Lockheed Martin Project Lead shall update the Remediation Waste Management Training Matrix located on the Remediation Process Asset Library once training has occurred. All training and certification documentation will reside on the Remediation DMS under Training Records.

Table 2

EESH Remediation Staff DOT Requirements for Hazmat Employees	
Requirement	**Completion Method**
General Awareness [49 CFR 172.704(a)(1)]	• Vendor (e.g. Lions) provided Hazardous Materials Transportation Workshop • DOT OJT (taught by EESH DOT SME)
Function-Specific [49 CFR 172.704(a)(2)]	• Vendor (e.g. Lions) provided Hazardous Materials Transportation Workshop • DOT OJT (taught by EESH DOT SME)
Safety [49 CFR 172.704(a)(3)]	• Vendor (e.g. Lions) provided Hazardous Materials Transportation Workshop • DOT OJT (taught by EESH DOT SME) • Hazwoper 24 Hour Training • Site specific safety training [NOTE: This element of safety training may be fulfilled through completing any one (1) of the following three (3) options which provides the required site specific safety information: 1) Site Safety Plan Review, 2) Site HazCom/ General Employee Training or 3) Site Visitor Safety Briefing/Training. The source of the training must be entered as part of the information on the test which is administered for site specific safety training.]
Security Awareness [49 CFR 172.704(a)(4)]	• Vendor (e.g. Lions) provided Hazardous Materials Transportation Workshop • DOT OJT (taught by EESH DOT SME) • Site specific security awareness training [NOTE: This element of security awareness training may be fulfilled through completing any one (1) of the following three (3) options which provides the required site specific security information: 1) Site Security Plan Review, 2) Site HazCom/General Employee Training or 3) Site Visitor Security Briefing/Training. The source of the training must be entered as part of the information on the test which is administered for site specific security training.]
In-Depth Security (Hazmat Security Plan) Only applicable when haz material/waste meets certain class and volume thresholds (reference Section 4.1, Element C, iv, 4) [49 CFR 172.704(a)(5)]	• Site Hazmat Transportation Security Plan Training

The EESH DOT SME will certify EESH Remediation staff members as DOT Hazmat Employees on behalf of Lockheed Martin once training and safety and security tests have been completed.

Attachment #1

Waste Listing Assessment Form

Waste Listing
Assessment Form

Attachment #2

Hazardous Waste Manifest Signature Authorization Form

Designee
Authorization Form

Attachment #3

Hazardous Material/Waste Shipment Checklist

Hazardous Material/
Waste Shipment Che

Attachment #4

Non-Specification Bulk Container Packing and Closing Instructions

Non-Specification
Bulk Container Packin

Waste Identification and Classification Form

LMC Remediation Project		**State Generated**	
Description of Waste			
Generic Name		**Solid, Liquid, Gas**	
		Additional Info.	
Date of Waste Generation		**Ongoing (Y/N)?**	

Description of Process Generating Waste

Listed Waste ? (Y/N)		**F,K, P or U Codes, if applicable**	

Justification for Waste Classification (attach support documentation)

Completed by	
Company	
Date	

Lockheed Martin Hazardous Waste Manifest Signatory Authorization

This Authorization Agreement, effective for the remediation site and period of performance written below, is entered into by and between:

LOCKHEED MARTIN CORPORATION (hereinafter "Lockheed Martin"), having a business office at 6801 Rockledge Drive, Bethesda, Maryland 20817 USA, and incorporated in the State of Maryland, and

_____

(hereinafter "_____")

having a business office at_____

_____.

WHEREAS, _____ (company representative) of _____ (company) will sign Hazardous Waste Manifests on behalf of Lockheed Martin for the project and hazardous waste, as defined at 40 CFR Pt. 261 *et seq.* indicated below.

Remediation Site: _____
Site Address: _____
Period of Performance: _____
Hazardous Waste Description:
_____
_____
Hazardous Waste Disposal Facility and Location: _____
_____
_____

This Authorization Agreement certifies that the representative signing on behalf of Lockheed Martin has taken the appropriate Department of Transportation training, as delineated at 49 CFR Part 172 *t seq.* to sign Hazardous Waste Manifests and is in compliance with all state and federal requirements for hazardous waste manifesting.

Lockheed Martin shall remain responsible and liable for the hazardous waste being disposed regardless of the Signatory Authorization provided herein.

