U.S. Army

Final
Work Plan Addendum for
Heating Oil Spill Site Investigation
Building 419
Fort Stewart, Georgia

IMA

July 2013
(Revision 1)

Submitted to:
Directorate of Public Works
Environmental Division
Fort Stewart, Georgia 31314-4927

Submitted to:
U.S. Army Corps of Engineers
Savannah District
100 West Oglethorpe Avenue
Savannah, Georgia 31401-3604

Prepared by:
SpecPro Environmental Services LLC
1006 Floyd Culler Court
Oak Ridge, Tennessee 37830
under
Contract No. W912HN-10-D-0001
Delivery Order No. 0029

DOCUMENT 3

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Acronyms and Abbreviations

AMSL	above mean sea level
BTEX	benzene, toluene, ethylbenzene, and xylenes
CAP	Corrective Action Plan
DNR	Department of Natural Resources
DPT	direct push technology
DPW	Directorate of Public Works
DRO	diesel range organics
EDD	electronic deliverable data
EFR	enhanced fluid recovery
EPA	Environmental Protection Agency
EPD	Environmental Protection Division
ERIS	Environmental Restoration Information System
ft	foot/ feet
IDW	investigative-derived waste
MS	matrix spike
MSD	matrix spike duplicate
NP	not present
PAH	polynuclear aromatic hydrocarbons
PID	photoionization detector
POC	point of contact
QC	quality control
SES	SpecPro Environmental Services LLC
SOP	standard operating procedure
TOC	top of casing
TPH	total petroleum hydrocarbons
USACE	U.S. Army Corps of Engineers
UPC	Utility Protection Center
UST	underground storage tank
USTMP	Underground Storage Tank Management Program

1. INTRODUCTION

SpecPro Environmental Services LLC (SES) has been contracted by the U.S. Army Corps of Engineers (USACE), Savannah District, to perform a site delineation and extraction of free product for a heating oil spill at Building 419, Fort Stewart, Georgia. A preliminary assessment, site investigation, and free product removal were performed from March to August 2011 to delineate the site. The results indicate further delineation is needed. This work plan addendum provides site-specific and background information for the further delineation and describes the actions necessary to remove the free product, fully delineate the soil and groundwater contamination, and complete the necessary reporting requirements. All work will be performed in accordance with Federal, state, and local regulations.

1.1 PURPOSE OF THIS WORK PLAN ADDENDUM

This work plan addendum provides site-specific and background information related to a heating oil spill at Building 419. It describes the remedial activities, the numbers and types of samples to be taken, sampling rationale and criteria, field investigation techniques and procedures, analytical requirements and methods, quality control (QC) requirements, and necessary reporting requirements.

1.2 SCOPE

The scope of work includes

- Installing soil borings and groundwater monitor wells,
- Collecting soil samples from the borings,
- Collecting groundwater samples,
- Conducting free product removal,
- Conducting a two-year groundwater monitoring program,
- Properly storing and disposing of the investigative-derived waste (IDW), and
- Using the data collected to prepare a Corrective Action Plan (CAP) – Part A and CAP-Part B to satisfy requirements of the Georgia Environmental Protection Division (EPD) Underground Storage Tank Management Program (USTMP).

2. SITE BACKGROUND

Fort Stewart is in portions of Long, Evans, Tattnall, Bryan, and Liberty counties, Georgia, and is approximately 40 miles southwest of Savannah, Georgia. The nearest city is Hinesville, approximately 1 ½

miles to the south (Figure 2-1). Building 419 is near the intersection of Hero Road and Steele Avenue in the Post Exchange (PX) complex (Figure 2-2). A January 4, 2008, inquiry to an inventory discrepancy indicated that approximately 4,500 gallons of No. 2 heating fuel oil were released into the ground behind Building 419 near Steele Avenue on the west side of the loading dock (Figure 2-3). Mr. Scott Coburn of the Georgia EPD Spill Response Center was notified the day the spill was discovered. It was determined that the release came from the water heating boiler fuel oil return line that was connected to a 4,000-gallon underground storage tank (UST) containing heating oil. The United States Geological Services 7.5 minute quad map associated with the area of this site is included (Figure 2-4).

3. PREVIOUS INVESTIGATIONS

Fort Stewart initiated the emergency spill response in close coordination with Georgia EPD. Then Fort Stewart contracted with SWS First Response to determine the extent of contamination, to extract contaminated soil up to groundwater infiltration, and to remove the UST. SWS First Response's project summary letter report is available in Appendix D.

Because of the heating oil spill at Building 419, Solutions To Environmental Problems (STEP), which is now SES, was asked to install recovery wells in the area. On February 12, 2008, STEP installed a total of six recovery wells downgradient and sidegradient of the location of the former tank (Figure 3-1). STEP checked these wells for free product the next day, and four of them contained free product (Table 3-1).

Table 3-1 Free Product Thickness February 13, 2008

Well Number	Total Depth of Well (ft)	Depth to Water (ft)	Depth to Free Product (ft)	Product Thickness (ft)
RW 01	10.0	7.71	6.71	1.0
RW 02	10.0	8.01	N/A	N/A
RW 03	10.0	8.03	N/A	N/A
RW 04	10.0	7.91	5.91	2.0
RW 05	10.0	7.83	5.83	2.0
RW 06	8.0	4.31	1.31	3.0

ft = foot/ feet
RW = recovery well
N/A = not applicable



LEGEND

★ Site Location

Job Title: Heating Oil Spill Site Investigation Building 419
Fort Stewart, Georgia
Data Source: Ft. Stewart GIS

Figure 2-1 Fort Stewart Location Map

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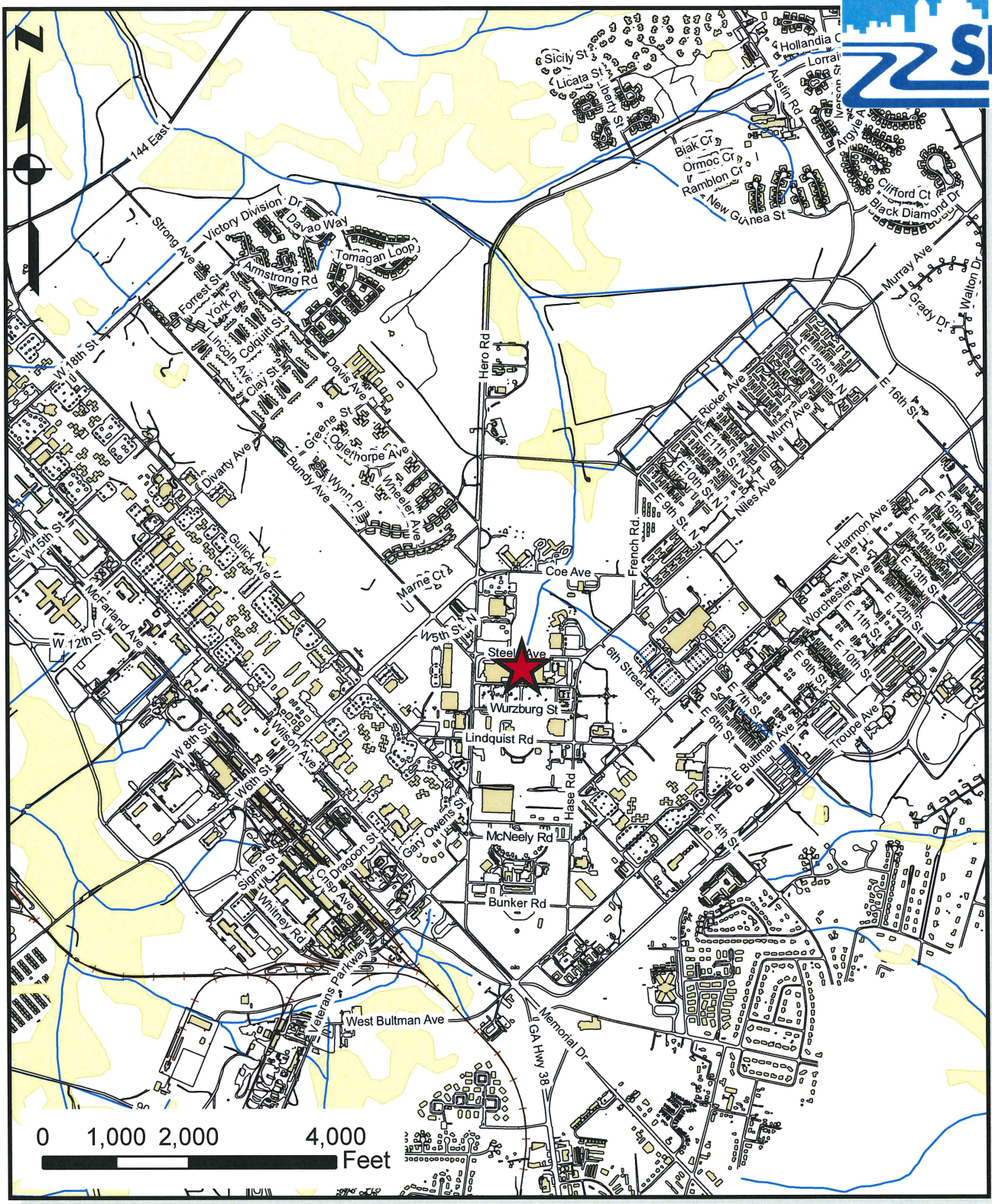

LEGEND

★ Site Location

Job Title: Heating Oil Spill Site Investigation at Building 419
Fort Stewart, Georgia
Data Source: Ft. Stewart GIS

Figure 2-2 Site Location Map

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r:\projects\E0209\E0209.0029\graphics\Figure 2-3 Project Location Map (APP).mxd

E0209.0029

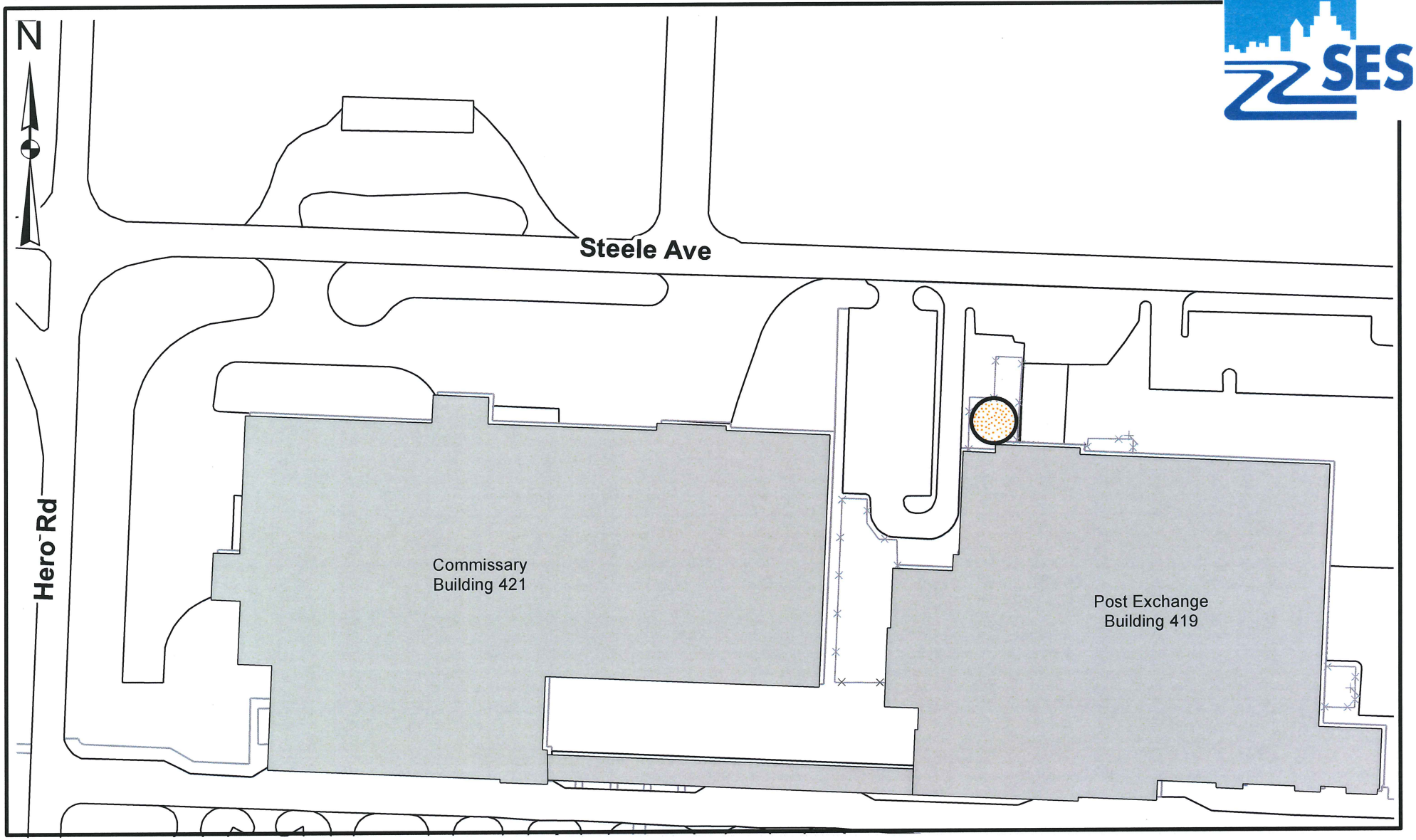
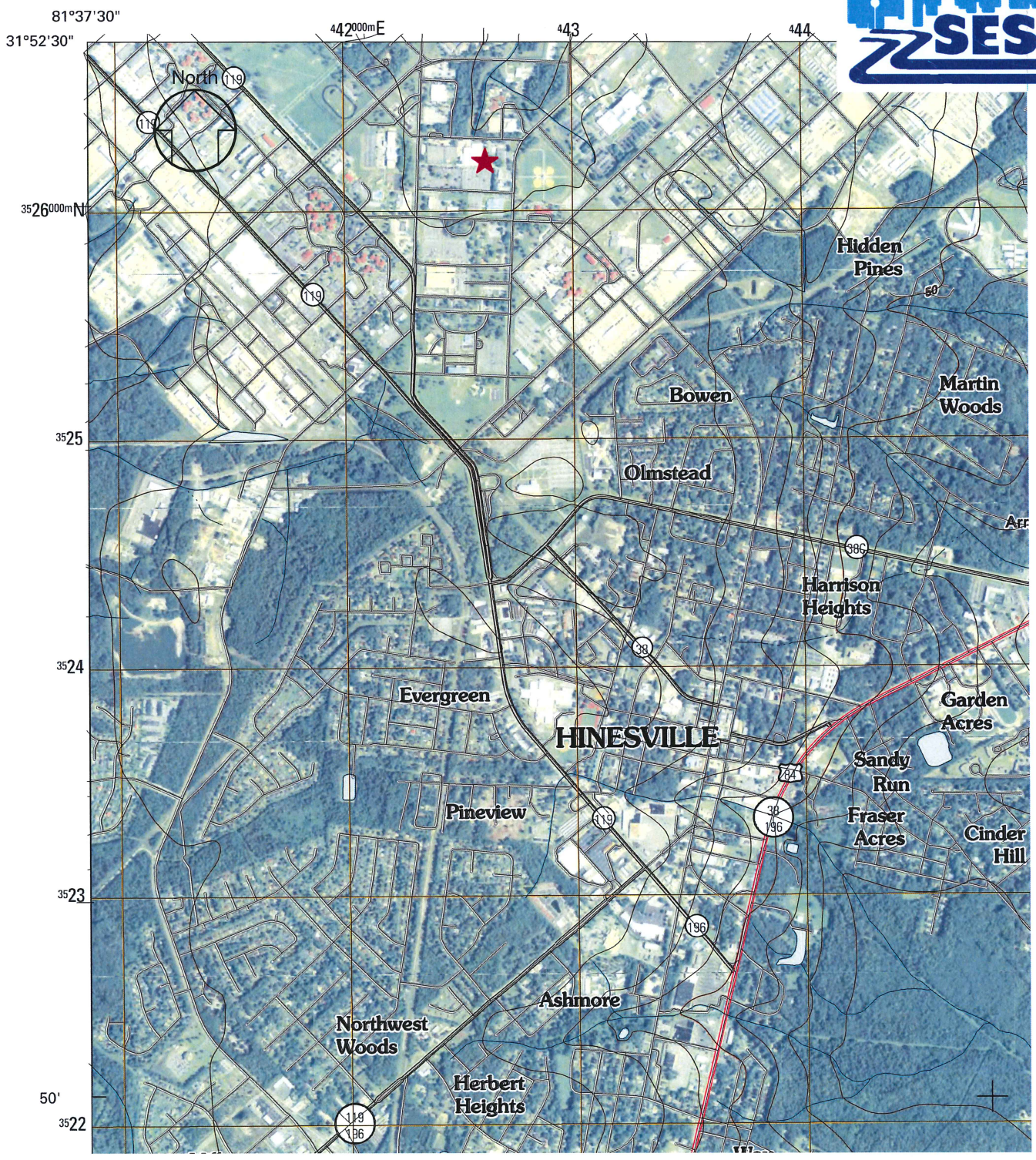


Figure 2-3 Project Location Map

5/28/13



Legend

★ Project Location

Job Title: Heating Oil Spill Site Investigation at Building 419
Fort Stewart, Georgia
Source: USGS Quadrangle Map, Hinesville, Georgia 2011

Figure 2-4 USGS Quadrangle Map

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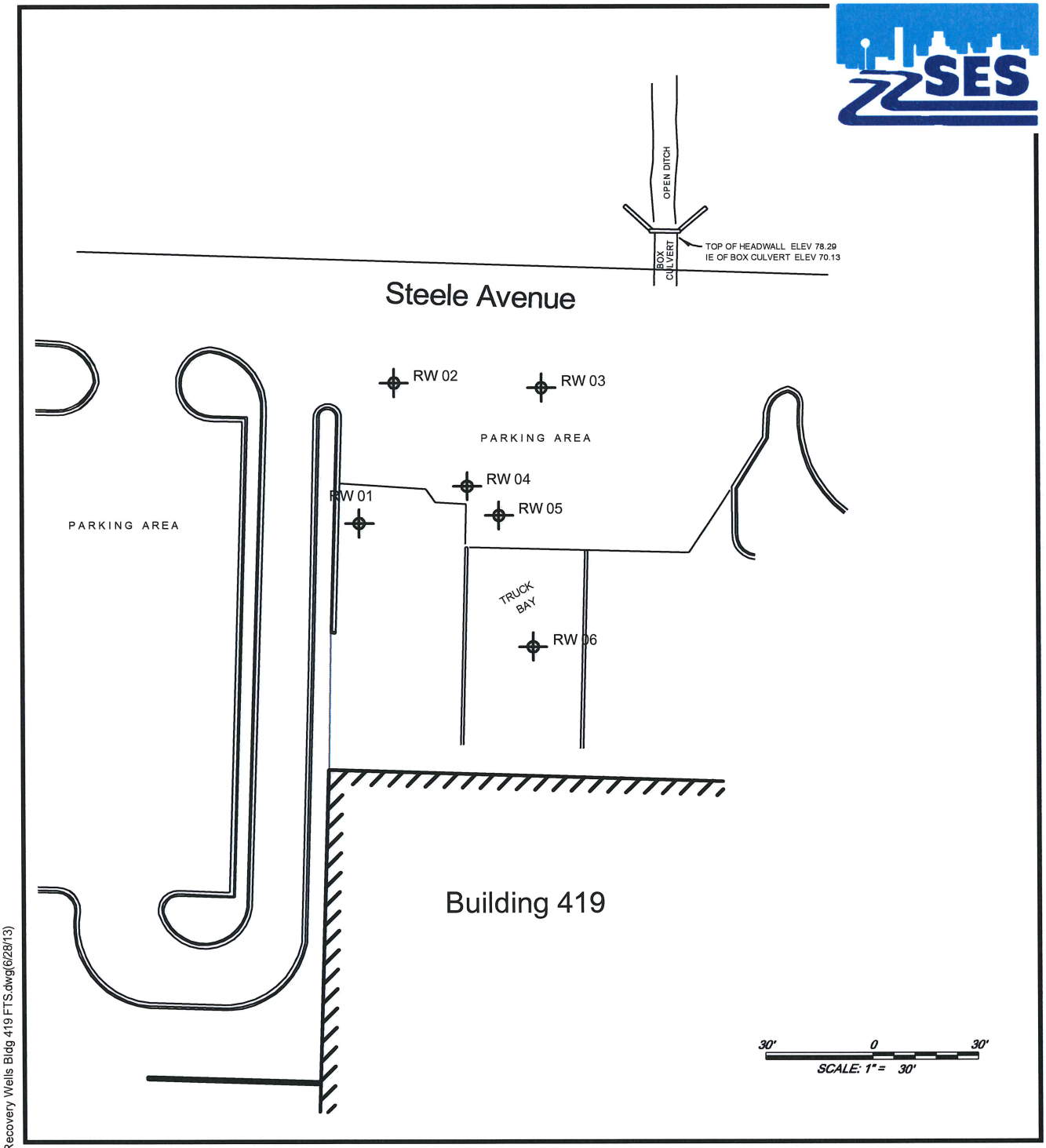

Legend	
RW 05 Recovery Well	Job Title: Heating Oil Spill Site Investigation at Building 419 Fort Stewart, Georgia

Figure 3-1 Recovery Wells

R:\E0209\E0209.0029\graphics\Figure Recovery Wells Bldg 419 FTS.dwg(6/28/13)

After the recovery wells were installed, a vacuum extraction truck from Fort Stewart recovered approximately 1,475 gallons of fuel between February 2008 and November 2008 (Table 3-2).

Table 3-2 Building 419 UST Fuel Recovery

Date	Fuel Pumped (Gallons)	Groundwater Pumped (Gallons)
2/8/2008	250	0
2/15/2008	130	0
2/28/2008	100	350
3/3/2008	100	125
3/12/2008	100	100
3/14/2008	100	75
3/17/2008	100	25
4/3/2008	180	20
4/18/2008	200	60
4/25/2008	75	50
5/13/2008	60	80
5/19/2008	75	55
7/29/2008	5	170
10/23/2008	unknown	600
10/30/2008	unknown	400
11/6/2008	unknown	175
Total pumped	1,475	2,285

When additional funding became available in Fiscal Year 2011, SES was contracted to conduct the preliminary site investigation. In March 2011, SES installed 20 soil borings using a direct push technology (DPT) drilling rig at the site. One soil boring was installed in the vicinity of the suspected release source area, and the other borings were installed outwardly from that point. The soil borings were installed upgradient and downgradient of the suspected release area. The soil borings were sampled continuously, described and classified by a geologist, and field-screened using a photoionization detector (PID). Six soil boring locations were selected to be groundwater monitor well locations. These locations were selected to delineate the extent of possible groundwater contamination from the source area. The new groundwater monitor wells were allowed to equilibrate with the localized groundwater conditions. Free product was measured and recorded to estimate the extent and mass of the free product in the subsurface on June 12, July 17, and August 6, 2011 (SES, August 2012). Table 3-3 shows which wells contained free product and its quantity.

Table 3-3 Groundwater Elevations for Enhanced Fluid Recovery Events

Well Number	Date Measured	Top of Casing (ft AMSL)	Depth to Free Product (ft TOC)	Water Depth (ft TOC)	Product Thickness (ft)	Corrected Groundwater Elev. (ft)
Event 1 – June 12, 2011						
MW-01	06/12/2011	76.29	NP	7.64	---	68.65
MW-02	06/12/2011	79.38	NP	8.01	---	71.37
MW-03	06/12/2011	79.94	NP	7.66	---	72.28
MW-04	06/12/2011	76.78	4.51	4.93	0.42	72.19*
MW-05	06/12/2011	78.92	NP	8.60	---	70.32
MW-06	06/12/2011	78.92	NP	8.49	---	70.43
RW-01	06/12/2011	79.25	8.54	8.79	0.25	70.67*
RW-02	06/12/2011	79.22	NP	8.03	---	71.19
RW-04	06/12/2011	78.98	7.60	12.10	4.5	70.57*
RW-05	06/12/2011	79.19	7.81	11.60	3.79	70.70*
RW-06	06/12/2011	77.59	5.79	6.81	1.02	71.62*
Event 2 – July 17, 2011						
MW-01	07/17/2011	76.29	NP	7.31	---	68.98
MW-02	07/17/2011	79.38	NP	7.79	---	71.59
MW-03	07/17/2011	79.94	NP	7.49	---	72.45
MW-04	07/17/2011	76.78	4.42	4.88	0.46	72.28*
MW-05	07/17/2011	78.92	NP	8.05	---	70.87
MW-06	07/17/2011	78.92	NP	8.31	---	70.61
RW-01	07/17/2011	79.25	8.41	8.46	0.05	70.83*
RW-02	07/17/2011	79.22	NP	8.67	---	70.55
RW-04	07/17/2011	78.98	7.79	10.05	2.26	70.78*
RW-05	07/17/2011	79.19	7.86	10.45	2.59	70.86*
RW-06	07/17/2011	77.59	5.80	6.27	0.47	71.71*
Event 3 – August 6, 2011						
MW-01	08/06/2011	76.29	NP	7.26	---	69.03
MW-02	08/06/2011	79.38	NP	7.62	---	71.76
MW-03	08/06/2011	79.94	NP	8.86	---	71.08
MW-04	08/06/2011	76.78	4.59	4.94	0.35	72.13*
MW-05	08/06/2011	78.92	NP	8.06	---	70.86
MW-06	08/06/2011	78.92	NP	8.35	---	70.57
RW-01	08/06/2011	79.25	NP	8.05	---	71.20
RW-02	08/06/2011	79.22	NP	8.70	---	70.52
RW-04	08/06/2011	78.98	7.99	9.39	1.40	70.74*
RW-05	08/06/2011	79.19	8.04	9.09	1.05	70.96*
RW-06	08/06/2011	77.59	5.96	6.43	0.47	71.55*

NOTE: Corrected Groundwater Elevation = Top of casing elevation - Depth to water + (Specific gravity x Product Thickness)
Gasoline's specific gravity of 0.82 was used.
*Corrected groundwater elevation because of free product
AMSL = above mean seal level ft = feet TOC = top of casing NP = not present

The benzene, toluene, ethylbenzene and xylenes (BTEX) and/or polynuclear aromatic hydrocarbons (PAH) concentrations in eight soil borings exceeded Georgia USTMP Table A, Soil Threshold Levels. Diesel range organics exceeded the reporting limit in 14 borings (SES, August 2012).

All results from groundwater sampling were below Georgia In-Stream Water Quality Standards. Ethylbenzene and xylenes (total) groundwater sample results from one groundwater monitor well exceeded minimum quantitation and reporting levels (SES, August 2012).

An eight-hour enhanced fluid recovery (EFR) event took place monthly between June 2011 and August 2011. Ninety equivalent gallons of free product and 7,667 gallons of contaminated groundwater were removed from the site during the three monthly events. At the end of each EFR event, the material was transported to the Georgia Petroleum, Inc. treatment facility for disposal (SES, August 2012). Using information collected during the July 2011 EFR event, SES's subcontractor, EcoVac Systems, conducted a phase behavior and compatibility treatability study to determine the surfactant that is compatible with the site's groundwater.

Based on information collected from site activities, SES recommended a CAP-Part A for the UST release with installation of additional soil borings and groundwater monitor wells for contamination and free product delineation. The Georgia EPD accepted this recommendation, and a copy of the acceptance letter is available in Appendix E. A pilot study consisting of surfactant injection and multiphase extraction was recommended to address the free phase product on the site (SES, August 2012).

4. SITE INVESTIGATION

Additional field activities are required to obtain the data necessary to complete a CAP-Part A report. These field activities, which will delineate the contamination at the project site, are discussed in this section.

SES personnel will obtain all permits and utility clearances for this investigation prior to conducting intrusive field activities. SES personnel will determine all soil boring and monitor well locations in the field. Excavation permits will be obtained through Georgia Utilities Protection Center (UPC).

All sampling will follow the Environmental Protection Agency (EPA) Region 4 Standard Operating Procedures (SOPs), and appropriate quality assurance/ QC samples will be collected. A schedule of fieldwork and report preparation is shown in Appendix A Project Management Plan.

SES will conduct site investigation activities to provide Fort Stewart with a completed CAP-Part A report that discusses the extent of the contamination on site, explains the results of the soil and groundwater analysis, and outlines recommendations for future remediation concerning potential contamination from the heating oil release.

4.1 Site Reconnaissance, Preparation, and Restoration Procedures

Before field activities begin, all excavation permits and utility clearances for the site will be obtained in coordination with the Georgia UPC. These requests can be made by calling (800) 282-7411 or by visiting www.gaupc.com and clicking on the IRTH login. UPC requires preregistration for online requests. Then, the excavating contractor must mark the boundaries of the proposed excavation site using white paint, flags, or stakes.

UPC officials locate utility lines based on Directorate of Public Works (DPW) information. The DPW accepts responsibility for the accuracy of markings for gas and fuel lines, water lines, electrical lines (including secondary electricity), airfield lighting, low voltage, fire systems, sewer lines, roof drain lines, storm drain lines, industrial waste lines, chilled water lines, high temperature water lines, irrigation systems, and DPW nonfiber computer lines. These requests will be forwarded to all utility companies with services at the excavation site.

- Permits will be issued within 48 hours of the next business day after UPC gets the request.
- Permits will be valid for 21 days. Renewal requests should be submitted at least three days before expiration.
- Requesting contractors are responsible for maintaining marks during the 21-day period.
- If after acquiring a permit, a utility is damaged during the excavation process, the appropriate utility company needs to be notified. The Fort Stewart DPW point of contact (POC) is Jim Maddox - (912) 228-7233.

4.2 SAMPLE COLLECTION

Subsurface soil or surface soil and groundwater samples are to be collected. Each boring and groundwater monitor well will be surveyed to provide horizontal and vertical coordinates. The proposed locations and numbers of soil borings, permanent monitor wells, and samples shown in this work plan are approximate and subject to change based on field conditions. A data management plan is in Appendix B.

4.2.1 Soil Samples

SES will install six soil borings as recommended in *Corrective Action Plan Part A Guidance Document 2011* [Georgia Department of Natural Resources (DNR), January 2011]. The proposed locations for the soil borings are shown in Figure 4-1. Actual soil boring locations will be determined at the time of drilling because underground and/or overhead utilities may be present.

The soil borings will be conducted using DPT. Soil sampling will be accomplished using a Geoprobe in accordance with SOP Number SESDPROC-300-R1 (EPA, November 2007).

Two samples will be collected from each boring using cellulite acetate butyrate liners at each sample location (EPA, November 2007). Acceptable analytical methods and required laboratory detection limits follow the CAP-Part A guidelines (Georgia DNR, January 2011). The sample depth within the boring will be determined by screening with a portable PID using the headspace method. Two soil samples will be collected from each boring where the headspace screening indicates the highest readings. If no organic vapors are detected from the headspace screening, two soil samples will be collected and submitted to the lab for chemical testing from the following depths: one between 0 and 3 feet and one at the soil/ groundwater interface. Twelve primary samples will be collected (not including QC samples). Each sample will be analyzed for BTEX, diesel range organics, and PAHs. Table 4-1 shows quantities of samples to be collected. Any field changes in the quantities of borings and/or samples will receive approval from USACE at that time.

R:\E209\E209.0029\graphics\Fig 4-2 Proposed GW Mon Wells.dwg(08/31/12)

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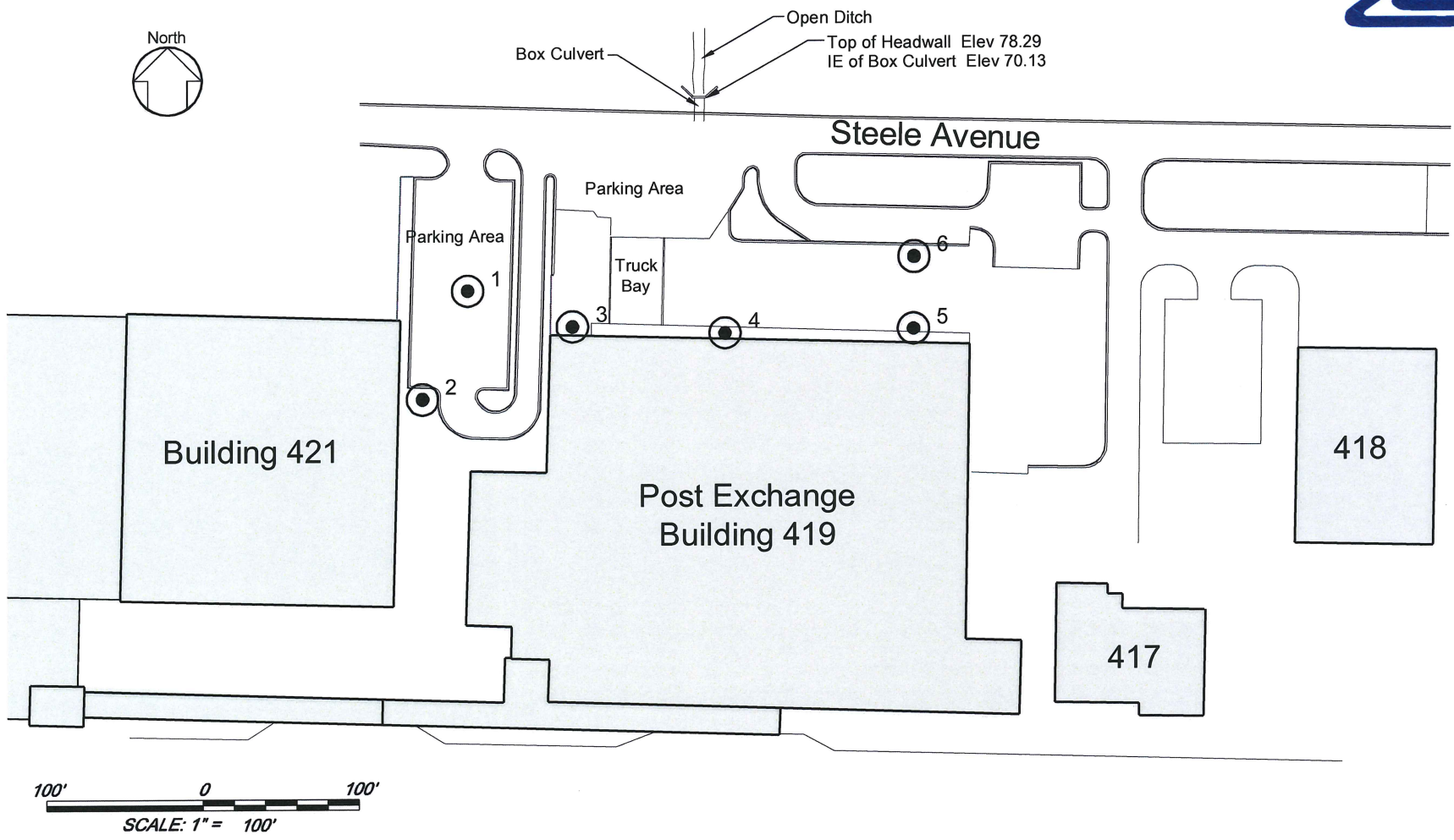

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1 Proposed Soil Boring

Job Title: Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia

Figure 4-1 Proposed Locations of Soil Borings

6/28/13

Table 4-1 Soil Samples for Building 419

Sample Type	BTEX Method (8260B)	PAHs Method (8270C)	TPH-DRO Method (8015B)
Primary Samples	12	12	12
Field Duplicates	2	2	2
Equipment Rinseates	1	1	1
Field Blanks	1	1	1
Trip Blanks	2	0	0
MS/MSD	1	1	1
Total Number of Samples	19	17	17

Notes:
1. Equipment rinseates and field duplicates will be taken at a rate of 10 percent of the total number of primary samples.
2. One field blank sample per event for all analyses.
3. Matrix spike and matrix spike duplicates will be analyzed on representative matrix at a rate of a minimum of one sample per batch or 1 in 20 samples.

BTEX = benzene, toluene, ethylbenzene, and xylenes
DRO = diesel range organics
MS = matrix spike
MSD = matrix spike duplicate
PAHs=polynuclear aromatic hydrocarbons
TPH = total petroleum hydrocarbons

4.2.2 Groundwater Samples

Six permanent groundwater monitor wells will be installed to delineate groundwater contamination. The groundwater monitor well locations will be determined after the soil boring results have been evaluated. The 2-inch monitor wells are estimated to be 20 feet deep and have a 10-foot screen with 7 feet of screen placed in groundwater and 3 feet above groundwater if possible to facilitate measuring free phase product.

If the soil boring locations are adequate, the proposed groundwater monitor wells will be installed in those borings. If any locations are not adequate for the permanent groundwater monitor wells, two soil samples will be collected from each additional soil boring for the permanent groundwater monitor wells using the same sample collection procedures as the six soil borings described in Section 4.2.1.

One groundwater sample will be collected from each newly completed groundwater monitor well. Each sample will be analyzed for BTEX and PAHs. Any field changes on the quantities of borings and/or samples will receive approval from USACE at that time.

The installation, development, and sampling of the groundwater monitor wells will follow EPA Region 4 SOPs (EPA, November 2007). Acceptable analytical methods and required laboratory detection limits

follow the CAP-Part A guidelines (Georgia DNR, January 2011). Table 4-2 lists quantities of samples and analytical requirements.

Table 4-2 Groundwater Samples for Building 419

Sample Type	BTEX Method (8260B)	PAHs Method (8270C)
Primary Samples	6	6
Field Duplicates	1	1
Equipment Rinseates	1	1
Field Blanks	1	1
Trip Blanks	2	0
MS/MSD	1	1
Total Number of Samples	12	10

Notes:
1. Equipment rinseates and field duplicates will be taken at a rate of 10 percent of the total number of samples for each parameter by matrix and event.
2. One field blank sample per event for all analyses.
3. Matrix spike and matrix spike duplicates will be analyzed on representative matrix at a rate of a minimum of one sample per batch or 1 in 20 samples.

BTEX = benzene, toluene, ethylbenzene, and xylenes MS = matrix spike
MSD = matrix spike duplicate PAH = polynuclear aromatic hydrocarbon

4.2.3 Investigative-Derived Waste

All IDW will be properly disposed in accordance with state and Federal regulations. IDW should be minimal and contain soil (from the soil borings) and liquid (decontamination water). It will be stored in drums and placed on pallets at a nearby area designated by USACE or Fort Stewart representatives pending receipt of characterization results required to determine appropriate off-site disposal.

Each IDW container will be labeled in accordance with applicable state and Federal requirements. IDW shall be labeled "UNCLASSIFIED WASTE, ANALYSIS PENDING" with a weather-resistant label. In addition, the following information shall be included on the label:

- The location where the IDW originated,
- The SES POC and telephone number,
- Fort Stewart POC,
- The USACE POC and telephone number, and
- A description of the contents.

IDW storage areas will be flagged with surveying tape and stakes. All other wastes (for example, trash, Tyvek suits, gloves, respirator cartridges, etc.) will be disposed off site in accordance with all applicable regulations.

IDW will be characterized for disposal within 60 days of the date of generation and properly disposed (on site and/or off site) within 90 days of generation. All IDW will be disposed at an approved, permitted facility. SES will remove all emptied drums, spill containment pallets, etc.

SES will complete all required manifests for waste disposal, and DPW personnel will get a 72-hour notice for signature. (Note: a DPW representative must sign each manifest). SES will be on site during all waste removal activities. SES will also submit a list to Installation personnel with the number and location of IDW drums and the date and location where the IDW was derived.

The IDW soil will be analyzed for the full suite of Toxicity Characteristic Leaching Procedure analytes along with reactivity, ignitability, and corrosivity for disposal purposes. The IDW water will be analyzed for target compound list volatile organic compounds, semivolatile organic compounds, and target analyte list metals.

5. FREE PRODUCT REMOVAL

5.1 ADDITIONAL FIELD ACTIVITIES

Additional field activities are required to obtain the data necessary to determine the remedial system design for free product removal. The wells containing free product will be used in a pilot test

5.1.1 Pilot Test

SES's subcontractor, EcoVac, will perform a two-day pilot test at a maximum of four wells. The objective of the pilot test is to identify the surfactant systems that would be best-suited to remove the free product. Each individual well will be tested to

- Determine the surfactant injection volumes, locations, and sequence;
- Achieve contaminant removal by the multiphase/ dual-phase extraction process;
- Assess the need for additional treatment wells;
- Determine the need for additional removal of separate phase hydrocarbons; and
- Determine the duration of surfactant injection/ capture events.

The pilot test will be conducted by using organic vapor monitoring equipment at each well individually to record the concentrations of recovered volatiles. No surfactant will be used during the pilot test, and nothing will be injected into the wells.

5.1.2 Free Product Removal

After the completion of the pilot study, two additional multiphase extraction events will be required prior to the surfactant injection. A maximum of seven eight-hour surfactant injection/capture events will be conducted at a maximum of four groundwater monitor wells on site. Organic vapor monitoring equipment will be used to record the concentrations of recovered volatiles. Groundwater and free product measurements will be recorded before and after each event. The groundwater containing free product will be disposed of at an off-site facility and will not be stored at Fort Stewart.

5.2 GROUNDWATER MONITORING

After the free phase product has been delineated and extracted from the site, the groundwater monitoring program will be implemented at the site. A two-year groundwater monitoring program will be established with one year of quarterly sampling followed by one year of semiannual groundwater monitoring for evaluating the groundwater remediation approach and the progress toward established site cleanup goals. The first round of quarterly sampling and the last round of semiannual groundwater sampling will sample all groundwater monitor wells on site. The remainder of the sampling events will only sample 10 essential wells on site. The groundwater samples will be analyzed for BTEX and PAH contamination. The free product will be disposed of at Georgia Petroleum in Valdosta, Georgia, and will not be stored at Fort Stewart.

6. REPORTS

All reports will be submitted as draft, final, and revised final. Reports will follow the format and present the content required by the *Corrective Action Plan Part A Guidance Document 2011* (GA DNR, January 2011). All reports will be signed and sealed by an appropriately licensed professional as required by the state of Georgia. Each report, as applicable, will include a certification page for signature by a Fort Stewart representative.

A CAP-Part A report, CAP-Part B report, semiannual monitoring reports, and other reports that may be applicable during the course of the work are planned. Figure 6-1 shows the progression of the reporting planned for this project. In addition, monthly progress reports will be submitted to the USACE project manager.

6.1 ELECTRONIC DELIVERABLE DATA

SES will provide electronic deliverable data (EDD) for the analytical data in an Environmental Restoration Information System (ERIS) format; SES will load the EDD containing the analytical data from the sampling conducted under this scope of work into the ERIS database.

7. REFERENCES

Georgia Department of Natural Resources (DNR) Environmental Protection Division (EPD), February 1995. *Underground Storage Tank (UST) Guidance Document – Underground Storage Tank Release: Corrective Action Plan (CAP) Part B.*

Georgia DNR EPD, January 2011. *Corrective Action Plan Part A Guidance Document 2011.*

SpecPro Environmental Services (SES), August 2012. *Final Preliminary Assessment and Site Investigation Report for Heating Oil Spill Site Investigation at Building 419 Fort Stewart, Georgia.*

U.S. Army Corps of Engineers Savannah District, February 2012. "Scope of Work for Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia."

U.S. Environmental Protection Agency Region 4, November 2007. *Field Braches Quality System and Technical Procedures.*

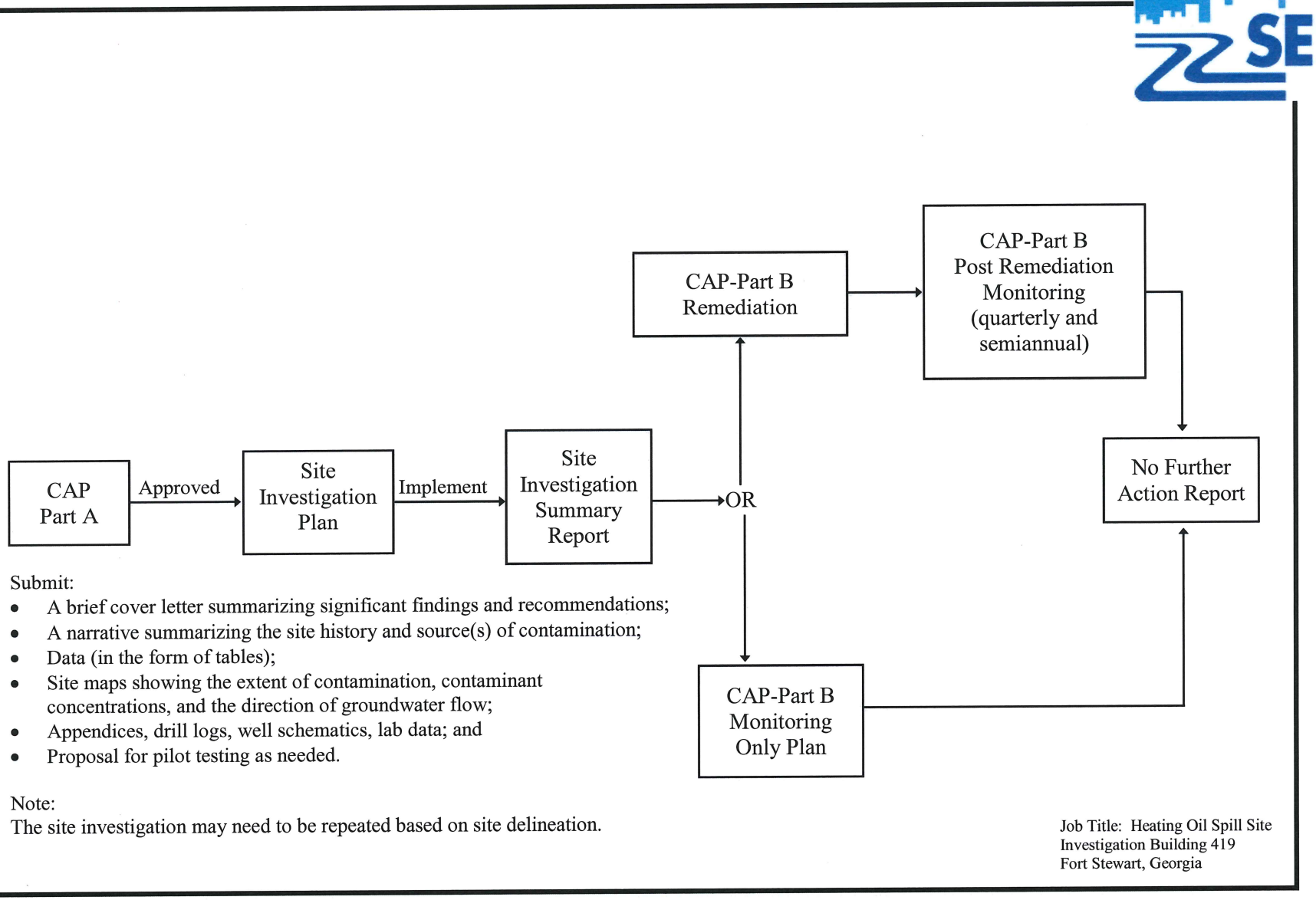

Figure 6-1 Reporting Flow Diagram

Appendix A

Project Management Plan

Final
Project Management Plan
for Heating Oil Site Investigation
Building 419
Fort Stewart, Georgia

May 2013

Submitted to:
Directorate of Public Works
Environmental Division
Fort Stewart, Georgia

Submitted by:
U.S. Army Corps of Engineers
Savannah District

Prepared by:
SpecPro Environmental Services, LLC
1006 Floyd Culler Court
Oak Ridge, Tennessee 37830
under
Contract No. W912HN-10-D-0001
Delivery Order No. 0029

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Acronyms and Abbreviations

POC	point of contact
SES	SpecPro Environmental Services LLC
USACE	United States Army Corps of Engineers

1. PROGRAM MANAGEMENT

This section provides details of the project and contains information on specific elements of project management and related functions.

1.1 PROJECT MANAGER

SpecPro Environmental Services LLC (SES) has assigned a key employee to serve as the project manager, Mr. Doug Hawn. Mr. Hawn will oversee the coordination and execution of the entire project and will be able to administer all instructions from the U.S. Army Corps of Engineers (USACE) and obtain answers to all questions about the project.

1.2 PROJECT TEAM

A team of personnel experienced in the appropriate disciplines will be assembled to accomplish the work described in the work plan addendum. Refer to Figure 1-1 for the organizational chart containing this information.

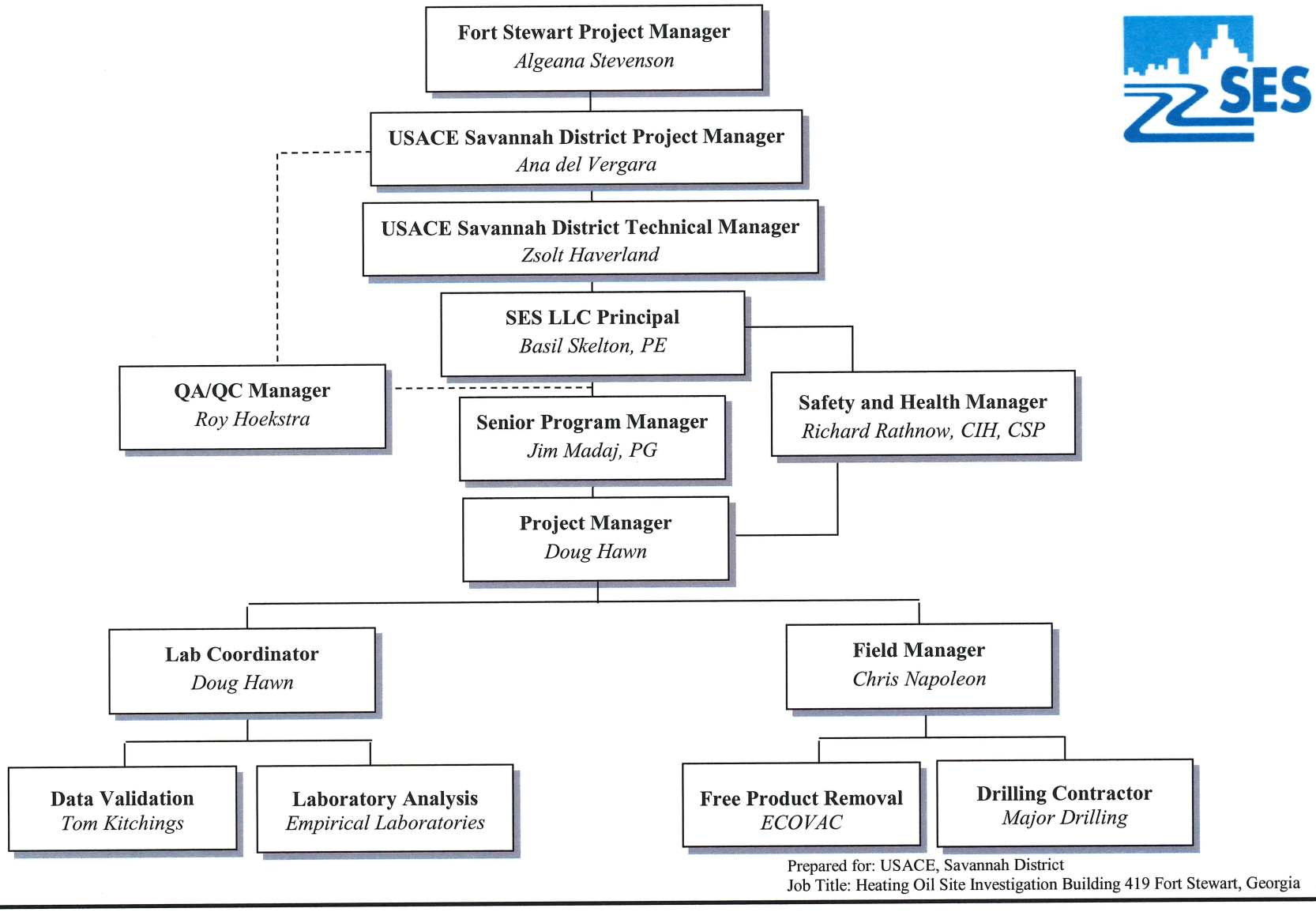


Figure 1-1 Organizational Chart

1.3 COORDINATION AND POINTS OF CONTACT

A listing of project key personnel and contact information is available below.

Contact Information – Key Personnel

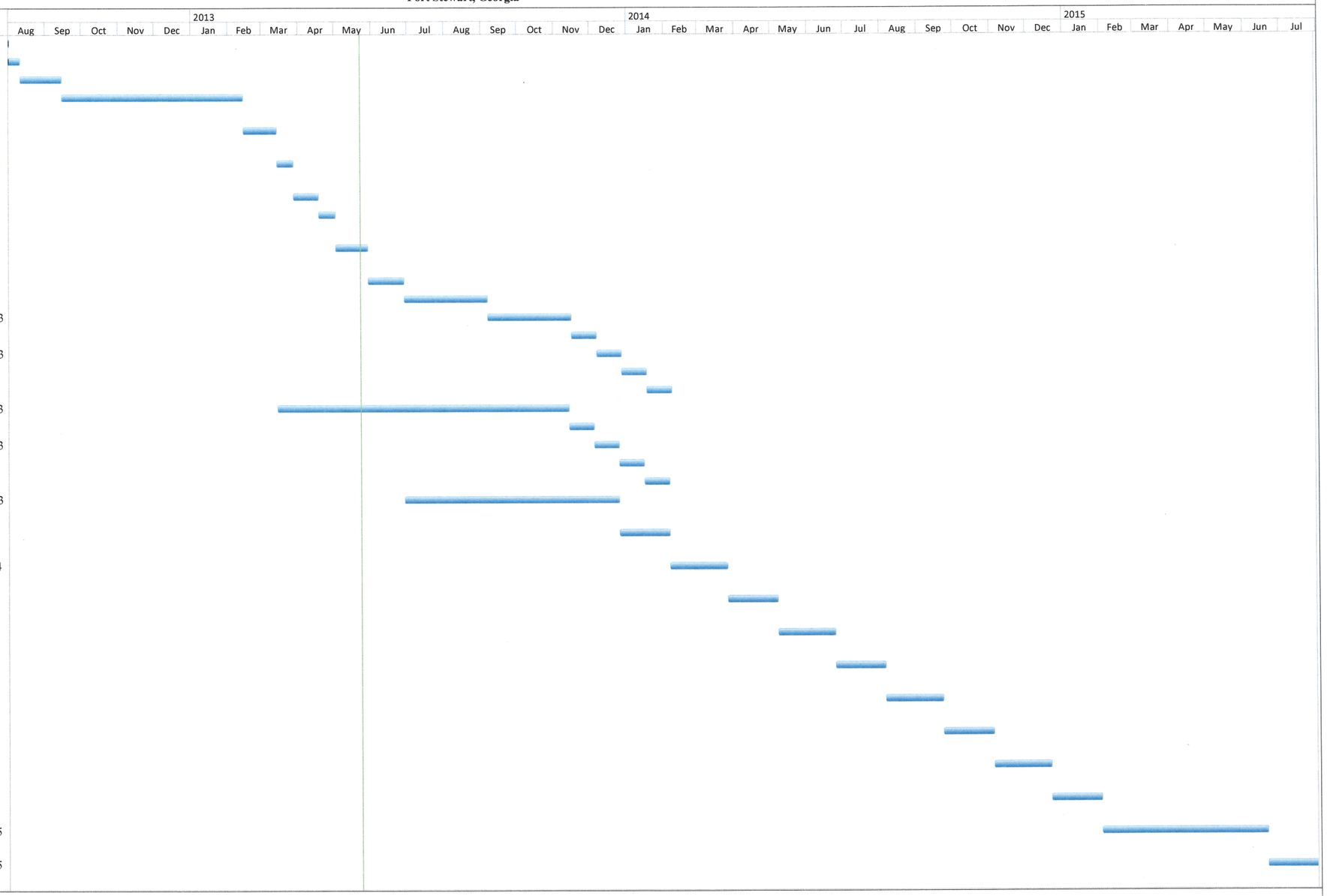
Tressa Rutland, Fort Stewart Prevention and Compliance, Branch Chief Environmental Branch, Directorate of Public Works HQs 3d Infantry Division (Mechanized and Fort Stewart) 1557 Veterans Parkway Fort Stewart, GA 31314-4928	(912) 767-7919 (912) 767-2010
Algeana Stevenson, Remediation Section Leader Environmental Branch, Directorate of Public Works HQs 3d Infantry Division (Mechanized and Fort Stewart) 1557 Veterans Parkway Fort Stewart, GA 31314-4928	(912) 315-5144 (912) 767-2281
Ana Vergara, Savannah COE, Project Manager Box 889 Savannah, GA 31402-0889	(912) 652-5835
Zsolt Haverland, Savannah COE, Technical Manager Box 889 Savannah, GA 31402-0889	(912) 652-5815
Jim Madaj, PG, Senior Program Manager SES 1006 Floyd Culler Court Oak Ridge, TN 37830	(865) 481-7837 ext. 266
Doug Hawn, Project Manager SES 1006 Floyd Culler Court Oak Ridge, TN 37830	(865) 481-7837 ext. 264

2. SCHEDULE

Figure 2-1 provides a detailed schedule for preparing and submitting this project work plan, conducting fieldwork, and preparing and submitting the draft and final completion reports.

Heating Oil Spill Site Investigation
Building 419
Fort Stewart, Georgia

ID	Task Name	Duration	Start	Finish
1	Notice to Proceed	1 day	Wed 8/1/12	Wed 8/1/12
2	Progress chart	10 days	Wed 8/1/12	Fri 8/10/12
3	Draft work plan addendum	35 days	Sat 8/11/12	Fri 9/14/12
4	Draft work plan addendum review	152 days	Sat 9/15/12	Wed 2/13/13
5	Draft Revision 1 work plan addendum	28 days	Thu 2/14/13	Wed 3/13/13
6	Draft Revision 1 work plan addendum review	14 days	Thu 3/14/13	Wed 3/27/13
7	Final work plan addendum	21 days	Thu 3/28/13	Wed 4/17/13
8	Final work plan addendum review	14 days	Thu 4/18/13	Wed 5/1/13
9	Revised final work plan addendum	27 days	Thu 5/2/13	Tue 5/28/13
10	Site investigation	30 days	Wed 5/29/13	Thu 6/27/13
11	Free product removal	70 days	Fri 6/28/13	Thu 9/5/13
12	Draft CAP A report	70 days	Fri 9/6/13	Thu 11/14/13
13	Draft CAP A report review	21 days	Fri 11/15/13	Thu 12/5/13
14	Final CAP A report	21 days	Fri 12/6/13	Thu 12/26/13
15	Final CAP A report review	21 days	Fri 12/27/13	Thu 1/16/14
16	Revised final CAP A report	21 days	Fri 1/17/14	Thu 2/6/14
17	Draft CAP B report	244 days	Thu 3/14/13	Tue 11/12/13
18	Draft CAP B report review	21 days	Wed 11/13/13	Tue 12/3/13
19	Final CAP B report	21 days	Wed 12/4/13	Tue 12/24/13
20	Final CAP B report review	21 days	Wed 12/25/13	Tue 1/14/14
21	Revised final CAP B report	21 days	Wed 1/15/14	Tue 2/4/14
22	Draft quarterly groundwater monitoring report	180 days	Fri 6/28/13	Tue 12/24/13
23	Final quarterly groundwater monitoring report	42 days	Wed 12/25/13	Tue 2/4/14
24	Draft quarterly groundwater monitoring report	48 days	Wed 2/5/14	Mon 3/24/14
25	Final quarterly groundwater monitoring report	42 days	Tue 3/25/14	Mon 5/5/14
26	Draft quarterly groundwater monitoring report	48 days	Tue 5/6/14	Sun 6/22/14
27	Final quarterly groundwater monitoring report	42 days	Mon 6/23/14	Sun 8/3/14
28	Draft quarterly groundwater monitoring report	48 days	Mon 8/4/14	Sat 9/20/14
29	Final quarterly groundwater monitoring report	42 days	Sun 9/21/14	Sat 11/1/14
30	Draft semiannual groundwater monitoring report	48 days	Sun 11/2/14	Fri 12/19/14
31	Final semiannual groundwater monitoring report	42 days	Sat 12/20/14	Fri 1/30/15
32	Draft semiannual groundwater monitoring report	138 days	Sat 1/31/15	Wed 6/17/15
33	Final semiannual groundwater monitoring report	42 days	Thu 6/18/15	Wed 7/29/15



Task — Summary — External Milestone — Inactive Summary — Manual Summary Rollup — Finish-only — Manual Progress
Split — Project Summary — Inactive Task — Manual Task — Manual Summary — Deadline
Milestone — External Tasks — Inactive Milestone — Duration-only — Start-only — Progress

Figure 2-1 Project Schedule

The actual progress of work will be updated and submitted by the fifth day of each month and may be included with the request for payment. Progress charts must be revised to reflect modifications and other approved changes in scheduling. Along with the progress chart, a monthly progress report in letter form will be provided to the USACE project manager. The letter will outline the progress during the past month and the anticipated work effort for the next month. All progress reports and schedules will be submitted via electronic mail.

3. SUBMITTALS

SES will submit all draft, final, and revised final copies of the work plan and the reports to the following addresses. All other documents will be submitted to the Savannah District only. All submittals for review will contain a cover letter stating the project title, contract and task order numbers, and phone numbers for the SES point of contact (POC) and the USACE POC.

	Number of Copies of Reports		
List of Addresses	Draft	Final	Revised Final
U.S. Army Corps of Engineers PO Box 889 Savannah, Georgia 31401	3	2	2
Department of the Army HQ, 3D Infantry Division (Mechanized) & Fort Stewart Directorate of Public Works 1557 Veterans Parkway Fort Stewart, GA 31314	2	3	3

4. REFERENCES

U.S. Army Corps of Engineers Savannah District, February 2012. "Scope of Work for Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia."

Appendix B

Data Management Plan

Final
Data Management Plan
for Heating Oil Site Investigation
Building 419
Fort Stewart, Georgia

May 2013

Submitted to:
Directorate of Public Works
Environmental Division
Fort Stewart, Georgia

Submitted by:
U.S. Army Corps of Engineers
Savannah District

Prepared by:
SpecPro Environmental Services, LLC
1006 Floyd Culler Court
Oak Ridge, Tennessee 37830
under
Contract No. W912HN-10-D-0001
Delivery Order No. 0029

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Acronyms and Abbreviations

CLP	Contract Laboratory Program
COC	chain of custody
EPA	Environmental Protection Agency
QA	quality assurance
QC	quality control
SES	SpecPro Environmental Services
USACE	U.S. Army Corps of Engineers

1. QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES AND REQUIREMENTS

1.1 SAMPLE COLLECTION, PRESERVATION, AND HOLDING TIMES

Procedures for collecting samples will follow U.S. Environmental Protection Agency (EPA) protocols. Samples will be collected with properly decontaminated equipment and contained in properly cleaned sample containers. All field sampling equipment will be decontaminated before use and after each sample location.

The laboratory performing the analysis will provide sample containers and preservatives to collect and contain samples for chemical analysis. The bottles must be precleaned and traceable to the laboratory that performed the cleaning, and lot numbers of containers and reagents used for preservatives must be traceable to the laboratory that performed the initial assay. Certificates of cleanliness must be provided by the laboratory and kept in the project file.

All samples for chemical analysis will be placed on ice as soon as possible after collection. Samples will be chilled to 4 +/-2 degrees centigrade and maintained at that temperature through transport and subsequent storage at the analytical laboratory. In no case will samples be retained more than 48 hours on site.

1.2 SAMPLE IDENTIFICATION AND CHAIN-OF-CUSTODY PROCEDURES

Sample chain-of-custody (COC) procedures require that possession and handling of the sample from the moment of its collection through analysis be documented by written record. The record must clearly reflect the movement of the sample through the COC to ensure the sample has been positively controlled and has not been tampered with in any way. A sample is judged to be in one's custody when one of the following criteria has been met.

- The sample is in one's actual physical possession.
- The sample is in one's clear field of view after being in one's physical possession.
- The sample is in one's physical possession and is then locked up in a secure container, so no one can tamper with it.
- The sample is kept in a secured area that is restricted to authorized personnel only.

1.2.1 Sample Labels and Identification

All samples will be identified with a label attached directly to the container. Each label will include a unique sample number. Sample label information will be completed using waterproof black ink and will contain at least the following information:

- Company name and site,
- Date and time of sample collection,
- Parameters to be analyzed,
- Preservative (if any), and
- Initials of person collecting the sample.

1.2.2 Chain-of-Custody Record

To maintain a record of sample collection, a COC record will be filled out documenting the collection and shipment of samples and receipt by the laboratory. Each time samples are transferred, the signatures of the person relinquishing and receiving the samples as well as the date and time of transfer will be documented.

1.2.3 Transfer of Custody and Shipment

Before samples are shipped, the COC record will be signed and dated by a member of the field team who has verified that those samples indicated on the COC record are indeed being shipped. After packaging has been completed, the samples will be locked in the cooler, and custody seals signed and dated by a member of the field team will be placed over the lid edge.

All samples will be shipped by courier (for example, Federal Express or United Parcel Service) to the analytical laboratory. Upon receipt of samples at the laboratory, the recipient will complete the transfer by dating and signing the COC record. If shipped by commercial courier, the air bill number and shipping data will be transcribed to the COC in the appropriate signature/date block. A copy of the air bill is to be kept with the field copy of the COC form to record specific shipping information.

1.3 DOCUMENTATION PROCEDURES

All documentation must be legible and completed in indelible ink. Corrections must be marked with a single line, dated, and initialed. Serialized documents are not to be destroyed or discarded even if illegible or inaccurate. Voided entries must be maintained in project files. Every line in the logbook should contain text or have notations that the line is intentionally not being used. Text should be continuous with no breaks between topics. Empty lines should have a diagonal line drawn across them and be signed and dated.

Field documentation shall consist of a master site logbook, one or more job- or area-specific field logbooks, field forms, and sample log/labels. This format of documentation allows for detailed recording of information in various field logbooks and forms referenced in the site logbook.

Site and field logbooks provide a daily handwritten record of all field activities at an investigation site. All logbooks must be permanently bound and have a hard cover. Field logbooks must be waterproof. Logbooks must be ruled or ruled and gridded with sequentially numbered pages. The site logbook is a master record of all site activities, and entries are usually made at the end of each workday. Field logbooks are detailed daily records kept in real time and assigned to specific activities, positions, or areas within the site. Separate logbooks shall be used for each sampling and field (drilling) team.

1.4 QUALITY CONTROL FOR FIELD MEASUREMENTS

Most data will be developed in the analytical laboratory from the samples collected; however, field measurements for health and safety monitoring and sample collection locations may be performed and recorded in the field. The primary quality assurance (QA) objectives of field activities where measurements will be taken are to verify that quality control (QC) checks are performed, verify that measurements are obtained to the degree of accuracy consistent with their intended use, and provide documentation of adherence to the measurement procedures.

Field measurement instruments will be calibrated according to manufacturers' specifications before and after each field use or as otherwise required. Where necessary, instruments will be calibrated each day during field use, and calibration information will be documented on calibration log sheets or in logbooks. Information to be recorded includes date, operator, and calibration standards (concentration, manufacturer, lot number, and expiration date). Field measurements are considered valid provided that

- Calibration records for field measurement equipment are properly maintained,
- Training records exist that document field personnel are familiar with standard procedures for taking measurements, and
- Verification exists that calculations and observations are accurately recorded and transcribed.

2. CHEMICAL DATA

Chemical data will be generated using EPA SW-846 analytical methods. For SW-846 methods, forms that include information similar to the Contract Laboratory Program (CLP) forms are included in the data package. Forms do not need to be presented in the format specified by the CLP but must include similar laboratory information as required by the CLP forms, including specifications for any QC acceptance limits or criteria required by the method performed. The laboratory that will analyze the data holds a current U.S. Army Corps of Engineers (USACE) laboratory certification and holds accreditation for environmental laboratories in Georgia.

2.1 PERFORMANCE AND SYSTEM AUDITS

If deemed appropriate by Fort Stewart Directorate of Public Works personnel or the USACE project manager, surveillance of project field and/or laboratory operations may be conducted. The QA adequacy of these operations will be assessed against the requirements outlined in this document.

3. DATA EVALUATION

The results of the soil sampling and groundwater sampling will be compared to the Georgia UST Closure Guidance.

Appendix C

Sampling and Analysis Plan

Final
Sampling and Analysis Plan
for Heating Oil Spill Site Investigation
Building 419
Fort Stewart, Georgia

May 2013

Submitted to:
Directorate of Public Works
Environmental Division
Fort Stewart, Georgia

Submitted by:
U.S. Army Corps of Engineers
Savannah District

Prepared by:
SpecPro Environmental Services LLC
1006 Floyd Culler Court
Oak Ridge, Tennessee 37830
under
Contract Number W912HN-10-D-0001
Delivery Order 0029

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Acronyms and Abbreviations

COC	chain of custody
DO	dissolved oxygen
DOT	Department of Transportation
DQO	data quality objective
DTW	depth to water
EPA	Environmental Protection Agency
FSP	field sampling plan
LNAPL	light nonaqueous-phase liquid
MS	matrix spike
MSD	matrix spike duplicate
POC	purgeable organic carbon
POX	purgeable organic halogens
PVC	polyvinyl chloride
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
RPD	relative percent difference
SAP	sampling and analysis plan
VOA	volatile organic analyte
VOC	volatile organic compound

1. INTRODUCTION

This sampling and analysis plan (SAP) is divided into two parts: a field sampling plan (FSP) and a quality assurance project plan (QAPP). The FSP addresses the field activities, including all aspects of sampling, drilling, monitor well installation, and field data gathering activities. The QAPP addresses the data quality objectives (DQOs), analytical methodologies, specific quality assurance (QA) and quality control (QC) activities, laboratory requirements, and data assessment activities designed to achieve the data quality goals of the project.

Refer to the work plan for the project background, site history and contaminants, and previous investigations. The project organization and responsibilities are in the project management plan, Appendix A.

2. FIELD SAMPLING PLAN

One of the main goals of any investigation is to collect samples that represent site conditions so an accurate assessment of contamination can be made with a minimum number of samples. .

The sampling approach is to use biased sampling in the area the tank release occurred and professional opinions to where additional sampling will occur.

2.1 SOIL SAMPLING

The type of soil samples to be obtained are subsurface composite soil samples over specified intervals of the soil borings as discussed in Section 4 of the work plan. Direct push technology using a Geoprobe will be used to obtain the soil samples.

The sampling method, known as the direct push method, involves sampling devices that are directly inserted into the soil to be sampled without drilling or borehole excavation. Direct push sampling consists of advancing a sampling device into the subsurface by applying static pressure, impacts, vibration, or a combination of these to the aboveground portion of the sampler extensions until the sampler has been advanced its full length into the desired soil strata. No specific guidance or standards document the "direct push sampling method," but the guidance is a modification of standards from the Shelby tube, split spoon, piston, and penetrometer methods. The method is used under various protocols by commercial entities and called by various proprietary names (such as Geoprobe).

Direct push methods may be used to collect soil, and in some cases, the method may be combined with sampling devices capable of water and/or vapor sampling. The equipment generally used in direct push sampling is small and relatively compact allowing for better mobility around the site and access to confined areas. Direct push insertion methods include static push, impact, percussion, other vibratory driving, and combinations of these methods using direct push equipment adapted to drilling rigs, cone penetrometer units (the reference standard for which is ASTM D 5778-95), and specially designed percussion/ direct push combination machines. Standard drilling rods used for rotary drilling are sometimes used when sampling is done at the base of drill holes. A direct push soil sampling system consists of a sample collection tool; hollow extension rods for advancement, retrieval, and transmission of energy to the sampler; and an energy source to force penetration by the sampler.

The sampling procedure is as follows:

- Assemble decontaminated direct push sampling device that will be pushed into the ground to collect data or samples.
- Advance the sampling device into subsurface soils by applying static pressure, impacts, or vibration or a combination of these to the aboveground portion of the sampler extensions until the sampler has been advanced its full length into the desired soil strata.
- Sampling can be continuous for full-depth borehole logging or incremental for specific strata sampling. Samplers can be protected for controlled specimen gathering or unprotected for general data collection.
- Recover the sampler from the borehole and remove the soil sample from the sampler.
- Begin sampling with the acquisition of any volatile organic compound (VOC) samples, conducting the sampling with as little disturbance as possible to the media. Refer to Section 2.3 for additional information on the collection, handling, and storage of solid volatile organic analyte (VOA) samples.
- If homogenization of the sample location is appropriate for the remaining analytical parameters or if compositing of a different location is desired, transfer the sample to a stainless steel bowl for mixing.
- Transfer the sample into an appropriate sample bottle using a stainless steel spoon or equivalent.
- Check that a Teflon liner is in the cap. Secure the cap tightly.
- Label the sample bottle. Complete the label completely and clearly, addressing all the categories and parameters.
- Place filled sample containers on ice immediately.

- Complete chain-of-custody (COC) documents and field sheets and record in the logbook (see Section 2.3).
- Prepare samples for shipment (see Section 2.3).
- Decontaminate the equipment following each probe or sample.

2.2 GROUNDWATER SAMPLING

Typical groundwater monitor wells are 2 or 4 inches in diameter and are constructed of polyvinyl chloride (PVC) or stainless steel. Procedures presented are intended to include sample collection from wells that have not been completed as production or extraction wells. Instructions for purging and sampling wells by using a bailer or using peristaltic pump are included.

The monitor well locations are as shown in the work plan. Because each monitor well does not have a sampler dedicated to the well, the order of sampling monitoring should be from the least contaminated to the most contaminated. Because the work plan addresses the first round of monitoring, reviewing the geologic log of the borings should indicate the degree of contamination. Groundwater samples will be discrete samples. A discrete (grab) sample is a discrete aliquot representative of a specific location at a given point in time. The sample is collected at once and at a particular point in the sample matrix. The representativeness of such samples is defined by the nature of the materials being sampled. In general, because contamination in groundwater disperses over time and distance, it will take more grab samples to characterize the extent of contamination as the time from a release increases.

Sample preservation and handling: Many chemical constituents and physicochemical parameters that are to be measured or evaluated in groundwater monitoring programs are not chemically stable, and, therefore, sample preservation is required. These preservation methods and sample containers are based on "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods" (EPA/SW-846).

Improper sample handling may alter the analytical results of the sample, causing the results to be invalid. Samples should be transferred in the field from the sampling equipment directly into the container required for that analysis or set of compatible parameters. The sample should then be preserved in the field. Because of the low analytical detection limits required for certain data uses, care must be taken when collecting the sample to avoid the loss/gain of any contaminants. The samples for volatile analysis should be carefully transferred directly from the sample collection device to the sample container to minimize contaminant loss through agitation/volatilization or adherence to another container. If more

than one container is required per parameter, the sample should be split equally among all containers until filled. Containers used to collect samples for organic analyses should not be pre-rinsed with water because of the possibility of preservation loss or the loss/gain of contaminants that may taint the analytical results.

When metals are the analytes of interest, high-density polyethylene containers with Teflon-lined polypropylene caps should be used. When organics are the analytes of interest, glass bottles with Teflon-lined caps should be used. Because pre-cleaned bottles will be used, the cleanliness of each lot of pre-cleaned bottles should be verified by the container supplier or in the laboratory and appropriate paperwork (certificates) retained with other field documentation. Samples should be collected and containerized in the order of the volatilization sensitivity of the parameters. The following is a preferred collection order for common ground water parameters:

- VOA,
- Purgeable organic carbon (POC),
- Purgeable organic halogens (POX),
- Total organic halogens,
- Total organic carbon,
- Extractable organics,
- Total metals,
- Dissolved metals,
- Phenols,
- Cyanide,
- Sulfate and chloride,
- Turbidity,
- Nitrate and ammonia, and
- Radionuclides.

Methods of sample preservation are relatively limited and are generally intended to retard biological action, retard hydrolysis, and reduce sorption effects. Preservation methods are generally limited to pH control, chemical addition, cooling, and protection from light.

Water samples to be analyzed for POCs should be stored in 40 mL vials with septum inserts and screw caps. The septum should be placed on the sample vial so the Teflon side is in contact with the sample.

The 40 mL vials should be completely filled to prevent volatilization. Extreme caution should be exercised when filling a vial to avoid any turbulence that could also produce volatilization. The sample should be carefully poured down the side of the vial to minimize turbulence. As a rule, it is best to pour the last few drops into the vial gently so that surface tension holds the water in a convex meniscus. The septum is then applied and some overflow is lost, but air space in the bottle is eliminated. After the bottle is capped, it should be turned over and tapped to check for bubbles. If any bubbles are present, the procedure must be repeated. Care should be taken to ensure that no loss of preservative occurs.

Contaminants can be detected in the parts per billion and/or parts per trillion ranges. Therefore, extreme care must be taken to prevent cross-contamination of these samples. The following general precautions should be taken when sampling:

- A clean pair of new disposable gloves should be worn each time a different location is sampled, and gloves should be donned immediately before sampling.
- To prevent cross-contamination between samples, it is suggested that the multiple VOA vials from each sampling location be sealed in a separate smaller plastic bag when the sampled medium is suspected of containing high concentrations of volatile organics.
- Sample containers filled with source or waste samples or samples suspected of containing high concentrations of contaminants should be placed in separate plastic bags immediately after collecting and preserving, and activated carbon should be included in the bags to prevent cross-contamination.
- If possible, background samples and source samples should be collected by different field teams. If different field teams cannot be used, all background samples should be collected first and placed in separate ice chests or shipping containers. Samples of waste or highly contaminated samples should never be placed in the same ice chest as environmental samples. It is good practice to enclose waste or highly contaminated samples in a plastic bag before placing them in ice chests. Ice chests or shipping containers for source samples or samples suspected to contain high concentrations of contaminants should be lined with new, clean plastic bags.
- If possible, one member of the field team should take all the notes, fill out sample tags, field sheets, etc., while the other members collect all the samples.
- Sample collection activities should proceed progressively from the suspected least contaminated area to the suspected most contaminated area.
- Field personnel should use equipment constructed of Teflon, stainless steel, or glass that has been properly pre-cleaned. PTFE or glass is preferred for collecting samples where trace metals are of concern.

- Adequate field control samples should be collected.

After installation, the well should be developed to remove any fine material next to the well casing. Wells should not be sampled immediately after development because of the time needed to reach chemical equilibrium with the well construction materials.

Once a well has been located and properly identified, field measurements should be noted in a bound field logbook. A cross-reference should be made between the previously recorded physical location/ identification locating the well to be sampled to ensure the proper well has been selected. Misidentification of a sampling point in the field will result in erroneous data that may affect management decisions. Also included in field measurements are the physical measurements of the well and its physicochemical parameters. Physical measurements that may be recorded in the field logbook include the presence and diameter of protective casing, diameter and construction material of the well casing, total depth of well from the top of casing, surveyors' mark, depth from top of casing to water, and the volume of water in the well and filter pack. The volume of water can be calculated by the submerged length of the well and calculating the volume of water in the submerged casing and filter pack. The total depth of the well should not be measured before sampling but be obtained from well logs. Measuring to the bottom of the well casing may cause resuspension of settled solids from the formation materials and require longer purging times for turbidity equilibration. The well depth should be measured after sampling is complete.

The volume of water in the filter pack should be calculated assuming a porosity of 30 percent within the filter pack. Besides the physical measurements taken as described previously and other information that may identify the well, physicochemical information such as dissolved oxygen, pH, specific conductance, temperature, and turbidity will be recorded initially (and in that order) during purging and before sampling.

Each well must be purged prior to sampling. To obtain a representative sample of groundwater from a groundwater monitor well, the water that has stagnated and/or thermally stratified in the well casing must be purged or evacuated. The purging procedure allows fresh or representative groundwater to enter the well. The optimum or preferred method to ensure that fresh water representative of the aquifer in contact with the well screen is being sampled is to perform a controlled sampling experiment. When indicator parameters such as specific conductance, pH, temperature, turbidity, and dissolved oxygen are stabilized, the well is presumed to be adequately flushed for the representative sample. In some instances, purging

rates must be kept below 500 mL/min to avoid overpumping or pumping the well to dryness. Ideally, wells should never be pumped to dryness. To accomplish this, pump rates may be adjusted, sometimes to less than 500 mL/min, and pumping times extended. Pumping with low-flow rates may also reduce the need for filtering water samples.

The well can be purged or evacuated in several ways. In any instance, it is paramount to ensure that the purging procedure does not cause cross-contamination from one well to the next. The selection of an evacuation method most often relies on the depth to water (DTW) in the well. If the static DTW is less than 7.6 meters (25 feet), a hand pump or bailer may be the best method for evacuation. If the static DTW is greater than 7.6 meters (25 feet), a submersible pump should be used. As mentioned earlier, care must be taken to ensure that this does not act as a route of cross-contamination. Pumps should be decontaminated between well locations. During evacuation, pump intake must not be set greater than 1.8 meters (6 feet) below the dynamic water level. This requires that the evacuation device be lowered as purging continues and the water level drops. Hand bailing may be used with a static water level greater than 7.6 m (25 feet) if a submersible pump is not available or with a static water level less than 7.6 meters (25 feet) if other conventional pumps are not available. However, use of a bailer is not recommended because it has the potential to aerate the well water, produce inadequate removal of fines, concentrate floating product on the bailer that may introduce contamination, introduce contaminants from inside the well casing, and cause nonsteady removal of water, which may result in dilution instead of evacuation of the well. In general, the mechanics of the hand-bailing method for well purging may introduce contamination potential and variability. There are many pumps that may be used for well purging. The preferred and most commonly used pumps are centrifugal and peristaltic pumps [when depth to water is less than 7.6 meters (25 feet) and submersible pumps (when depth to water is greater than 7.6 meters (25 feet)]. Because the water level is anticipated to be less than 25 feet at this site, a peristaltic pump will be used. Occasionally, a light, nonaqueous phase layer (LNAPL) (floating product) may be present in a monitor well designated for sampling. If it is suspected that the well contains an LNAPL, an interface probe should be used to verify its presence. If an LNAPL is present, the thickness should be measured and an appropriate inert bailer should be used to collect a sample of the floating product. Whenever possible, measurements of the free product should be taken using either steel tape and paste or an interface probe.

Collection of a groundwater sample may not be appropriate if an LNAPL is present in the well because the sampler will likely become contaminated as it passes through the LNAPL to reach and sample the groundwater below.

2.2.1 Groundwater Sampling Methods

As stated previously the two methods that may be used to sample the groundwater are bailers and peristaltic pumps.

Bailers are one of the simplest and most commonly used sampling methods for sampling groundwater monitor wells. Bailers are constructed of a variety of materials compatible with the parameter of interest. They are economical and convenient enough that a separate bailer will be dedicated to each well to minimize cross-contamination. An external power source is not required. Bailers provide a low surface-to-volume ratio, which reduces degassing of VOCs. Cross-contamination can be a problem if the bailer is not adequately decontaminated; therefore, disposable bailers will be used. Bailers offer a relatively limited sample volume and may not be desirable for purging a well if large amounts of water need to be removed from the well for purging. The sampling technique used with bailers may, however, cause a surging action on the well, which may increase the turbidity of the well sample. Consequently, bailers have a higher potential for loss of volatiles and are not recommended for either volatile or metals sampling. Bailers are manufactured in numerous types, sizes, and construction materials. Bailers are typically weighted lengths of pipe attached to a cord with a check valve at the lower end. They are typically constructed of PVC, Teflon, or stainless steel. The Teflon bailer is recommended if the bailer is used to collect groundwater samples for VOC analysis. Bailers can be dedicated to a specific well (used only for purging and sampling that well). Disposable bailers are also available and are cost-effective for certain investigations. Haul lines for bailers may consist of Teflon-coated stainless steel cable, polyethylene rope, or nylon rope. Of these three, nylon rope is the least desirable because it may introduce contaminants. The use of braided rope is discouraged because it cannot be decontaminated. For each sampling event, the rope for dedicated bailers should be changed following purging and before sampling. For nondedicated bailers, rope should be changed between wells. After removal, the rope should be properly discarded.

2.2.2 Bailer Sampling Procedure

- Prepare the work area outside the well by placing plastic sheeting on the ground to avoid cross-contamination.
- Determine the saturated water column in the well using an electronic water level indicator. Calculate the fluid volume in the casing and determine the amount of water to be removed for purging.

- Attach a decontaminated bailer to cable or line for lowering, or use dedicated bailer already in well.
- Lower bailer slowly until it contacts water surface.
- Allow bailer to sink and fill with a minimum of surface disturbance.
- Slowly raise bailer to surface. Do not allow bailer line or bailer to contact ground.
- Purge well until the dissolved oxygen (DO), pH, specific conductance, temperature, and turbidity are each at equilibrium, and begin sampling. Equilibrium is established as follows: ±10 percent for DO, ±0.2 pH units, ±3 percent for specific conductance, ±1 degree Celsius for temperature, and ±10 percent for turbidity. (If redox potential is used as an indicator, ±10 mV should be used as the stabilization criterion.)
- Ensure that equilibrium is established by making three consecutive readings, where one casing volume is pumped between each reading.
- Collect VOA samples first following guidelines specified within this appendix.
- Fill sample bottles for remaining parameters by tipping bailer to allow slow discharge from top to flow gently down the side of the sample bottle with minimum entry turbulence. If a bottom drain is present on the bailer, recommended that a slow steady flow be achieved.
- Repeat these steps as needed to acquire sufficient volume to fill all sample containers.
- Preserve the sample as necessary and verify that the pH is sufficient for the criteria.
- Verify that a Teflon liner is present in the cap. Secure the cap tightly.
- Label the sample bottle with an appropriate label. Be sure to include all necessary information.
- Place filled sample containers on ice immediately along with the required trip blank, if analyzing for VOCs.
- Record the information in the field logbook and field sheet, and complete all COC documents (see Section 2.3).
- Thoroughly decontaminate the bailer after each use, regardless of whether the bailer is dedicated to one well or used to sample other wells.
- Close well.