LOCKHEED MARTIN CORPORATION	_____
By:_____	By:_____
Name:_____	Name:_____
Title:_____	Title:_____
Date:_____	Date:_____

Lockheed Martin Hazardous Material/Waste Shipment Checklist

Date:
Project Site Name:
Shipping Document No.:

A. DESCRIPTION

A1._____ UN/NA Identification Number, Proper Shipping Name, Hazard Class/Division Number, Packing Group
A2._____ Subsidiary hazard class(es) or division number(s), if any, in parenthesis
A3._____ Total Quantity of Material
A4._____ 24-Hour Emergency Phone Number and Response Information ERG No.: _____
A5._____ Page of Pages, *for multiple shipping papers/EPA Manifest/Air Decs.*
A6._____ Shipper's Certification, *as applicable*
A7._____ Small Quantity Exception/Dangerous Goods In Excepted Quantities/Diagnostic Specimen/Sample

B. ADDITIONAL DESCRIPTIONS - GENERAL

B1._____ Exemptions "DOT-E-*ex.#"*
B2._____ "Limited Quantity" (*not to exceed 66 lb gross weight*)
B3._____ "X" or "RQ" (if RQ, Hazardous Substance Contact @ 1-800-424-8802)
B4._____ "Waste" for RCRA regulated material
B5._____ "Mixture" or "Solution" - as appropriate.
B6._____ *(technical names), for poisons/mixtures/n.o.s./generic proper shipping names*
B7._____ "Marine Pollutant" and constituent in ( ), *for bulk shipments only*
B8._____ *(hazardous substance names) per 172.101 appendix if not contained in proper shipping name*
B9._____ *(EPA waste identification numbers)- used to identify the hazardous substance*
B10._____ "Poison" - *if not identified in proper shipping name or hazard class*
B11._____ "Poison-Inhalation Hazard" & Zone A, Zone B, Zone C, or Zone D, as appropriate*****
(*******Note Special Provisions 1-6 and 13 in Column 7 of 172.101)*

C. MARKING FOR NON-BULK PACKAGINGS

C1._____ Proper Shipping Name, UN/NA Identification Number
C2._____ (*technical name)*
C3._____ (*EPA waste identification number)*
C4._____ "RQ"
C5._____ Exemption Packagings "DOT-E-*ex.#*"
C6._____ Consignee's Name & Address
C7._____ Net or Gross quantity for non-rad Dangerous Goods (adjacent to PSN & UN#)
C8._____ Ltd. Qty - PSN only *per 172.301(a)(1) or* UN ID# placed in square-on-point border *per 172.315*
C9._____ Package Orientation Arrows, *for liquids in inner packagings*
C10._____ "Inhalation Hazard", unless these words appear on the label prescribed in *172.416* or *172.429*
C11._____ "Overpack" adjacent to proper shipping name marking [*see 173.25(a)(4)*]
C12._____ TSCA PCB Marking (*for actual or source concentration greater than or equal to 50 ppm **)
(* Note Potential Vehicle Marking Requirements in *40 CFR 761.40*)

D. MARKING FOR BULK PACKAGINGS (DUMP TRUCKS OR ROLL-OFFS)

D1._____ UN/NA Identification Number on orange panel or placard or white square-on-point display configuration as prescribed by 172.302 and 172.332

E. LABELING

E1._____ Primary Hazard Label(s): _____
E2._____ Subsidiary Hazard Label(s) with class/division: _____
E3._____ Hazardous Wastes Label(s)

F. PLACARDING

F1. 172.504 Table 1 Materials - Any Amount

F1.1._____ Dangerous When Wet (4.3)
F1.2._____ Poison (6.1, Inhalation Hazard, Zone A or B)***** (Primary or Subsidiary _____

*(******Materials subject to the "Poison-Inhalation Hazard" notation must be placarded with a POISON INHALATION HAZARD or POISON GAS placard , as appropriate, and also placarded for any other hazard class required for that material in 172.504)*

F1.3._____ Radioactive (7, LSA/SCO Exclusive Use Shipments)

F2. 172.504 Table 2 Materials - 1,001 lb:

G. PACKAGING

G1._____ Container Type: (Inner Pkg)_____
G2._____ Container Type: (Outer Pkg)_____
G3._____ Container Type: (Bulk Pkg)_____
G4._____ Loaded and Closed As Required_____