2.2.3 Peristaltic Pump

Peristaltic pumps operate in a manner similar to that of centrifugal pumps but displace the fluid by mechanical peristalsis. An advantage of the peristaltic pump is its design, which isolates the sample from the moving part of the pump and allows for easy decontamination by removing or replacing the flexible tubing. Tubing can be dedicated to wells to reduce decontamination time. Disadvantages of these pumps

include their low pumping rates and their limited height of intake lift [less than 6 meters (20 feet)]. These pumps also require an outside power source and, like other suction pumps, are not suitable for collecting samples for VOC analysis because of potential degassing effects.

A flexible sampling tube is mounted around the pump chamber, and rotating rollers compress the tubing, forcing fluid movement ahead (the peristaltic effect) and inducing suction behind each roller. Peristaltic pumps generally have very low pumping rates suitable only for sampling shallow water tables in small-diameter wells.

Sampling procedures: Recommended sampling procedures are as follows:

- Prepare the work area outside the well by placing plastic sheeting on the ground to avoid cross-contamination.
- Determine the saturated water column in the well using an electronic water level indicator. Calculate the fluid volume in the casing and determine the amount of water to be removed for purging.
- Install clean medical-grade silicone tubing in the peristaltic pump head and attach the silicone tubing to the glass tubing outlet from the sample bottle.
- Attach the inlet glass tubing from the sample bottle to the required length of new PTFE suction line and lower to the midpoint of the well screen, if known, or slightly below the existing water level.
- Purge well until the DO, pH, specific conductance, temperature, and turbidity are each at equilibrium, and begin sampling. Equilibrium is established as follows: ±10 percent for DO, ±0.2 pH units, ±3 percent for specific conductance, ±1 degree Celsius for temperature, and ±10 percent for turbidity. (If redox potential is used as an indicator, ±10 mV should be used as the stabilization criterion.)
- Ensure that equilibrium is established by making three consecutive readings, where one casing volume is pumped between each reading.
- Collect VOA samples, if required, with a bailer following guidelines established within this appendix.
- Fill sample bottles for remaining parameters by allowing pump discharge to flow gently into the bottle with minimal entry turbulence. Pump discharge should be less than 500 mL/min. Cap each bottle as filled.
- Preserve the samples as necessary and verify that the pH is sufficient for the criteria.
- Verify that a Teflon liner is present in the cap. Secure the cap tightly.

- Label the sample bottle with an appropriate label. Be sure to complete the label with all necessary information.
- Place filled sample containers on ice immediately along with the required trip blank if analyzing for VOCs.
- Complete COC documents, field sheet, and field logbook (see Section 2.3.).
- Allow system to drain; then disassemble. Decontaminate or replace tubing for next sampling.
- Close the well.

2.3 SAMPLE DOCUMENTATION AND SHIPPING PROCEDURES

The following discussion outlines standard practices and procedures to be used when documenting a sampling episode. All project-specific documentation requirements must be presented in the SAP. This includes identification of procedures required for field documentation, sample labeling, and the maintenance of COC. Applicable requirements are identified in the following sections. Proper completion of all documentation with indelible ink is necessary to support the use of these records in any potential enforcement actions that may result. Protocols for corrections to documentation should not obliterate data entries, but place a single line through the incorrect entry, noting corrected information, recorder's initials, and date correction was performed. Maintaining sample integrity through proper documentation is essential. Following site activities, all project documentation becomes part of the final evidence file. These records should be maintained for a certain period of retention time. The documentation retention time requirements of a project must be presented in the SAP and may be based on the use of the data, funding source, or regulatory authority.

Field logbooks: Sampling situations vary widely. No general rules can specify the exact information that must be entered in a field logbook for a particular site. However, the logbook should contain sufficient information to enable the sampling activity to be reconstructed without relying on the collector's memory. Project field logbooks should be bound and have numbered, water-resistant pages.

Record the site name and project name and number on the inside front cover of logbook. All pertinent information regarding the site and sampling procedures must be documented as near to real-time as possible.

At the conclusion of each day, the person maintaining the logbook should sign and date the day's documentation entries. Notations should be made in logbook fashion, noting the time and date of all entries.

Information recorded in other project documents (boring logs, well installation/ development logs, or drum logs) should not be repeated in the field logbook, except in summary form to avoid transcription errors.

Logbooks should be kept in the field team member's possession or in a secure place during fieldwork. Following site activities or if the logbook is completely filled, the logbook becomes part of the project final evidence file as noted previously. The technical planning team may also elect to establish documentation requirements that follow a more uniform organization than a field logbook. These documentation requirements would include the use of project forms. This approach helps enhance consistency in the information recorded and streamlines the documenting process. Any forms proposed for use should be task-specific and should incorporate appropriate topics from those identified as follows. All forms must be presented in the project SAP. The following are some suggested topics to include in the field logbook:

- Name and exact location of site of investigation or interest;
- Name and title of person maintaining logbook (author);
- Date and time of arrival and departure at site location;
- Purpose of site visit or sampling activity;
- Name and address of field contact. This may also include information on access agreements;
- Names and responsibilities of all people on site;
- Names, affiliations, and purpose of all site visitors;
- Level of personal protective equipment worn at the site;
- Weather conditions on the day of sampling, and any additional environmental conditions or observations pertinent to field activities;
- Field instrumentation or equipment used, and purpose of use (health and safety screening, sample selection for laboratory analysis). Note source, quality, or lot numbers for any supplies or reagents (sample containers, preservatives, reagents, water for field blanks/ field control samples, and decontamination procedures). Retain any certificates or information supplied with the equipment used;
- Type of waste, suspected waste concentrations if known, and sample matrices to be handled;

- Document the sample collection method and any sample handling procedures, such as filtration, compositing, and executed preservation techniques used;
- Document the sample location. If a compositing scheme is used, clearly identify appropriate locations for all sample aliquots included within each composite sample. Prepare a dimensional sketch of the general surroundings of the sampling area (site), and/or support with other forms of documentation (such as photographic log). Sample identification numbers should correspond directly with sample locations;
- Identify sample numbers, volumes, and containers (number, size, type) used for each sample collected. Note the date and time of each sample, identify any associated QC samples, or any factors that may affect the quality;
- Record any field measurements, field screening/analytical results generated, calibration methods used, field results, and QC information;
- Identify decontamination procedures employed for sampling equipment;
- Document appropriate references to maps and photographic logs of the sampling site;
- Record information on scheduling modifications, change orders, sampling or drilling decisions/ changes;
- Describe the number of shipping coolers packed, note COC numbers or attach a copy of COC, and record the mode of transportation and applicable tracking numbers;
- Record name and address of all receiving laboratories; and
- Maintain appropriate documentation for investigative-derived wastes. Note contents and volumes of waste generated, storage, and disposal methods used.

The exact locations of sampling points should be documented to generate an accurate representation of the site conditions using the data generated to date, define data gaps, and identify potential future data needs. A monument should be chosen at each site to act as a stationary reference point from which all sampling points can be measured using a compass and measuring tape. If a building or other stationary structure exists, its corner may act as this reference point. If no monument exists, it will be necessary to create one. A piece of wood, approximately 5 centimeters by 5 centimeters (2 inches by 2 inches), should be hammered into the ground to almost ground level, making it difficult to remove and thus ensuring its permanence. The stake should then be marked with flagging tape or fluorescent paint. When applicable, sampling points associated with coordinates that are referenced to a position on the earth must comply with ER 1110-1-8156. ER 1110-1-8156 requires geospatial data to be documented using the Federal Geographic Data Committee's content standards for digital geospatial metadata. Geospatial data are nontactical data, referenced either directly or indirectly to a location and boundaries on the earth.

Additional guidance on geospatial data systems may be found in EM 1110-1- 2909. To establish a sampling point, the following procedure is recommended:

- Standing at the monument, facing the sampling point, use the compass hairlines to determine the degree of direction.
- Ensure that the line of sight runs from the monument, through both hairline needles on the compass, to the sampling point.
- When first establishing the sampling point, record the degree and direction reading from the compass in the field logbook, along with the distance measurement from the monument to the sampling point.

All sampling points should be documented on film. A film record of a sampling event allows positive identification of the sampling point. In some cases, a photograph of the actual sample collected may also be required. Photographs are the most accurate and convenient record of field personnel observations. Photographs taken to document sampling points should include two or more reference points to help find the point again at a later date. Keeping a record of photographs taken is crucial to their validity as a representation of an existing situation. Photographic documentation is invaluable if the sampling and subsequent analytical data end in litigation, enforcement, or cost recovery actions. In addition to photographs, video coverage of a sampling episode can be equally as valuable as or even more valuable than photographs because it can be used to prove that samples were taken properly as well as verify the location at which they were taken. Video coverage can be used as a record of site conditions and can give those who have not been on site an idea of the circumstances. For each photograph taken, the following items should be noted in the field logbook:

- Date,
- Time,
- Photographer (signature),
- Name of site,
- General direction faced and description of the subject,
- Sequential number of the photograph and the roll number, and
- Site photo map.

2.3.1 Sample Documentation

Sample labels are required for properly identifying samples and evidence. All samples must be properly labeled with the label affixed to the container prior to transportation to the laboratory. It is also recommended that samples be photographed so that labels are clearly readable for later identification. Information on sample labels should include, but not be limited to, the following:

- Project Code: An assigned contractor, project number, site name.
- Station Number: A unique identifier assigned to a sampling point by the sampling team.
- Sample Identification Number: Each sample, including field control samples, collected for a project should be assigned a unique number. This assigned number incorporates information on the sample type and date.
- Samplers: Each sampler's name and signature or initials.
- Preservative: Whether a preservative is used and the type of preservative.
- Analysis: The type of analysis requested.
- Date/Time: Identify the date and time the sample was taken.
- Type of Sample: The type of sample should be identified as discrete or composite.

A sample numbering system should be used to identify each sample collected and submitted for analysis. The purpose of the numbering system is to assist in the tracking of samples and to facilitate retrieval of analytical results. The sample identification numbers for each sampling effort should be used on sample labels, sample tracking matrix forms, COC forms, field logbooks, and all other applicable documentation. A listing of all sample identification numbers should be recorded in the field logbook. The sampling numbering system may vary depending upon the number and type of samples that will be collected at the site. An example of a sample numbering system follows. Location and sample identification numbers should consist of the following designations to identify the location (AABBB-CC), sample sequence number, date (MMDDYY), and sample depth interval for soils (00-00):

- For soil: AABBB-CC/MMDDYY/00-00
- For water: AABBB-CC/MMDDYY
- For QC samples: AABBB-CC/MMDDYY

Example: SB001-01/081492/08-10 = Soil Boring SB001 Sample Number 1, sampled on August 14, 1992, from a sample depth interval of 8 to 10 feet (2.4 to 3 meters). Duplicate samples should be numbered in sequential order. For example, a duplicate sample collected from this soil boring example would have a designation as follows: SB001-02/081492/08-10. Each sample collected must be assigned a unique

sample number. Sample numbers should change when the media or location changes. Sample numbers should not change because different analyses are requested. For example, water samples collected at the same location, date, and time for volatile organics, semivolatile organics, and metals analyses would all have the same sample number although the various sample aliquots would be collected in different containers.

COC procedures provide documentation of the handling of each sample from the time it is collected until it is destroyed. COC procedures are implemented so that a record of sample collection, transfer of samples between personnel, sample shipping, and receipt by the laboratory that will analyze the sample is maintained. Records concerning the cleaning of empty sample containers, container shipment from the laboratory to the site, and security of empty containers at the site should also be maintained. The COC record serves as a legal record of possession of the sample. The chain-of-custody record is initiated with the acquisition of the sample. The chain-of-custody record remains with the sample at all times and bears the name of the person (field investigator) assuming responsibility for the samples. The field investigator is tasked with ensuring secure and appropriate handling of the bottles and samples. To simplify the COC record and eliminate potential litigation problems, as few people as possible should handle the sample or physical evidence during the investigation. A sample is considered to be under custody if one or more of the following criteria are met:

- The sample is in the sampler's possession,
- The sample is in the sampler's view after being in possession.
- The sample was in the sampler's possession and then was locked up to prevent tampering.
- The sample is in a designated secure area.

In addition to the COC record, there is also a COC (custody) seal. The COC seal is an adhesive seal placed in areas such that if a sealed container is opened, the seal would be broken. The COC seal ensures that no sample tampering occurred between the field and the laboratory analysis.

All sample sets should be accompanied by a COC record. When transferring possession of samples, the individual receiving the samples should sign, date, and note the time that he/she received the samples on the COC record. This COC record documents transfer of custody of samples from the field investigator to another person, other laboratories, or other organizational units. Samples must be properly packaged for shipment and delivered or shipped to the designated laboratory for analyses. Shipping containers must be secured by using nylon strapping tape and custody seals. The custody seals must be placed on the container so it cannot be opened without breaking the seals. The seal must be signed and dated by the

field investigator. When samples are split with a facility, state regulatory agency, or other government agency, the agency representative must sign the COC record, if present. All samples should be accompanied by the COC record. The U.S. Army Corps of Engineers tracking number [such as laboratory information management system number] that is used in conjunction with the Government QA sample shipment must be written on the COC record of the QA sample. The original and one copy of the record will be placed in a plastic bag taped to the inside lid of the secured shipping container. One copy of the record will be retained by the field investigator or project leader. The original record will be transmitted to the field investigator or project leader after samples are accepted by the laboratory. This copy will become a part of the project file. If sent by mail, the package should be registered with return receipt requested. If sent by common carrier, an air bill should be used. Receipts from post offices and air bills should be retained as part of the documentation of the COC. The air bill number or registered mail serial number should be recorded in the remarks section of the COC record.

To ensure that proper analysis is performed on the samples, additional paperwork may need to be filled out, as required by the laboratory performing the analysis. This form identifies samples by number, location, and time collected and allows the collector to indicate the desired analysis. This form should act as a supplement/confirmation to the COC record and laboratory contacts made prior to the sample event initiation.

2.3.2 QA/QC Requirements

All original data recorded in field logbooks and on sample labels, COC records, and receipt-for-samples forms are written in waterproof ink. If an error is made on an accountable document, corrections should be made simply by crossing out the error and entering the correct information. The erroneous information should not be obliterated. Any error discovered on a document should be corrected by the person who made the entry. All corrections must be initialed and dated.

The photographer should review the photographs or slides when they return from developing and compare them with the photographic log to confirm that the log and photographs match.

Although most sample labels are made with water-resistant paper and are filled out using waterproof ink, inclement weather and general field conditions can affect the legibility of sample labels. It is recommended that after sample labels are filled out and affixed to the sample container, the label should be covered with wide clear tape. This will preserve the label and keep it from becoming illegible. In

addition to label protection, COC and analysis request forms should be protected when samples are shipped in iced coolers. Typically, these forms should be placed inside a ziplock bag or similar waterproof protection and taped to the inside lid of the secured shipping container with the samples.

2.3.3 Packaging and Shipping Procedures

Environmental samples are defined as those samples collected from environmental matrices such as soil, groundwater, or sediments. The following sections identify packaging and shipping requirements for environmental samples that are unpreserved or preserved by acid/base/chemical addition. The following general procedures apply to the packaging of all environmental samples:

- Verify that the sample label is complete and adequately identifies the items.
- Verify that each sample cap/lid is secured on the bottle, and place each sample in a plastic bag. For multiple VOA vials, all vials from each sample location should be placed in a small plastic bag at a minimum. Evidence tape or custody seals may be placed over the sample lid and container, or over the seal of the bag for additional security, if desired.
- Squeeze as much air as possible from the bag, and seal the bag. Trip blanks are packaged in the same manner as that for aqueous VOA samples.
- Prepare the shipping container for use. For a commercial cooler, this includes taping the drain plug shut inside and out, and lining the cooler with a large plastic garbage bag. Place approximately 7.5 centimeters (3 inches) of inert packing material in the bottom of the liner. Place vermiculite or perlite on the bottom if the materials are liquid. Alternative shipping containers may be used if approved by project technical personnel.
- Place the samples upright in the lined cooler or storage container in such a way that the samples will not touch each other during shipment. Add inert packing material as necessary to ensure separation of samples.
- With the exception of aqueous metals analyses, all environmental samples should be shipped to the laboratory on ice and chilled to 4 degrees centigrade $\pm$ 2 degrees centigrade. If any of the shipped samples require cooling, place double bags of ice around the containers. Also include a 40 mL VOA vial filled with water for use as a temperature blank for the laboratory.
- Fill the cooler with packing material and tape the inner liner shut. NOTE: Do not use "environmentally friendly" peanuts made of starch to pack containers of liquids. These packing materials will dissolve when they get wet or moist.
- Place the paperwork being sent to the laboratory inside a plastic bag and tape it to the inside of the cooler lid. Include a copy of the COC form in the paperwork sent to the laboratory. The

sampler keeps one copy of the COC form. Include any additional paperwork to notify the laboratory of project information (laboratory notification checklist), or if a sample is suspected of containing any substance for which laboratory personnel should take safety precautions.

- Close the cooler and seal it with strapping tape.
- Place at least two custody seals on the outside of the cooler (one on the front and one on the back). More custody seals may be used at the discretion of the sampler.
- Prepare standard air bill paperwork for shipment of the samples to the laboratory. Personnel should be aware of carrier weight or other policy restrictions.

Environmental samples that are shipped unpreserved are not considered a hazardous material by the Department of Transportation (DOT) if they do not exhibit a DOT hazard class. This exempts them from DOT regulation during transportation to the laboratory. In general, this applies to soil/sediment and aqueous samples preserved by cooling.

All samples that are preserved by the addition of chemicals are subjected to greater scrutiny when defining whether DOT regulations apply and the appropriate packaging and shipping requirements necessary. Care should be exercised when adding any chemicals to environmental samples for preservation purposes.

3. QUALITY ASSURANCE PROJECT PLAN

The QAPP describes the chemical data quality objectives, analytical methods and measurements, QA/QC protocols necessary to achieve the DQOs, and data assessment procedures for the evaluation and the identification of any data limitations.

3.1 PROJECT LABORATORY

The project laboratory for this project is Empirical Laboratories, LLC, in Nashville, Tennessee. Empirical holds a current National Environmental Laboratory Accreditation Conference and maintains the necessary certifications for the state of Georgia licensing program.

3.2 DATA QUALITY OBJECTIVES

The DQOs for this project are to satisfy that the analytical results can be used to determine remediation activities if needed. relative to soil and groundwater samples. The analytical requirements for this project

are listed in Table 4-1 for soil and Table 4-2 for groundwater in the work plan. The laboratory will use the most up to date version of SW-846, "Standard Test Methods for Evaluating Solid Wastes." The project QC objectives (precision, accuracy, representativeness, comparability, and completeness) are discussed below:

- *Precision*: Precision is defined as the reproducibility, or degree of agreement, among duplicated (collocated) sample measurements of the same quantity. The closer the numerical values of the measurements come to each other, the more precise the measurement is. Analytical precision is expressed as a percentage of the difference between results of duplicate samples for a given analyte. For organic parameters, precision is measured by the relative percent difference (RPD) between the matrix spike (MS) and the matrix spike duplicate (MSD). For inorganic parameters, precision is measured by the RPD between the original sample and the duplicate or the MS and MSD (if required by the analytical method performed). Required precision is 90 percent.
- *Accuracy*: Accuracy is defined as the degree of difference between measured or calculated values and the true value. The closer the numerical value of the measurement comes to the true value, or actual concentration, the more accurate the measurement. Analytical accuracy is expressed as the percent recovery of a compound or element that has been added to the environmental sample at a known concentration before analysis. Required accuracy is 90 percent.
- *Representativeness*: Representativeness expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Representativeness is a qualitative parameter dependent on the proper design of the sampling program and proper laboratory protocol. Representativeness will be ensured by using proper sampling techniques and analytical procedures. Representativeness is ensured in the laboratory by proper sample preservation and storage, preparation and analysis of samples within required holding times, and analysis of method and instrument blanks. Field QC samples — including trip blanks, source water check samples, and equipment rinseates—will be collected and analyzed to evaluate the possibility of cross-contamination during sample collection and shipping. Results of field duplicate samples will also be evaluated for assessing representativeness.
- *Comparability*: Comparability is a qualitative parameter that expresses the confidence with which one data set can be compared with another, and is limited to the other parameters, because only when precision and accuracy are known can data be compared with confidence. The sampling and analytical procedures described in this work plan that will be used to obtain analytical data are expected to provide comparable data. Comparability will be further ensured by the analysis of U.S. Environmental Protection Agency standard reference materials,

establishing that analytical procedures are generating valid data, and reporting results in standard concentration units.

- *Completeness*: Completeness is defined as the amount of valid (useable) data obtained compared to the planned amount and is expressed as a percentage of measurements judged to be valid. Completeness is usually measured following data validation. Data qualified as a result of validation can be considered valid data; rejected data are not valid. The completeness goal is to generate a sufficient amount of valid data based on project needs. Required completeness is 90 percent.

The laboratory will provide definitive level data. Level III validation will be performed on all chemical data following the logic identified in *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (June 2008) and *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (January 2009) by DataChek of Caswell Beach, North Carolina.

4. REFERENCES

U.S. Environmental Protection Agency (EPA), June 2008. OSWER 9240.1-48. *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (USEPA-540-R-08-01).

EPA, January 2009. OSWER 9200-1-85. *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA-540/ R-08-005).

Appendix D

SWS First Response Report

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Date: 03-05-08

SWS Project Summary Report

SWS Project #SAV0801267

Location: Bldg. 419 - Ft. Stewart – Hinesville, GA

Scope of Work:: Removal of Fuel Oil Contaminated Soil

SWS was contacted by Craig Christopher to look into cleaning up a Fuel Oil Spill that occurred when a fuel return line coming from the boiler in Building 419 & leading to an Underground Storage Tank (U.S.T.) developed a leak. It is uncertain exactly how long the line was leaking, but it was not discovered until the fuel began to seep out of cracks in the Asphalt & Concrete in the area behind building 419 where the U.S.T. was located. SWS came to the site & met with Craig Christopher to find out what the cleanup would require & also what Ft. Stewart would like to have done so a Job Proposal could be created per Craig Christopher's request.

January 15, 2008 the Job Proposal was given to Craig Christopher & later approved on January 18th. On January 24th, SWS came to the site with Whitaker labs & took boring samples & installed temporary monitoring wells to find out the extent of the contamination. On February 1st SWS began to mob in the equipment needed for the Soil Remediation. A 1000gal temporary fuel tank was also brought to the site so that the boiler could be used during the remediation.

On February 4th, SWS began removing the Asphalt & Concrete in the proposed dig area. The Concrete & Asphalt was disposed of by Ft. Stewart. During the removal, part of the U.S.T. was exposed & was found to run underneath a Concrete Slab that we originally were trying to save. After the Concrete & Asphalt was removed, we used our Vacuum Truck to transfer the fuel into the temporary fuel storage tank. After the fuel was transferred, construction fence was put up around the hole & the site was secured until we returned on the next day.

On February 5th, we began the soil removal. During the digging, a Terra Cotta Sewage pipe was damaged. Soil removal was stopped so that the pipe was not damaged any further. The sewage was not leaking out into the hole so the damaged section was covered

so that dirt would not fall into the pipe & the site was secured for the day. The pipe was repaired the next day. Twelve loads of contaminated soil were removed. On February 6th, we resumed digging & removed twelve more loads of contaminated soil.

On February 7th, we returned to the site to finish digging the proposed area. We could not dig any soil from the South Wall due to the wall caving in & compromising the stability of the cooling tower. We were at 8' feet and fuel was coming up from the bottom of the hole. Craig Christopher had us finish digging the proposed area and take samples of the walls & the bottom. SWS was finished with what we could do, Craig had the hole backfilled.

If there are any questions or concerns, I can be reached at any of the numbers below, or through e-mail.

Thank You,

Brian Clark
SWS First Response
16 Foundation Dr.
Savannah, GA
Office 912-966-0686
Cell 912-313-3329
mailto:brian.clark@swsefr.com

Analytical Environmental Services, Inc.

Date: *27-Feb-08*

CLIENT: Whitaker Labs
Project: Former PX
Lab ID: 0802C16-001

Client Sample ID: NORTH WALL
Collection Date: 2/7/2008 1:00:00 PM
Matrix: SOIL

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed
POLYAROMATIC HYDROCARBONS		**SW8270C**		**(SW3550)**			Analyst: **MC**
Naphthalene	BRL	0.69		mg/Kg-dry	96651	2	2/22/2008 3:58 PM
Acenaphthylene	1.2	0.69		mg/Kg-dry	96651	2	2/22/2008 3:58 PM
1-Methylnaphthalene	BRL	0.69		mg/Kg-dry	96651	2	2/22/2008 3:58 PM
2-Methylnaphthalene	BRL	0.69		mg/Kg-dry	96651	2	2/22/2008 3:58 PM
Acenaphthene	BRL	0.69		mg/Kg-dry	96651	2	2/22/2008 3:58 PM
Fluorene	BRL	0.69		mg/Kg-dry	96651	2	2/22/2008 3:58 PM
Phenanthrene	1.0	0.69		mg/Kg-dry	96651	2	2/22/2008 3:58 PM
Anthracene	1.1	0.69		mg/Kg-dry	96651	2	2/22/2008 3:58 PM
Fluoranthene	3.0	0.69		mg/Kg-dry	96651	2	2/22/2008 3:58 PM
Pyrene	5.1	0.69		mg/Kg-dry	96651	2	2/22/2008 3:58 PM
Benz(a)anthracene	2.3	0.69		mg/Kg-dry	96651	2	2/22/2008 3:58 PM
Chrysene	2.6	0.69		mg/Kg-dry	96651	2	2/22/2008 3:58 PM
Benzo(b)fluoranthene	1.6	0.69		mg/Kg-dry	96651	2	2/22/2008 3:58 PM
Benzo(k)fluoranthene	1.6	0.69		mg/Kg-dry	96651	2	2/22/2008 3:58 PM
Benzo(a)pyrene	1.8	0.69		mg/Kg-dry	96651	2	2/22/2008 3:58 PM
Dibenz(a,h)anthracene	BRL	0.69		mg/Kg-dry	96651	2	2/22/2008 3:58 PM
Benzo(g,h,i)perylene	1.0	0.69		mg/Kg-dry	96651	2	2/22/2008 3:58 PM
Indeno(1,2,3-cd)pyrene	0.84	0.69		mg/Kg-dry	96651	2	2/22/2008 3:58 PM
Surr: 2-Fluorobiphenyl	84.4	59-120		%REC	96651	2	2/22/2008 3:58 PM
Surr: 4-Terphenyl-d14	90.4	63.9-120		%REC	96651	2	2/22/2008 3:58 PM
Surr: Nitrobenzene-d5	107	48.2-120		%REC	96651	2	2/22/2008 3:58 PM
VOLATILE ORGANICS		**SW8260B**		**(SW5035)**			Analyst: **PV**
Benzene	0.0014	0.0006		mg/Kg-dry	96644	1	2/21/2008 5:48 PM
Toluene	0.0043	0.0006		mg/Kg-dry	96644	1	2/21/2008 5:48 PM
Ethylbenzene	0.0022	0.0006		mg/Kg-dry	96644	1	2/21/2008 5:48 PM
Xylenes, Total	0.010	0.0011		mg/Kg-dry	96644	1	2/21/2008 5:48 PM
Surr: 4-Bromofluorobenzene	71.5	54.6-144		%REC	96644	1	2/21/2008 5:48 PM
PERCENT MOISTURE		**D2216**					Analyst: **VRA**
Percent Moisture	4.74	0		wt%		1	2/25/2008 5:00 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	E	Estimated (Value above quantitation range)
BRL	Below Reporting Limit	S	Surrogate Recovery outside accepted recovery limits
H	Holding times for preparation or analysis exceeded	Narr	See Case Narrative
N	Analyte not NELAC certified	NC	Not Confirmed
B	Analyte detected in the associated Method Blank		

Analytical Environmental Services, Inc.

Date: *27-Feb-08*

CLIENT: Whitaker Labs
Project: Former PX
Lab ID: 0802C16-002

Client Sample ID: SOUTH WALL
Collection Date: 2/7/2008 1:00:00 PM
Matrix: SOIL

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed
POLYAROMATIC HYDROCARBONS		**SW8270C**		**(SW3550)**			Analyst: **MC**
Naphthalene	1.9	0.74		mg/Kg-dry	96651	2	2/22/2008 4:31 PM
Acenaphthylene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 4:31 PM
1-Methylnaphthalene	5.2	0.74		mg/Kg-dry	96651	2	2/22/2008 4:31 PM
2-Methylnaphthalene	4.4	0.74		mg/Kg-dry	96651	2	2/22/2008 4:31 PM
Acenaphthene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 4:31 PM
Fluorene	2.0	0.74		mg/Kg-dry	96651	2	2/22/2008 4:31 PM
Phenanthrene	2.2	0.74		mg/Kg-dry	96651	2	2/22/2008 4:31 PM
Anthracene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 4:31 PM
Fluoranthene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 4:31 PM
Pyrene	0.88	0.74		mg/Kg-dry	96651	2	2/22/2008 4:31 PM
Benz(a)anthracene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 4:31 PM
Chrysene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 4:31 PM
Benzo(b)fluoranthene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 4:31 PM
Benzo(k)fluoranthene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 4:31 PM
Benzo(a)pyrene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 4:31 PM
Dibenz(a,h)anthracene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 4:31 PM
Benzo(g,h,i)perylene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 4:31 PM
Indeno(1,2,3-cd)pyrene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 4:31 PM
Surr: 2-Fluorobiphenyl	105	59-120		%REC	96651	2	2/22/2008 4:31 PM
Surr: 4-Terphenyl-d14	84.1	63.9-120		%REC	96651	2	2/22/2008 4:31 PM
Surr: Nitrobenzene-d5	98.0	48.2-120		%REC	96651	2	2/22/2008 4:31 PM
VOLATILE ORGANICS		**SW8260B**		**(SW5035)**			Analyst: **PV**
Benzene	0.0049	0.0005		mg/Kg-dry	96644	1	2/21/2008 3:11 PM
Toluene	0.024	0.0005		mg/Kg-dry	96644	1	2/21/2008 3:11 PM
Ethylbenzene	BRL	0.0005		mg/Kg-dry	96644	1	2/21/2008 3:11 PM
Xylenes, Total	2.9	0.056		mg/Kg-dry	96656	50	2/21/2008 3:44 PM
Surr: 4-Bromofluorobenzene	895	54.6-144	S	%REC	96644	1	2/21/2008 3:11 PM
Surr: 4-Bromofluorobenzene	126	54.6-144		%REC	96656	50	2/21/2008 3:44 PM
PERCENT MOISTURE		**D2216**					Analyst: **VRA**
Percent Moisture	11.1	0		wt%		1	2/25/2008 5:00 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	E	Estimated (Value above quantitation range)
BRL	Below Reporting Limit	S	Surrogate Recovery outside accepted recovery limits
H	Holding times for preparation or analysis exceeded	Narr	See Case Narrative
N	Analyte not NELAC certified	NC	Not Confirmed
B	Analyte detected in the associated Method Blank		

Analytical Environmental Services, Inc.

Date: *27-Feb-08*

CLIENT: Whitaker Labs
Project: Former PX
Lab ID: 0802C16-003

Client Sample ID: EAST WELL
Collection Date: 2/7/2008 1:00:00 PM
Matrix: SOIL

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed
POLYAROMATIC HYDROCARBONS		**SW8270C**		**(SW3550)**			Analyst: **MC**
Naphthalene	1.1	0.79		mg/Kg-dry	96651	2	2/22/2008 5:03 PM
Acenaphthylene	BRL	0.79		mg/Kg-dry	96651	2	2/22/2008 5:03 PM
1-Methylnaphthalene	2.7	0.79		mg/Kg-dry	96651	2	2/22/2008 5:03 PM
2-Methylnaphthalene	2.6	0.79		mg/Kg-dry	96651	2	2/22/2008 5:03 PM
Acenaphthene	BRL	0.79		mg/Kg-dry	96651	2	2/22/2008 5:03 PM
Fluorene	BRL	0.79		mg/Kg-dry	96651	2	2/22/2008 5:03 PM
Phenanthrene	0.85	0.79		mg/Kg-dry	96651	2	2/22/2008 5:03 PM
Anthracene	BRL	0.79		mg/Kg-dry	96651	2	2/22/2008 5:03 PM
Fluoranthene	BRL	0.79		mg/Kg-dry	96651	2	2/22/2008 5:03 PM
Pyrene	BRL	0.79		mg/Kg-dry	96651	2	2/22/2008 5:03 PM
Benz(a)anthracene	BRL	0.79		mg/Kg-dry	96651	2	2/22/2008 5:03 PM
Chrysene	BRL	0.79		mg/Kg-dry	96651	2	2/22/2008 5:03 PM
Benzo(b)fluoranthene	BRL	0.79		mg/Kg-dry	96651	2	2/22/2008 5:03 PM
Benzo(k)fluoranthene	BRL	0.79		mg/Kg-dry	96651	2	2/22/2008 5:03 PM
Benzo(a)pyrene	BRL	0.79		mg/Kg-dry	96651	2	2/22/2008 5:03 PM
Dibenz(a,h)anthracene	BRL	0.79		mg/Kg-dry	96651	2	2/22/2008 5:03 PM
Benzo(g,h,i)perylene	BRL	0.79		mg/Kg-dry	96651	2	2/22/2008 5:03 PM
Indeno(1,2,3-cd)pyrene	BRL	0.79		mg/Kg-dry	96651	2	2/22/2008 5:03 PM
Surr: 2-Fluorobiphenyl	107	59-120		%REC	96651	2	2/22/2008 5:03 PM
Surr: 4-Terphenyl-d14	95.3	63.9-120		%REC	96651	2	2/22/2008 5:03 PM
Surr: Nitrobenzene-d5	180	48.2-120	S	%REC	96651	2	2/22/2008 5:03 PM
VOLATILE ORGANICS		**SW8260B**		**(SW5035)**			Analyst: **PV**
Benzene	0.0064	0.0006		mg/Kg-dry	96644	1	2/21/2008 3:41 PM
Toluene	0.031	0.0006		mg/Kg-dry	96644	1	2/21/2008 3:41 PM
Ethylbenzene	0.033	0.0006		mg/Kg-dry	96644	1	2/21/2008 3:41 PM
Xylenes, Total	3.6	0.085		mg/Kg-dry	96656	50	2/21/2008 4:46 PM
Surr: 4-Bromofluorobenzene	95.7	54.6-144		%REC	96656	50	2/21/2008 4:46 PM
Surr: 4-Bromofluorobenzene	716	54.6-144	S	%REC	96644	1	2/21/2008 3:41 PM
PERCENT MOISTURE		**D2216**					Analyst: **VRA**
Percent Moisture	16.7	0		wt%		1	2/25/2008 5:00 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	E	Estimated (Value above quantitation range)
BRL	Below Reporting Limit	S	Surrogate Recovery outside accepted recovery limits
H	Holding times for preparation or analysis exceeded	Narr	See Case Narrative
N	Analyte not NELAC certified	NC	Not Confirmed
B	Analyte detected in the associated Method Blank		

Analytical Environmental Services, Inc.

Date: *27-Feb-08*

CLIENT: Whitaker Labs
Project: Former PX
Lab ID: 0802C16-004

Client Sample ID: WEST WALL
Collection Date: 2/7/2008 1:00:00 PM
Matrix: SOIL

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed
POLYAROMATIC HYDROCARBONS		**SW8270C**		**(SW3550)**			Analyst: **MC**
Naphthalene	BRL	0.38		mg/Kg-dry	96651	1	2/22/2008 7:12 PM
Acenaphthylene	4.6	0.38		mg/Kg-dry	96651	1	2/22/2008 7:12 PM
1-Methylnaphthalene	BRL	0.38		mg/Kg-dry	96651	1	2/22/2008 7:12 PM
2-Methylnaphthalene	BRL	0.38		mg/Kg-dry	96651	1	2/22/2008 7:12 PM
Acenaphthene	BRL	0.38		mg/Kg-dry	96651	1	2/22/2008 7:12 PM
Fluorene	BRL	0.38		mg/Kg-dry	96651	1	2/22/2008 7:12 PM
Phenanthrene	0.91	0.38		mg/Kg-dry	96651	1	2/22/2008 7:12 PM
Anthracene	3.2	0.38		mg/Kg-dry	96651	1	2/22/2008 7:12 PM
Fluoranthene	5.2	0.38		mg/Kg-dry	96651	1	2/22/2008 7:12 PM
Pyrene	9.3	0.76		mg/Kg-dry	96651	2	2/22/2008 5:35 PM
Benz(a)anthracene	5.6	0.38		mg/Kg-dry	96651	1	2/22/2008 7:12 PM
Chrysene	5.3	0.38		mg/Kg-dry	96651	1	2/22/2008 7:12 PM
Benzo(b)fluoranthene	7.2	0.76		mg/Kg-dry	96651	2	2/22/2008 5:35 PM
Benzo(k)fluoranthene	1.5	0.76		mg/Kg-dry	96651	2	2/22/2008 5:35 PM
Benzo(a)pyrene	4.6	0.38		mg/Kg-dry	96651	1	2/22/2008 7:12 PM
Dibenz(a,h)anthracene	0.54	0.38		mg/Kg-dry	96651	1	2/22/2008 7:12 PM
Benzo(g,h,i)perylene	1.9	0.38		mg/Kg-dry	96651	1	2/22/2008 7:12 PM
Indeno(1,2,3-cd)pyrene	1.7	0.38		mg/Kg-dry	96651	1	2/22/2008 7:12 PM
Surr: 2-Fluorobiphenyl	82.4	59-120		%REC	96651	1	2/22/2008 7:12 PM
Surr: 4-Terphenyl-d14	83.5	63.9-120		%REC	96651	1	2/22/2008 7:12 PM
Surr: Nitrobenzene-d5	83.9	48.2-120		%REC	96651	1	2/22/2008 7:12 PM
VOLATILE ORGANICS		**SW8260B**		**(SW5035)**			Analyst: **PV**
Benzene	BRL	0.0007		mg/Kg-dry	96644	1	2/21/2008 5:23 PM
Toluene	0.0011	0.0007		mg/Kg-dry	96644	1	2/21/2008 5:23 PM
Ethylbenzene	0.0023	0.0007		mg/Kg-dry	96644	1	2/21/2008 5:23 PM
Xylenes, Total	0.0097	0.0013		mg/Kg-dry	96644	1	2/21/2008 5:23 PM
Surr: 4-Bromofluorobenzene	61.4	54.6-144		%REC	96644	1	2/21/2008 5:23 PM
PERCENT MOISTURE		**D2216**					Analyst: **VRA**
Percent Moisture	12.8	0		wt%		1	2/25/2008 5:00 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	E	Estimated (Value above quantitation range)
BRL	Below Reporting Limit	S	Surrogate Recovery outside accepted recovery limits
H	Holding times for preparation or analysis exceeded	Narr	See Case Narrative
N	Analyte not NELAC certified	NC	Not Confirmed
B	Analyte detected in the associated Method Blank		

Analytical Environmental Services, Inc.

Date: *27-Feb-08*

CLIENT: Whitaker Labs
Project: Former PX
Lab ID: 0802C16-005

Client Sample ID: MIDDLE BOTTOM
Collection Date: 2/7/2008 1:00:00 PM
Matrix: SOIL

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed
POLYAROMATIC HYDROCARBONS		**SW8270C**		**(SW3550)**			Analyst: **MC**
Naphthalene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 6:07 PM
Acenaphthylene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 6:07 PM
1-Methylnaphthalene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 6:07 PM
2-Methylnaphthalene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 6:07 PM
Acenaphthene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 6:07 PM
Fluorene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 6:07 PM
Phenanthrene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 6:07 PM
Anthracene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 6:07 PM
Fluoranthene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 6:07 PM
Pyrene	0.82	0.74		mg/Kg-dry	96651	2	2/22/2008 6:07 PM
Benz(a)anthracene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 6:07 PM
Chrysene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 6:07 PM
Benzo(b)fluoranthene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 6:07 PM
Benzo(k)fluoranthene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 6:07 PM
Benzo(a)pyrene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 6:07 PM
Dibenz(a,h)anthracene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 6:07 PM
Benzo(g,h,i)perylene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 6:07 PM
Indeno(1,2,3-cd)pyrene	BRL	0.74		mg/Kg-dry	96651	2	2/22/2008 6:07 PM
Surr: 2-Fluorobiphenyl	104	59-120		%REC	96651	2	2/22/2008 6:07 PM
Surr: 4-Terphenyl-d14	77.8	63.9-120		%REC	96651	2	2/22/2008 6:07 PM
Surr: Nitrobenzene-d5	118	48.2-120		%REC	96651	2	2/22/2008 6:07 PM
VOLATILE ORGANICS		**SW8260B**		**(SW5035)**			Analyst: **PV**
Benzene	0.0016	0.0005		mg/Kg-dry	96644	1	2/21/2008 4:32 PM
Toluene	0.0065	0.0005		mg/Kg-dry	96644	1	2/21/2008 4:32 PM
Ethylbenzene	0.0035	0.0005		mg/Kg-dry	96644	1	2/21/2008 4:32 PM
Xylenes, Total	0.17	0.058		mg/Kg-dry	96656	50	2/21/2008 1:39 PM
Surr: 4-Bromofluorobenzene	85.1	54.6-144		%REC	96656	50	2/21/2008 1:39 PM
Surr: 4-Bromofluorobenzene	211	54.6-144	S	%REC	96644	1	2/21/2008 4:32 PM
PERCENT MOISTURE		**D2216**					Analyst: **VRA**
Percent Moisture	10.4	0		wt%		1	2/25/2008 5:00 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	E	Estimated (Value above quantitation range)
BRL	Below Reporting Limit	S	Surrogate Recovery outside accepted recovery limits
H	Holding times for preparation or analysis exceeded	Narr	See Case Narrative
N	Analyte not NELAC certified	NC	Not Confirmed
B	Analyte detected in the associated Method Blank		

Appendix E

Georgia EPD Letter

RECEIVED
2012
SEP 04 REC'D
By

Georgia Department of Natural Resources
Environmental Protection Division
Solid Waste Management Program
4244 International Parkway, Suite 104, Atlanta, Georgia 30354
Mark Williams, Commissioner
Judson H. Turner, Director
404/362-2692

August 27, 2012

Ms. Tressa Rutland
Directorate of Public Works
1550 Veterans Parkway
Building 1137
Ft. Stewart, Georgia 31314-4927

SUBJECT: Heating Oil Spill Site, Bldg 419 – Ft. Stewart, Georgia

Dear Ms Rutland:

The Georgia Environmental Protection Division (EPD) has reviewed the August 2012 Final Preliminary Assessment and Site Investigation Report submitted by SpecPro Environmental Services LLC for the site referenced above.

EPD approves of the installation of additional monitoring wells and preparation of a CAP-Part A. The next report should include a figure showing the location of the site on a USGS 7.5 minute quad map. In addition, the location of the former Bldg 419, heating oil UST should be shown on site maps and the report should include any information regarding emergency response actions that occurred at the time of the release.

Feel free to contact me at 404 362 2556 if you have any comments or questions.

Sincerely,

James S. Guentert
Geologist III

cc: Melanie Henry, EPD
Algeana Stevenson, Department of the Army
File

Appendix F

Accident Prevention Plan

Final
Accident Prevention Plan
for Heating Oil Spill Site Investigation
Building 419
Fort Stewart, Georgia

May 2013

Submitted to:
U.S. Army Corps of Engineers
Savannah District

Prepared by:
SpecPro Environmental Services LLC
1006 Floyd Culler Court
Oak Ridge, Tennessee 37830
under
Contract No. W912HN-10-D-0001
Delivery Order No. 0029

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Attachment 8 Site Safety and Health Plan

SIGNATURE PAGE

Accident Prevention Plan
for Heating Oil Spill Site Investigation Building 419
Fort Stewart, Georgia

Contract No. W912HN-10-D-0001
Delivery Order No. 0029

Prepared By:	Doug Hawn	05/20/13
	Doug Hawn, Project Manager (plan preparer)	Date
	SpecPro Environmental Services LLC	(865) 481-7837

Plan Approval:	Jim Madaj	5-20-13
	Jim Madaj, Senior Program Manager (company officer)	Date
	SpecPro Environmental Services LLC	(865) 481-7837

Plan Concurrence:	CIH, CSP	5-20-2013
	Richard Rathnow, CIH, CSP	Date
	Safety and Health Manager, CIH, CSP	
	SpecPro Environmental Services LLC	(865) 481-7837 ext. 305

ACCIDENT PREVENTION PLAN
for Heating Oil Spill Site Investigation Building 419
Fort Stewart, Georgia
Revised May 2013

PURPOSE AND SCOPE

This accident prevention plan (APP) will serve, in essence, as a safety and health policy and program document for this project. This plan will address the job-specific hazards associated with this project and also any unusual or unique aspects of the project. The plan also represents a good-faith effort to identify, evaluate, and prescribe controls for the hazards that will be posed by this work. The site safety and health officer (SSHO) will perform daily safety inspections to verify that the controls in this plan are appropriate and sufficient and will revise these controls as necessary to ensure that the work is performed safely. Revisions to the APP will be documented, and those revisions that result in decreasing or eliminating a hazard control will be approved by the SES safety and health manager before they are implemented.

SES subcontractors as applicable will be informed of the requirements of this plan and will be provided with copies of, or unrestricted access to, copies of this plan. SES's subcontractors will be required to comply with the requirements of this plan. This plan does not relieve subcontractors of the regulatory requirement to provide a safe workplace, and SES subcontractors will be required to supplement the requirements of this plan, as necessary, to ensure that their employees perform their specific tasks safely.

This document is designed to satisfy the requirements of EM 385-1-1, *Safety and Health Requirements Manual* [U.S. Army Corps of Engineers (USACE), September 2008 (updated July 2012)]; relevant Occupational Safety and Health Administration (OSHA) regulations; and the *SpecPro Environmental Services LLC Safety and Health Program Manual* (SES, June 2009).

1. SIGNATURE SHEET

The signature page is included on page 1 of this document.

2. BACKGROUND INFORMATION

2.a. Contractor: SpecPro Environmental Services LLC (SES).

2.b. Contract Number: W912HN-10-D-0001, Delivery Order No. 0029.

2.c. Project Name: Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia.

2.d. Project Description: Fort Stewart is in portions of Long, Evans, Tattnall, Bryan, and Liberty counties, Georgia, approximately 40 miles southwest of Savannah, Georgia. The nearest city is Hinesville, approximately 1½ miles to the south (Figure 2-1). Building 419 is near the intersection of Hero Road and Steele Avenue in the PX complex. According to information obtained from the fuel delivery inventory, 4,500 gallons of heating oil were released into the ground behind Building 419 and Steele Avenue on the west side of the loading dock. Heating oil (known in the United States as No. 2 heating oil) is similar to diesel fuel, and both are classified as distillates. For this investigation and cleanup, the heating oil will be categorized as a diesel range organic (DRO), and personal protection measures will be designed accordingly. Soil samples will be analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX); DRO; and polynuclear aromatic hydrocarbons (PAHs). Figure 2-2 is the project location map.



LEGEND

Site Location

Job Title: Heating Oil Spill Site
Investigation Building 419
Fort Stewart, Georgia
Data Source: Ft. Stewart GIS

Figure 2-1 Site Location Map

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r:\projects\E0209\E0209.0029\graphics\Figure 2-2 Project Location Map (APP).mxd

E0209.0029

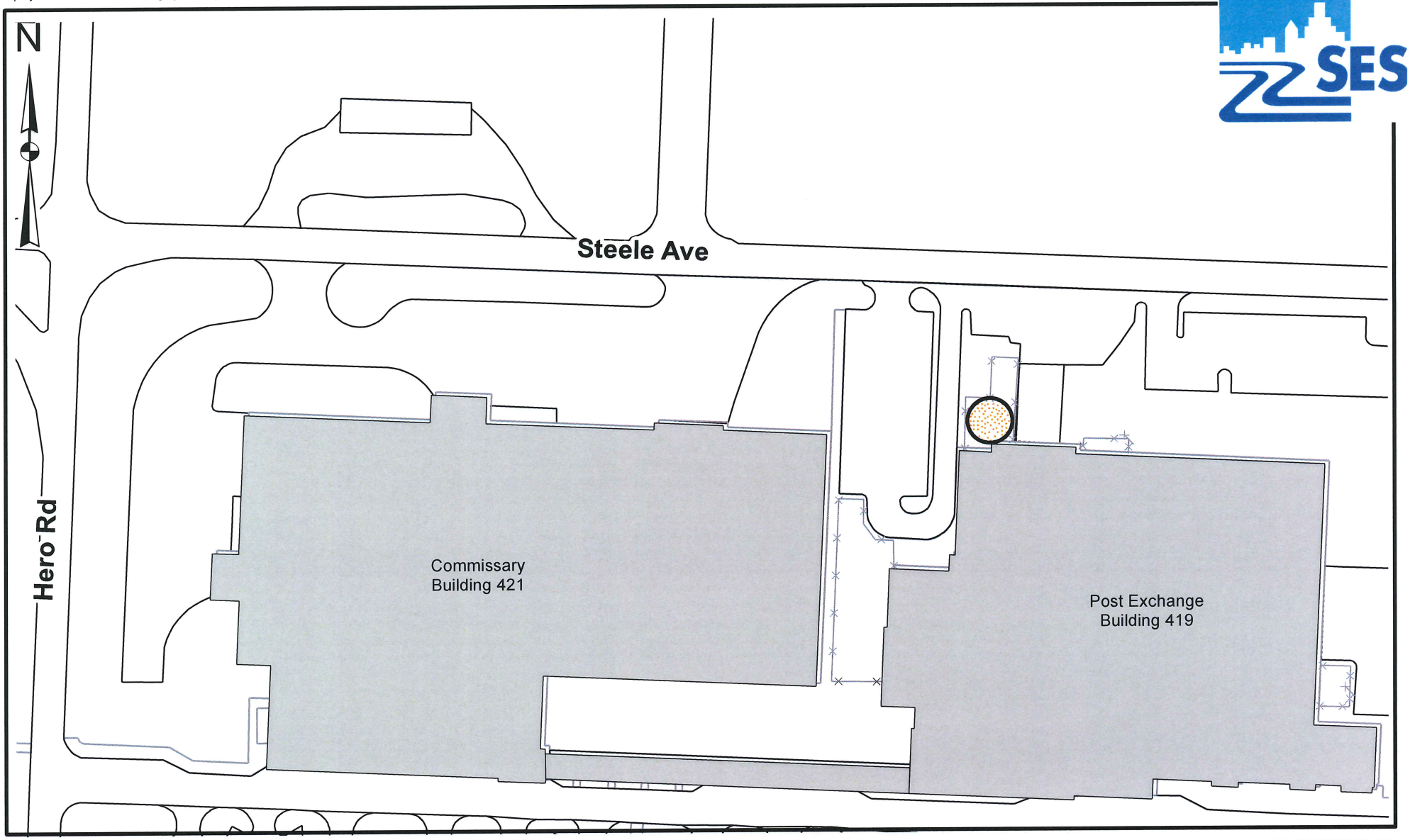

Figure 2-2 Project Location Map

6/28/13

SES will conduct further delineation at the project site by installing additional soil borings and groundwater wells and then removing free product. This should provide data to develop state of Georgia required reports.

A two-day pilot test and free product removal will be conducted to determine the most effective way to remove the free product and depress the water table to limit the amount of groundwater extracted. The pilot test will help determine the surfactant injection volumes, locations, and sequence; the location of additional treatment wells; the potential need for additional multiphase extraction events; and the duration of the surfactant injection/capture events. The objective of the pilot study is to identify the surfactant systems that would be best-suited to remove the free product.

After the completion of the pilot study, two additional multiphase extraction events will be required prior to the surfactant injection. A maximum of seven eight-hour surfactant injection/capture events will be conducted at a maximum of four groundwater monitor wells on site. Organic vapor monitoring equipment will be used to record the concentrations of recovered volatiles. Groundwater and free product measurements will be recorded before and after each event. The groundwater containing free product will be disposed of at an off-site facility and will not be stored at Fort Stewart.

Under this scope of work, SES and its subcontractors will

- Install soil borings and groundwater monitor wells,
- Collect soil samples from the borings,
- Collect groundwater samples,
- Conduct free product removal,
- Conduct a two-year groundwater monitoring program, and
- Properly store and dispose of the investigative-derived waste.

3. STATEMENT OF SAFETY AND HEALTH POLICY

SES's commitment to excellence in the areas of health and safety performance is consistent with the company's goal of being acknowledged as an industry leader. As such, SES is committed to the following principles.

- **Zero incidents:** SES has adopted a "zero incidents" safety culture approach to project safety. The term *Focus Zero* represents this desired safety culture. The key ingredient to establishing a *Focus Zero* culture is leadership. Demonstrated leadership in support of safety and health from the chief executive officer, program management, and operations is essential to the success of achieving this culture. To project a strong outward safety and health culture, SES believes that a strong internal culture must be established and supported. *Focus Zero* means that every employee must take responsibility to achieve
    - Zero Incidents (injuries and illnesses, property damage, and serious near misses),
    - Zero Adverse Impacts (environmental stewardship), and
    - Zero Errors and Omissions (first-time quality).

  Focus Zero reflects the philosophy of continual improvement. When an incident occurs, it is evaluated, system corrections are made, and the process starts over, focusing on the ultimate drive toward zero.

  The *Focus Zero* safety culture emphasis is to be communicated, encouraged, and adopted for subcontractor workers on each and every SES project as well.

- **Decision-making:** SES makes health and safety concerns an integral part of corporate decision-making. All strategic and operational decision-making take into account health and safety implications.
- **Compliance**: SES complies with all applicable health and safety laws and regulations. Health and safety programs have been established and are maintained. Audits are conducted to assess compliance with laws and regulations as well as these principles.
- **Communication with employees:** SES promotes among its employees an individual and collective sense of responsibility to protect health and safety through daily safety briefings, monthly safety coordination meetings, and periodic distribution of relevant safety and lessons learned bulletins.
- **Subcontractor selection:** SES preferentially selects subcontractors with excellent safety programs that demonstrate a commitment to the principles of worker safety and health.
- **Measurement of performance:** SES maintains metrics to measure both current and future health and safety performance in meeting these principles.
- **Risk management:** SES integrates risk management principles into all areas of project delivery through identifying and analyzing hazards, identifying control measures, determining associated risk by assessing the likelihood of failure of the control measures and the potential consequences of injury or damage, and reviewing the principles of control to ensure that the risk of performing any task is either eliminated or reduced to a tolerable level.
- **Responsibility:** All SES employees are empowered to take the necessary means to protect their personal safety as well as that of their co-workers. SES employees are responsible for complying with safety requirements as well as bringing safety concerns to the attention of management.
- **Safety goals**: SES's project safety goal is to complete the project and all associated activities with no recordable accidents or illnesses and no first aid incidents. The SES Human Resources Department maintains all accident records.

SES believes that all work-related accidents are preventable. The safety of our workers holds the same priority as production and client satisfaction.

Company management, field supervisors, and employees plan safety into each work task to prevent occupational injuries and illnesses. The ultimate success of SES's safety program depends on the full cooperation and participation of each employee.

SES management extends its full commitment to health and safety excellence to protect our most valued asset: our employees.

4. RESPONSIBILITIES AND LINES OF AUTHORITY

4.a. SES's Responsibility for Safety: SES is ultimately responsible for the implementation of its health and safety program during the performance of this project work. In accordance with the Occupational Safety and Health Administration (OSHA) General Duty Clause, SES is committed to providing each of our employees with a place of employment free from recognized hazards that are causing or are likely to cause death or serious physical harm to them. SES will make every good faith effort to comply with EM 385-1-1, *Safety and Health Requirements Manual*; OSHA regulations; and referenced standards. In turn, each employee is expected to and shall be required to comply with SES rules as well as occupational safety and health standards based on the OSHA regulations.

SES has established the policies and procedures set forth in its program to

- Provide a safe and healthful work environment for all SES employees and subcontractors;
- Prevent or minimize occupational injuries and illnesses;

- Eliminate damage to equipment and property; and
- Comply with all applicable Federal, state, local, and consensus safety and health standards.

SES's General Safety Program provides steps to protect the safety and health of our employees. This program is intended to provide safety-related tools and guidance for all employees as well as provide essential elements of regulatory and internal requirements.

This program includes general safety procedures and requirements, as well as specific written programs to address actual or potential workplace hazards. It may be necessary during certain circumstances to consult appropriate OSHA regulations for more specific information.

The corporate *Safety and Health Program Manual* (S&H Manual) is one tool necessary to achieve SES's health and safety program objectives. The manual, however, cannot ensure a safe and healthful work environment by itself. *The responsibility of conducting work in a manner that ensures our well-being and that of co-workers, clients, and the general public rests with management at all levels as well as each individual employee. Managers and site supervisory personnel will be held accountable for the successful implementation of program and project safety and health requirements and results for projects under their direction. Project management and supervision personnel's annual review includes an evaluation of their administration, implementation, and compliance with the corporate Safety and Health Program. This evaluation and their dedication to the advancement of the safety culture are factored into any annual merit increase they may receive.*

4.b. Personnel Responsible for Safety: This section presents the lines of authority, responsibilities, and communication procedures related to site safety and health and emergency response. It includes key SES and subcontractor personnel. All fieldwork will be under the supervision of the SES field manager. The SES field manager will oversee normal and emergency work and will perform any required emergency notification. Table 4-1 identifies the individuals who will fill key roles for the project field activities. Resumes of the key personnel are in Attachment 5.

The key personnel assigned to the field activity positions in Table 4-1 represent those individuals who are expected to participate in the project. If personnel other than those presented in Table 4-1 are assigned to the project, SES will submit an amendment to this APP providing the names of these individuals for acceptance by the USACE Savannah District Government Designated Authority (GDA) prior to mobilization.

The USACE Savannah District GDA for this project is Ana Vergara, contracting officer's representative (COR) and project manager, (912) 652-5835. The technical manager is Zsolt Haverland, (912) 652-5815.

Table 4-1 Staff Organization

Position	Name	Telephone
Senior Program Manager	Jim Madaj	(865) 481-7837
Safety and Health Manager	Rich Rathnow, CIH, CSP	(865) 481-7837
Project Manager	Doug Hawn	(865) 481-7837
Field Manager	Chris Napoleon	(865) 360-9910
SSHO*	Chris Napoleon	(865) 360-9910
Alternate SSHO	LeAnn McNeal	(912) 660-4782

CIH = Certified Industrial Hygienist
CSP = Certified Safety Professional
SSHO = Site Safety and Health Officer

No work shall be performed unless a designated competent person is present on the job site.

4.b.1 SES Senior Program Manager

SES Senior Program Manager Jim Madaj is the primary interface with the client and has ultimate responsibility for the project. The senior program manager provides progress reports and addresses client questions and concerns. In addition, he is responsible for ensuring conformance with the SES safety and health program and USACE policies and procedures. Specific responsibilities of the senior program manager include the following:

- Coordinating with USACE personnel,
- Ensuring that project managers satisfy SES and USACE health and safety requirements,
- Ensuring that project staff implement project APPs, and
- Ensuring that projects have the resources necessary to operate safely.

4.b.2 SES Safety and Health Manager

SES Safety and Health Manager Rich Rathnow, CIH, CSP, oversees the SES safety and health program. This includes establishing health and safety policies and procedures, supporting project and office activities, and verifying safe work practices and conditions. The SES safety and health manager is certified in the comprehensive practice of industrial hygiene by the American Board of Industrial Hygiene and has more than 20 years of hazardous waste experience. The specific responsibilities of the safety and health manager include the following:

- Coordinating with USACE health and safety personnel,
- Reviewing and approving APPs,
- Approving downgrades in personal protective equipment (PPE) or protective procedures, and
- Collaborating with project personnel through routine communication and audit of selected projects.

4.b.3 SES Project Manager

SES Project Manager Doug Hawn is responsible for overall project execution. The responsibilities of the project manager include the following:

- Coordinating with USACE personnel (including reporting accidents and incidents to the USACE Savannah District project manager immediately and submitting written reports within five working days),
- Ensuring implementation of the project APP,
- Maintaining auditable project documentation of all required records,
- Ensuring that a qualified SSHO is designated, and
- Maintaining a current copy of the project APP.

4.b.4 SES Field Manager

SES Field Manager Chris Napoleon is in charge of all SES and subcontractor field activities associated with this project. All SES and subcontractor personnel performing fieldwork on this project must report to the field manager.

The SES field manager will be responsible for site accessibility, safety, and quality assurance. The field manager is responsible for enforcing the field requirements of this APP. Specific responsibilities of the field manager are

- Enforcing compliance with the project APP;
- Coordinating on-site operations, including subcontractor activities;
- Ensuring that subcontractors follow the requirements of this APP;
- Coordinating and controlling any emergency response actions;
- Ensuring that at least two people currently certified in first aid/cardiopulmonary resuscitation (CPR) and bloodborne pathogens are on site during site operations;
- Performing a daily safety inspection and documenting the inspection on the daily safety inspection form (or ensuring that this inspection is performed); and
- Maintaining current copies of the project APP; EM 385-1-1, *Safety and Health Requirements Manual* [USACE, September 2008 (updated July 2012)]; and the SES S&H Manual (SES, June 2009) on site.

4.b.5 Site Safety and Health Officer

SES SSHO Chris Napoleon will serve as the appointed competent person as required by EM 385-1-1, September 2008 (updated July 2012), Section 01.A.17. The SSHO will be on site during all fieldwork activities. The SSHO is responsible for making safety and health decisions, for specific safety and health activities, and for verifying the effectiveness of the safety and health program. The SSHO's qualifications include at a minimum, completion of the OSHA 30 Hour Construction Safety course, five years of experience with similar projects, knowledge and understanding of the project APP, 24 hours of ongoing continued education every four years, and the ability to use required monitoring equipment. The SSHO has primary responsibility for the following:

- Implementing and verifying compliance with this APP and reporting to the project manager and safety and health manager any deviations from anticipated conditions;
- Conducting and documenting daily safety inspections;
- Stopping work or upgrading protective measures (including protective clothing) with the approval of the safety and health manager if uncontrolled safety and health hazards are encountered (Indications of uncontrolled safety and health hazards include monitoring instrument readings higher than established action limits, encountering liquids other than water, and soil staining suggestive of unexpectedly high concentrations of nonvolatile contaminants.);
- Authorizing resumption of work after adverse conditions have been corrected;
- Completing the safety and health debriefing based on SES S&H Manual Section 8.0, "Tool Box Safety Meetings";
- Documenting deficiencies listed in the daily inspections and identifying responsible parties, procedures, and timetables for correction;
- Ensuring that site personnel have access to this plan and are aware of its provisions;
- Conducting a site-specific pre-entry safety and health briefing covering potential chemical and physical hazards, safe work practices, and emergency procedures;
- Maintaining on-site auditable documentation of
    - Material safety data sheets (MSDSs) for applicable materials used at the site;
    - Training for site workers and visitors;
    - Calibration/maintenance of field instruments, such as photoionization detectors, flame ionization detectors, or combustible gas indicators;
    - Environmental and personal exposure monitoring results as applicable; and
    - Notification of accidents/incidents.

- Confirming that all on-site personnel have received the training listed in Section 6 of this APP; and
- Issuing respirators as necessary and ensuring that all respirator users have received medical clearance.

4.c. Competent Person: SES SSHO Chris Napoleon will serve as the designated competent person as required by EM 385-1-1, September 2008 (updated July 2012), Section 01.A.17. His resume is in Attachment 5.

Mr. Napoleon has completed the OSHA 30 Hour Construction Industry Outreach Training (Attachment 3) as required by the USACE and has the experience and training to fulfill this role for this project. In addition to his hydrogeology background, his training, and experience, he has the authority to manage, implement, and enforce the SES APP and safety and health program, including any corrective actions for any construction hazards or safety concerns that arise during the course of this project work. . This includes the authority to remove personnel from the project site as deemed necessary for flagrant violation of safety policy or endangering themselves and/or others. The competent person/SSHO assignment letter is in Attachment 5, and a copy of Mr. Napoleon's OSHA 30 Hour certification is in Attachment 3.

In his absence, alternate SSHO LeAnn McNeal will serve as the designated competent person as required by EM 385-1-1, September 2008 (updated July 2012), Section 01.A.17. Her resume and assignment letter are in Attachment 5, and a copy of her OSHA 30 Hour certification is in Attachment 3.

4.d. No work shall be performed unless a designated and qualified competent person is present on the job site.

4.e. Requirements for Pre-Task Safety and Health Analysis: A pre-task-specific safety and health analysis is required for this project. An activity hazard analysis (AHA) has been performed as required for all major phases of work prior to the task being started at the project site. A pre-task safety and health analysis has been performed as required for the following features of work:

- Mobilizing,
- Installing soil borings and monitor wells,
- Collecting soil samples from the borings,
- Collecting groundwater samples,
- Conducting multiphase extraction events,
- Properly storing and disposing of the investigative-derived waste (IDW), and
- Demobilizing.

For all phases of the hazard analysis, the corporate safety and health manager considered the various methods for mitigating the hazards. Employees will be trained on this hierarchy of controls during their safety training and reminded of them throughout fieldwork on the project.

- Elimination of the hazards (use remote sampling methodology to avoid going into a confined space);
- Substitution (reduce exposure to vapors by using a Geoprobe instead of test pitting);
- Engineering controls (ventilate a confined space to improve air quality);
- Warnings (establish exclusion zones to keep untrained people away from hazardous waste work);
- Administrative controls (implement a work-rest schedule to reduce the chance of heat stress); and
- Use of PPE (use respirators when action levels are exceeded).

The SSHO identifies, analyzes, and reviews hazards and hazard control measures with the field crew in the daily pre-task safety meetings prior to work being performed.

Site tasks present some possible physical hazards, which include heavy equipment, moving equipment, vehicle accidents, minimal contaminant exposure, and inclement weather. However, precautionary measures will be communicated to site workers relating to any potential for such items. If additional tasks or significant hazards are encountered during the work, work will stop and this document will be modified by addendum or field change order to include the additional information.

4.e.1 Activity Hazard Analysis

An AHA must be developed before any phase of work is initiated in the field. An AHA defines the activity being performed, the hazards posed, and control measures required to perform the work safely. Workers are briefed on the AHA before doing the work, and their input is solicited prior to, during, and after the performance of work to further identify the hazards posed and control measures required. The AHA shall identify the work tasks required to perform each activity, along with potential safety and health hazards and recommended control measures for each hazard. In addition, a listing of the equipment to be used to perform the activity, inspection requirements, and training requirements for the safe operation of the equipment listed must be identified. AHAs have been prepared for SES activities and are attached to this APP.

Subcontractor AHAs

SES subcontractors are required to provide AHAs specific to their scope of work on the project for acceptance by SES. Each subcontractor shall submit AHAs for its field activities, as defined in the work plan/ scope of work, along with the project-specific safety plan/procedures. Additions or changes in field activities, equipment, tools, or material used to perform work or hazards not addressed in existing AHAs requires either a new AHA to be prepared or an existing AHA to be revised and then communicated to all affected workers.

4.f. Lines of Authority: The SES corporate safety and health manager administers the health and safety program. Figure 4-1 is an organizational chart identifying the line of authority for corporate health and safety structure.

The USACE Savannah District GDA for this project is Ana Vergara, COR and project manager, (912) 652-5835. The technical manager is Zsolt Haverland, (912) 652-5815.

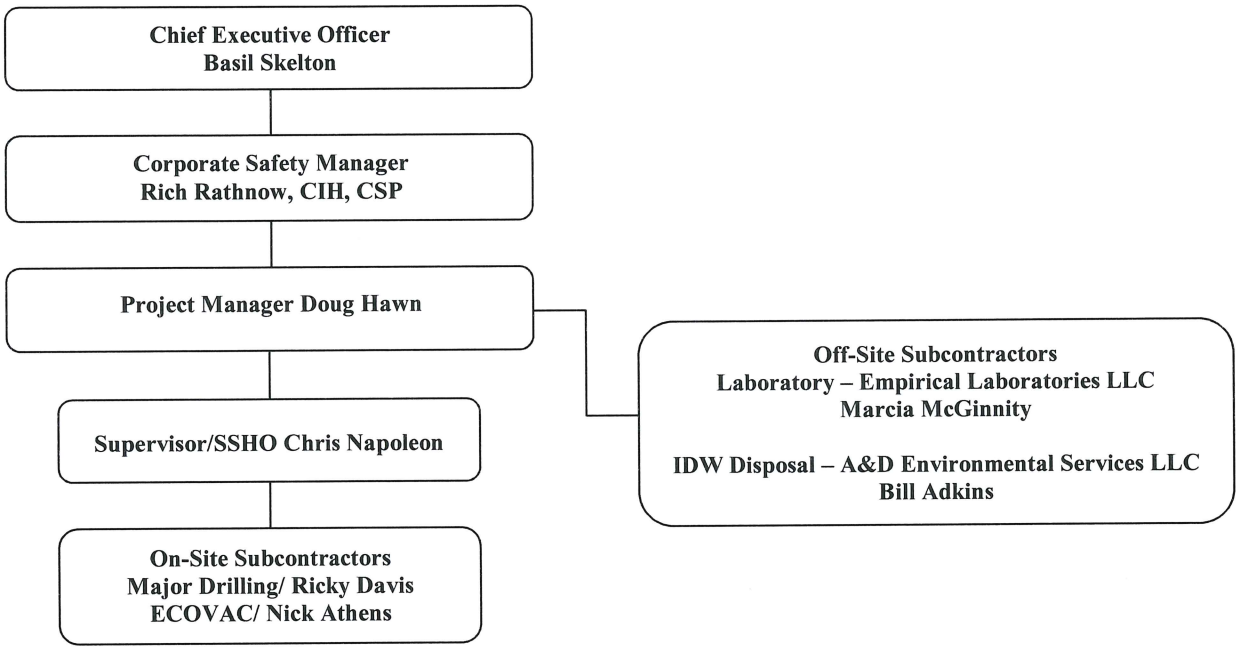

Figure 4-1 Project Safety Program Line of Authority

As deemed necessary, the SSHO/supervisor has the authority to correct flagrant violations of safety policy and to remove personnel from the project site if they flagrantly violate safety policy or endanger themselves or others. The disciplinary process will then be implemented according to SES policy.

The CEO has the overall responsibility and overall authority for all aspects of the corporate safety and health program and its implementation.

The corporate safety and health manager reports directly to the CEO and has the authority delegated by the CEO for all actions necessary to effectively implement the corporate safety and health program on all projects.

The project manager has the responsibility to implement the safety and health program at the project level and has the authority to make decisions and take actions relating to the effective implementation of the program in coordination with the corporate safety and health manager.

The project supervisor is delegated the responsibility and authority for implementation of the safety program by the project manager. The project supervisor may also hold the SSHO responsibility on some projects depending on project scope and size. If the project supervisor does not serve as the SSHO, then the two work together closely and ensure that project safety is carried out in accordance with all regulatory requirements and in accordance with the APP. This individual has the authority to make day-to-day decisions about the implementation of the S&H program on the project.

The SSHO has the authority to correct any and all health and safety hazards and unsafe conditions on the project site. The SSHO in the role of competent person has the authority to stop aspects of the project work as warranted if he/she deems a condition at the work site is a hazard to site workers, the client, or the public. The SSHO in the role of competent person also has the authority to remove personnel from the project for flagrant violations of safety policy or for reckless behavior that endangers themselves or others. The SSHO works in cooperation and close communication with the corporate safety and health manager.

4.g. Policies and Procedures for Noncompliance: Noncompliance with safety and health requirements will be corrected immediately as designated by on-site supervisory personnel. Documentation will be made in the logbook. The site manager or SSHO will report serious, noncompliant personnel to the immediate supervisor. The supervisor shall counsel the employee.

SES complies with all Federal, state, and local safety and health regulations. SES also has instituted internal requirements to help reduce the potential for accidents or illnesses. All employees are expected to follow safe work practices, to take responsibility for their own safety, and to respect the safety of others. SES's safety management approach attempts to motivate employees to work safely rather than punish them for unsafe behaviors, but there may be instances where disciplinary action is necessary.

Any personnel not abiding by regulatory or internal safety rules or policies will be subject to progressive discipline. The general approach to progressive discipline includes the following steps.

- First offense – documented verbal warning,
- Second offense – written warning,
- Third offense – three days suspension without pay, and
- Fourth offense – termination.

The supervisor will document disciplinary actions, and a notice will be placed in the individual's personnel record.

Depending on the nature, severity, or frequency of safety violations, and at SES's sole discretion, individual or multiple steps in this progressive discipline approach may be bypassed with potential actions up to or including termination on the first offense.

4.h. Supervisory Accountability for Safety: The responsibility of conducting work in a manner that ensures our well-being and that of co-workers, clients, and the general public rests with management at all levels as well as each individual employee. Managers and site supervisory personnel will be held accountable for the successful implementation of program and project safety and health requirements and results for projects under their direction.

5. SUBCONTRACTORS AND SUPPLIERS

5.a. Identification of Subcontractors: Major Drilling LLC will be the on-site drilling contractor, and ECOVAC will perform free product removal at the site. Contact information is available in Table 5-1.

Table 5-1 Subcontractor Contacts

Subcontractor	Role	Contact	Phone Number
Major Drilling	Drilling	Ricky Davis	(256) 852-7000
ECOVAC	Free product removal	Nick Athens	(770) 592-1001

5.b. Safety Responsibilities of Subcontractors: The subcontractor field manager will oversee the field activities of the subcontractor employees. He/she is responsible for enforcing the field requirements of this APP and has the following responsibilities:

- Ensuring that subcontract personnel follow the requirements of the APP and any other applicable safety and health requirements,
- Verifying that this APP adequately addresses the hazards and controls of the subcontracted work,
- Ensuring the safe operation of subcontractor equipment,

- Coordinating the on-site operations of subcontract personnel, and
- Maintaining any required documentation specific to subcontract operations.

SES subcontractors will be informed of the requirements of this plan and will be provided with copies of or unrestricted access to copies of this plan. SES's subcontractors will be required to review, understand, and sign off acknowledging and accepting the duty to comply with the requirements of this plan. This plan does not relieve subcontractors of the regulatory requirement to provide a safe workplace, and SES subcontractors will be required to supplement the requirements of this plan as necessary to ensure that their employees perform their specific tasks safely.

6. TRAINING

6.a. New Hire Safety and Occupational Health Training: SES employees will be provided with safety and health orientation training by a qualified person before the start of work. All workers will receive continuous safety and health training to enable them to perform their work safely. All trainings, meetings, and indoctrinations will be documented in writing, including the date of the training, the worker's name, content of training, and name of trainer.

Indoctrination and training will be based upon the SES safety and health program and will include but not be limited to

- Requirements and responsibilities for accident prevention and maintenance of safe and healthful work environments;
- General safety and health policies and procedures and pertinent provisions of this plan;
- Employee and supervisor responsibilities for reporting all accidents;
- Provisions for medical facilities and emergency response and procedures for obtaining medical treatment or emergency assistance;
- Procedures for reporting and correcting unsafe conditions or practices;
- Job hazards and the means to control/eliminate those hazards, including applicable AHAs; and
- Specific training as required by USACE EM 385-1-1.

Personnel who participate in field activities associated with this project or who enter areas controlled by SES are subject to the training requirements in Table 6-1. Field activities include all tasks specified in Section 2d of this plan as well as any unspecified tasks that take place within the work area. Activities such as driving or walking on paved roads, performing paperwork or attending meetings inside routinely occupied buildings, and performing paperwork or similar activities inside office trailers are not subject to these training requirements. Casual visitors who access only the office or staging areas of the support zone are not subject to these training requirements; however, they MUST be briefed by a qualified person on the hazards to be expected on site and the safety and health controls required.

6.b. Mandatory Safety Training

Table 6-1 Training Requirements

Training	Worker[a]	Worker[b]	SSHO	Site Visitor[c]
40-Hour HAZWOPER	N	Y	Y	N
HAZWOPER Annual Refresher (8 hours)	N	Y	Y	N
HAZWOPER Supervisor (8 hours)	N	N	Y	N
30 Hour OSHA Construction Safety Training	N	N	Y	N
Hazard Communication	N	Y	Y	N
Hearing Conservation	N/Y	Y	Y	N
Respiratory Protection	N	2 workers	N	Y
Pre-Entry Briefing	Y	Y	Y	Y
Safety Briefing	Y	Y	Y	N
PPE	N	Y	Y	N
First Aid/CPR	2 workers	2 workers	N	N
Bloodborne Pathogens	2 workers	2 workers	N	N

Note: For the purposes of this table, the SSHO is considered a site worker.
[a]Workers performing nonintrusive tasks under conditions that present no possibility of exposure to hazardous waste or chemicals. This includes surveyors and USACE personnel who enter the site after closure. If workers are exposed to noise levels above 85 dBA, they must be enrolled in a hearing conservation program.
[b]Workers performing tasks inside SES-controlled areas under conditions that pose a potential risk of exposure to hazardous waste or chemicals. This includes all SES personnel and subcontractors performing work as part of the project, vendors, and similar personnel.
[c]Vendors and similar personnel
CPR = cardiopulmonary resuscitation
HAZWOPER = hazardous waste operations and emergency response
PPE = personal protective equipment
SSHO = site safety and health officer

6.c. Procedures for Periodic Safety and Health Training for Supervisors and Employees: The following sections present brief summaries of training requirements and retraining intervals as applicable.

6.c.1 Off-Site Training

The 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) course is required for general site workers engaged in hazardous, toxic, and radioactive waste activities that expose or potentially expose them to hazardous substances. Three days of relevant field experience are required in conjunction with this training.

The eight-hour HAZWOPER refresher is required annually to maintain currency in the above course.

HAZWOPER supervisor training is required for personnel who directly supervise hazardous waste site workers. This is an eight-hour course that must be taken once. The 40-hour course is a prerequisite for this training. As per 29 *Code of Federal Regulations* (CFR) 1910.120(e)(4), the HAZWOPER supervisor course covers the following topics:

- Site Safety and Health Officer Responsibilities,
- Site Safety and Health Plan Elements and Implementation;
- Direct Reading Instruments, Their Operation, Use, and Limitations;
- Equipment Calibration;
- Personal Protective Equipment Uses and Limitations and Respirator Selection;

- Safety Briefings and Effective Site Safety Communications; and
- Site Safety and Health Plan Management.

Competent Person/SSHO Construction Safety Training

30 Hour OSHA Construction Safety Training is required by EM 385-1-1 [September 2008 (updated July 2012)] for an individual to serve as the site construction safety competent person and as the SSHO with 24 hours of ongoing continued education every four years. The training requires the following content:

- Occupational Safety and Health Act/General Duty Clause;
- 29 CFR 1904, "Record Keeping";
- Subpart C: "General Safety and Health Provisions, Competent Person";
- Subpart D: "Occupational Health and Environmental Controls, Citations and Safety Programs";
- Subpart E: "PPE, Types and Requirements for Use";
- Subpart F: "Understanding Fire Protection in the Workplace";
- Subpart K: "Electrical";
- Subpart M: "Fall Protection"; and
- Rigging, welding and cutting, scaffolding, excavations, concrete and masonry, demolition, health hazards in construction, materials handling, storage and disposal, hand and power tools, motor vehicles, mechanized equipment, marine operations, steel erection, stairways and ladders, confined spaces, or any others that are applicable to the work being performed.

Hazard communication is required for all site workers. This training is designed to inform personnel of the characteristics of chemicals with which they will be working, the hazards presented by those chemicals, and methods of protection from exposure to the chemicals. This initial generalized training is supplemented by training on site-specific chemicals.

Hearing conservation is required annually for all employees enrolled in a hearing conservation program as mandated by 29 CFR 1910.95. This includes all employees exposed to occupational noise in excess of 85 dBA as a time-weighted average.

Respiratory protection is required for all workers who wear respirators. This training requirement is met by taking the 40-hour HAZWOPER course initially and then refreshed annually during the eight-hour refresher.

6.c.2 Site-Specific Training

On-site personnel must receive site-specific training. Site workers will receive information on site hazards, hazard controls, and emergency procedures. Visitors will receive information that is relevant to the purpose of their visit. Signatures of those attending and the type of briefing must be entered into the field logbook before site access will be granted. Site-specific training will include the following information, as appropriate:

- Names of health and safety personnel,
- Contents of the project APP,
- Hazards and symptoms of chemical exposure,
- Physical hazards on the site,
- Location and availability of the Hazard Communication Program documents,
- Site- and task-specific PPE,
- Safe work practices,
- Safe use of engineering controls and equipment,

- Medical surveillance requirements,
- Site control measures,
- Reporting requirements for spills and emergencies,
- Personnel decontamination procedures,
- Contingency plans, and
- Emergency equipment.

6.c.3 Pretask Safety Plan

Safety briefings will be held daily before the start of work activities and whenever conditions at the site change. The field manager or the SSHO will conduct these, and the briefings will be required for all site workers. These briefings will address site- and task-specific safety hazards and control measures and issues and will be used to refresh and train workers on specific procedures and controls.

6.d. Emergency Response Training: All site workers will be trained during the site orientation and project safety briefing session on emergency procedures to be followed specifically pertaining to this project. The training will include recognizing emergencies, reporting emergencies, and responding to emergencies, including the location of first aid and firefighting equipment as well as the assembly areas for accountability when an emergency notification is broadcasted.

The SSHO or field manager will designate the evacuation routes and assembly areas and emphasize these during the project orientation and safety briefing meeting. The routes and assembly areas will be posted on the central job board as well. All employees will be required to be familiar with these routes and assembly areas. These procedures will be reviewed and documented periodically during the daily pre-task safety plan sessions. Additional emergency response training will be conducted as identified in accordance with the requirements in Section 9.b.

7. SAFETY AND HEALTH INSPECTIONS

7.a. Safety Inspection Personnel: The SSHO serving as the competent person (qualifications, resume, and assignment thereof provided in the attachments) will conduct ***daily and weekly*** site safety inspections of the work site, material, and equipment. These inspections/audits shall be documented in writing and available upon request to the GDA. They shall include the name of the inspector, date, and all findings.

Identified safety and health issues and deficiencies and the actions, timetable, and responsibility for correcting the deficiencies will be recorded in inspection reports. Follow-up inspections to ensure correction of any identified deficiencies will be conducted and documented in inspection reports.

SES has established a safety and occupational health deficiency tracking system that lists and monitors the status of safety and health deficiencies in chronological order.

The list shall be posted on the project safety bulletin board, be updated daily, and provide the following information:

1. Date deficiency was identified,
2. Description of deficiency,
3. Name of person responsible for correcting deficiency,
4. Projected resolution date, and
5. Date actually resolved.

7.b. External Inspections/Certifications: SES will immediately notify the GDA of any OSHA or other regulatory agency inspection and provide the GDA an opportunity to accompany SES on the inspection. (The inspection will not be delayed if the GDA is unavailable.) SES will provide the GDA with a copy of any citations or reports issued by inspector and any corrective action responses to the citation(s) or report(s).

The corporate safety and health manager may make announced or unannounced site visits. The corporate safety and health manager also performs a quarterly review of all projects to ensure the proper documentation and follow-up of safety meetings, inspections, and briefings.

The SES SSHO will accommodate all USACE, U.S. Coast Guard, or other applicable inspection agencies as necessary to ensure that project compliance is maintained for all activities.

8. ACCIDENT REPORTING

8.a. Exposure/Man-Hours: Mr. Doug Hawn (SES) will provide monthly reporting of man-hours and exposure data per EM 385-1-1 01.D.05 and contract requirements.

8.b. Accident Investigations, Reports, and Logs: SES will thoroughly investigate all accidents as required and submit findings/results and appropriate corrective actions to the contracting officer (CO)/ COR in the prescribed format as soon as possible but no later than five working days after the accident. SES will report all accidents as required to the CO/COR as soon as possible but not more than 24 hours later. Corrective actions must be implemented and tracked to closure as soon as reasonably possible.

The field manager and SSHO will initiate and coordinate all site incident investigations. Subcontractor safety contacts are to be engaged and involved in all site investigations involving subcontractor personnel or equipment. All subcontractor incidents must be reported as soon as practically possible if not immediately to SES, depending on circumstances surrounding the incident. Subcontractors must submit an initial written incident report to the SES site representative within eight hours of the incident.

8.c. Accident Notification: The following specific incidents require immediate incident notification to the CO/COR:

1. A fatal injury,
2. A permanent total disability,
3. A permanent partial disability,
4. The hospitalization of three or more people resulting from a single occurrence, or
5. Property damage of $200,000 or more.

The SSHO shall immediately report the following information to the safety and health manager and project manager by phone and e-mail (Figure 8-1):

- Project name/site manager,
- Date and time of incident,
- Description of incident,
- Extent of known injuries/damage,
- Level of medical attention, and
- Preliminary root cause/corrective actions.

The SES team shall comply with all applicable statutory incident reporting requirements such as those to OSHA and the police.