H. PAPERWORK AND MISCELLANEOUS ITEMS

H1._____ Shipping Paper/Hazardous Waste Manifest/Bill of Lading/Airway Bill/Shipper's Declaration
H2._____ Instructions for Maintenance of Exclusive Use Shipments
H3._____ Small Quantity/Excepted Quantity Statement on Package, *for 173.4 shipments* / **DGEQ** statement per *2.7.7.2* noted on Airway Bill
H4._____ Photograph, *if applicable*
H5._____ Vehicle Inspection
H6._____ Check Driver's Qualifications
H7._____ Emergency Telephone Number Notification, if required, see 172.604(b)
H8._____ LMC Notification Instructions

I. ADDITIONAL REQUREMENTS FOR RADIOACTIVE MATERIAL SHIPMENTS

I1. SHIPPING PAPER DESCRIPTIONS
- I1.1.____ Radionuclide Symbol(s), *per 173.435*
- I1.2.____ Physical & Chemical Form, *if not special form*
- I1.3.____ Activity per Package
- I1.4 ____ Radioactive Labels
- I1.5.____ Fissile Excepted, *if applicable*
- I1.6.____ "Exclusive Use Shipment"

I2. MARKING FOR NON-BULK PACKAGINGS
- I2.1.____Gross Weight, *for radioactive material packages in excess of 110 lb*
- I2.2.____ "Radioactive"; "Radioactive – LSA" ; "Radioactive – SCO"
- I2.3.____ Package Certification Number, *for radioactive material packages, as appropriate*
- I2.4.____ IP-1, IP-2, IP-3 markings
- I2.5.____ "USA" on all IP and Type A packagings
- I2.6.____ Packaging manufacturer marking on Type A

I3. LABELING
- I3.1.____ Radioactive Labels
- I3.2.____ "EMPTY" Label
- I3.3.____ "Radioactive Material, Excepted Package" handling label

I4. PLACARDING (172.504 TABLE 1 MATERIALS - ANY AMOUNT)
- I4.1.____ Radioactive (7, LSA/SCO Exclusive Use Shipments)

I5. PAPERWORK AND MISCELLANEOUS ITEMS
- H1._____ Instructions for Maintenance of Exclusive Use Shipments
- H2._____ Radioactive Excepted Package statement per *10.8.8.3.3* on Airway Bill
- H3._____Limited Quantity Radioactive Material *for multiple hazard limited quantity Class 7*.
- H4._____Health Physics Information
- H5._____NRC Manifest #540 for radioactive waste shipment for land disposal.

Completed By: **Company:** **Date:**

PACKING AND CLOSING INSTRUCTIONS FOR NON-SPECIFICATION BULK CONTAINERS (DUMP TRUCKS AND ROLL-OFFS) 04/10/2009

PRELIMINARY TASKS

- Select the transport container based on the Department of Transportation hazard classification and the packaging requirements specified in the Hazardous Materials Table.
- Perform moisture evaluation of waste material to be loaded into transport containers to determine the potential for releasing liquid.

PREPARATION OF BULK CONTAINERS FOR LOADING

- Transport containers must be inspected for any condition that may affect their safety or performance prior to each use.
- Dump trucks and roll-offs with doors must have gaskets installed at the tailgate or doors that when the tailgate or doors are closed the gasket is compressed sealing the tailgate or doors to assure package integrity and containment of materials. The gasket must be inspected prior to each use for overall integrity including positioning, damage such as holes or tears or debris which could prevent tight closure. Any deficiencies shall require replacement prior to use.
- An absorption pad shall be placed in the truck or roll-off bed. The pad specification shall be determined utilizing the data determined in the waste material moisture evaluation and must be capable of absorbing the liquid which could be released.
- An absorption log at the rear of the transport container along the bottom of the tailgate or rear doors.
- A minimum 6 mil poly liner shall be placed over the absorption pad and absorption log prior to loading.
- Determine the amount of waste that can be loaded into the transport container. (Subtract the unladen weight of the transport vehicle from the maximum licensed weight of the transport vehicle. NOTE: Do not load the maximum permissible load determined in the mathematical calculation to allow for variance in scales that may be utilized to weigh the loaded vehicle.)

LOADING AND CLOSING BULK CONTAINERS

- Waste material shall be loaded into the transport container in such a manner that does not compromise either the liner or container integrity.
- Do not load material above the height of the sides of the transport container.
- Close the poly liner over of the waste material prior to tarping the load.
- Close the transport container by putting a heavy roll tarp over the top of the transport container and secure the tarp by utilizing tie downs on all four sides.