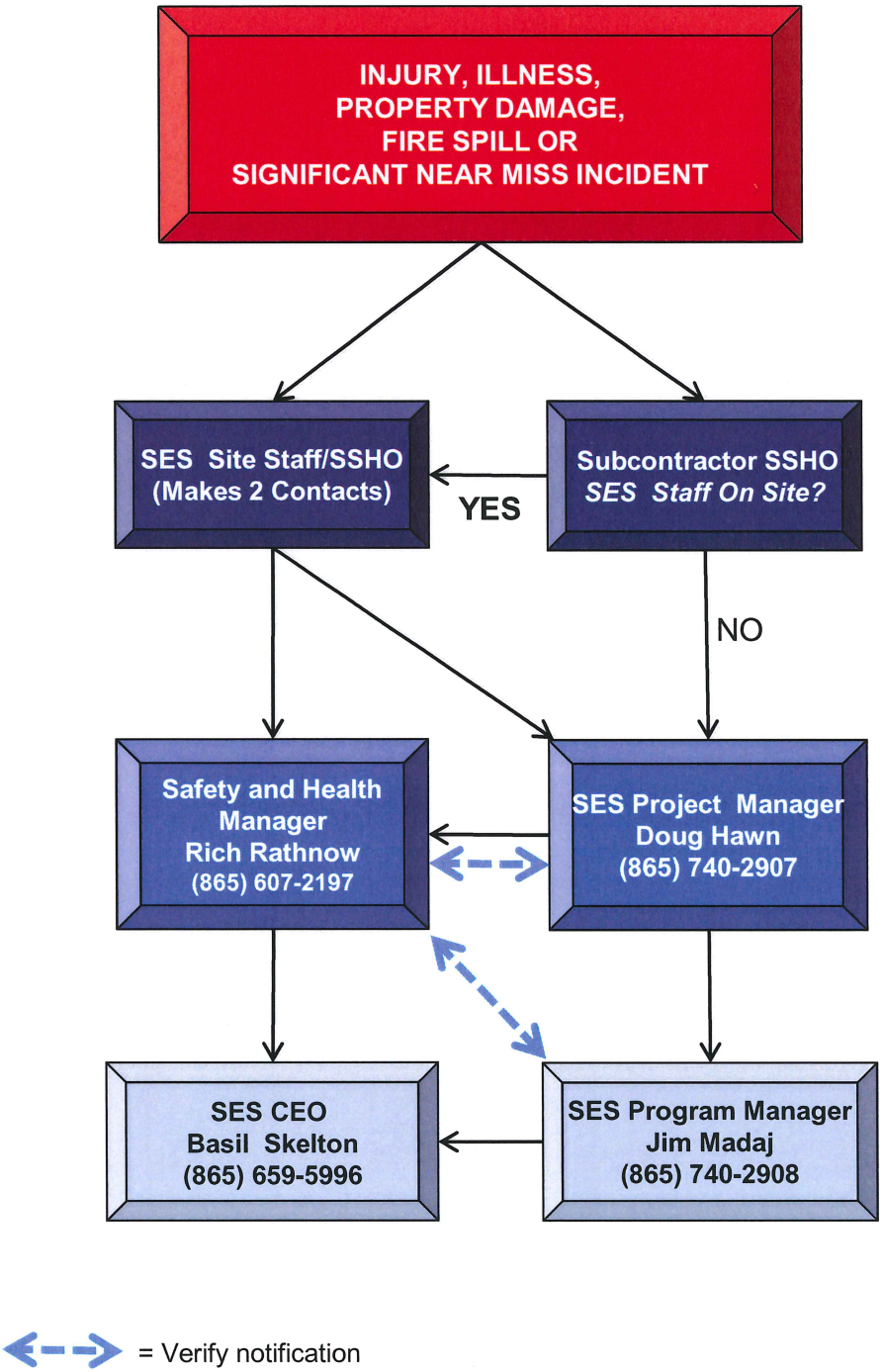

Figure 8-1 SES Incident Reporting Process

9. PLANS, PROGRAMS AND PROCEDURES REQUIRED BY THE SAFETY MANUAL

The following elements of the SES S&H program will be used to manage project-specific occupational risks. EM 385-1-1, *Safety and Health Requirements Manual* [September 2008 (updated July 2012)] is used as a guide for the development and inclusion of these plans.

9.a. Layout Plans: A layout plan is not required because the elements described relating to temporary facilities are not applicable to this project scope of work. SES will be working out of field vehicles for this project.

9.b. Emergency Response Plans

9.b.1 Procedures and Tests

SES has developed and will implement a project emergency plan to ensure employee safety in case of fire or other emergency. The plan is below and will be reviewed with all affected project employees.

This emergency plan will be tested. A discussion below is included as to how the plan will be tested to ensure effectiveness.

Escape Procedures and Routes

The assembly area and evacuation routes are in Figure 9-1. All employees will be familiar with these routes and assembly areas. ***An initial test*** and monthly review of this process and the designated assembly areas will be conducted.

- Evacuation routes and assembly areas will be explained to workers at the start of fieldwork.
- The SSHO will designate evacuation route(s) and assembly area(s) before work begins, communicate them to all workers, and review them frequently.
- Personnel will assemble at the designated assembly area(s) upon hearing the emergency signal for evacuation.

Critical Plant Operations

This section is not applicable to the scope of work because the work is not being conducted inside a plant area or affected by plant operations.

Accounting for Employees following Evacuation

- The SSHO and a "buddy" will remain on the site after the site has been evacuated (if safe) to assist local responders and advise them of the nature and location of the incident.
- The SSHO will account for all personnel in the on-site assembly area.
- A designated person will account for personnel at alternate assembly area(s) as may be established to meet project site conditions.
- ***A documented practice drill/test will be performed initially and monthly. This process will be reviewed and practiced as described in this plan.***

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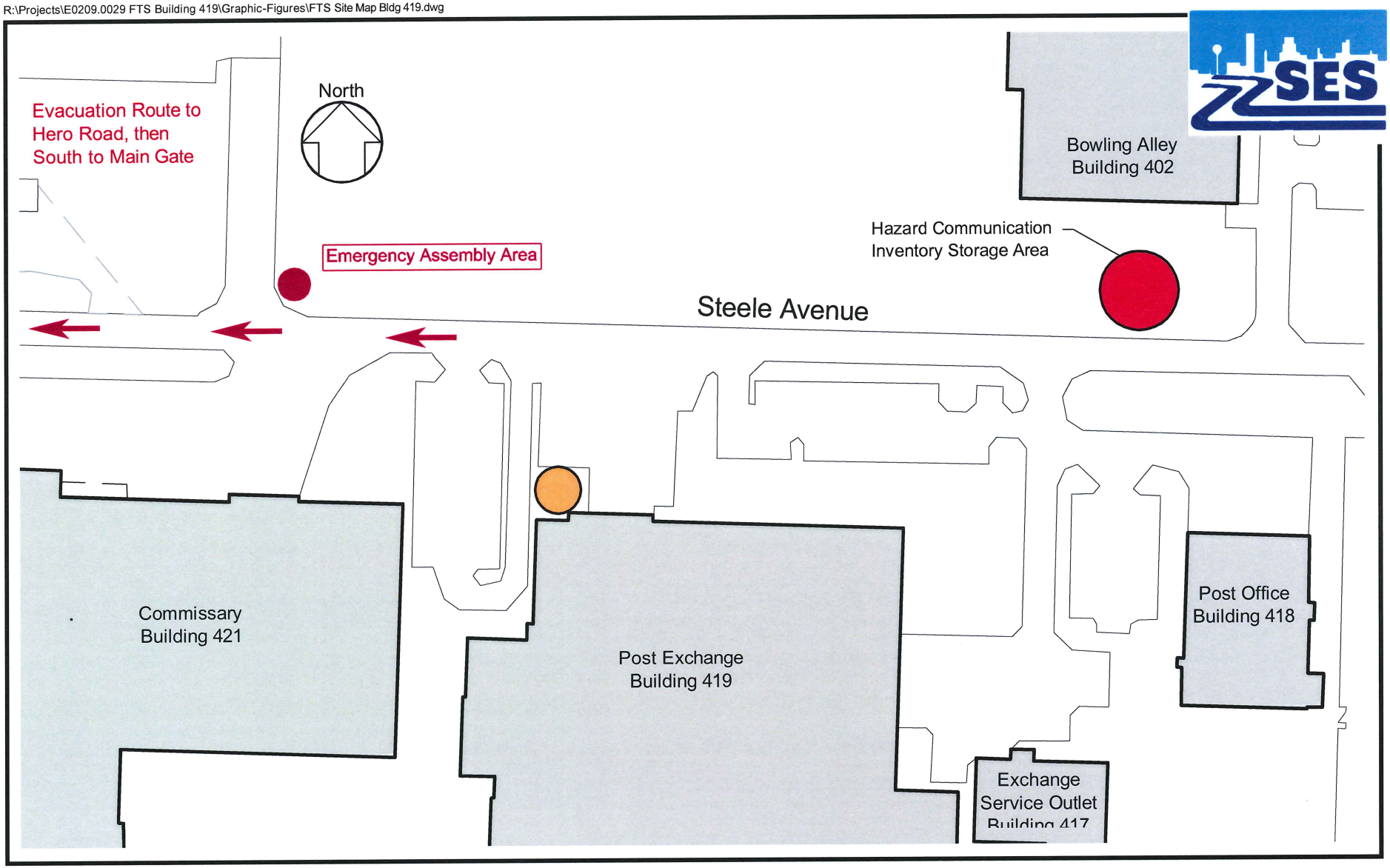

Figure 9-1 Evacuation Route and Assembly Area

Rescue and Medical Duties

The SSHO coordinates emergency response rescue and medical duties with SES on-site parties, the facility, and local emergency service providers as appropriate.

SES personnel shall review and implement all applicable components of the SES S&H Manual Section 21.0, "Work Site Emergency Procedure," except where other requirements may be more stringent.

- Where appropriate and acceptable to the client, the SSHO will inform emergency room and ambulance and emergency response teams of anticipated types of site emergencies.
- Review changed site conditions, on-site operations, and personnel availability in relation to emergency response procedures.
- Designate one vehicle as the emergency vehicle; place hospital directions and map inside, and keep keys in the ignition during field activities.
- Inventory and check site emergency equipment, supplies, and potable water regularly.
- Communicate/train emergency procedures for personnel injury, exposures, fires, explosions, and releases.
- Rehearse the emergency response plan before site activities begin, including driving route to hospital.
- Train new workers on the emergency response plan.

Reporting Emergencies

The SSHO performs the applicable reporting of emergency duties and other pre-emergency planning tasks before starting field activities.

SES personnel shall review and implement all applicable components of SES S&H Manual Section 21.0, "Work Site Emergency Procedure," except where other requirements are more stringent.

The SSHO also will perform the following responsibilities:

- Review the facility emergency and contingency plans where applicable.
- Determine what on-site communication equipment is available (two-way radio, air horn).
- Determine what off-site communication equipment is needed (nearest telephone, cell phone).
- Confirm and post emergency telephone numbers, evacuation routes, assembly areas, and route to the hospital; communicate the information to on-site personnel.

People to Be Contacted for Information or Clarification

Table 9-1 identifies SES personnel who may be contacted for additional information or clarification.

Table 9-1 Contacts

Name	Telephone
SES – Jim Madaj, Senior Program Manager	(865) 481-7837 ext. 266
SES SSHO Chris Napoleon	(865) 360-9910
SES Project Manager Doug Hawn	(865) 740-2907
SES – Rich Rathnow, Safety and Health Manager	(865) 481-7837 (865) 607-2197 (cell)

SES = SpecPro Environmental Services SSHO = site safety and health officer

Integration of On-Site Emergency Planning with Off-Site Emergency Support

The SSHO will verify the off-site emergency services contact numbers and offer these services the opportunity for an on-site orientation of the project and associated hazards. Where appropriate and acceptable to the client, the SSHO will inform emergency room and ambulance and emergency response teams of anticipated types of site emergencies. Emergency contacts are in Table 9-2. The SSHO will verify these contacts before project activities start.

Table 9-2 Emergency Contacts

Name	Telephone
Fort Stewart Military Police	911*
Fire Department	911*
Police	911*
Emergency Medical Services	911*
Hospital –Winn Army Community Hospital 1061 Harmon Avenue #2j11b Fort Stewart, Georgia 31314-5641	(912) 435-6666
Hospital – Liberty Regional Medical Center 462 Miles Parkway Hinesville, Georgia 31313	(912) 369-9400
USACE – Savannah District	(912) 652-5838
Range Control	(912) 435-8777
Environmental Compliance	(912) 315-5144

*Must designate Fort Stewart Cantonment Area USACE = U.S. Army Corps of Engineers

9.b.2 Spill Plans

SES has developed and will implement the spill plan contained herein to ensure employee safety in case of spills that might occur during project work. The spill plan shall be reviewed with all workers periodically to ensure understanding of its detailed implementation and effectiveness.

Hazard Evaluation

All operations, materials, and equipment have been evaluated in relation to the potential for spills to determine the presence of hazardous environments or if hazardous or toxic agents could be released into the work environment. It has been determined through implementation of the Risk Management System via hazard inventory, general pre-task hazard analysis, and AHAs that there is no risk of significant hazardous or toxic agents being released into the work environment during this work.

There is a minimal risk of general use materials listed below being spilled in small quantities at the project site. The initial response to any spill or discharge will be to protect human health and safety and then the environment. Identification, containment, treatment, and disposal assessment will be the secondary response.

The following is a list of materials or chemicals that are considered to pose a minimal risk for spill on site. These may be brought on site and incorporated as part of the final completion of the work, generated during the execution of the work for off-site disposal or recycling, or used to facilitate site work. The

items on this list may require spill prevention and countermeasure control processes to ensure sensitive environmental receptors are not adversely impacted if a spill/release were to occur.

- Free product heating oil from project source;
- Diesel fuel (heavy equipment fueling);
- Gasoline (small safety containers for fueling generators);
- Motor and hydraulic oil (heavy equipment operations);
- Decontamination fluids (inorganic metals, semivolatile organic compound impacted); and
- Grease (lubricating heavy equipment).

In the event of a free product heating oil spill or release to the air, soil, or water, SES and subcontractors will immediately notify the Fort Stewart USACE Environmental Department, the USACE COR, and the SES safety and health manager. The magnitude and potential impact of the release will be assessed. If it is safe to do so, site personnel will isolate the source of the spill, prevent further spill, and contain the spilled and/or affected materials as follows:

- The spill or release will be approached cautiously. Real-time air monitoring will be continuously performed in the spill vicinity.
- Hazards will be identified based on available information from witnesses or material identification documents (placards, MSDSs, logs). The potential hazards will be evaluated to determine the proper personal protection levels, methods, and equipment necessary for response.
- If necessary, the release area will be evacuated, isolated, and secured.
- If possible, spill containment will initially be made without entering the immediate hazard area.
- Entry to the release area will be made with the PPE, personnel, methods, and equipment necessary to perform the work. Hazardous spill containment and collection will be performed in four steps as follows:
    1. Contain the spill with absorbent socks, booms, granules, or construction of temporary dikes.
    2. Control the spill at the source by plugging leaks, uprighting containers, overpacking containers, or transferring contents of a leaking container.
    3. Collect the spilled material with shovels or heavy equipment as necessary.
    4. Store the spilled material for further treatment or disposal. Treatment and/or disposal options of the material will depend on the amount and type of material.

If site personnel cannot safely and sufficiently respond to an environmental release, evacuation of the area may be warranted. The decision to evacuate will depend upon the risk of exposure to client, SES, and subcontractor personnel and the severity of the release. In the event of a spill, appropriate personnel will be notified depending upon the quantity. Upon their arrival at the site, the SSHO will brief them on the current situation and any potential hazards the team may face.

The project manager has the authority to commit resources as needed to contain and control released material and to prevent its spread to off-site areas. The project manager is responsible for notification to the SES senior program manager and safety and health manager.

Through the Risk Management Process, which included the use of pre-task hazard analysis and AHAs, engineering and administrative controls have been identified to address these concerns and shall be used to control these hazards. PPE specific to this limited chemical use is typical for this type of operation and includes American National Standards Institute-approved hard hats, safety glasses, safety boots, chemical splash goggles, and Nitrile gloves. Additional engineering and administrative controls above normal manufacturer-recommended handling procedures as identified in the MSDS will be needed for safe performance of this work. These controls are identified in the AHAs in the attachments to this plan.

This plan and the AHAs attached serve as certification of this task hazard assessment and include **the workplace and activities evaluated**, the name of the person certifying that the evaluation has been performed, and the date of the evaluation.

SES Corporate Safety and Health Manager Rich Rathnow, an American Board of Industrial Hygiene-certified industrial hygienist and a Board of Certified Safety Professionals-certified safety professional, has evaluated the activities to be performed during this scope of work along with the materials and equipment involving potential exposure to hazardous or toxic agents or environments.

All activities will undergo this process annually as applicable.

9.b.3 Firefighting Plan

SES personnel will only attempt to fight small fires that can be controlled comfortably through use of a portable hand held fire extinguisher. Only those individuals who have been trained in and are comfortable with using portable fire extinguishers for this purpose will attempt to extinguish small fires.

Only small quantities of flammable liquids will be maintained on site per Section 9.q Fire Prevention Plan of this APP. SES will shut off all energy sources or materials that might feed into the fire (in this case there are no such instances).

In the event of a fire emergency that is beyond the capability of SES personnel, SES will contact the base fire department for assistance with the fire. The base fire and emergency services will be contacted prior to mobilization to obtain authorization and agreement in gaining their assistance for fire and other emergencies, injuries, and illnesses. SES does not assume that government resources for such situations are automatically available and will gain the appropriate approval and agreement prior to the work being performed.

9.b.4 Posting of Emergency Telephone Numbers

Emergency telephone numbers will be placed and maintained in all project vehicles with clear directions for contacting local emergency support services and appropriate company and client contacts. The most direct route to the nearest occupational medical clinic or hospital for emergencies also will be placed in all project vehicles. Emergency contacts and phone numbers are listed in Table 9-3. This information is provided again in Attachment 4 for posting at the site.

Table 9-3 Emergency Contacts

Contact	Telephone Number
Fort Stewart Military Police	911*
Fire Department	911*
Police	911*
Emergency Medical Services	911*
Hospital –Winn Army Community Hospital 1061 Harmon Avenue #2j11b Fort Stewart, Georgia 31314-5641	(912) 435-6666
Hospital – Liberty Regional Medical Center 462 Miles Parkway Hinesville, Georgia 31313	(912) 369-9400
USACE – Savannah District	(912) 652-5838
Range Control	(912) 435-8777
Environmental Compliance	(912) 315-5144
SES – Jim Madaj, Senior Program Manager	(865) 481-7837 ext. 266
SES SSHO Chris Napoleon	(865) 360-9910
SES Project Manager Doug Hawn	(865) 740-2907
SES – Rich Rathnow, Safety and Health Manager	(865) 481-7837 (865) 607-2197 (cell)

SES = SpecPro Environmental Services
SSHO = site safety and health officer
USACE = U.S. Army Corps of Engineers

9.b.5 Man Overboard/Abandon Ship

This section does not apply to this project scope of work because it refers to the section on Floating Plants and Marine Activities (Section 19 of EM 385-1-1).

9.b.6 Medical Support

The procedures listed below may also be applied to nonemergency incidents. SES employee injuries and illnesses must be reported to the Human Resources contacts in Attachment 4 of this APP after all other notification requirements have been fulfilled. If there is doubt about whether medical treatment is necessary or if the injured person is reluctant to accept medical treatment, contact Rich Rathnow, corporate safety and health manager. During nonemergencies, follow these procedures as appropriate.

- The SSHO shall ensure that potable water, an ANSI-approved portable eye wash station, and an easily accessible, clearly marked and fully stocked first aid kit in a Type III container are at the project site primary work area. Each vehicle will also contain a first aid kit.
- Notify appropriate emergency response authorities.
- The SSHO will assume charge during a medical emergency until the ambulance arrives or until the injured person is admitted to the emergency room.
- Prevent further injury.
- Initiate first aid and CPR where feasible.
- For life-threatening emergencies, get or summon medical attention immediately.
- Perform decontamination where feasible; lifesaving and first aid or medical treatment take priority.
- Make certain that the injured person is accompanied to the emergency room.

- When contacting the medical consultant, give your name and telephone number, the name of the injured person, the extent of the injury or exposure, and the name and location of the medical facility where the injured person was taken.
- Report the incident as outlined in Section 8.
- **A map showing the route to the nearest local hospital is in Attachment 4.**

In the event of a medical emergency, the field manager will immediately notify local emergency medical services as identified in the project emergency telephone contacts list. At least two first aid/CPR- and bloodborne pathogens-trained personnel will be on site at all times, and these personnel will perform first aid pending release of the injured person to medical personnel. An injured person who may be contaminated will be decontaminated to the extent feasible. Decontamination may be bypassed for life-threatening injuries or illnesses.

On-site first aid services will be rendered by first aid-trained individuals and documented in the project first aid injury log.

Injuries that are nonemergency yet require medical attention will be transported to a local occupational medical physician for proper treatment.

Qualified individuals for providing first aid and CPR include the following:
Doug Hawn (Attachment 3)
Chris Napoleon (Attachment 3)
LeAnn McNeal (Attachment 3)

9.c. Alcohol and Drug Abuse Prevention Plan: SES participates in a Drug-Free Workplace Program, which is certified by the state of Tennessee. No alcoholic beverages or illegal substances may be used during work hours or stored on the person or in company vehicles. Personnel who appear to be under the influence of these substances at any time during the work period shall not operate any motorized tools, equipment, or vehicles. Personnel who appear to be under the influence of over-the counter drugs or medications (antihistamines, allergy medication, etc.) that impair their ability to function (fitness for duty, such as operation of equipment or vehicles) shall be prevented from doing so. The on-site manager (SSHO or alternate) shall contact the SES project manager and human resources manager for guidance in accordance with the SES Alcohol and Drug Abuse Policy.

1. The first violation will result in immediate suspension without pay for two (2) weeks, at which time the employee can return to work upon providing SES with a copy of a current negative drug test at his/her own expense. A "First Warning" documenting the incident and the measures taken, signed by the employee and an authorized representative of SES will be placed in the employee's personnel file;
2. The second violation will result in immediate suspension without pay for one (1) month, at which time the employee can return to work if there is a position open upon providing SES with a copy of a current negative drug test at his/her own expense. A "Second Warning" documenting the incident and the measures taken, signed by the employee and an authorized representative of SES will be placed in the employee's personnel file;
3. The third violation will result in immediate suspension without pay and without benefits for six (6) months. The employee may reapply for a position, if one is available, with SES upon providing SES with a copy of a current negative drug test at his/her own expense. A "Third Warning" documenting the incident and the measures taken, signed by the employee and an authorized representative of SES will be placed in the employee's personnel file.

If a disciplined employee works for a full year from the date the employee returns to work after their suspension without further disciplinary action under this policy, the next violation may be treated as a first violation under this policy. However, SES may still consider all past disciplinary actions in evaluating the employee.

SES will continue to test under the following circumstances: (1) pre-employment; (2) for-cause testing; (3) post-accident testing; and (4) random testing.

Two groups will be established for random testing. The first group will consist of all employees who have warnings in their personnel files. The second group will consist of all other employees. SES has purchased a software program specifically designed to make random test selection. The program is set up to make one selection from the first group and two selections from the second group on a quarterly basis. SES determines the date, time, and location for testing. The employees picked are notified of their selection and must report to the designated testing center within one (1) hour of notification or as otherwise instructed by management. A "no-show" at the designated time and place is interpreted as a positive test result.

Under normal circumstances, SES endorses this policy of progressive discipline, where employees receive notice of violation and an opportunity to improve. SES does, however, retain the right to administer discipline in any manner it sees fit based on the individual circumstances of the incident. This policy does not modify the status of employees-at-will or in any way restrict SES's right to bypass the disciplinary procedures suggested.

9.d. Site Sanitation Plan

9.d.1 Housekeeping

- Good housekeeping must be maintained at all times in all project work areas.
- Common paths of travel should be established and kept free from accumulation of material.
- Keep access to aisles, exits, ladders, stairways, scaffolding, and emergency equipment free from obstructions.
- Provide slip-resistant surfaces, ropes, and/or other devices.
- Specific areas should be designated for the proper storage of materials.
- Tools, equipment, materials, and supplies shall be stored in an orderly manner.
- As work progresses, scrap and unessential materials must be neatly stored or removed from the work area.
- Containers should be provided for collecting trash and other debris and shall be removed at regular intervals.
- All spills shall be quickly cleaned up. Oil and grease shall be cleaned from walking and working surfaces.

9.d.2 Drinking Water

- Potable water will be maintained on site for both drinking and personal cleansing.
- Drinking water must be dispensed in a manner that prevents contamination between the worker and the water source.
- Water dispensing systems must be capable of being closed and shall have a tap.
- Water dispensing containers shall be marked "Drinking Water" and will not be used for other purposes.

- Do not use open containers, such as barrels or pails from which the water is "dipped" or poured, for drinking purposes.
- Workers must be provided individual drinking cups, and a common cup will not be allowed.
- Unused drinking cups must be kept in sanitary containers, and a waste receptacle must be provided for used cups.
- During hot weather, cool water must be available for site workers.
- When a project trailer is used, it shall be properly connected to the local municipal water supply unless the remote location makes this impossible.
- Temporary potable water systems can be used with services provided by a licensed potable water contractor.
- Do NOT use reclaimed water under any circumstances.

9.d.3 Nonpotable Water

- Outlets dispensing nonpotable water will be conspicuously posted "Caution – Water Unsafe for Drinking, Washing, or Cooking."
- There will be no cross-connection between a system furnishing potable water and a system supplying nonpotable water.
- Nonpotable water may be used for cleaning work areas except where food is prepared or consumed and personal service rooms. This water must not contain fecal coli form or other substances that might create unsanitary conditions or be harmful to workers.

9.d.4 Toilets

- Clean restrooms in compliance with EM 385-1-1 Section 02.E.02 for Construction Sites will be available for employees through the use of Porta Potty standard portable restroom.
- Adequate ventilation will be available in toilet areas.
- All personnel are expected to use good personal hygiene practices when exiting potentially contaminated work areas.
- Observing hygiene practices will minimize the potential migration of contaminants from "dirty" areas into "clean" areas.

9.d.5 Washing Facilities and Hand Washing

- Washing facilities will be provided at toilet facilities and as needed to maintain healthful and sanitary conditions through the use of a standalone portable sink station with soap and paper towels.
- Each washing facility will be maintained in a sanitary condition and provided with water, soap, and individual means of drying.
- Workers are encouraged to wash hands thoroughly prior to and after using the restroom facilities.

9.e. Access and Haul Road Plan: This does not apply to this project because haul road construction is not part of the scope of work.

9.f. Respiratory Protection Plan: A respiratory protection plan will not be required because respiratory protection will not be used during this project. During this work, there will be no occupational exposure levels that exceed OSHA Permissible Exposure Limits or American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values requiring its use.

Table 4-1 of the SSHP requires respiratory protection training for a minimum of two people at the site for work conducted inside a controlled area under conditions that pose a potential risk of exposure to hazardous waste or chemicals. Based on the information available from reference documents and site characterization data, respiratory protection is not required for this project; however, unforeseeable site conditions may warrant the use of respiratory equipment. If an upgrade in PPE involving respiratory protection is required, the SSHO will stop work and notify the site manager and the safety and health manager. If respiratory protection is needed, the SES Respiratory Protection Program will be attached to this document and/ or available at the project site for use and implementation with approval from the GDA.

9.g. Health Hazard Control Programs

9.g.1 Hazard Evaluation

All operations, materials, and equipment have been evaluated in relation to the potential for worker exposure to health hazards to determine the presence of hazardous environments or if hazardous or toxic agents could be released into the work environment. Implementation of the Risk Management System via hazard inventory, general pre-task hazard analysis, and AHAs shows that there is no risk of significant hazardous or toxic agents being released into the work environment during this work.

This plan and the AHAs attached serve as certification of this task hazard assessment and include **the workplace and activities evaluated**, the name of the person certifying that the evaluation has been performed, and the date of the evaluation.

SES Corporate Safety and Health Manager Rich Rathnow, an American Board of Industrial Hygiene-certified industrial hygienist and a Board of Certified Safety Professionals-certified safety professional, has evaluated the operations to be performed during this scope of work along with the materials and equipment involved to make the health hazard control determination.

The low level risk of exposure to heating oil during the well installation, sampling, and free product removal phases of work will be reduced to a tolerable level using air monitoring, engineering controls where feasible, and administrative and work practice controls supplemented with PPE as identified in Table 5-1 of the SSHP.

Hearing protection with a noise reduction rating (NRR) sufficient to reduce worker exposure below 85 dBA will be used. The minimum NRR for hearing protection used on this project will be 32. Hearing protection with an NRR of 32 will be adequate for noise levels up to 105 dBA using a buffer factor of 5 dBA. If noise levels are suspected of exceeding 105 dBA, double-layer hearing protection will be required.

When double hearing protection is required (noise greater than 105 dBA), affected employees will switch from ANSI Z87.1-2010 standard safety glasses with side shields to safety goggles that meet the requirements of ANSI Z87.1-2010, where the elastic strap can be worn over the exterior of the earmuff rather than the stem of the safety glasses breaking the seal of the earmuffs.

A sound level survey will be performed using a noise dosimeter for Geoprobe operation at startup. Sound levels will be identified at the source and then again at intervals of every 10 feet concentrically. Using the results of the sound level survey along with the premise that every doubling of distance from the noise source reduces noise 6 dB, a boundary barrier zone will be established identifying

1. The zone where noise levels exceed 105 dB and double hearing protection is mandatory.

2. The zone where noise levels exceed 85 dB but do not exceed 105 dB and single layer hearing protection with a minimum NRR of 32 is required.

When double hearing protection is required (noise greater than 105 dBA), affected employees will switch from ANSI Z87.1-2010 standard safety glasses with side shields to safety goggles that meet the requirements of ANSI Z87.1-2010, where the elastic strap can be worn over the exterior of the earmuff rather than the stem of the safety glasses breaking the seal of the earmuffs.

Signs will be posted at these barrier zones alerting personnel and visitors/ the public to the hearing protection requirements. Personnel operating heavy equipment or other machinery will wear hearing protection.

All activities will undergo this process annually as applicable.

9.g.2 Testing and Monitoring

Table 9-4 provides direct reading monitoring specifications.

Dust suppression and control measures will be used to avoid worker, client, and community exposure to nuisance dusts.

9.h. Hazard Communication Program

9.h.1 Hazardous or Toxic Agent Inventory

The SSHO will establish and maintain a chemical register/inventory using the form in Attachment 2 of this APP. The form identifies

- Site location and name,
- Hazard communication coordinator's name,
- Name of chemical,
- Quantity of chemical,
- Location of chemical,
- Whether chemical is labeled properly,
- Whether an MSDS is present for the chemical, and
- Location where MSDSs can be viewed.

For mobilization purposes the following are the estimated quantities of materials covered under the SES Hazard Communication Program at the onset of this project. Other materials brought on site will be evaluated, added to the inventory, and workers briefed on potential hazards and properties of the material prior to their use.

- Diesel fuel (heavy equipment fueling), 5 gallons;
- Gasoline (small safety containers for fueling demolition saw or generators), 5-10 gallons;
- Motor and hydraulic oil (heavy equipment operations), 4-6 quarts;
- Grease (lubricating heavy equipment), 1 pint;
- Sand, 100 pounds;
- Bentonite, 100 pounds; and
- Acidified sample jars, 48.

Table 9-4 Direct Reading Monitoring Specifications

Instrument	Tasks	Action Levels[a]		Frequency [b]	Calibration
PID: OVM with 10.2eV lamp or equivalent	All soil intrusive and contaminated soil and groundwater handling and exposure activities	Up to 1ppm 1-2.5 ppm 2.5 -10 ppm > 10 ppm	Level D Level D; collect benzene tube; benzene action level not exceeded Level D: collect benzene tube; benzene action level not exceeded Level C: Stop work and Contact CIH	Initially and periodically during task	Daily
Dust Monitor Visual Assessment	All activities	No Visible Dust Visible Dust	Level D Use dust suppression methods to control visible dust. If dust generation is from an off-site source, stop work and determine path forward.	Initially and periodically during tasks	Not Applicable
Detector Tube: Draeger benzene specific 0.5/c (0.5 to 10 ppm range) with pre-tube, or equivalent	All Soil Intrusive Activities	<0.5 ppm 0.5-1 ppm >1 ppm	Level D Level C Level B – Stop work contact CIH	Initially and periodically when PID >1 ppm	Not applicable
Noise-Level Monitor [c]:	As necessary per the SSHO	<85 dB(A) 85-105 dB(A) >105 dB(A)	No action required Hearing protection required Stop; re-evaluate periodically Wear double hearing protection[d]	Initially and periodically during task	Daily

[a] Action levels apply to sustained breathing-zone measurements above background.

[b] The exact frequency of monitoring depends on field conditions and is to be determined by the SSHO; generally, every 5 to 15 minutes if acceptable; more frequently may be appropriate. Monitoring results should be recorded. Documentation should include instrument and calibration information, time, measurement results, personnel monitored, and place/location where measurement is taken (e.g., "Breathing Zone/MW-3", "at surface/SB-2", etc.).

[c] Noise monitoring and audiometric testing also required.

When double hearing protection is required (noise greater than 105 dBA), affected employees will switch from ANSI Z87.1-2010 standard safety glasses with side shields to safety goggles that meet the requirements of ANSI Z87.1-2010, where the elastic strap can be worn over the exterior of the earmuff rather than the stem of the safety glasses breaking the seal of the earmuffs.

9.h.2 Hazardous or Toxic Agent Labeling

At a minimum, the following actions will be taken.

- All hazardous material containers on site will be labeled. The SSHO will inventory all chemicals initially and update monthly checking containers to ensure that they are correctly labeled. The SSHO will check labeling status during daily and weekly site inspections.
- Labels will include
    - Contents of the container;
    - Designation of health, flammability, and reactivity hazards; and
    - Name and address of the manufacturer.

9.h.3 MSDS Management Procedures to Ensure that MSDSs Are Maintained for Each Agent

- MSDSs for all hazardous materials that are present will be maintained on site.
- Subcontractors bringing chemicals on site will provide an MSDS to the SSHO immediately upon the material's arrival.
- The SSHO will provide site-specific training to all affected site workers; it will include hazards posed by the materials, protective measures, location of the materials, and emergency procedures.
- Applicable MSDS information is contained in the general hazard analysis and in the AHAs for the project.
- MSDS information will be followed at all times during use, storage, and disposal of material and selection of hazard control and emergency response measures.

9.h.4 Employee Information and Training

Using the form in Attachment 2 of this APP, the SSHO/hazard communication coordinator will conduct and document chemical-specific training initially and periodically when the use of hazardous or toxic agents is altered or modified to accommodate changing on-site work procedures. This training must be documented prior to employees working with the specific chemicals for the first time. This training and form cover the following topics.

1. Requirements and use of the hazcom program on the project,
2. The location of all hazardous or toxic agents at the project (Figure 9-1),
3. Identification and recognition of hazardous or toxic agents on the project,
4. Physical and health hazards of the hazardous or toxic agents pertinent to project activities, and
5. Protective measures employees can implement when working with project-specific hazardous or toxic agents.

9.i. Process Safety Management Plan: Process safety management does not apply to the scope of this work in accordance with Section 06.B.04 of EM 385-1-1 because it does not meet the following:

- Chemicals on site are not used at or above the threshold quantity listed in Appendix A of 29 CFR 1926.64 and
- The process does not involve a flammable liquid or gas on site in one location in a quantity of 10,000 pounds or more.

9.j. Lead Abatement Plan: The project scope of work has been evaluated using the risk management process for the potential to contact lead-containing materials. The result is that there is no potential to contact lead-containing materials as described in Section 06.B.05 of EM 385-1-1.

9.k. Asbestos Abatement Plan: The project scope of work has been evaluated using the risk management process for the potential to contact asbestos-containing materials. The result is that there is no potential to contact asbestos-containing materials as described in Section 06.B.05 of EM 385-1-1.

9.l. Radiation Safety Program: The project scope of work has been evaluated to determine if anyone will be using, possessing, transporting, transferring, or disposing of radioactive materials or radiation-generating devices. The result is that there is not going to be anyone who will be using, possessing, transporting, transferring, or disposing of radioactive materials or radiation-generating devices as described in Section 06.E. of EM 385-1-1.

9.m. Abrasive Blasting: The project scope of work has been evaluated, and there will be no abrasive blasting activities during this project.

9.n. Inclement Weather and Heat/ Cold Stress Management

9.n.1 Inclement Weather

Sudden inclement weather can rapidly encroach upon field personnel. Field crew members performing work outdoors should carry clothing appropriate for bad weather. In severe weather conditions (high wind or electrical storms), the field crews should leave the area and find safe shelter until the weather abates and until a decision is made to resume the field activities. When there are warnings or indications of impending severe weather, the SSHO shall monitor the weather conditions using a weather station that is part of the National Oceanic and Atmospheric Administration weather radio all hazards network or similar notification system.

Severe weather triggers to alert the SSHO to monitor weather conditions are

- Storm on horizon,
- High winds,
- Driving rain,
- Lightning when thunder sounds 30 seconds after the flash,
- Funnel clouds/ tornadoes, or
- Communication from base authorities.

The site manager or SSHO shall monitor weather forecasts for predictions of storms in the area. At first sight of lightning, operations shall be stopped and only resumed when conditions permit. The site manager or SSHO shall monitor weather conditions to determine when it is appropriate to resume work. The lightning safety recommendation is 30-30: Seek refuge when thunder sounds within 30 seconds after a lightning flash, and do not resume activity until 30 minutes after the last thunder clap.

Training on Severe Weather Precautions and Actions

The SSHO will be knowledgeable about extreme weather conditions typically experienced in the region for the project. The SSHO will train site workers about what conditions to expect during the various seasons when work is being completed. This training will describe conditions that might occur, what can be expected, and the actions that personnel are to take in the event of each identified condition.

Identified Area of Retreat

The site evacuation assembly area and route are identified in Figure 9-1. Field vehicles will be used as areas of retreat for the project. The SSHO will communicate this again at the project onset. All workers

will be made aware of actions to take during a weather emergency. These plans are further discussed in the Emergency Evacuation Section of this APP.

Workers shall retreat the designated assembly area as shown on Figure 9-1. Some other general precautions in regard to areas of retreat include

- The inclination to see trees as enormous umbrellas is the most frequent and most deadly mistake. Do not go under a large tree that is standing alone. Likewise, avoid poles, antennae, and towers.
- Stay away from lakes, streams, pools, or any water.
- Stay away from railroad tracks, which can carry lightning charges for long distances.
- If the area is wide open, go to a valley or ravine, but be aware of flash flooding. Do not stand on top of a hill.
- If you are caught in a level open area during an electrical storm and you feel your hair stand on end, drop to your knees, bend forward and put your hands on your knees or crouch. The idea is to make your body less vulnerable by being as low to the ground as possible and taking up as little ground space as possible. Lying down is dangerous because the wet earth can conduct electricity. Do not touch the ground with your hands.
- Do not use telephones during electrical storms except in an emergency.

9.n.2 Heat/ Cold Stress Monitoring Plan

Heat-Related Exposures

Heat-related illnesses are caused by more than just temperature and humidity factors. SES has implemented a heat-related exposure safety program that includes the exposure thresholds found in the ACGIH's "Threshold Limit Values and Biological Exposure Indices" as guidance as well as other references, including the U.S. Army (wind-chill index), and the National Safety Council (NSC).

In hot environments, the following guidelines will be followed to prevent heat-related injury.

- Drinking water shall be made available to employees and employees encouraged to frequently drink small amounts (one cup every 15-20 minutes; the water shall be kept cool).
- Tool box training in hot environments shall include the symptoms of heat-related problems, contributing factors to heat-related injuries, and prevention techniques.
- When possible, work should be scheduled for cooler periods during the day.
- SES employees shall be encouraged to take breaks in a cooler location and use cooling devices as necessary, such as cooling vests, to prevent heat-related injury. A buddy system shall be established to encourage fluid intake and watch for symptoms of heat-related injury.
- The SSHO shall monitor those individuals who have had a previous heat-related injury, are known to be on medication, or exhibit signs of possibly having consumed large amounts of alcohol in the previous 24 hours for signs or indicating symptoms of heat-related injuries.
- Individuals who are not acclimatized shall be allowed additional breaks. The SSHO will determine the period and number and provide them to the supervisor and employee for implementation.

In situations where heat stress may impact employee safety and health, employee acclimatization and workloads shall be assessed and work/rest regimens shall be established.

- For employees in permeable work clothing, Wet Bulb Globe Temperature Index or personal worker monitoring shall be conducted and work/rest regimens established. The SSHO in coordination with the SES safety and health manager will assess the condition of the employees, specific weather conditions, work tasks, and other environmental factors and conditions to

determine when to begin monitoring. Refer to Table 9-5 for the work/ rest regimen using the Wet Bulb Globe Temperature Index.

Table 9-5 WBGT Permissible Heat Exposure Threshold Limit Values

	---------- Work Load* ----------		
Work/Rest Regimen	**Light**	**Moderate**	**Heavy**
Continuous work	30.0°C (86°F)	26.7°C (80°F)	25.0°C (77°F)
75% work, 25% rest, each hour	30.6°C (87°F)	28.0°C (82°F)	25.9°C (78°F)
50% work, 50% rest, each hour	31.4°C (89°F)	29.4°C (85°F)	27.9°C (82°F)
25% work, 75% rest, each hour	32.2°C (90°F)	31.1°C (88°F)	30.0°C (86°F)

*Values are in °C and °F, WBGT.

These TLVs are based on the assumption that nearly all acclimatized, fully clothed workers with adequate water and salt intake should be able to function effectively under the given working conditions without exceeding a deep body temperature of 38°C (100.4° F). They are also based on the assumption that the WBGT of the resting place is the same or very close to that of the workplace. Where the WBGT of the work area is different from that of the rest area, a time-weighted average will be used. These TLVs apply to physically fit and acclimatized individuals wearing light summer clothing. If heavier clothing that impedes sweat or has a higher insulation value is required, the permissible heat exposure TLVs will be reduced by the corrections shown below.

Clothing Type	**Clo* Value**	**WBGT Correction**
Summer lightweight working clothing	0.6	0
Cotton overalls	1.0	-2
Winter work clothing	1.4	-4
Water barrier, permeable	1.2	-6

*Clo: Insulation value of clothing. One clo = 5.55 kcal/m^2/hr of heat exchange by radiation and convection for each degree °C difference in temperature between the skin and the adjusted dry bulb temperature.

- For employees in impermeable work clothing, only physiological monitoring will be conducted, and work/ rest regiments and fluid replacement schedules shall be established.
- Where employees are exposed to solar radiation for short periods and there is the potential for sunburn or exposure for prolonged periods where long-term exposure could lead to health effects such as skin cancer, SES will provide sunscreen with a sun protection factor (SPF) appropriate for their skin type and exposure. Sunscreens shall be used only in accordance with the manufacturer's recommendations.
- SES employees who work in conditions that increase the risk of heat stress will be personally monitored. These conditions include wearing semipermeable or impermeable clothing when the temperature exceeds 69.8 degrees Fahrenheit (21 degrees Celsius), working at extreme metabolic loads (greater than 500 kcal/hour), etc.
- Personal worker monitoring will be done by checking the heart rate. To check the heart rate, workers will count their radial pulse for 30 seconds at the beginning of the rest period. If the heart rate exceeds 110 beats per minute, the next work period will be shortened by one-third and the same rest period maintained. This will be continued until the heart rate does not exceed 110 beats per minute at the beginning of the rest period.
- The SSHO will document all physiological monitoring, including radial pulse checks and break and work times, in his/ her daily log book.

<u>Cold Related Exposures</u>

- Employees working in air temperatures of minus 15 degrees Fahrenheit (minus 26 degrees Celsius) or less shall use the work-/warm-up regimen specified in the ACGIH's "Threshold Limit Values and Biological Exposure Indices."

- At air temperatures of 36 degrees Fahrenheit (2 degrees Celsius) or less, employees who become immersed in water or whose clothing becomes wet shall immediately change into dry clothing/ blankets and be treated for hypothermia. Blankets shall be included as part of the first aid equipment on such activities, and employees shall ensure they have a change of clothing.
- When manual dexterity is not required, employees shall wear thermally protective gloves when exposed to the following temperatures.
    - For light work, 40 degrees Fahrenheit (4 degrees Celsius) and below, and
    - For moderate and heavy work, 20 degrees Fahrenheit (minus 6.6 degrees Celsius) and below.
- When fine work must be performed with bare hands for more than 10-20 minutes in an environment below 50 degrees Fahrenheit (10 degrees Celsius), procedures will be established for keeping employees' hands warm.
- Metal handles and control bars will be covered by thermal insulating material at temperatures below 30 degrees Fahrenheit (minus 1 degree Celsius).
- Cold weather sheltering and clothing requirements:
    - If wind chill is a factor at a work location, the cooling effect of the wind shall be reduced by shielding the work area or SES employees will wear an outer windbreak layer garment. The project AHAs will include details for specific controls to minimize employee exposure to extreme cold.
    - Extremities, ears, toes, and nose shall be protected from extreme cold by proper clothing, such as hats, gloves, masks, etc.
    - Employees whose clothing may become wet will wear an outer layer of clothing that is impermeable to water.
    - Outer garments must provide ventilation to prevent wetting of inner clothing by sweat.
    - If clothing is wet, the employee shall change into dry clothes before entering a cold environment.
    - Employees will change socks and removable felt insoles at regular daily intervals or shall use vapor barrier boots.
    - Because of the added danger of cold injury from evaporative cooling, employees handling evaporative liquid (such as gasoline, alcohol, or cleaning fluids) at air temperatures below 40 degrees Fahrenheit (4 degrees Celsius) will be trained in precautions to avoid soaking of clothing or contact with skin.
    - Eyewear providing protection against ultraviolet light, glare, and blowing ice crystals shall be provided employees in snow and or ice-covered terrain.
- Environmental monitoring shall be conducted as follows:
    - At air temperatures below 45 degrees Fahrenheit (7 degrees Celsius) the temperature shall be monitored a minimum of every eight hours or as warranted.
    - At temperatures below 45 degrees Fahrenheit (7 degrees Celsius) and above 30 degrees Fahrenheit (minus 1 degree Celsius) the temperature and wind speed shall be monitored every four hours or as warranted.
    - At air temperatures below 30 degrees Fahrenheit (minus 1 degree Celsius) the temperature and wind speed shall be measured and recorded at least every four hours or more frequently if it begins to lower.
    - Use Figure 9-2 to determine the equivalent chill temperature and frostbite precautions.
- SES employees who express concern about their ability to work in a cold environment shall provide medical documentation on their ability to work in cold weather [30 degrees Fahrenheit (minus 1 degree Celsius) or below]. If medical documentation is provided that shows they are suffering from diseases or taking medication that interferes with normal body temperature regulation or reduces tolerance to work in cold environments, they will be excluded from the cold weather tasks.

Wind Chill Temperature Table

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

LITTLE DANGER — INCREASED DANGER — GREAT DANGER

RISK OF FROSTBITE (see times on chart below)

GREEN	LITTLE DANGER (frostbite occurs in >2 hours in dry, exposed skin)
YELLOW	INCREASED DANGER (frostbite could occur in 45 minutes or less in dry, exposed skin)
RED	GREAT DANGER (frostbite could occur in 5 minutes or less in dry, exposed skin)

Wind Chill Category

Work Intensity	Little Danger	Increased Danger	Great Danger
High **Digging foxhole, running, marching with rucksack, making or breaking bivouac**	Increased surveillance by small unit leaders; Black gloves optional - mandatory below 0°F (-18°C);	ECWCS or equivalent; Mittens with liners; No facial camouflage; Exposed skin covered and kept dry; Rest in warm, sheltered area; Vapor barrier boots below 0°F (-18°C) Provide warming facilities	Postpone non-essential training; Essential tasks only with <15 minute exposure; Work groups of no less than 2; Cover all exposed skin, Provide warming facilities
Low **Walking, marching without rucksack, drill and ceremony**	Increased surveillance; Cover exposed flesh when possible; Mittens with liner and no facial camouflage below 10°F (-12°C); Full head cover below 0°F (-18°C). Keep skin dry - especially around nose and mouth.	Restrict Non-essential training; 30-40 minute work cycles with frequent supervisory surveillance for essential tasks. See above.	Cancel Outdoor Training
Sedentary **Sentry duty, eating, resting, sleeping, clerical work**	See above; Full head cover and no facial camouflage below 10°F (-12°C); Cold-weather boots (VB) below 0°F (-18°C); Shorten duty cycles; Provide warming facilities	Postpone non-essential training; 15-20 minute work cycles for essential tasks; Work groups of no less than 2 personnel; No exposed skin	Cancel Outdoor Training

These guidelines are generalized for worldwide use. Commanders of units with extensive extreme cold-weather training and specialized equipment may opt to use less conservative guidelines.

Source: USARIEM Technical Note "SUSTAINING HEALTH & PERFORMANCE IN COLD WEATHER OPERATIONS," October 2001

Figure 9-2 Wind Chill Temperature and Frostbite Precautions

9.o. Crystalline Silica Monitoring Plan: The project scope of work has been evaluated using the risk management process for the potential of exposure to materials containing crystalline silica. The result is that there are no tasks identified with potential for exposure to materials containing crystalline silica as described in Section 06.M of EM 385-1-1.

9.p. Night Operations Lighting Plan: Not applicable to this project work scope.

9.q. Fire Prevention Plan: SES will follow the fire prevention and control procedures listed below.

The major workplace fire hazards for this project scope of work include

- Small quantities of flammable liquids use and storage,
- Ordinary combustible materials and storage, and
- Equipment or machinery.

Potential ignition sources include

- Overheating of engine components,
- Smoking materials,
- Hot work activities,
- Electrical short circuit, and
- Static electrical charges.

9.q.1 Types of Fire Suppression Equipment

Fire extinguishers will be used as the primary fire suppression equipment at the project site.

- The SSHO is responsible for maintaining fire extinguishers in the proper locations, inspected monthly, and fully charged for use.
- The SSHO is responsible for controlling fuel source hazards and ensuring safe housekeeping is maintained during this project.

9.q.2 Housekeeping Procedures

- The area in front of extinguishers must be kept clear.
- Post "Exit" signs over exiting doors, and post "Fire Extinguisher" signs over extinguisher locations.
- Combustible materials stored outside should be at least 10 feet from any building.
- Solvent waste and oily rags must be kept in a fire-resistant, covered container and removed from the site weekly.
- Good housekeeping must be maintained at all times in all project work areas.
- Common paths of travel should be established and kept free from the accumulation of materials.
- Keep access to aisles, exits, ladders, stairways, scaffolding, and emergency equipment free from obstructions.
- Provide slip-resistant surfaces, ropes, and/or other devices.
- Specific areas should be designated for the proper storage of materials.
- Tools, equipment, materials, and supplies shall be stored in an orderly manner.
- As work progresses, scrap and unessential materials must be neatly stored or removed from the work area.
- Containers should be provided for collecting trash and other debris and shall be removed at regular intervals.

- All spills shall be quickly cleaned up. Oil and grease shall be cleaned from walking and working surfaces.

This plan shall be used to brief employees and emergency first responders on the fire hazards, the materials and processes to which they are exposed, and the emergency evacuation procedures.

- A qualified person shall make an annual survey of the suitability and effectiveness of fire prevention and protection measures and facilities at each project or Installation.
- Records of the survey findings and recommendations shall be retained on file at the project site or Installation.
- When unusual fire hazards exist or fire emergencies develop, additional protection shall be provided as required.
- Fires and open flame devices shall not be left unattended.
- All sources of ignition shall be prohibited within 50 feet of operations with a potential fire hazard.
- The area shall be conspicuously and legibly posted "**NO SMOKING, MATCHES, OR OPEN FLAME.**"
- Smoking shall be prohibited in all areas where flammable, combustible, or oxidizing materials are stored. "**NO SMOKING, MATCHES, OR OPEN FLAME**" signs will be posted in all prohibited areas.
- A barrier having a fire resistance rating equivalent to a listing of at least one hour shall segregate Department of Transportation-identified incompatible materials that may create a fire hazard.
- A good housekeeping program that provides for the prompt removal and disposal of accumulations of combustible scrap and debris shall be implemented on the site.
- Self-closing containers shall be used to collect waste saturated with flammable or combustible liquids. Only noncombustible or Underwriters Laboratory-labeled nonmetallic containers may be used to dispose of waste and rubbish.
- Measures must be taken to control the growth of tall grass, brush, and weeds next to facilities. A break of at least 3 feet shall be maintained around all facilities.
- Paint-soiled clothing and drop cloths when not in use shall be stored in well-ventilated steel cabinets or containers.
- Insulating material with a combustible vapor barrier shall be stored at least 25 feet from buildings or structures. Only the quantity required for one day's use shall be permitted in buildings under construction.
- Disposal of combustible waste materials shall comply with applicable fire and environmental laws and regulations.
- Low-density fiberboard, combustible insulation, or vapor barriers with a flame spread rating greater than 25 shall not be installed in permanent buildings.
- Temporary enclosures shall be covered with flame-resistant tarpaulins or material of equivalent fire-resistant characteristics.
- When outside help is relied upon for fire protection, a written agreement or a memorandum of record shall be made, stating the terms of the arrangement and the details for fire protection services; this shall be provided to the GDA.
- Temporary building spacing shall be in accordance with the International Building Code (IBC).
- Fire lanes providing access to all areas shall be established and maintained free of obstruction.
- Vehicles, equipment, materials, and supplies shall not obstruct access to fire hydrants and other firefighting equipment.

9.q.3 Hazardous Locations

- Electrical lighting shall be the only means of artificial illumination in areas where flammable liquids, vapors, fumes, dust, or gases are present.
- All electrical equipment and installations in hazardous locations shall be in accordance with the National Electrical Code (NEC) for hazardous locations.
- Globes or lamps shall not be removed or replaced nor shall repairs be made on the electrical circuit until it has been de-energized.
- Sufficient clearance shall be maintained around lights and heating units to prevent ignition of combustible materials.
- All combustibles shall be shielded from the flames of torches used to cut or sweat pipe.
- Recommendations of the National Fire Prevention Association shall be complied with in situations not covered in this section. Where local building codes are established, the more stringent requirements shall apply.

9.r. Wild Land Fire Management Plan: The project scope of work has been evaluated using the risk management process for the potential exposure to wild land fire. The result is that there are no specific tasks identified that present a significant risk with potential for exposure to wild land fires as described in Section 09.K. of EM 385-1-1; however, parking with hot engines over high weeds or grass may pose the potential for fires in dry weather.

- Work areas will be cleared and grubbed to the best extent possible to remove any tall grasses or other brush that may become dry and be susceptible to ignition from hot vehicle components.
- There will be no smoking or open flames allowed in the vicinity of dry brush or tall grass, etc.
- Drivers will make an effort to travel and park their vehicles on pavement whenever possible and minimize the time they operate on dry brush or tall grass.
- Equipment will be shut off and not allowed to remain running when not in use when parked over dry brush or tall grass.
- Every vehicle and piece of heavy equipment will be equipped with a minimum of a 5 lb. ABC fire extinguisher.
- A 10 lb. ABC fire extinguisher will be available in the immediate vicinity of work being performed.
- A nonpotable water tank will be kept near operations for both dust control and for fire prevention and protection relating to dry brush and tall grass.

9.s. Hazardous Energy Control Plan: At this time, no lockout/tagout activities that would require development of a hazardous energy control plan are anticipated for this project.

Overhead line distances will be checked before raising loads overhead. Dig permits will be obtained before any excavation work is performed.

9.t. Critical Lift Procedures: By definition of EM 385-1-1 16.H.01 critical lifts are not planned as part of this scope of work.

9.u. Contingency Plan for Severe Weather: This section is not applicable to the project scope of work because it applies to floating plants and marine activities per Section 19.A.03 of EM 385-1-1.

9.v. Float Plan: The scope of work of this project does not include boat operation that will be remote or include solo travel. This element, therefore, is not applicable to the project scope of work.

9.w. Site-Specific Fall Protection and Prevention Plan: This project is not anticipated to have personnel who will be working at heights or exposed to fall hazards and who will be wearing fall protection equipment.

If work from an elevated position requiring the use of fall protection equipment arises, the SSHO must contact the safety and health manager so a site-specific fall protection plan can be established and AHAs developed for the work accordingly.

9.x. Demolition Plan: This project scope of work does not include any activities that would fall under the demolition category.

9.y. Excavation/Trenching Plan: In accordance with EM 385-1-1 25.A.01 there will not be any excavations during the course of this work that will exceed 5 feet in depth so an excavation plan is not required. The safety measures to be taken for ensuring safe work as it relates to excavations are contained in the AHAs attached to this APP.

9.z. Emergency Rescue (Tunneling): The scope of work does not include activities pertaining to EM 385-1-1 Section 26 Underground Construction (Tunnels), Shafts, and Caissons.

9.aa. Underground Construction Fire Prevention and Protection Plan: The scope of work does not include activities pertaining to EM 385-1-1 Section 26 Underground Construction (Tunnels), Shafts, and Caissons.

9.bb. Compressed Air Plan: The scope of work does not include activities pertaining to EM 385-1-1 Section 26 Underground Construction (Tunnels), Shafts, and Caissons.

9.cc. Formwork and Shoring Erection and Removal Plans: The scope of work does not include activities pertaining to EM 385-1-1 Section 27 Concrete, Masonry, Steel Erection and Residential Construction.

9.dd. Pre-Cast Concrete Plan: The scope of work does not include activities pertaining to EM 385-1-1 Section 27 Concrete, Masonry, Steel Erection and Residential Construction.

9.ee. Lift Slab Plans: The scope of work does not include activities pertaining to EM 385-1-1 Section 27 Concrete, Masonry, Steel Erection and Residential Construction.

9.ff. Steel Erection Plan: The scope of work does not include activities pertaining to EM 385-1-1 Section 27 Concrete, Masonry, Steel Erection and Residential Construction.

9.gg. Site Safety and Health Plan for HTRW work: An SSHP in accordance with EM 385-1-1 Section 28.B is available in Attachment 8.

9.hh. Blasting Plan: A blasting plan will not be required in accordance with EM 385-1-1 Section 29.A.01 because no blasting activities are included in the scope of work.

9.ii. Diving Plan: A diving plan will not be required in accordance with EM 385-1-1 Section 30.A.13 because no diving activities are included in the scope of work.

9.jj. Confined Space Program: Entry into a confined space is not expected during this project. Trench work will be a maximum of 48 inches deep and will involve only very minimal entry. Therefore, it has been determined using the risk management process that confined space entry hazards are not a concern for this scope of work.

10. RISK MANAGEMENT PROCESSES

An initial hazard inventory and general hazard identification and analysis have been completed for this project. Control measures for the major hazard categories are also included. Prior to any task for a phase of work being initiated, an AHA that addresses each major phase/activity of work is developed. These AHAs are attached to the APP. The AHAs detail project-specific hazards and hazard control measures that are associated with the sequential task element. The AHAs are reviewed and discussed with all affected site workers prior to beginning work. A daily Pre-Task Safety Plan session is held with all site workers to review the specific work to be performed each day along with the hazards that might be encountered as well as the hazard control measures to be implemented for safe work conduct.

Appendix E

Accident Prevention Plan

Final
Accident Prevention Plan
for Heating Oil Spill Site Investigation
Building 419
Fort Stewart, Georgia

May 2013

Submitted to:
U.S. Army Corps of Engineers
Savannah District

Prepared by:
SpecPro Environmental Services LLC
1006 Floyd Culler Court
Oak Ridge, Tennessee 37830
under
Contract No. W912HN-10-D-0001
Delivery Order No. 0029

Attachment 1

Reporting Forms

Employee Signature Page
ENG Form 3394
SES Loss Investigation Report
SES First Aid Injury Log
Equipment Daily Inspection Checklist
Daily Tool Box/ Pre-Task Safety Meetings Documentation Form
Weekly Job Site Checklist
Drilling Self Assessment Checklist
Air Monitoring Log
Deficiency Tracking Log

EMPLOYEE SIGNOFF FORM

Accident Prevention Plan

The SES project employees and subcontractors listed below have been provided with a copy of this APP, have read and understood it, and agree to abide by its provisions.

Project Name: Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia		**Project Number:** E0209.0029	
EMPLOYEE NAME (Please print)	**EMPLOYEE SIGNATURE**	**COMPANY**	**DATE**

(For Safety Staff only)	REPORT NO.	EROC CODE	**UNITED STATES ARMY CORPS OF ENGINEERS ACCIDENT INVESTIGATION REPORT** *(For Use of this Form See Help Menu and USACE Suppl to AR 385-40)*	REQUIREMENT CONTROL SYMBOL: CEEC-S-8(R2)

1. ACCIDENT CLASSIFICATION

PERSONNEL CLASSIFICATION	INJURY/ILLNESS/FATAL	PROPERTY DAMAGE	MOTOR VEHICLE INVOLVED	DIVING
GOVERNMENT ☐ CIVILIAN ☐ MILITARY	☐	☐ FIRE INVOLVED ☐ OTHER	☐	☐
☐ CONTRACTOR	☐	☐ FIRE INVOLVED ☐ OTHER	☐	☐
☐ PUBLIC	☐ FATAL ☐ OTHER		☐	

2. PERSONAL DATA

a. Name *(Last, First, MI)*	b. AGE	c. SEX ☐ MALE ☐ FEMALE	d. SOCIAL SECURITY NUMBER	e. GRADE

f. JOB SERIES/TITLE	g. DUTY STATUS AT TIME OF ACCIDENT	h. EMPLOYMENT STATUS AT TIME OF ACCIDENT
	☐ ON DUTY ☐ TDY ☐ OFF DUTY	☐ ARMY ACTIVE ☐ ARMY RESERVE ☐ VOLUNTEER ☐ PERMANENT ☐ FOREIGN NATIONAL ☐ SEASONAL ☐ TEMPORARY ☐ STUDENT ☐ OTHER *(Specify)*

3. GENERAL INFORMATION

a. DATE OF ACCIDENT *(month/day/year)*	b. TIME OF ACCIDENT *(Military time)*	c. EXACT LOCATION OF ACCIDENT	d. CONTRACTOR'S NAME
	hrs		(1) PRIME: (2) SUBCONTRACTOR:

e. CONTRACT NUMBER	f. TYPE OF CONTRACT	g. HAZARDOUS/TOXIC WASTE ACTIVITY
☐ CIVIL WORKS ☐ MILITARY ☐ OTHER *(Specify)*	☐ CONSTRUCTION ☐ SERVICE ☐ A/E ☐ DREDGE ☐ OTHER *(Specify)*	☐ SUPERFUND ☐ DERP ☐ IRP ☐ OTHER *(Specify)*

4. CONSTRUCTION ACTIVITIES ONLY *(Fill in line and corresponding code number in box from list - see help menu)*

a. CONSTRUCTION ACTIVITY	(CODE) #	b. TYPE OF CONSTRUCTION EQUIPMENT	(CODE) #

5. INJURY/ILLNESS INFORMATION *(Include name on line and corresponding code number in box for items e, f & g - see help menu)*

a. SEVERITY OF ILLNESS/INJURY	(CODE) #	B. ESTIMATED DAYS LOST	C. ESTIMATED DAYS HOSPITALIZED	D. ESTIMATED DAYS RESTRICTED DUTY

e. BODY PART AFFECTED	(CODE) #	g. TYPE AND SOURCE OF INJURY/ILLNESS	(CODE) #
PRIMARY		TYPE	
SECONDARY		SOURCE	
f. NATURE OF ILLNESS / INJURY	(CODE) #		

6. PUBLIC FATALITY *(Fill in line and correspondence code number in box - see help menu)*

a. ACTIVITY AT TIME OF ACCIDENT	(CODE) #	b. PERSONAL FLOATATION DEVICE USED?
		☐ YES ☐ NO ☐ N/A

7. MOTOR VEHICLE ACCIDENT

a. TYPE OF VEHICLE	b. TYPE OF COLLISION	c. SEAT BELTS	USED	NOT USED	NOT AVAILABLE
☐☐ PICKUP/VAN ☐☐ AUTOMOBILE ☐☐ TRUCK ☐☐ OTHER *(Specify)*	☐ SIDE SWIPE ☐ HEAD ON ☐ REAR END ☐ BROADSIDE ☐ ROLL OVER ☐ BACKING ☐ OTHER *(Specify)*	(1) FRONT SEAT			
		(2) REAR SEAT			

8. PROPERTY/MATERIAL INVOLVED

a. NAME OF ITEM	B. OWNERSHIP	C. $ AMOUNT OF DAMAGE
(1)		
(2)		
(3)		

9. VESSEL/FLOATING PLANT ACCIDENT *(Fill in line and correspondence code number in box from list - see help menu)*

a. TYPE OF VESSEI/FLOATING PLANT	(CODE) #	b. TYPE OF COLLISION/MISHAP	(CODE) #

10. ACCIDENT DESCRIPTION *(Use additional paper, if necessary)*

See attached page.

11. **CAUSAL FACTOR(S)** *(Read Instruction Before Completing)*

a. (Explain YES answers in item 13)	YES	NO
DESIGN: Was design of facility, workplace or equipment a factor?	☐	☐
INSPECTION/MAINTENANCE: Were inspection & maintenance procedures a factor?	☐	☐
PERSON'S PHYSICAL CONDITION: In your opinion, was the physical condition of the person a factor?	☐	☐
OPERATING PROCEDURES: Were operating procedures a factor?	☐	☐
JOB PRACTICES: Were any job safety/health practices not followed when the accident occurred?	☐	☐
HUMAN FACTORS: Did any human factors such as, size or strength of person, etc., contribute to accident?	☐	☐
ENVIRONMENTAL FACTORS: Did heat, cold, dust, sun, glare, etc., contribute to the accident?	☐	☐

a. *(CONTINUED)*	YES	NO
CHEMICAL AND PHYSICAL AGENT FACTORS: Did exposure to chemical agents, such as dust, fumes, mists, vapors or physical agents, such as, noise, radiation, etc., contribute to accident?	☐	☐
OFFICE FACTORS: Did office setting such as, lifting office furniture, carrying, stooping, etc., contribute to the accident?	☐	☐
SUPPORT FACTORS: Were inappropriate tools/resources provided to properly perform the activity/task?	☐	☐
PERSONAL PROTECTIVE EQUIPMENT: Did the improper selection, use or maintenance of personal protective equipment contribute to the accident?	☐	☐
DRUGS/ALCOHOL: In your opinion, was drugs or alcohol a factor to the accident	☐	☐

b. WAS A WRITTEN JOB/ACTIVITY HAZARD ANALYSIS COMPLETED FOR TASK BEING PERFORMED AT TIME OF ACCIDENT?

☐ YES *(If yes, attach a copy.)* ☐ NO

12. **TRAINING**

a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?	b. TYPE OF TRAINING.	c. DATE OF MOST RECENT FORMAL TRAINING.
☐ YES ☐ NO	☐ CLASSROOM ☐ ON JOB	(Month) (Day) (Year)

13. **FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT; INCLUDE DIRECT AND INDIRECT CAUSES** *(See instruction for definition of direct and indirect causes.) (Use additional paper, if necessary)*

a. DIRECT CAUSE

See attached page.

b. INDIRECT CAUSE(S)

See attached page.

14. **ACTION(S) TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE(S).**

DESCRIBE FULLY:

See attached page.

15. **DATES FOR ACTIONS IDENTIFIED IN BLOCK 14.**

a. BEGINNING (Month/Day/Year)	b. ANTICIPATED COMPLETION (Month/Day/Year)		
c. SIGNATURE AND TITLE OF SUPERVISOR COMPLETING REPORT CORPS _____ CONTRACTOR _____	d. DATE *(Mo/Da/Yr)*	e. ORGANIZATION IDENTIFIER *(Div, Br, Sect)*	f. OFFICE SYMBOL

16. **MANAGEMENT REVIEW** *(1st)*

a. ☐ CONCUR b. ☐ NON CONCUR c. COMMENTS

SIGNATURE	TITLE	DATE

17. **MANAGEMENT REVIEW** *(2nd - Chief Operations, Construction, Engineering, etc.)*

a. ☐ CONCUR b. ☐ NON CONCUR c. COMMENTS

SIGNATURE	TITLE	DATE

18. **SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW**

a. ☐ CONCUR b. ☐ NON CONCUR c. ADDITIONAL ACTIONS/COMMENTS

SIGNATURE	TITLE	DATE

19. **COMMAND APPROVAL**

COMMENTS

COMMANDER SIGNATURE	DATE

*U.S. GOVERNMENT PRINTING OFFICE: 1993-0-791-757

10. ACCIDENT DESCRIPTION *(Continuation)*

13a. DIRECT CAUSE *(Continuation)*

13b. INDIRECT CAUSES *(Continuation)*

14. ACTION(S) TAKEN, ANTICIPATED, OR RECOMMENDED TO ELIMINATE CAUSE(S) *(Continuation)*

Project Title: Heating Oil Spill Site Investigation
Building 419 Fort Stewart, Georgia
Project No. E0209.0029

SES LOSS/NEAR LOSS INCIDENT INVESTIGATION FORM

I. The Employee		II. The Injury/Illness
1. Name:		6. Nature of Injury /Incident and Body Parts Affected:
2. Employee/SS No.:	3. Job Title:	
4. Temporary or Full Time (circle one)	5. Time on This Job:	7. Date Injury/Incident Reported or Illness Diagnosed:

III. The Incident

☐ Near Miss ☐ First Aid ☐ Doctor/Hospital Visit ☐ Property Damage ☐ Spill

8. Date of Incident:	9. Day of Week	10. Time of Incident:	11. Exact Location of Incident:
12. Job Performing When Incident Occurred:			13. Exact Step or Job Part Being Performed:

14. Description of Incident:

Describe so that a person unfamiliar with the plant and operation will understand. Give necessary background, the involved employee's position relative to surroundings, what the person was doing, how it was being done, what triggered the incident, the source of injury, the incident type, etc.

15. Incident Type:
(check one)

☐ Struck By ☐ Struck Against ☐ Caught Between ☐ Same Level Fall ☐ Different Level Fall
☐ Chemical Exposure ☐ Strain/Over Exertion ☐ Other (Explain)_____

16. Frequency Potential	17. Severity Potential
Select the potential for the incident to occur	Select the potential severity of an injury
☐ Frequent ☐ Occasional ☐ Rare	☐ Major ☐ Serious ☐ Minor
18. Names of Witnesses to the Incident:	19. Property Damage Did equipment or other property damage result from the incident? ☐ Yes ☐ No

IV. The Causes

20. Direct Personal Causes

What did a person – the victim or someone else do – or fail to do that contributed directly to this incident? Be specific, for example, "operated machine without authority"

_____

_____

22. Direct Environmental Causes

What defective or otherwise unsafe condition(s) or tools, machinery, equipment, product, working surface, structures, or work area contributed to this incident? Be specific, for example "Hand-railing missing".

_____

_____

21. Indirect Personal Causes (check all that apply)

Check items below that best indicate reasons why act identified in above was committed. Write in information for indirect causes not listed.

1. ☐ Unaware of job hazards
2. ☐ Inattentive of hazards
3. ☐ Unaware of safe method
4. ☐ Low level of job skill
5. ☐ Tried to gain or save time
6. ☐ Tried to avoid extra effort
7. ☐ Acted to avoid discomfort
8. ☐ Influence of emotions
9. ☐ Influence of fatigue
10. ☐ Influene of illness
11. ☐ Influence of intoxicants
12. ☐ Defective hearing/vision
13. ☐ Unable to determine
14. ☐ Other (explain)

_____ _____

23. Indirect Environmental Causes (check all that apply)

Check items below that best indicate reasons why condition identified in above existed. Write in information for indirect causes not listed.

1. ☐ Worn out from normal use
2. ☐ Abuse or misuse by others
3. ☐ Required inspection not done
4. ☐ Inspection not required
5. ☐ Clean-up failure
6. ☐ Clean-up not required
7. ☐ Clean-up not done
8. ☐ Inadequate ventilation
9. ☐ Congestion – lack of space
10. ☐ Unsafe design
11. ☐ Inadequate illumination
12. ☐ Fault Construction
13. ☐ Lubrication failure
14. ☐ Exposure to corrosion
15. ☐ Exposure to vibration
16. ☐ Exposure to temp. extreme
17. ☐ Tampering
18. ☐ Supervisor failed to correct
19. ☐ Unable to determine
20. ☐ Other (explain)

_____ _____

24. Primary Unsafe Act (check one)

MAIN CAUSE

1. ☐ Operating or using equipment without authority
2. ☐ Failure to secure against unexpected movement
3. ☐ Operating or working at an unsafe speed
4. ☐ Failure to warn or signal as required
5. ☐ Removing or making safety devices inoperative
6. ☐ Using defective tools or equipment
7. ☐ Taking an unsafe position or posture
8. ☐ Servicing moving, energized or otherwise hazardous equip.
9. ☐ Riding hazardous moving equipment
10. ☐ Horseplay, distracting, startling, teasing, etc.
11. ☐ Failure to wear personal protective equipment
12. ☐ Failure to evaluate/consider/plan for work surroundings
13. ☐ Other than above
14. ☐ None

25. Primary Unsafe Condition (check one)

ENVIRONMENTAL CAUSE

1. ☐ Lack of or inadequate guards and safety devices
2. ☐ Lack of or inadequate warning system
3. ☐ Fire and explosion hazards
4. ☐ Unexpected movement hazards
5. ☐ Poor housekeeping hazards
6. ☐ Protruding objects hazard
7. ☐ Close clearance and congestion hazards
8. ☐ Hazardous atmospheric conditions
9. ☐ Hazardous arrangement, placement, or storage
10. ☐ Hazardous defects of tools, equipment, etc.
11. ☐ Inadequate illumination; intense noise
12. ☐ Hazardous personal attire
13. ☐ Other than above
14. ☐ None

26. Does the investigation require additional technical support? ☐ Yes ☐ No

V. The Correction

27. Corrective Action Taken (check all that apply)

Check those actions taken to prevent recurrence. Fill in the appropriate box for corrective actions decided upon or planned but not yet initiated or completed.

1. ☐ Reinstruction of those involved
2. ☐ Discipline of those involved
3. ☐ Job reassignment
4. ☐ Equipment repair or replace
5. ☐ Action to improve inspection
6. ☐ Order job safety analysis done
7. ☐ Improve housekeeping
8. ☐ Improve personal protection
9. ☐ Improve design
10. ☐ Install guard or device
11. ☐ Correct congestion
12. ☐ Order pre-job instructions
13. ☐ Check with manufacturer
14. ☐ Inform other supervision
15. ☐ Other than above

Corrective Action: _____

_____

28. Person Responsible for Corrective Action:		29. Target Date:	30. Date Completed:
31. Safety Member:	Date:	32. Division Manager:	Date:
33. Employee:	Date:	34. Project Manager:	Date:

Project Title: Heating Oil Spill Site Investigation
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Project No. E0209.0029

SES First Aid Injury Log

Record all minor first aid injuries where first aid treatment is rendered.
(Medical attention is not required)

Date	Time	Name	Task Description	Injury/Treatment

Project Title: Heating Oil Spill Site Investigation
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SES

Material Handling Equipment, Daily Inspection Checklist

(This checklist must be completed daily by the driver before operating the equipment.)

Equipment No._____ Week of _____

ASSIGNED OPERATORS

_____

_____

_____

ALTERNATE OPERATORS

_____

_____

_____

Hour Meter/ Odometer Reading

Start of Week _____

End of Week _____

	SUNDAY		MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY		SATURDAY	
	OK	Needs Attn.	OK	Needs Attn.	OK	Needs Attn.	OK	Needs Attn.	OK	Needs Attn.	OK	Needs Attn.	OK	Needs Attn.
Battery Compartment cleanliness														
water levels														
connections														
Battery Indicator inspect state of charge														
Tire Check damaged wheels														
damaged or missing lugs														
condition of tires														
Brakes pedal travel														
parking brake holds equipment in place														
Safety Devices check horn														
check backup alarm														
lights and reflectors														
Check for new Damage Explain in remarks section														
Operators compartment check operator controls														
check seat belts														
windshield wipers														
defrosters														
fire extinguisher														
overhead guard in place & secure														
Leaks Check under vehicle for puddles														
Steering Check operation of steering mechanism														
General Operation inspect for unusual operation														
Mast and Forks fork pins														
mast operation														
are forks level														

Project Title: Heating Oil Spill Site Investigation
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DAILY SAFETY MEETING/ PRE-TASK SAFETY PLAN (PTSP)

DAILY PRE-TASK SAFETY PLAN (PTSP)

Project:_____ Location: _____ Date:_____

Site Safety & Health Officer: _____ Job Activity: _____ Site #:_____

Task Personnel:

_____

_____

_____

List Tasks:

_____

_____

Tools/Equipment/Materials required (ladders, scaffolds, fall protection, cranes/rigging, heavy equipment, power tools, cords, generators, compressed gases, regulated chemical products, etc.):

_____

_____

_____

Potential H&S Hazards, including chemical, physical, safety, biological and environmental (Check all that apply):

__ Chemical burns/contact Dermal protection (hands), eye protection. See SSHP/AHAs for PPE requirements per task.	__ Trench, excavations, cave-ins	__Ergonomics
__ Pressurized lines/equipment	_ Overexertion Work/break regiment as dictated by task. Maintain fluid intake for hydration	__ Chemical splash Use PPE in accordance with SSHP/AHAs. Protect hands from splash during decon. activities.
__Thermal burns Watch for warm engine/muffler components on generators.	__ Pinch points	__ Poisonous plants/insects Review SSHP/AHAs for identification of poisonous snakes in the geographic area. Long sleeves in areas where poison ivy, sumac or oak may exist. Use insect repellent. Tape pant legs to boots (ticks).
_ Electrical GCFIs for generators, Inspect. & protect extension Chords, Chords rated for use & have 3rd wire grounding	_Cuts/abrasions Do not use razor knives. Cut away from body. Identify and avoid rusty/jagged or sharp surfaces from above ground features (brush, pipe chases/supports, utility structures, doors)	__ Eye hazards/flying projectile Use eye protection at all times. Ensure head protection is used in areas where heavy brush, trees, thorns, vines exist when accessing well heads.
__ Weather conditions Foul and cold weather clothing as dictated by expected conditions	__ Spills Use funnels & nozzles during fueling of generators.	__ Inhalation hazard
__Heights/fall> 6'	__ Overhead Electrical hazards	__ **Heat**/cold stress Work/break regiment as dictated by heat exposure Provide sufficient fluids for employee intake. Recommended employees begin with 16 oz. of water before initiating field work.
__Noise Use hear protection in loud work environments	__ Elevated loads	__ Water/drowning hazard
__Explosion/fire Metal safety cans for fuel storage, No open flame, sparks ignition in hazardous/flammable/ combustible storage areas. Let engine surfaces cool before fueling.	__ Slips, trip and falls Exercise good general house keeping practices Identify/remove slip/trip falls hazards in work area. Watch for and avoid holes, ground protrusions. Watch for entanglement of feet around vines and brush.	__ Heavy equipment
__ Radiation Solar. UV protection on skin and UV eye protection. ANSI rated safety eye protection only.	__Manual lifting >50 lbs or awkward loads, get assistance. If employee not capable of lifting 40 lbs. seek assistance.	__ Aerial lifts/platforms
__ Confined space entry	__Welding/cutting	__ Demolition

Continue on page 3 of 3 (if necessary)

Hazard Control Measures (Check all that apply):

PPE	Protective Systems	Fire Protection	Electrical
__ Head protection	__ Locate buried utilities	__ Fire extinguishers	__ Lockout/tagout
__ Face protection	__ Competent person	__ Fire watch	__ Grounded
__ Hard toe work boots	__ Daily inspections	__ Non-spark tools	__ Panels covered
__ Thermal/lined	__ Sloping	__ Grounding/bonding	__ GFCI/extension cords
__ Eye	__ Shoring	__ Intrinsically safe equipment	__ Power tools/cord inspected
__ Dermal/hand	__ Trench box	__Combustible materials storage	__Insulated tools/gloves
__ Hearing	__ Barricades	__Chemical Storage	
__ Respiratory			
__ Reflective vests			
Fall Protection	**Air Monitoring**	**Proper Equipment**	**Welding & Cutting**
__ Harness/lanyards	__ PID/FID	__ Aerial lift/ladders/scaffolds	__ Cylinders secured/capped
__ Adequate anchorage	__ Detector tubes	__ Forklift/ Heavy equipment	__ Cylinders separated/upright
__ Guardrail system	__ Radiation	__ Backup alarms	__ Flash-back arrestors
__ Covered opening	__ Personnel sampling	__ Hand/power tools	__ No cylinders in CSE
__ Fixed barricades	__ LEL/O2	__ Crane w/current inspection	__ Flame retardant clothing
__ Warning system	__ Other	__ Proper rigging	__ Appropriate goggles
		__ Operator qualified	
Confined Space Entry	**Medical/Emerg. Response**	**Heat/Cold Stress**	**Vehicle/Traffic**
__ Isolation	__ First-aid & BBP kit	__ Work/rest regime	__ Traffic Awareness
__ Air monitoring	__ Eye wash	__ Rest area	__Traffic control
__ Trained personnel	__ FA-CPR training	__ Liquids available	__ Barricades
__ Permit completed	__ Route to hospital	__ Monitoring	__ Flags
__ Rescue provisions		__ Training	__ Signs
Permits	**Demolition**	**Inspections**	**Training**
__ Hot work	__ Pre-demolition survey	__ Ladders/aerial lifts	__ Hazwaste
__ Confined space	__ Structure condition	__ Lanyards/harness	__ Construction
__ Lockout/tagout	__ Isolate area/utilities	__ Scaffolds	__Equipment
__ Excavation	__ Competent person	__ Heavy equipment	__ Competent person
__ Demolition	__ Hazmat present	__Cranes and rigging	__ Task-specific (AHA)
__ Energized work		__Other per Field Safety Plan	__ Hazcom
__Local/Environmental			

FieldNotes:_____

_____

_____

_____

Project Title: Heating Oil Spill Site Investigation
Building 419 Fort Stewart, Georgia
Project No. E0209.0029

Additional Space for Project Specific Hazard Awareness (if necessary):

Attendees:

Name (Printed):	Signature:

Meeting Conducted By:

Name Printed	Signature

Weekly Job Site Inspection Checklist

Project Name: _____ **Inspection Date:** _____

Project Supervisor: _____

	DESCRIPTION	YES	NO	N/A	If NO Why?
1.0	**Project Administration: 1926, Subpart C**				
1.1	OSHA and other required posters/sign posted on safety bulletin board				
1.2	Do all employees meet the required training levels?				
1.3	Was a pre-job safety orientation meeting held/documented for all employees?				
1.4	Are Daily Pre-Task Safety Plan meetings conducted and documented for all workers including subcontractors?				
1.5	Are Loss Prevention Observations conducted and documented at least weekly?				
2.0	**General/Trailers/Site Control/Housekeeping**				
2.1	General orderliness of the site acceptable?				
2.2	Passageways and walkways clear?				
2.3	Containers with lids provided for trash?				
2.4	Office and storage trailers anchored?				
2.5	Stairs to trailer have handrails if 4 or more steps				
2.6	Floors, working spaces, and passageways free from protruding nails, splinters, loose boards, clutter?				
2.7	Has traffic control around site been adequately addressed?				
2.8	Are construction areas barricaded with adequate warning to prevent pedestrian and vehicle entry				
2.9	Are excavations barricaded to prevent inadvertent worker, pedestrian or vehicle entry?				
2.10	Are construction hazard warning signs properly posted and visible every 150 ft.?				
3.0	**Medical Services and First Aid**				
3.1	Has a local occupational provider been identified for medical attention of a non-emergency nature?				
3.2	Is there a safety bulletin board erected with emergency numbers, map to hospital, and deficiency tracking system?				
3.3	Two employees on site with current CPR/First Aid?				
3.4	First aid kits (type III, 16 unit) provided and properly stocked?				
4.0	**Sanitation, 1926, Subpart D**				
4.1	Adequate supply of drinking water provided with disposable cups and and a waste receptacle present				
4.2	Toilet facilities with locks (1 per 20 people) and washing facilities available?				
5.0	**Hazard Communication**				
5.1	Is a hazardous material inventory available?				
5.2	Are MSDSs available for all hazardous materials on site?				
5.3	Are all containers properly labeled?				
5.4	Have all employees been trained?				

	DESCRIPTION	YES	NO	N/A	If NO Why?
6.0	**Personal Protective Equipment: 1926, Subpart E**				
6.1	Are approved hard hats worn by all personnel?				
6.2	ANSI approved safety glasses with side shields, other eye and face protection provided and used as needed?				
6.3	Are employees wearing the work gloves when handling construction materials and as otherwise required?				
6.4	Are employees dressed in appropriate work clothing?				
6.5	Are employees wearing ANSI approved safety footwear?				
6.6	Is all equipment inspected regularly and maintained in a safe and sanitary condition?				
6.7	Are employees wearing ANSI Type II high visibility apparel when exposed to vehicular or equipment traffic?				
6.8	Workers wearing Coast Guard approved PFB when working adjacent to or over water?				
7.0	**Fire Protection and Prevention: 1926, Subpart F**				
7.1	Is the necessary fire-fighting equipment provided?				
7.2	Are fire extinguishers provided and visible every 75 ft. for low hazard areas and 50 ft. for high hazard areas?				
7.3	Are fire extinguishers inspected monthly with inspection recorded on tags?				
7.4	Fire extinguishers present for hot work activities?				
7.5	Are No Smoking signs posted within 50 feet of flammable liquids?				
7.6	Are combustible or flammable materials stored, dispensed, and used properly?				
7.7	Is fuel stored in red safety (self-closing with baffle/spark arrester) cans with yellow band and labeled with contents listed?				
8.0	**Material Handling and Storage: 1926, Subpart H**				
8.1	Is material stacked, racked, blocked, or otherwise secured to prevent falling or collapse?				
8.2	Are correct lifting methods used?				
8.3	Is all rigging equipment properly used and inspected by a qualified person?				
8.4	Is the Crane Operator certified and trained?				
8.5	Crane inspected by competent person daily?				
8.6	Heavy Equipment operators trained and qualified?				
8.7	Workers avoid equipment blind spots?				
8.8	Daily equipment inspections documented?				
8.9	Seatbelts used where provided?				
8.10	Backup alarms operational? Spotter used?				
8.11	Equipment operated at safe speeds and under control?				
8.12	Signal person is trained and qualified?				
8.13	Equipment operated a safe distance from overhead electrical sources.				
8.14	Forklift (includind lull) operators trained and licensed?				
9.0	**Tools – Hand and Power: 1926, Subpart I**				
9.1	Proper tools being used for the job?				
9.2	Proper inspection and maintenance of tools?				

	DESCRIPTION	YES	NO	N/A	If NO Why?
9.3	Tools and cords in good condition & free of defects?				
9.4	All mechanical safeguards in place?				
9.5	Ground fault protection being utilized?				
10.0	**Electrical: 1926, Subpart K**				
10.1	Electrical work performed by qualified persons?				
10.2	Energized work permit in place prior to start of work?				
10.3	Arc Flash requirements known an in place?				
10.4	Adequate wiring, well-insulated, no frayed cords?				
10.5	GFCIs used for all outdoor/wet locations?				
10.6	Are extension cords 3-prong and designed for extra hard usage?				
10.7	Flexible cords inspected daily and protected from damage by equipment, materials, or structures?				
10.8	**Scaffolds 1926 Subpart L**				
10.9	Designated scaffold competent person oversees erection, dismantling and moving of scaffold?				
10.10	Scaffolds erected level on base plates and mud sills on a firm foundation?				
10.11	Cross bracing, top rails, mid-rails, toe boards in place?				
10.12	Planks overlap 6"-12" over end with toe boards?				
10.13	Scaffolds > 4 times the height vs. width secured in place or outriggers used?				
10.14	Area beneath scaffold barricaded with "construction area do not enter" signs in place.				
10.15	Safe access provided to each level?				
10.16	Casters on rolling scaffolds locked while in use?				
11.0	**Fall Protection and Roofing 1926 Subpart M**				
11.1	Have all workers above the six foot fall protection threshold been protected from falling to a lower level?				
11.2	Effective rescue plan is in place that uses a buddy system?				
11.3	Employees trained to specific fall protection system in use by competent person?				
11.4	Designated competent person on site?				
11.5	Has a daily inspection been completed by the competent person for roofing work?				
11.6	Kettles a minimum of 25 feet from buildings, tanks etc.				
11.7	Kettle attendant wearing assigned personal protective equipment?				
11.8	Two fire extinguishers located at the kettle?				
11.9	Fuel cylinders at least 10 ft. from open flame?				
11.10	If warning lines used for low slope roofs are they properly installed and maintained?				
12.0	**Excavations 1926 Subpart P**				
12.1	Designated competent person able to demonstrate training, experience, and knowledge of soil analysis and protective systems and authority to stop work.				
12.2	Daily inspection by competent person performed?				
12.3	Ladder provided every 25 feet when trench is over 4 feet deep and 2 means of egress?				
12.4	Spoil pile at least 2 feet from edge of excavation				

	DESCRIPTION	YES	NO	N/A	If NO Why?
12.5	Over 5 feet trench is properly sloped and/or shored.				
12.6	Water controlled or removed?				
12.7	Perimeter protection that meets Class I, Class II, or Class III requirements provided?				
13.0	**Stairways and Ladders 1926 Subpart X**				
13.1	Ladders extend 3 ft. above landing platform and secured?				
13.2	Ladders at proper ¼ distance from structure				
13.3	All flights of stairs over 4 or more risers have hand rails				
13.4	Ladders inspected before use?				
13.5	3 points of contact rule observed?				
13.6	No carrying of tools up or down ladders?				
13.7	No work off of top of step ladders?				
14.0	**Others**				
14.1	Are environmentally sensitive areas, equipment, or storage clearly identified and controlled?				

Supervisor Signature: _____ Date: _____

Project Title: Heating Oil Spill Site Investigation
Building 419 Fort Stewart, Georgia
Project No. E0209.0029

SPECPRO ENVIRONMENTAL SERVICES LLC
DRILL RIG CHECKLIST

Site Name: _____

Equipment Type (Model and Manufacturer):_____

Serial Number:_____ Owner of Rig:_____

Inspection Performed by:_____
(Driller's Signature) (Date)

Checklist Reviewed and Emergency
Shutdown Observed by:_____
(Signature) (Date)

1.0 GENERAL

1.1 Check all safety devices that are part of drill rig and can be verified (* see note). Are all devices intact and operating as designed? Yes ☐ No ☐

Emergency Interrupt System

A.	Kill Switch 1	Yes ☐	No ☐	N/A ☐
B.	Kill Switch 2	Yes ☐	No ☐	N/A ☐
C.	Kill Switch 3	Yes ☐	No ☐	N/A ☐
D.	Kill Switch 4	Yes ☐	No ☐	N/A ☐
E.	Kill Switch 5	Yes ☐	No ☐	N/A ☐
F.	Other _____	Yes ☐	No ☐	N/A ☐
G.	Other _____	Yes ☐	No ☐	N/A ☐
H.	Other _____	Yes ☐	No ☐	N/A ☐

* Note: All safety devices not otherwise listed in this checklist should be identified for each drill rig at the beginning of each project and subsequently checked at each inspection. Testing of all safety devices must be observed by health and safety personnel. List only safety devices that can be checked without disassembly or without rendering the device ineffective. This checklist does not cover U.S. Department of Transportation requirements.

1.2	Is the proper type and capacity of fire extinguisher(s) present properly charged, and inspected?	Yes ☐	No ☐	N/A☐
1.3	Is rig properly grounded?	Yes ☐	No ☐	N/A☐
1.4	Are rig and mast a safe distance from electrical lines?	Yes ☐	No ☐	N/A☐
1.5	Can mast be raised without encountering overhead obstruction?	Yes ☐	No ☐	N/A☐
1.6	Have spill prevention materials been placed under rig (i.e. plastic sheeting)?	Yes ☐	No ☐	N/A☐
1.7	Is a spill kit present?	Yes ☐	No ☐	N/A☐
1.8	Is the safe operating zone/exclusion zone posted (minimum radius at least equal to height of raised drill mast)?	Yes ☐	No ☐	N/A☐
1.9	Do all modifications made to the drill rig permit it to operate in a safe manner and allow the drill to operate within the manufacturer's specifications?	Yes ☐	No ☐	N/A☐
1.10	Are moving parts (excluding cathead) properly guarded?	Yes ☐	No ☐	N/A☐
1.11	Are all exhaust pipes, which could come into contact with personnel during normal operations properly guarded?	Yes ☐	No ☐	N/A☐
1.12	Are tank(s) and lines free of leakage?	Yes ☐	No ☐	N/A☐
1.13	Have all normal or manufacturer-recommended maintenance activities been performed at the appropriate frequency?	Yes ☐	No ☐	N/A☐
1.14	Are walking and standing surfaces, steps, rungs, etc. free of substances (excess grease, oil, or mud) that could create a hazard?	Yes ☐	No ☐	N/A☐

2.0 CONTROL MECHANISMS

	Are all control mechanisms and gauges on the drill rig functional and free of grease, oil and ice (checked while running)?	Yes ☐	No ☐	N/A☐

3.0 HYDRAULICS AND PNEUMATICS

Note: The mast should be lowered during the completion of this section to allow inspection of portions of the lifting mechanisms normally out of reach during operation.

3.1	Do all hydraulic reservoirs have proper fluid levels?	Yes ☐	No ☐	N/A☐
3.2	Are hydraulic and/or pneumatic systems in good condition and functioning correctly (checked while running)?	Yes ☐	No ☐	N/A☐

4.0 LIFTING MECHANISMS

Note: The mast should be lowered during the completion of this section to allow inspection of portions of the lifting mechanisms normally out of reach during operation.

4.1	Have all wires, ropes, cables, and lines that are kinked, worn, corroded, cracked, bent, crushed, frayed, stretched, birdcaged, or otherwise damaged been replaced and the defective equipment removed from the site?	Yes ☐	No ☐	N/A☐
4.2	Have all wires, ropes, cables, and lines been wrapped around winch drums without excessive pinching or binding?	Yes ☐	No ☐	N/A☐
4.3	Are all pulleys undamaged & functional?	Yes ☐	No ☐	N/A☐
4.4	Are all clips, clamps, clevises, hooks or other hardware used to rig wires, ropes, cables, or lines undamaged and attached properly?	Yes ☐	No ☐	N/A☐
4.5	Do all eyes formed in wires, ropes, cables, or lines attached to the rig use a thimble to retail the shape of the eye?	Yes ☐	No ☐	N/A☐
4.6	Do all hooks have functioning safety gates/latches?	Yes ☐	No ☐	N/A☐

5.0 NONCONFORMING ITEMS

5.1 When did the last operation checklist inspection take place for this drill rig at this site?
Date: _____

5.2 Have any nonconforming items been carried over from the last inspection? List any items and dates of original nonconformance.

A. _____

Date:_____

B. _____

Date:_____

C. _____

Date:_____

D. _____

Date:_____

Any nonconforming items must be documented in the following remarks section and reported to the Site Superintendent and/or the SSHO for the project prior to operating the drill rig. Reference all remarks to the item numbers noted above.

Remarks:

_____

_____

_____

_____

Safety and Health Self-Assessment Checklist - DRILLING

This checklist shall be used by SES personnel **only** and shall be completed at the frequency specified in the project's APP/SHSP.

This checklist is to be used at locations where: 1) SES employees are potentially exposed to hazards associated with drilling operations (complete Sections 1 and 3), and/or 2) SES oversight of a drilling subcontractor is required (complete entire checklist).

SC may consult with drilling subcontractors when completing this checklist, but shall not direct the means and methods of drilling operations nor direct the details of corrective actions. Drilling subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

Completed checklists shall be sent to the health and safety manager for review.

Project Name: _____ Project No.: _____

Location: _____ PM: _____

Auditor: _____ Title: _____ Date: _____

This specific checklist has been completed to:

☐ Evaluate SES employee exposures to drilling hazards
☐ Evaluate a SES subcontractor's compliance with drilling HS&E requirements
Subcontractors Name: _____

- Check "Yes" if an assessment item is complete/correct.
- Check "No" if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the drilling subcontractor. Section 3 must be completed for all items checked "No."
- Check "N/A" if an item is not applicable.
- Check "N/O" if an item is applicable but was not observed during the assessment.

SECTION 1	Yes	No	N/A	N/O
PERSONNEL SAFE WORK PRACTICES				
1. Only authorized personnel operating drill rig	☐	☐	☐	☐
2. Personnel cleared during rig startup	☐	☐	☐	☐
3. Personnel clear of rotating parts	☐	☐	☐	☐
4. Personnel not positioned under hoisted loads	☐	☐	☐	☐
5. Loose clothing and jewelry removed	☐	☐	☐	☐
6. Personnel instructed not to approach equipment that has become electrically energized	☐	☐	☐	☐
7. Smoking is prohibited around drilling operation	☐	☐	☐	☐
8. Personnel wearing appropriate PPE, per APP/SHSP	☐	☐	☐	☐

Safety and Health Self-Assessment Checklist - DRILLING

SECTION 2	Yes	No	N/A	N/O
GENERAL				
9. Aquifer evaluated for contamination, sole source and wellhead protection	☐	☐	☐	☐
10. Daily safety briefing/meeting conducted with crew	☐	☐	☐	☐
11. Daily inspection of drill rig and equipment conducted before use	☐	☐	☐	☐
DRILL RIG PLACEMENT				
12. Location of underground utilities identified	☐	☐	☐	☐
13. Safe clearance distance maintained from overhead powerlines	☐	☐	☐	☐
14. Drilling pad established, when necessary	☐	☐	☐	☐
15. Drill rig leveled and stabilized	☐	☐	☐	☐
DRILL RIG TRAVEL				
16. Rig shut down and mast lowered and secured prior to rig movement	☐	☐	☐	☐
17. Tools and equipment secured prior to rig movement	☐	☐	☐	☐
18. Only personnel seated in cab are riding on rig during movement	☐	☐	☐	☐
19. Safe clearance distance maintained while traveling under overhead powerlines	☐	☐	☐	☐
20. Backup alarm or spotter used when backing rig	☐	☐	☐	☐
DRILL RIG OPERATION				
21. Kill switch clearly identified and operational	☐	☐	☐	☐
22. All machine guards are in place	☐	☐	☐	☐
23. Rig ropes not wrapped around body parts	☐	☐	☐	☐
24. Pressurized lines and hoses secured from whipping hazards	☐	☐	☐	☐
25. Drill operation stopped during inclement weather	☐	☐	☐	☐
26. Air monitoring conducted per APP/SHSP for hazardous atmospheres	☐	☐	☐	☐
27. Rig placed in neutral when operator not at controls	☐	☐	☐	☐
DRILL RIG MAINTENANCE				
28. Defective components repaired immediately	☐	☐	☐	☐
29. Lockout/tagout procedures used prior to maintenance	☐	☐	☐	☐
30. Cathead in clean, sound condition	☐	☐	☐	☐
31. Drill rig ropes in clean, sound condition	☐	☐	☐	☐
32. Fall protection used for fall exposures of 6 feet or greater	☐	☐	☐	☐
33. Rig in neutral and augers stopped rotating before cleaning	☐	☐	☐	☐
34. Good housekeeping maintained on and around rig	☐	☐	☐	☐
DRILLING WASTE MANAGEMENT				
35. Drill cuttings and purge water managed and disposed properly	☐	☐	☐	☐
DRILLING AT HAZARDOUS WASTE SITES				
36. Waste disposed of according to APP/SHSP and RCRA regulations	☐	☐	☐	☐
37. Appropriate decontamination procedures being followed, per APP/SHSP	☐	☐	☐	☐
FORMS/PERMITS				
38. Driller license/certification and drill rig permit obtained	☐	☐	☐	☐
39. Well development/abandonment notifications and logs submitted and in project files	☐	☐	☐	☐
40. Water withdrawal permit obtained, where required	☐	☐	☐	☐
41. Dig permit obtained, where required	☐	☐	☐	☐

Safety and Health Self-Assessment Checklist - DRILLING

SECTION 3

Complete this section for all items checked "No" in Sections 1 or 2. Deficient items must be corrected in a timely manner.

Item #	Corrective Action Planned/Taken	Date Corrected

Project Title: Heating Oil Spill Site Investigation
Building 419 Fort Stewart, Georgia
Project No. E0209.0029

AIR MONITORING LOG

Date	Time	Activity	Location	LEL	02	CO	H2S	VOC

Project Title: Heating Oil Spill Site Investigation
Building 419 Fort Stewart, Georgia
Project No. E0209.0029

DEFICIENCY TRACKING LOG
CONTRACT NO.

Deficiency Description	Initial Report		Scheduled		When Corrected		Remarks
	Report #	Date*	Report #	Date*	Report #	Date**	

*Include initials of who identified deficiency
**Include initials of who corrected deficiency

Log Prepared By _____

Attachment 2

Chemical Inventory

Material Safety Data Sheets

Gasoline
Diesel
Motor Oil
Heating Oil
Hydraulic Oil
Lubricating Grease
Benzene
Toluene
Ethylbenzene
Xylene
Methyl Tert-Butyl Ether
Alconox
ECOVAC Formulated Surfactant (EFS™)

Project Title: Heating Oil Spill Site Investigation
Building 419 Fort Stewart, Georgia
Project No. E0209.0029

CHEMICAL-SPECIFIC TRAINING FORM

Location:	Project # :
Hazard Communication Coordinator:	Trainer:

TRAINING PARTICIPANTS:

NAME	SIGNATURE	NAME	SIGNATURE

REGULATED PRODUCTS/TASKS COVERED BY THIS TRAINING:

The HCC shall use the product MSDS to provide the following information concerning each of the products listed above.

☐ Physical and health hazards

☐ Control measures that can be used to provide protection (including appropriate work practices, emergency procedures, and personal protective equipment to be used)

☐ Methods and observations used to detect the presence or release of the regulated product in the workplace (including periodic monitoring, continuous monitoring devices, visual appearance or odor of regulated product when being released, etc.)

Training participants shall have the opportunity to ask questions concerning these products and, upon completion of this training, will understand the product hazards and appropriate control measures available for their protection.

Copies of MSDSs, chemical inventories, and SES's written hazard communication program shall be made available for employee review in the facility/project hazard communication file.

Project Title: Heating Oil Spill Site Investigation
Building 419 Fort Stewart, Georgia
Project No. E0209.0029

CHEMICAL INVENTORY/REGISTER FORM

Location:
Hazard Communication Coordinator (HCC):
☐ Office ☐ Warehouse ☐ Laboratory ☒ Project:
Project No.:

Regulated Product	Location	Container labeled (✓if yes)	MSDS available (✓if yes)

MSDS for the listed products will be maintained at:

MATERIAL SAFETY DATA SHEET

Gasoline, All Grades **MSDS No. 9950**

EMERGENCY OVERVIEW

DANGER!

EXTREMELY FLAMMABLE - EYE AND MUCOUS MEMBRANE IRRITANT - EFFECTS CENTRAL NERVOUS SYSTEM - HARMFUL OR FATAL IF SWALLOWED - ASPIRATION HAZARD



NFPA 704 (Section 16)

High fire hazard. Keep away from heat, spark, open flame, and other ignition sources.

If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs). Contact may cause eye, skin and mucous membrane irritation. Harmful if absorbed through the skin. Avoid prolonged breathing of vapors or mists. Inhalation may cause irritation, anesthetic effects (dizziness, nausea, headache, intoxication), and respiratory system effects.

Long-term exposure may cause effects to specific organs, such as to the liver, kidneys, blood, nervous system, and skin. Contains benzene, which can cause blood disease, including anemia and leukemia.

1. CHEMICAL PRODUCT and COMPANY INFORMATION

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

EMERGENCY TELEPHONE NUMBER (24 hrs): **CHEMTREC (800)424-9300**
COMPANY CONTACT (business hours): Corporate Safety (732)750-6000
MSDS (Environment, Health, Safety) Internet Website www.hess.com

SYNONYMS: Hess Conventional (Oxygenated and Non-oxygenated) Gasoline; Reformulated Gasoline (RFG); Reformulated Gasoline Blendstock for Oxygenate Blending (RBOB); Unleaded Motor or Automotive Gasoline

See Section 16 for abbreviations and acronyms.

2. COMPOSITION and INFORMATION ON INGREDIENTS *

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Gasoline (86290-81-5)	100
Benzene (71-43-2)	0.1 - 4.9 (0.1 - 1.3 reformulated gasoline)
n-Butane (106-97-8)	< 10
Ethyl Alcohol (Ethanol) (64-17-5)	0 - 10
Ethyl benzene (100-41-4)	< 3
n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Tertiary-amyl methyl ether (TAME) (994-05-8)	0 to 17.2
Toluene (108-88-3)	1 - 25
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 - 15

A complex blend of petroleum-derived normal and branched-chain alkane, cycloalkane, alkene, and aromatic hydrocarbons. May contain antioxidant and multifunctional additives. Non-oxygenated Conventional Gasoline and RBOB do not have oxygenates (Ethanol or MTBE and/or TAME).

Oxygenated Conventional and Reformulated Gasoline will have oxygenates for octane enhancement or as legally required.

3. HAZARDS IDENTIFICATION

EYES
Moderate irritant. Contact with liquid or vapor may cause irritation.

SKIN
Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed repeatedly.

INGESTION
The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

INHALATION
Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

CHRONIC EFFECTS and CARCINOGENICITY
Contains benzene, a regulated human carcinogen. Benzene has the potential to cause anemia and other blood diseases, including leukemia, after repeated and prolonged exposure. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with systemic toxicity. See also Section 11 - Toxicological Information.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash). Chronic respiratory disease, liver or kidney dysfunction, or pre-existing central nervous system disorders may be aggravated by exposure.

4. FIRST AID MEASURES

EYES
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

SKIN
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

INGESTION

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

INHALATION
Remove person to fresh air. If person is not breathing, ensure an open airway and provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT:	-45 °F (-43°C)
AUTOIGNITION TEMPERATURE:	highly variable; > 530 °F (>280 °C)
OSHA/NFPA FLAMMABILITY CLASS:	1A (flammable liquid)
LOWER EXPLOSIVE LIMIT (%):	1.4%
UPPER EXPLOSIVE LIMIT (%):	7.6%

FIRE AND EXPLOSION HAZARDS
Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

EXTINGUISHING MEDIA
SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

During certain times of the year and/or in certain geographical locations, gasoline may contain MTBE and/or TAME. Firefighting foam suitable for polar solvents is recommended for fuel with greater than 10% oxygenate concentration - refer to NFPA 11 "Low Expansion Foam - 1994 Edition."

FIRE FIGHTING INSTRUCTIONS
Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.

6. ACCIDENTAL RELEASE MEASURES

ACTIVATE FACILITY SPILL CONTINGENCY or EMERGENCY PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

7. HANDLING and STORAGE

HANDLING PRECAUTIONS

******USE ONLY AS A MOTOR FUEL******
******DO NOT SIPHON BY MOUTH******

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents.

STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

WORK/HYGIENIC PRACTICES

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

8. EXPOSURE CONTROLS and PERSONAL PROTECTION

EXPOSURE LIMITS

Component (CAS No.)	Source	Exposure Limits TWA (ppm)	STEL (ppm)	Note
Gasoline (86290-81-5)	ACGIH	300	500	A3
Benzene (71-43-2)	OSHA	1	5	Carcinogen
	ACGIH	0.5	2.5	A1, skin
	USCG	1	5	
n-Butane (106-97-8)	ACGIH	1000	--	Aliphatic Hydrocarbon Gases Alkane (C1-C4)
Ethyl Alcohol (ethanol) (64-17-5)	OSHA	1000	--	
	ACGIH	1000	--	A4
Ethyl benzene (100-41-4)	OSHA	100	--	
	ACGIH	100	125	A3
n-Hexane (110-54-3)	OSHA	500	--	
	ACGIH	50	--	Skin
Methyl-tertiary butyl ether [MTBE] (1634-04-4)	ACGIH	50		A3
Tertiary-amyl methyl ether [TAME] (994-05-8)				None established
Toluene (108-88-3)	OSHA	200		Ceiling: 300 ppm; Peak: 500 ppm (10 min.)
	ACGIH	20	--	A4
1,2,4- Trimethylbenzene (95-63-6)	ACGIH	25	--	
Xylene, mixed isomers (1330-20-7)	OSHA	100	--	
	ACGIH	100	150	A4

ENGINEERING CONTROLS

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

EYE/FACE PROTECTION

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION

Gloves constructed of nitrile or neoprene are recommended. Chemical protective clothing such as that made of of E.I. DuPont Tychem ®, products or equivalent is recommended based on degree of exposure.

Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION

A NIOSH-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection and limitations.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE

A translucent, straw-colored or light yellow liquid

ODOR
A strong, characteristic aromatic hydrocarbon odor. Oxygenated gasoline with MTBE and/or TAME may have a sweet, ether-like odor and is detectable at a lower concentration than non-oxygenated gasoline.

ODOR THRESHOLD

	Odor Detection	Odor Recognition
Non-oxygenated gasoline:	0.5 - 0.6 ppm	0.8 - 1.1 ppm
Gasoline with 15% MTBE:	0.2 - 0.3 ppm	0.4 - 0.7 ppm
Gasoline with 15% TAME:	0.1 ppm	0.2 ppm

BASIC PHYSICAL PROPERTIES

BOILING RANGE:	85 to 437 °F (39 to 200 °C)
VAPOR PRESSURE:	6.4 - 15 RVP @ 100 °F (38 °C) (275-475 mm Hg @ 68 °F (20 °C)
VAPOR DENSITY (air = 1):	AP 3 to 4
SPECIFIC GRAVITY (H_2O = 1):	0.70 – 0.78
EVAPORATION RATE:	10-11 (n-butyl acetate = 1)
PERCENT VOLATILES:	100 %
SOLUBILITY (H_2O):	Non-oxygenated gasoline - negligible (< 0.1% @ 77 °F). Gasoline with 15% MTBE - slight (0.1 - 3% @ 77 °F); ethanol is readily soluble in water

10. STABILITY and REACTIVITY)
STABILITY: Stable. Hazardous polymerization will not occur.

CONDITIONS TO AVOID
Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources

INCOMPATIBLE MATERIALS
Keep away from strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS
Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitrocresols that can decompose violently.

11. TOXICOLOGICAL PROPERTIES
ACUTE TOXICITY
Acute Dermal LD50 (rabbits): > 5 ml/kg
Acute Oral LD50 (rat): 18.75 ml/kg
Primary dermal irritation (rabbits): slightly irritating
Draize eye irritation (rabbits): non-irritating
Guinea pig sensitization: negative

CHRONIC EFFECTS AND CARCINOGENICITY
Carcinogenicity: OSHA: NO IARC: YES - 2B NTP: NO ACGIH: YES (A3)

IARC has determined that gasoline and gasoline exhaust are possibly carcinogenic in humans. Inhalation exposure to completely vaporized unleaded gasoline caused kidney cancers in male rats and liver tumors in female mice. The U.S. EPA has determined that the male kidney tumors are species-specific and are irrelevant for human health risk assessment. The significance of the tumors seen in female mice is not known. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with effects to the central and peripheral nervous systems, liver, and kidneys. The significance of these animal models to predict similar human response to gasoline is uncertain.

This product contains benzene. Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-forming system (particularly bone marrow), and serious blood disorders such as aplastic anemia and leukemia. Benzene is listed as a human carcinogen by the NTP, IARC, OSHA and ACGIH.

This product may contain methyl tertiary butyl ether (MTBE): animal and human health effects studies indicate that MTBE may cause eye, skin, and respiratory tract irritation, central nervous system depression and neurotoxicity. MTBE is classified as an animal carcinogen (A3) by the ACGIH.

12. ECOLOGICAL INFORMATION

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations. If released, oxygenates such as ethers and alcohols will be expected to exhibit fairly high mobility in soil, and therefore may leach into groundwater. The API (www.api.org) provides a number of useful references addressing petroleum and oxygenate contamination of groundwater.

13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options.

14. TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME:	Gasoline
DOT HAZARD CLASS and PACKING GROUP:	3, PG II
DOT IDENTIFICATION NUMBER:	UN 1203
DOT SHIPPING LABEL:	FLAMMABLE LIQUID

PLACARD:



15. REGULATORY INFORMATION

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other federal, state, or local regulations; consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a “petroleum exclusion” clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

ACUTE HEALTH	CHRONIC HEALTH	FIRE	SUDDEN RELEASE OF PRESSURE	REACTIVE
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

INGREDIENT NAME (CAS NUMBER)	CONCENTRATION WT. PERCENT
Benzene (71-43-2)	0.1 to 4.9 (0.1 to 1.3 for reformulated gasoline)
Ethyl benzene (100-41-4)	< 3

n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Toluene (108-88-3)	1 to 15
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 to 15

US EPA guidance documents (www.epa.gov/tri) for reporting Persistent Bioaccumulating Toxics (PBTs) indicate this product may contain the following deminimis levels of toxic chemicals subject to Section 313 reporting:

INGREDIENT NAME (CAS NUMBER)	CONCENTRATION - Parts per million (ppm) by weight
Polycyclic aromatic compounds (PACs)	17
Benzo (g,h,i) perylene (191-24-2)	2.55
Lead (7439-92-1)	0.079

CALIFORNIA PROPOSITION 65 LIST OF CHEMICALS

This product contains the following chemicals that are included on the Proposition 65 "List of Chemicals" required by the California Safe Drinking Water and Toxic Enforcement Act of 1986:

INGREDIENT NAME (CAS NUMBER)	Date Listed
Benzene	2/27/1987
Ethyl benzene	6/11/2004
Toluene	1/1/1991

CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 2 (Flammable Liquid)
Class D, Division 2A (Very toxic by other means) and Class D, Division 2B (Toxic by other means)

16. OTHER INFORMATION

NFPA® HAZARD RATING	HEALTH:	1	Slight
	FIRE:	3	Serious
	REACTIVITY:	0	Minimal
HMIS® HAZARD RATING	HEALTH:	1 *	Slight
	FIRE:	3	Serious
	PHYSICAL:	0	Minimal
			* CHRONIC

SUPERSEDES MSDS DATED: 07/01/06

ABBREVIATIONS:

AP = Approximately	< = Less than	> = Greater than
N/A = Not Applicable	N/D = Not Determined	ppm = parts per million

ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists	CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act
AIHA	American Industrial Hygiene Association	DOT	U.S. Department of Transportation [General Info: (800)467-4922]
ANSI	American National Standards Institute (212)642-4900	EPA	U.S. Environmental Protection Agency
API	American Petroleum Institute (202)682-8000	HMIS	Hazardous Materials Information System

IARC	International Agency For Research On Cancer
MSHA	Mine Safety and Health Administration
NFPA	National Fire Protection Association (617)770-3000
NIOSH	National Institute of Occupational Safety and Health
NOIC	Notice of Intended Change (proposed change to ACGIH TLV)
NTP	National Toxicology Program
OPA	Oil Pollution Act of 1990
OSHA	U.S. Occupational Safety & Health Administration
PEL	Permissible Exposure Limit (OSHA)
RCRA	Resource Conservation and Recovery Act
REL	Recommended Exposure Limit (NIOSH)
SARA	Superfund Amendments and Reauthorization Act of 1986 Title III
SCBA	Self-Contained Breathing Apparatus
SPCC	Spill Prevention, Control, and Countermeasures
STEL	Short-Term Exposure Limit (generally 15 minutes)
TLV	Threshold Limit Value (ACGIH)
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average (8 hr.)
WEEL	Workplace Environmental Exposure Level (AIHA)
WHMIS	Workplace Hazardous Materials Information System (Canada)

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

Safety Data Sheet

Material Name: Diesel Fuel, All Types

SDS No. 9909
US GHS

Synonyms: Ultra Low Sulfur Diesel; Low Sulfur Diesel; No. 2 Diesel; Motor Vehicle Diesel Fuel; Non-Road Diesel Fuel; Locomotive/Marine Diesel Fuel

* * * Section 1 - Product and Company Identification * * *

Manufacturer Information

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

Phone: 732-750-6000 Corporate EHS
Emergency # 800-424-9300 CHEMTREC
www.hess.com (Environment, Health, Safety Internet Website)

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Flammable Liquids - Category 3
Skin Corrosion/Irritation – Category 2
Germ Cell Mutagenicity – Category 2
Carcinogenicity - Category 2
Specific Target Organ Toxicity (Single Exposure) - Category 3 (respiratory irritation, narcosis)
Aspiration Hazard – Category 1
Hazardous to the Aquatic Environment, Acute Hazard – Category 3

GHS LABEL ELEMENTS

Symbol(s)



Signal Word

DANGER

Hazard Statements

Flammable liquid and vapor.
Causes skin irritation.
Suspected of causing genetic defects.
Suspected of causing cancer.
May cause respiratory irritation.
May cause drowsiness or dizziness.
May be fatal if swallowed and enters airways.
Harmful to aquatic life.

Precautionary Statements

Prevention

Keep away from heat/sparks/open flames/hot surfaces. No smoking
Keep container tightly closed.
Ground/bond container and receiving equipment.

Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/protective clothing/eye protection/face protection.
Wash hands and forearms thoroughly after handling.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Avoid breathing fume/mist/vapours/spray.

Response
In case of fire: Use water spray, fog or foam to extinguish.
IF ON SKIN (or hair): Wash with plenty of soap and water. Remove/Take off immediately all contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical advice/attention.
IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor if you feel unwell.
If swallowed: Immediately call a poison center or doctor. Do NOT induce vomiting.
IF exposed or concerned: Get medical advice/attention.

Storage
Store in a well-ventilated place. Keep cool.
Keep container tightly closed.
Store locked up.

Disposal
Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
68476-34-6	Fuels, diesel, no. 2	100
91-20-3	Naphthalene	<0.1

A complex mixture of hydrocarbons with carbon numbers in the range C9 and higher.

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

First Aid: Skin
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or with waterless hand cleanser. Obtain medical attention if irritation or redness develops. Thermal burns require immediate medical attention depending on the severity and the area of the body burned.

First Aid: Ingestion
DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

First Aid: Inhalation

Remove person to fresh air. If person is not breathing, provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

Hazardous Combustion Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

Extinguishing Media

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, and other gaseous agents.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

Unsuitable Extinguishing Media

None

Fire Fighting Equipment/Instructions

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment. Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing. Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

* * * Section 6 - Accidental Release Measures * * *

Recovery and Neutralization

Carefully contain and stop the source of the spill, if safe to do so.

Materials and Methods for Clean-Up

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Caution, flammable vapors may accumulate in closed containers.

Emergency Measures

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Personal Precautions and Protective Equipment

Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

Environmental Precautions

Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Prevention of Secondary Hazards

None

* * * Section 7 - Handling and Storage * * *

Handling Procedures

Handle as a combustible liquid. Keep away from heat, sparks, excessive temperatures and open flame! No smoking or open flame in storage, use or handling areas. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents."

Storage Procedures

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks."

Incompatibilities

Keep away from strong oxidizers.

* * * Section 8 - Exposure Controls / Personal Protection * * *

Component Exposure Limits

Fuels, diesel, no. 2 (68476-34-6)

ACGIH: 100 mg/m3 TWA (inhalable fraction and vapor, as total hydrocarbons, listed under Diesel fuel)
Skin - potential significant contribution to overall exposure by the cutaneous route (listed under Diesel fuel)

Naphthalene (91-20-3)

ACGIH: 10 ppm TWA
15 ppm STEL
Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA: 10 ppm TWA; 50 mg/m3 TWA
NIOSH: 10 ppm TWA; 50 mg/m3 TWA
15 ppm STEL; 75 mg/m3 STEL

Engineering Measures

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

Personal Protective Equipment: Respiratory

A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

Personal Protective Equipment: Hands

Gloves constructed of nitrile, neoprene, or PVC are recommended.

Personal Protective Equipment: Eyes

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

Personal Protective Equipment: Skin and Body

Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Clear, straw-yellow.	**Odor:**	Mild, petroleum distillate odor
Physical State:	Liquid	**pH:**	ND
Vapor Pressure:	0.009 psia @ 70 °F (21 °C)	**Vapor Density:**	>1.0
Boiling Point:	320 to 690 °F (160 to 366 °C)	**Melting Point:**	ND
Solubility (H2O):	Negligible	**Specific Gravity:**	0.83-0.876 @ 60°F (16°C)
Evaporation Rate:	Slow; varies with conditions	**VOC:**	ND
Percent Volatile:	100%	**Octanol/H2O Coeff.:**	ND
Flash Point:	>125 °F (>52 °C) minimum	**Flash Point Method:**	PMCC
Upper Flammability Limit (UFL):	7.5	**Lower Flammability Limit (LFL):**	0.6
Burning Rate:	ND	**Auto Ignition:**	494°F (257°C)

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources.

Incompatible Products

Keep away from strong oxidizers.

Hazardous Decomposition Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

* * * Section 11 - Toxicological Information * * *

Acute Toxicity

A: General Product Information

Harmful if swallowed.

B: Component Analysis - LD50/LC50

Naphthalene (91-20-3)

Inhalation LC50 Rat >340 mg/m3 1 h; Oral LD50 Rat 490 mg/kg; Dermal LD50 Rat >2500 mg/kg; Dermal LD50 Rabbit >20 g/kg

Potential Health Effects: Skin Corrosion Property/Stimulativeness

Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

Potential Health Effects: Eye Critical Damage/ Stimulativeness

Contact with eyes may cause mild irritation.

Potential Health Effects: Ingestion

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

Potential Health Effects: Inhalation

Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

Respiratory Organs Sensitization/Skin Sensitization

This product is not reported to have any skin sensitization effects.

Generative Cell Mutagenicity

This material has been positive in a mutagenicity study.

Carcinogenicity

A: General Product Information

Suspected of causing cancer.

Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.

B: Component Carcinogenicity

Fuels, diesel, no. 2 (68476-34-6)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans (listed under Diesel fuel)

Naphthalene (91-20-3)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
NTP: Reasonably Anticipated To Be A Human Carcinogen (Possible Select Carcinogen)
IARC: Monograph 82 [2002] (Group 2B (possibly carcinogenic to humans))

Reproductive Toxicity

This product is not reported to have any reproductive toxicity effects.

Specified Target Organ General Toxicity: Single Exposure

This product is not reported to have any specific target organ general toxicity single exposure effects.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ general toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Fuels, diesel, no. 2 (68476-34-6)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	35 mg/L [flow-through]	

Naphthalene (91-20-3)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	5.74-6.44 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	1.6 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	0.91-2.82 mg/L [static]	
96 Hr LC50 Pimephales promelas	1.99 mg/L [static]	

96 Hr LC50 Lepomis macrochirus	31.0265 mg/L [static]
72 Hr EC50 Skeletonema costatum	0.4 mg/L
48 Hr LC50 Daphnia magna	2.16 mg/L
48 Hr EC50 Daphnia magna	1.96 mg/L [Flow through]
48 Hr EC50 Daphnia magna	1.09 - 3.4 mg/L [Static]

Persistence/Degradability

No information available.

Bioaccumulation

No information available.

Mobility in Soil

No information available.

* * * Section 13 - Disposal Considerations * * *

Waste Disposal Instructions

See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

Disposal of Contaminated Containers or Packaging

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 14 - Transportation Information * * *

DOT Information

Shipping Name: Diesel Fuel
NA #: 1993 **Hazard Class:** 3 **Packing Group:** III
Placard:



* * * Section 15 - Regulatory Information * * *

Regulatory Information

Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Naphthalene (91-20-3)

CERCLA: 100 lb final RQ; 45.4 kg final RQ

SARA Section 311/312 – Hazard Classes

Acute Health	Chronic Health	Fire	Sudden Release of Pressure	Reactive
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product may contain listed chemicals below the de minimis levels which therefore are not subject to the supplier notification requirements of Section 313 of the Emergency Planning and Community Right- To-Know Act (EPCRA) of 1986 and of 40 CFR 372. If you may be required to report releases of chemicals listed in 40 CFR 372.28, you may contact Hess Corporate Safety if you require additional information regarding this product.

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Fuels, diesel, no. 2	68476-34-6	No	No	No	Yes	No	No
Naphthalene	91-20-3	Yes	Yes	Yes	Yes	Yes	No

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.

Component Analysis - WHMIS IDL

No components are listed in the WHMIS IDL.

Additional Regulatory Information

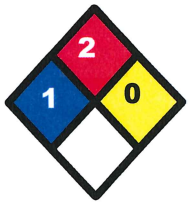
Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Fuels, diesel, no. 2	68476-34-6	Yes	DSL	EINECS
Naphthalene	91-20-3	Yes	DSL	EINECS

* * * Section 16 - Other Information * * *

NFPA® Hazard Rating

Health	1
Fire	2
Reactivity	0



HMIS® Hazard Rating

Health	1*	Slight
Fire	2	Moderate
Physical	0	Minimal
		*Chronic

Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists; ADG = Australian Code for the Transport of Dangerous Goods by Road and Rail; ADR/RID = European Agreement of Dangerous Goods by Road/Rail; AS = Standards Australia; DFG = Deutsche Forschungsgemeinschaft; DOT = Department of Transportation; DSL = Domestic Substances List; EEC = European Economic Community; EINECS = European Inventory of Existing Commercial Chemical Substances; ELINCS = European List of Notified Chemical Substances; EU = European Union; HMIS = Hazardous Materials Identification System; IARC = International Agency for Research on Cancer; IMO = International Maritime Organization; IATA = International Air Transport Association; MAK = Maximum Concentration Value in the Workplace; NDSL = Non-Domestic Substances List; NFPA = National Fire Protection Association; NOHSC = National Occupational Health & Safety Commission; NTP = National Toxicology Program; STEL = Short-term Exposure Limit; TDG = Transportation of Dangerous Goods; TLV = Threshold Limit Value; TSCA = Toxic Substances Control Act; TWA = Time Weighted Average

Literature References

None

Other Information

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

End of Sheet

MATERIAL SAFETY DATA SHEET

QUAKER STATE® PEAK PERFORMANCE CONVENTIONAL MOTOR OIL - ALL GRADES

1. PRODUCT AND COMPANY IDENTIFICATION

MSDS Number: 14938
Version Date: 07/16/02

Product Name: QUAKER STATE® PEAK PERFORMANCE CONVENTIONAL MOTOR OIL - ALL GRADES
Product Use: Engine oil
Synonyms: 5W-30, 10W-30, 10W-40, 20W-50, 15W-40

Company Information
SOPUS Products
P.O. Box 4427
Houston, TX 77210-4427
USA

Phone Numbers
Medical Emergency: 1-800-546-6040
Transportation Emergency (USA): 1-800-424-9300
Transportation Emergency (International): 1-703-527-3887 (Call Collect)
MSDS Assistance: 1-800-546-6227
Fax On Demand: 1-800-546-6227
Technical Assistance: 1-800-458-4998
Customer Service: 1-800-468-8397
Fax Number: 713-217-3181
Internet Address: www.MSDS.PZLQS.com

2. COMPONENT INFORMATION

Component	CAS No.	Weight Percent Range	Hazardous in Blend
HYDROTREATED HEAVY PARAFFINIC PETROLEUM DISTILLATES	64742-54-7	< 70	No
SOLVENT-DEWAXED HEAVY PARAFFINIC DISTILLATE	64742-65-0	< 70	No
DETERGENT/DISPERSANT	MIXTURE	5 - 10	No
VISCOSITY MODIFIER	9003-29-6	< 10	No
POUR POINT DEPRESSANT	MIXTURE	< 2	No

Under normal conditions of use or in a foreseeable emergency, this product does not meet the definition of a hazardous chemical when evaluated according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Other: No information available

3. HAZARDS IDENTIFICATION

Emergency and Hazards Overview
CAUTION: Contains Petroleum Lubricant. Repeated skin contact can cause skin disorders.

ATTENTION: Used motor oil is a possible skin cancer hazard based on animal data. Repeated exposure to oil mist in excess of the OSHA limit (5mg/m3) can result in accumulation of oil droplets in pulmonary tissue.

NFPA Ratings: **Health** 1 **Flammability** 1 **Reactivity** 0

Primary Route of Exposure: **Skin** X **Inhalation** -- **Eye** X

Health Effect Information
Eye Contact: This product is practically non-irritating to the eyes upon direct contact. Based on testing of similar products and/or components.

Skin Contact: Avoid skin contact. This product is minimally irritating to the skin upon direct contact. Based on testing of similar products and/or components. Prolonged or repeated contact may result in contact dermatitis which is characterized by dryness, chapping, and reddening. Prolonged or repeated contact may result in oil acne which is characterized by blackheads with possible secondary infection. Avoid prolonged and repeated skin contact with used motor oils. See Section 11 - Toxicological Information.

Inhalation: This product has a low vapor pressure and is not expected to present an inhalation hazard at ambient conditions. Caution should be taken to prevent aerosolization or misting of this product. On rare occasions, prolonged and repeated exposure to oil mist poses a risk of pulmonary disease such as chronic lung inflammation. Signs of respiratory effects vary with concentration and length of exposure and include nasal discharge, sore throat, coughing, bronchitis, pulmonary edema and difficulty breathing. Shortness of breath and cough are the most common symptoms.

Ingestion: Do not ingest. This product is relatively non-toxic by ingestion. This product has laxative properties and may result in abdominal cramps and diarrhea. Exposure to a large single dose, or repeated smaller doses, may lead to lung aspiration, which can lead to lipid pneumonia or chronic lung inflammation. These are low-grade, chronic localized tissue reactions.

Medical Conditions Aggravated by Exposure: Drying and chapping may make the skin more susceptible to other irritants, sensitizers and disease.

Other: No information available

4. FIRST AID INFORMATION

Eye Contact: Immediately flush eyes with large amounts of water and continue flushing until irritation subsides. If material is hot, treat for thermal burns and seek immediate medical attention.

Skin Contact: No treatment is necessary under ordinary circumstances. Remove contaminated clothing. Wash contaminated area thoroughly with soap and water. If material is hot, submerge injured area in cold water. If victim is severely burned, remove to a hospital immediately.

Inhalation: This material has a low vapor pressure and is not expected to present an inhalation exposure at ambient conditions. If vapor or mist is generated when the material is heated, and the victim experiences signs of respiratory tract irritation, remove to fresh air.

Ingestion: No treatment is necessary under ordinary circumstances. Do not induce vomiting. If victim exhibits signs of lung aspiration such as coughing or choking, seek immediate medical assistance.

Notes to Physician: No information available

Other: No information available

5. FIRE AND EXPLOSION INFORMATION

Flammable Properties

Flash Point: 415 F, 212.8 C — **Test Method:** ASTM 3278 - Closed Cup

Flammable Limits in Air

Upper Percent: No data available

Lower Percent: No data available

Autoignition Temperature: No data available — **Test Method:** No information available

NFPA Classification: Class III-B combustible liquid

Extinguishing Media: Use dry chemical, foam, or carbon dioxide.

Fire Fighting Measures

Special Fire Fighting Procedures and Equipment: Water may be ineffective but can be used to cool containers exposed to heat or flame to prevent vapor pressure buildup and possible container rupture. Caution should be exercised when using water or foam as frothing may occur, especially if sprayed into containers of hot, burning liquid.

Unusual Fire and Explosion Conditions: Dense smoke may be generated while burning. Carbon monoxide, carbon dioxide, and other oxides may be generated as products of combustion.

Hazardous Combustion By-Products: None

Other: No information available

6. ACCIDENTAL RELEASE MEASURES

Personnel Safeguards: Consult Health Effect Information in Section 3, Personal Protection Information in Section 8, Fire and Explosion Information in Section 5, and Stability and Reactivity Information in Section 10.

Regulatory Notifications: Notify appropriate authorities of spill.

Containment and Clean up: Contain spill immediately. Do not allow spill to enter sewers or watercourses. Absorb with appropriate inert material such as sand, clay, etc. Large spills may be picked up using vacuum pumps, shovels, buckets, or other means and placed in drums or other suitable containers.

Other: No information available

7. HANDLING AND STORAGE INFORMATION

Handling: Fire extinguishers should be kept readily available. See NFPA 30 and OSHA 1910.106--Flammable and Combustible Liquids.

Storage: Do not transfer to unmarked containers. Store in closed containers away from heat, sparks, open flame, or oxidizing materials.

Empty Container Warnings

Drums: Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner, or properly disposed.

Plastic: Empty container may retain product residues.

Other: No information available

8. EXPOSURE CONTROLS / PERSONAL PROTECTION INFORMATION

Exposure Limits and Guidelines

This product does not contain any components with OSHA or ACGIH exposure limits.

Personal Protective Equipment

Eye/Face Protection: Eye protection is not required under conditions of normal use. If material is handled such that it could be splashed into eyes, wear plastic face shield or splash-proof safety goggles.

Skin Protection: No skin protection is required for single, short duration exposures. For prolonged or repeated exposures, use impervious clothing (boots, gloves, aprons, etc.) over parts of the body subject to exposure. If handling hot material, use insulated protective clothing (boots, gloves, aprons, etc.). Launder soiled clothes. Properly dispose of contaminated leather articles including shoes, which cannot be decontaminated.

Respiratory Protection: Respiratory protection is not required under conditions of normal use. If vapor or mist is generated when the material is heated or handled, use an organic vapor respirator with a dust and mist filter. All respirators must be NIOSH certified. Do not use compressed oxygen in hydrocarbon atmospheres.

Personal Hygiene: Consumption of food and beverage should be avoided in work areas where hydrocarbons are present. Always wash hands and face with soap and water before eating, drinking, or smoking.

Engineering Controls / Work Practices

Ventilation: If vapor or mist is generated when the material is heated or handled, adequate ventilation in accordance with good engineering practice must be provided to maintain concentrations below the specified exposure or flammable limits.

Other: The OSHA permissible exposure limit (PEL) and ACGIH threshold limit value (TLV) for oil mist is 5 mg/m3. The ACGIH short-term exposure limit (STEL) for oil mist is 10 mg/m3.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Amber to dark amber	
Odor: Hydrocarbon - mild	**Vapor Pressure:** No data available
Physical state: Liquid	**Vapor Density (air=1):** No data available
pH: No data available	**Percent Volatile by Volume:** No data available
Boiling Point: No data available	**Volatile Organic Content:** No data available
Melting Point: No data available	**Molecular Weight:** No data available
Specific Gravity: 0.88 - 0.9 @ 16 C / 60 F	**Average Carbon Number:** No data available
Pour Point: -15 F, -26.1 C	**Viscosity @ 100 F:** No data available
	Viscosity @ 40 C: No data available
Solubility in Water: Negligible in water	
Octanol / Water Coefficient: Log K_{ow} = No data available	

10. STABILITY AND REACTIVITY INFORMATION

Chemical Stability: Stable

Conditions to Avoid: High heat and open flames.

Incompatible Materials to Avoid: May react with strong oxidizing agents.

Other: No information available

11. TOXICOLOGICAL INFORMATION

Primary Eye Irritation: No information available

Primary Skin Irritation: No information available

Acute Dermal Toxicity: No information available

Subacute Dermal Toxicity: No information available

Dermal Sensitization: No information available

Inhalation Toxicity: No information available

Inhalation Sensitization: No information available

Oral Toxicity: No information available

Mutagenicity: No information available

Carcinogenicity: The International Agency for Research on Cancer (IARC) has concluded that there is inadequate data to evaluate the carcinogenicity to experimental animals of this class of product. IARC has concluded there is sufficient evidence that used gasoline-engine motor oils produce skin tumors in experimental animals. Also, IARC has determined this class of products belongs to Group 3-"not classifiable as to its carcinogenicity to humans".

Reproductive and Developmental Toxicity: No information available

Teratogenicity: No information available

Immunotoxicity: No information available

Neurotoxicity: No information available

Other: No information available

12. ECOLOGICAL INFORMATION

Aquatic Toxicity: No information available

Terrestrial Toxicity: No information available

Chemical Fate and Transport: No information available

Other: No information available

13. DISPOSAL INFORMATION

Regulatory Information: All disposals must comply with federal, state, and local regulations. The material, if spilled or discarded, may be a regulated waste. Refer to state and local regulations. Caution! If regulated solvents are used to clean up spilled material, the resulting waste mixture may be regulated. Department of Transportation (DOT) regulations may apply for transporting this material when spilled.

Waste Disposal Methods: Waste material may be landfilled or incinerated at an approved facility. Materials should be recycled if possible.

Other: No information available

14. TRANSPORTATION INFORMATION

U.S. Department of Transportation (DOT)
Highway / Rail (Bulk): Not Regulated
Highway / Rail (Non-Bulk): Not Regulated

For US shipments, US DOT law requires the shipper to determine the proper shipping description of the material that is being shipped. The shipping information and description contained in this section may not be suitable for all shipments of this material, but may help the shipper determine the proper shipping description for a particular shipment.

International Information

Vessel:	**IMDG Regulated:**	--	**IMDG Not Regulated:**	X
Air:	**ICAO Regulated:**	--	**ICAO Not Regulated:**	X

Other: No information available

15. Regulatory Information

Regulatory Lists Searched: The components listed in Section 2 of this MSDS were compared to substances that appear on the following regulatory lists. Each list is numerically identified. See Regulatory Search Results below.

Health & Safety: 10 - IARC carcinogen, 11 - NTP carcinogen, 12 - OSHA carcinogen, 15 - ACGIH TLV, 16 - OSHA PEL, 17 - NIOSH exposure limit, 20 - US DOT Appendix A, Hazardous substances, 22 - FDA 21 CFR Total food additives, 23 - NFPA 49 or 325

Environmental: 30 - CAA 1990 Hazardous air pollutants, 31 - CAA Ozone depletors, 33 - CAA HON rule, 34 - CAA Toxic substance for accidental release prevention, 35 - CAA Volatile organic compounds (VOC's) in SOCMI, 41 - CERCLA / SARA Section 302 extremely hazardous substances, 42 - CERCLA / SARA Section 313 emissions reporting, 43 - CWA Hazardous substances, 44 - CWA Priority pollutants, 45 - CWA Toxic pollutants, 46 - EPA Proposed test rule for hazardous air pollutants, 47 - RCRA Basis for listing - Appendix VII, 48 - RCRA waste, 49 - SDWA - (S)MCLs

International: 50 - Canada - WHMIS Classification of substance, 54 - Mexico - Drinking water - ecological criteria, 55 - Mexico - Wastewater discharges, 56 - US -TSCA Section (12)(b) - export notification

State Lists: 60 - CA - Proposition 65, 61 - FL - Substances, 62 - MI - Critical materials, 63 - MA - RTK, 64 - MA - Extraordinarily hazardous substances, 65 - MN - Hazardous substances, 66 - PA - RTK, 67 - NJ - RTK, 68 - NJ - Environmental hazardous substances, 69 - NJ - Special hazardous substances

Inventories: 80 - Canada - Domestic substances , 81 - European - EINECS, 82 - Japan - ENCS, 83 - Korea - Existing and evaluated chemical substances, 84 - US - TSCA , 85 - China Inventory

Regulatory Search Results:
HYDROTREATED HEAVY PARAFFINIC PETROLEUM DISTILLATES: 80, 81, 83, 84, 85
SOLVENT-DEWAXED HEAVY PARAFFINIC DISTILLATE: 80, 81, 83, 84, 85
VISCOSITY MODIFIER: 35, 80, 83, 84, 85

U.S. TSCA Inventory: All components of this material are on the US TSCA Inventory.

SARA Section 313: This product is not known to contain any SARA, Title III, Section 313 Reportable Chemicals at or greater than 1.0% (0.1% for carcinogens).

IARC: No information available

SARA 311 / 312 Categories
Acute: -- **Chronic:** -- **Fire:** -- **Pressure:** -- **Reactive:** --
Not Regulated: X

Canadian WHMIS Classification
Not a controlled substance under WHMIS

European Union Classification
Hazard Symbols:
No classification recommended
Risk Phrases:
No classification recommended
Safety Phrases:
No classification recommended

Other: No information available

16. OTHER INFORMATION

Health and Environmental Label Language

WARNING: Continuous contact with used gasoline engine oils has caused skin cancer in animal tests.
ATTENTION: Prolonged or repeated skin contact may cause oil acne or dermatitis. Repeated exposure to oil mist in excess of the OSHA limit (5mg/m3 can result in accumulation of oil droplets in pulmonary tissue.

Precautionary Measures: Avoid prolonged or repeated contact with eyes, skin and clothing. Avoid generation and inhalation of oil mists.

First Aid: Skin Contact: Wash skin with soap and water. Launder soiled clothes and discard oil-soaked shoes. If irritation persists seek medical attention. Eye Contact: Flush with water. If irritation persists seek medical attention. Ingestion: Do not induce vomiting. In general, no treatment is necessary unless large quantities of product are ingested. If discomfort persists seek medical assistance.

Instructions in Case of Fire or Spill: In case of fire, use water fog, foam, dry chemical or carbon dioxide. Water spray may be ineffective, but can be used to cool containers. Do not use a direct stream of water. Material will float and can be reignited on surface of water.

Spill or Leak: Dike and contain spill. Do not use water; soak up with absorbent material such as clay, sand or other suitable material. Place in non-leaking container and seal tightly for proper disposal.

Contains: highly refined petroleum distillate, mixture; zinc compounds, mixture; polymer additives, mixture.

KEEP OUT OF REACH OF CHILDREN. (If intended for retail also)

MSDS Revisions
Previous Version Date: 06/01/01

Previous Version Information
Revised Section 1 - Product Name

Other

No information available

Prepared By:

SOPUS Products
P.O. Box 4427
Houston, TX 77210-4453 USA

Disclaimer of Warranty: The information contained herein is based upon data and information available to us, and reflects our best professional judgment. This product may be formulated in part with components purchased from other companies. In many instances, especially when proprietary or trade secret materials are used, SOPUS Products must rely upon the hazard evaluation of such components submitted by that product's manufacturer or importer. No warranty of merchantability, fitness for any use, or any other warranty is expressed or implied regarding the accuracy of such data or information, the results to be obtained from the use thereof, or that any such use do not infringe any patent. Since the information contained herein may be applied under conditions of use beyond our control and with which we may be unfamiliar, we do not assume responsibility for the results of such application. This information is furnished upon the condition that the person receiving it shall make his own determination of the suitability of the material for his particular use.

MATERIAL SAFETY DATA SHEET
HEATING OIL

DENNIS K. BURKE INC.
284 Eastern Ave. • P.O. Box 6069 • Chelsea, MA 02150
Telephone: (617) 884-7800 • Fax: (617) 884-7638

Additional copies of this MSDS can be obtained by calling 1-800-289-2875 or downloaded from our website at www.burkeoil.com

SECTION 1
PRODUCT INFORMATION

TRADE NAME (As used on label and list)
HEATING OIL

CHEMICAL NAME/SYNONYMS
#2 FUEL OIL, #2 HEATING FUEL
PETROLEUM DISTILLATE

CHEMICAL FAMILY — *CAS NUMBER*
PETROLEUM HYDROCARBONS — **68476-34-6**

PRODUCT CODE
H

PREPARATION DATE
OCTOBER 15, 2001

24-HOUR EMERGENCY ASSISTANCE
CHEMTREC 1-800-424-9300
In case of an accident involving hazardous materials, the Chemical Transportation Emergency Center (CHEMTREC) which is a voluntary program of the Chemical Manufacturer's Association (CMA) operates a 24-hour nationwide telephone number which can be contacted for assistance.

NATIONAL EMERGENCY RESPONSE CENTER 1-800-424-8802

MASSACHUSETTS POISON INFORMATION CENTER (617) 232-2020

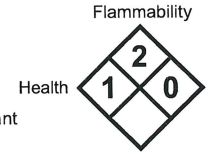
GENERAL ASSISTANCE
DENNIS K. BURKE, INC. 1-800-289-2875

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM (HMIS)

HEALTH	**1**
FLAMMABILITY	**2**
REACTIVITY	**0**
PROTECTION	**0**

NFPA FIRE HAZARD SYMBOL*

4 - Extreme
3 - High
2 - Moderate
1 - Slight
0 - Insignificant



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SECTION 2
HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

DOES PRODUCT CONTAIN HAZARDOUS INGREDIENTS? .... YES
DOES PRODUCT CONTAIN CARCINOGENS (NTP, IARC, or OSHA)? ..... NO

CHEMICAL/COMMON NAME	*CAS NUMBER*	*PERCENT*	*OSHA-PEL*	*ACGIH-TLV*
#2 Fuel Oil	68476-34-6	< 100	5 mg/m³	100 mg/m³
Napthalene	91-20-3	< 0.01	10 ppm	10/15 ppm
Sulfur	7704-34-9	< 0.30	NA	NA

Fuel oil is a complex mixture of middle distillate hydrocarbons, with carbon numbers in the range C9 and higher. Fuel oil also contains multifunctional performance additives. Remaining components not determined hazardous or that the hazardous components present are less than 1.0% (0.1% for carcinogens).

This product contains toxic chemicals subject to the reporting requirements of SARA Title III, Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (40 CFR 372).

SARA TITLE III INFORMATION

ACUTE HAZARD (Immediate Health) ..... **YES**
CHRONIC HAZARD (Delayed Health) ..... **YES**
FIRE HAZARD ..... **YES**
SUDDEN PRESSURE RELEASE HAZARD ..... **NO**
REACTIVITY HAZARD ..... **NO**

DOT REQUIREMENTS

DOT PROPER SHIPPING NAME
FUEL OIL, 3, NA1993, PG III

DOT HAZARD CLASS
COMBUSTIBLE LIQUID

DOT LABELS REQUIRED
NONE

DOT PLACARDS REQUIRED
1993



SECTION 3
PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT ..... > 340°F
VAPOR PRESSURE (mm Hg) .... < 1.0
VAPOR DENSITY (AIR = 1) ..... > 5.0
SPECIFIC GRAVITY (WATER = 1) .. 0.879
MELTING POINT ..... < -20°F
EVAPORATION RATE (n-BUTYL ACETATE = 1) 0.05
SOLUBILITY IN WATER ..... Negligible
APPEARANCE AND ODOR – This product is dyed red for non-taxable use. Faint petroleum odor.

SECTION 4
FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method Used) ..... COC = > 125°F
FLAMMABLE LIMITS ..... LEL = 0..6 UEL = 7.5

EXTINGUISHING MEDIA – Dry chemical, Carbon Dioxide, Foam and Water Spray.

SPECIAL FIRE FIGHTING PROCEDURES – Use a water spray to cool fire-exposed containers, structures and to protect personnel. If leak or spill has not ignited, ventilate area to protect personnel attempting to stop leak. Use water to flush spills away from sources of ignition. Do not flush down public sewers or other drainage systems.

Exposed firefighters must wear NIOSH/MSHA approved, positive pressure, self-contained, breathing apparatus with full face mask and full-protective clothing. Use a smothering technique for extinguishing fire of a combustible liquid. Do not use a forced water stream directly on fuel oil fires, as this will scatter the fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS – Flowing fuel oil can be ignited by self-generated static electricity. Fire hazard is greater as liquid temperature rises above 85°F. Irritating or toxic substances may be emitted upon thermal decomposition. Dangerous when exposed to heat or flame. Runoff to sewer may cause fire or explosion hazard. Containers may explode in heat of fire.

(• continued on page 2)

SECTION 5

REACTIVITY DATA

STABILITY . . . . . STABLE

CONDITIONS TO AVOID FOR STABILITY -- Avoid heat, sparks and open flames. Prevent vapor accumulation.

INCOMPATIBILITY (Materials To Avoid) – This product may react with strong oxidizing agents such as hydrogen peroxide, bromine, and chromic acid.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS – Carbon monoxide and carbon dioxide from burning. Oxides of phosphorous from burning. Oxides of sulfur.

HAZARDOUS POLYMERIZATION . . . . . NONE

CONDITIONS TO AVOID HAZARDOUS POLYMERIZATION . . . NA

SECTION 6

HEALTH HAZARD DATA

ROUTE(S) OF ENTRY – Inhalation, absorption and ingestion if hygienic practices are not observed.

HEALTH HAZARDS *(Acute And Chronic)*

EYE CONTACT – Practically non-irritating.

SKIN CONTACT – Slightly irritating. Repeated or prolonged contact with the skin could cause redness, itching, inflammation, cracking and possible secondary infection or dermatitis to affected area. Symptoms may include pain, feeling of heat, discoloration, swelling and blistering.

INJECTION – High pressure skin injections may not appear serious at first; tissue will become swollen, discolored and extremely painful.

DERMAL TOXICITY – Practically non-toxic to internal organs.

INHALATION – May cause respiratory tract irritation. Prolonged breathing of vapors can cause central nervous system effects. Symptoms may include: headache, dizziness, loss of appetite, weakness and loss of coordination. Degenerative changes in the liver, kidneys and bone marrow may occur with prolonged, high concentrations. Repeated or prolonged exposures may cause behavioral changes.

INHALATION OF EXHAUSE – The use of any hydrocarbon fuel in an area without adequate ventilation may result in hazardous combustion levels and inadequate oxygen levels. Exposure to exhaust from burning should be minimized. Inhalation of exhaust components, such as carbon monoxide, may cause death in high concentrations.

INGESTION – Moderately toxic. Aspiration into lungs may cause pneumonitis. May cause gastrointestinal disturbances. Symptoms may include irritation, nausea, vomiting and diarrhea. May cause harmful central nervous system effects. Effects may include excitation, euphoria, headache, dizziness, drowsiness, blurred vision, fatigue, tremors, convulsions, loss of consciousness, coma, respiratory arrest and death. Aspiration hazard if vomiting occurs.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE – Pre-existing dermatitis may be aggravated.

EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT – Flush immediately with fresh water. Remove contact lenses if worn.Eyelids should be held away from the eyeball to ensure thorough rinsing. Get medical attention if irritation persists.

SKIN CONTACT – Remove contaminated clothes immediately. Wash skin thoroughly with soap and water. Get medical attention if irritation persists. Wash contaminated clothes.

INJECTION – High pressure injections are serious medical emergencies. Get medical attention immediately.

INHALATION – Remove victim from source of exposure. If not breathing, ensure open airway and institute cardiopulmonary resuscitation (CPR). If breathing is difficult, administer oxygen if available. Get medical attention.

NOTES TO PHYSICIAN – In case of ingestion, gastric lavage with activated charcoal can be used promptly to prevent absorption. Consideration should be given to the use of an intratracheal tube, to prevent aspiration. Individuals intoxicated by fuel oil should be hospitalized immediately, with acute and continuing attention to neurologic and cardiopulmonary function. Positive pressure ventilation may be necessary. After initial episode, follow for changes in blood variables and delayed appearance of pulmonary edema and chemical pneumonitis. Such patients should be followed for several days or weeks for delayed effects, including bone marrow toxicity, hepatic and renal impairment. Individuals with chronic pulmonary disease will be more seriously impaired, and recovery from inhalation exposure may be complicated.

In case of skin injection, prompt debridement of the wound is necessary to minimize necrosis and tissue loss.

SECTION 7

PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED – Shut off ignition sources; no flares, smoking or flames in hazard area. Stop leak if you can do it without risk. Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind and keep out of low areas. Isolate for half mile in all directions if tank truck, or tank is involved in fire. Water spray may reduce vapor but may not prevent ignition in closed spaces.

Considered to be a water pollutant, releases of this product should be prevented from contaminating soil and water, and from entering drainage and sewer systems. Contain liquid to prevent further contamination of soil, surface water or groundwater. Clean up small spills using sand or other non-combustible sorbent materials and place into containers for later disposal.

The Clean Water Act requires the reporting of any discharge of oil and petroleum (in any kind or form) into surface waters. Immediately call the National Emergency Response Center at 1-800-424-8802.

WASTE DISPOSAL METHODS – Place contaminated materials in disposal containers and dispose of in a manner consistent with applicable regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE – Store in tightly closed containers in cool, dry, isolated, well-ventilated area away from heat, sources of ignition and incompatibles. Use non-spark tools. Ground lines and equipment used during transfer to reduce the possibility of static spark-initiated fire or explosion.Material may be at elevated temperatures and/or pressures. Exercise due care when opening bleeders and sampling ports.

EMPTY CONTAINERS – Empty containers contain toxic, flammable/combustible residue or vapors. Do not cut, drill, weld, reuse or dispose of containers unless precautions are taken against these hazards.

SECTION 8

CONTROL MEASURES

RESPIRATORY PROTECTION – NIOSH/MSHA approved self-contained breathing apparatus or supplied-air mask must be available for non-routine and emergency use. Ventilation may be used to control or reduce airborne concentrations.

VENTILATION

LOCAL EXHAUST . . . . . YES

MECHANICAL (General) . . . . . EXPLOSION PROOF

SPECIAL or OTHER . . . . . NA

SKIN PROTECTION – Wear impervious gloves and protective clothing to prevent skin contact.

EYE PROTECTION – Wear safety glasses or chemical goggles to prevent eye contact. Have eye washing facility readily available where eye contact can occur.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT – Chemical-resistant apron.

WORK PRACTICES – Do not use or store near flame, sparks or hot surfaces. Use only in well ventilated area. Keep container closed. Do not weld, heat or drill container. Replace cap or bung. Do not use pressure to empty drum or explosion may result. Keep head away from container when opening or dispensing.

HYGIENIC PRACTICES – Launder soiled clothing. Wash thoroughly with soap and water after handling.

NA = NOT APPLICABLE NDA = NO DATA AVAILABLE

This information is based on the data available to us and considered to be correct.However, Dennis K.Burke, Inc.makes no warranty, expressed or implied regarding the accuracy of this data or the results to be obtained from the use thereof. Dennis K. Burke, Inc. assumes no responsibility for injury or loss from the use of the product described herein.

Material Safety Data Sheet

308166
Rev. D
Updated: 5/02

First choice when quality counts.

This Data Sheet contains important information.
READ AND KEEP FOR REFERENCE.
INSTRUCTIONS

IMPORTANT: Read this MSDS before handling or disposing of this product and pass this information on to employees, customers and users of this product.

Emergency Overview

Physical State Liquid.
Color Clear to light amber. **Odor** Mild petroleum odor

WARNING!
Oil injected into the skin from high-pressure leaks in hydraulic systems can cause severe injury.
Most damage occurs during the first few hours.
Seek medical attention immediately.
Surgical removal of oil may be necessary.
Spills may create a slipping hazard.

Hazard Rankings

	HMIS	NFPA
Health Hazard	1	0
Fire Hazard	1	1
Reactivity	0	0

* = Chronic Health Hazard

Protective Equipment

Minimum Requirements
See Section 8 for Details



1.0 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Hydraulic Fluid
Chemical Name: Industrial Oils

Graco Inc.
P.O. Box 1441
60 11th Ave. NE
Minneapolis, MN 55440–1441

Part Number(s): 218-797

Use: Hydraulic Fluid used in PT2500 electric driver hydraulic pump.

Emergency Information
Health Emergency (RMPC): (303)– 623–5716

Chemical Spills (Chemtrec): (800)– 424–9300

2.0 COMPOSITION / INFORMATION ON INGREDIENTS

Component %	CAS#	% by Weight
1)Distillates, petroleum, solvent-refined light paraffinic	64741-89-5	30 – 50
2)Distillates, petroleum, solvent-refined heavy paraffinic	64741-89-5	40 – 60
3) Proprietary Ingredients	Proprietary Mixture	0 – 2
4) Zinc alkyldithiophosphate	68649-42-3	0 - 1

For exposure data, see **8.0, Exposure Controls / Personal Protection.**

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3.0 HAZARDS IDENTIFICATION

Emergency Overview: **Physical State:** Liquid **Odor:** Mild petroleum odor **Color:** Clear to light amber

Potential Health Effects:

Eye Contact	This product can cause transient mild eye irritation with short-term contact with liquid sprays or mists
Skin Contact	This material can cause mild skin irritation from prolonged or repeated skin contact. Injection under the skin can cause inflammation, swelling and mild central nervous system depression. Injection of pressurized hydrocarbons can cause severe, permanent tissue damage. Initial symptoms may be minor. Injection of petroleum hydrocarbons requires immediate medical attention.
Inhalation	At elevated temperatures or in enclosed spaces, product mist or vapors may irritate the mucous membranes of the nose, the throat, bronchi, and lungs
Ingestion	If swallowed, large volumes of material can cause generalized depression, headache, drowsiness, nausea, vomiting and diarrhea. Smaller doses can cause a laxative effect. If aspirated into the lungs, liquid can cause lung damage.
Chronic Health Effects Summary	Contains a petroleum-based mineral oil. Prolonged or repeated skin contact can cause mild irritation and inflammation characterized by drying, cracking, (dermatitis) or oil acne. Repeated or prolonged inhalation of petroleum-based mineral oil mists at concentrations above applicable workplace exposure levels can cause respiratory irritation or other pulmonary effects.
Conditions Aggravated by Exposure	Medical conditions aggravated by exposure to this material may include pre-existing skin disorders.
Target Organs	This material may cause damage to the following organs: skin.
Carcinogenic Potential	This product does not contain any components at concentrations above 0.1% which are considered carcinogenic by OSHA, IARC or NTP.

OSHA Hazard Classification is indicated by an "X" in the box adjacent to the hazard title. If no "X" is present, the product does not exhibit the hazard as defined in the OSHA Hazard Communication Standard (29 CFR 1910.1200).

OSHA Health Hazard Classification				**OSHA Physical Hazard Classification**					
Irritant	☐	**Toxic**	☐	**Combustible**	☐	**Explosive**	☐	**Pyrophoric**	☐
Sensitizer	☐	**Highly Toxic**	☐	**Flammable**	☐	**Oxidizer**	☐	**Water-reactive**	☐
Corrosive	☐	**Carcinogenic**	☐	**Compressed Gas**	☐	**Organic Peroxide**	☐	**Unstable**	☐

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4.0 FIRST AID MEASURES

Take proper precautions to ensure your own health and safety before attempting rescue or providing first aid. For more specific information, refer to Exposure Controls and Personal Protection in Section 8 of this MSDS.

Eye	Check for and remove contact lenses. Flush eyes with cool, clean, low-pressure water while occasionally lifting and lowering eyelids. Seek medical attention if excessive tearing, redness, or pain persists.
Skin	Remove contaminated shoes and clothing. Wipe off excess material. Wash exposed skin with mild soap and water. Seek medical attention if tissue appears damaged or if pain or irritation persists. Thoroughly clean contaminated clothing before reuse. Discard contaminated leather goods. If material is injected under the skin, seek medical attention immediately.
Inhalation	Move victim to fresh air. If victim is not breathing, immediately begin rescue breathing. If breathing is difficult, 100 percent humidified oxygen should be administered by a qualified individual. Seek medical attention immediately. Keep the affected individual warm and at rest.
Ingestion	Do not induce vomiting unless directed to by a physician. Do not give anything to drink unless directed to by a physician. Never give anything by mouth to a person who is not fully conscious. Seek medical attention immediately
Notes to Physician	In the event of injection in underlying tissue, immediate treatment should include extensive incision, debridement and saline irrigation. Inadequate treatment can result in ischemia and gangrene. Early symptoms may be minimal.

. **NOTES:** NA = Not Applicable; NE = Not Established; UN = Unavailable

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5.0 FIREFIGHTING MEASURES

Flashpoint	OPEN CUP: 212°C (414°F) (Cleveland.).
UFL	No Data
LFL	No Data
Autoignition Temperature	Not Available
Flammability Classification	NFPA Class-IIIB combustible material. Slightly combustible!
Extinguishing Media	Use dry chemical, foam, Carbon Dioxide or water fog
Special Properties	This material can burn but will not readily ignite. This material will release vapors when heated above the flash point temperature that can ignite when exposed to a source of ignition. In enclosed spaces, heated vapor can ignite with explosive force. Mists or sprays may burn at temperatures below the flash point.
Firefighting Equipment	Firefighters must use full bunker gear including NIOSH-approved positive pressure self-contained breathing apparatus to protect against potential hazardous combustion or decomposition products and oxygen deficiencies.
Hazardous Combustion Products	Carbon dioxide, carbon monoxide, smoke, fumes, unburned hydrocarbons and trace oxides of sulfur, phosphorus, zinc and/or nitrogen.

6.0 ACCIDENTAL RELEASE MEASURES

Take proper precautions to ensure your own health and safety before attempting spill control or clean-up. For more specific information, refer to the Emergency Overview on Page 1, Exposure Controls and Personal Protection in Section 8 and Disposal Considerations in Section 13 of this MSDS.

Do not touch damaged containers or spilled material unless wearing appropriate protective equipment. Slipping hazard; do not walk through spilled material. Stop leak if you can do so without risk. For small spills, absorb or cover with dry earth, sand, or other inert non-combustible absorbent material and place into waste containers for later disposal. Contain large spills to maximize product recovery or disposal. Prevent entry into waterways or sewers. In urban area, cleanup spill as soon as possible. In natural environments, seek cleanup advice from specialists to minimize physical habitat damage. This material will float on water. Absorbent pads and similar materials can be used. Comply with all laws and regulations.

7.0 HANDLING AND STORAGE

Handling	Avoid water contamination and extreme temperatures to minimize product degradation. Empty containers may contain product residues that can ignite with explosive force. Do not pressurize, cut, weld, braze solder, drill, grind or expose containers to flames, sparks, heat or other potential ignition sources. Consult appropriate federal, state and local authorities before reusing, reconditioning, reclaiming, recycling or disposing of empty containers and/or waste residues of this product
Storage	Keep container closed. Do not store with strong oxidizing agents. Do not store at temperatures above 120° F or in direct sunlight for extended periods of time. Consult appropriate federal, state and local authorities before reusing, reconditioning, reclaiming, recycling or disposing of empty containers or waste residues of this product.

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8.0 EXPOSURE CONTROLS / PERSONAL PROTECTION

Eye	Safety glasses equipped with side shields should be adequate protection under most conditions of use. Wear goggles and/or face shield if splashing or spraying is anticipated. Wear goggles and face shield if material is heated above 125°F (51°C). Have suitable eye wash water available
Personal Protective Equipment	Personal protective equipment should be selected based upon the conditions under which this material is used. A hazard assessment of the work area for PPE requirements should be conducted by a qualified professional pursuant to OSHA regulations. The following pictograms represent the minimum requirements for personal protective equipment. For certain operations, additional PPE may be required. 
Hand Protection	Use gloves constructed of chemical resistant materials such as neoprene or heavy nitrile rubber if frequent or prolonged contact is expected. Use heat-protective gloves when handling product at elevated temperatures.
Body Protection	Use clean and impervious protective clothing (e.g., neoprene or Tyvek ®) if splashing or spraying conditions are present. Protective clothing may include long-sleeve outer garment, apron, or lab coat. If significant contact occurs, remove oil-contaminated clothing as soon as possible and promptly shower. Launder contaminated before reuse or discard. Wear heat protective boots and protective clothing when handling material at elevated temperatures
Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of mists and/or vapors below the recommended exposure limits (see below). An eye wash station and safety shower should be located near the work-station
Respiratory Protection	Vaporization is not expected at ambient temperatures. Therefore, the need for respiratory protection is not anticipated under normal use conditions and with adequate ventilation. If elevated airborne concentrations above applicable workplace exposure levels are anticipated, a NIOSH-approved organic vapor respirator equipped with a dust/mist prefilter should be used. Protection factors vary depending upon the type of respirator used. Respirators should be used in accordance with OSHA requirements (29 CFR 1910.134).
General Comments	Use good personal hygiene practices. Wash hands and other exposed skin areas with plenty of mild soap and water before eating, drinking, smoking, use of toilet facilities, or leaving work. DO NOT use gasoline, kerosene, solvents or harsh abrasives as skin cleaners. Since specific exposure standards/control limits have not been established for this product, the "Oil Mist, Mineral" exposure limits shown below are suggested as minimum control guidelines.
Occupational Exposure Guidelines	**Substance** 1) Oil Mist, Mineral **Applicable Workplace Exposure Levels** **ACGIH (United States).** TWA: 5 mg/m 3 STEL: 10 mg/m 3 **OSHA (United States).** TWA: 5 mg/m 3

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9.0 CHEMICAL AND PHYSICAL PROPERTIES

Appearance and Odor	Mild petroleum odor
pH	Not Applicable
Vapor Pressure (mm Hg)	<0.001 kPa (<0.01 mmHg) (at 20°C)
Vapor Density (Air = 1)	>1 (Air = 1)
Boiling Point	Not available
Melting Point	Not available
Solubility in Water	Insoluble in cold water.
Specific Gravity (Water = 1)	0.87 (Water = 1)
Physical State	Liquid
Color	Clear to light amber
Viscosity (cST @ 40°C)	33
Volatile Characteristics	Negligible volatility
Additional Properties	Gravity, °API (ASTM D287) = 31.3 @ 60° F Density = 7.42 Lbs/gal. Viscosity (ASTM D2161) = 170 SUS @ 100° F

10.0 STABILITY AND REACTIVITY

Stability	Stable.
Conditions to Avoid	Keep away from extreme heat, sparks, open flame, and strongly oxidizing conditions.
Materials to Avoid	Strong oxidizers.
Hazardous Decomposition	No additional hazardous decomposition products were identified other than the combustion products identified in Section 5 of this MSDS
Hazardous Polymerization	Not expected to occur

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11.0 TOXILOGICAL INFORMATION

For other health-related information, refer to the Emergency Overview on Page 1 of the Hazards Identification in Section 3 of this MSDS.

Distillates, petroleum, solvent-refined light paraffinic:
ORAL (LD50): Acute: >5000 mg/kg [Rat].
DERMAL (LD50): Acute: >2000 mg/kg [Rabbit].
Distillates, petroleum, solvent-refined heavy paraffinic:
ORAL (LD50): Acute: >5000 mg/kg [Rat].
DERMAL (LD50): Acute: >2000 mg/kg [Rabbit].

Distillates, petroleum, solvent-refined light paraffinic:
Mineral oil mists derived from highly refined oils are reported to have low acute and sub-acute toxicities in animals. Effects from single and short-term repeated exposures to high concentrations of mineral oil mists well above applicable workplace exposure levels include lung inflammatory reaction, lipoid granuloma formation and lipoid pneumonia. In acute and sub-acute studies involving exposures to lower concentrations of mineral oil mists at or near current work place exposure levels produced no significant toxicological effects. In long term studies (up to two years) no carcinogenic effects have been reported in any animal species tested.

Distillates, petroleum, solvent-refined heavy paraffinic:
Mineral oil mists derived from highly refined oils are reported to have low acute and sub-acute toxicities in animals. Effects from single and short-term repeated exposures to high concentrations of mineral oil mists well above applicable workplace exposure levels include lung inflammatory reaction, lipoid granuloma formation and lipoid pneumonia. In acute and sub-acute studies involving exposures to lower concentrations of mineral oil mists at or near current work place exposure levels produced no significant toxicological effects. In long term studies (up to two years) no carcinogenic effects have been reported in any animal species tested.

Hydraulic Oils:
Repeated or prolonged skin contact with certain hydraulic oils can cause mild skin irritation characterized by drying, cracking (dermatitis) or oil acne. Injection under the skin, in muscle or into the blood stream can cause irritation, inflammation, swelling, fever, and systemic effects, including mild central nervous system depression. Injection of pressurized hydrocarbons can cause severe, permanent tissue damage.

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12.0 ECOLOGICAL INFORMATION

Ecotoxicity
Analysis for ecological effects has not been conducted on this product. However, if spilled, this product and any contaminated soil or water may be harmful to human, animal, and aquatic life. Also, the coating action associated with petroleum and petroleum products can be harmful or fatal to aquatic life and waterfowl.

Environmental Fate
An environmental fate analysis has not been conducted on this specific product. Plants and animals may experience harmful or fatal effects when coated with petroleum-based products. Petroleum-based (mineral) lube oils will normally float on water. In stagnant or slow-flowing waterways, an oil layer can cover a large surface area. As a result, this oil layer might limit or eliminate natural atmospheric oxygen transport into the water. With time, if not removed, oxygen depletion in the waterway can result in a loss of marine life or create an anaerobic environment. This material contains phosphorus which is a controlled element for disposal in effluent waters in most sections of North America. Phosphorus is known to enhance the formation of algae. Severe algae growth can reduce oxygen content in the water possibly below levels necessary to support marine life.

13.0 DISPOSAL INFORMATION

Hazard characteristic and regulatory waste stream classification can change with product use. Accordingly, it is the responsibility of the user to determine the proper storage, transportation, treatment and/or disposal methodologies for spent materials and residues at the time of disposition.

Conditions of use may cause this material to become a "hazardous waste", as defined by federal or state regulations. It is the responsibility of the user to determine if the material is a "hazardous waste" at the time of disposal. Transportation, treatment, storage, and disposal of waste material must be conducted in accordance with RCRA regulations (see 40 CFR 260 through 40 CFR 271). State and/or local regulations may be more restrictive. Contact the RCRA/Superfund Hotline at (800) 424-9346 or your regional US EPA office for guidance concerning case specific disposal issues. Empty drums and pails retain residue. DO NOT pressurize, cut, weld, braze, solder, drill, grind, or expose this product's empty container to heat, flame, or other ignition sources. DO NOT attempt to clean it. Empty drums and pails should be drained completely, properly bunged or sealed, and promptly sent to a reconditioner.

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14.0 TRANSPORTATION INFORMATION

U.S. Dept. of Transportation: Not a US Department of Transportation regulated material.

Hazard Class - Not regulated
Packing Group(s) – Not applicable
UN/NA ID – Not regulated
Reportable Quantity – A Reportable Quantity (RQ) has not been established for this material.
Placards



Emergency Response Guide No. Not applicable
Hazmat STCC No. – Not assigned
MARPOL III Status – Not a DOT "Marine Pollutant' Per 49 CFR 171.8

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15.0 REGULATORY INFORMATION

CERCLA Sections 102A/103 Hazardous Substances (40 CFR Part 302.4)	The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires notification of the National Response Center concerning release of quantities of "hazardous substances" equal to or greater than the reportable quantities (RQ's) listed in 40 CFR 302.4. As defined by CERCLA, the term "hazardous substance" does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically designated in 40 CFR 302.4. Chemical substances present in this product or refinery stream that may be subject to this statute are: Zinc and Zinc Compounds, Concentration: 0 - 1%
SARA Title III Section 302 Extremely Hazardous Substances (40 CFR Part 355)	The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to Subparts 302 and 304 to submit emergency planning and notification information based on Threshold Planning Quantities (TPQs) and Reportable Quantities (RQs) for "Extremely Hazardous Substances" listed in 40 CFR 302.4 and 40 CFR 355. No components were identified
SARA Title III Section 311/312 Hazardous Categorization (40 CFR Part 370)	The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to this subpart to submit aggregate information on chemicals by "Hazard Category" as defined in 40 CFR 370.2. This material would be classified under the following hazard categories: No SARA 311/312 hazard categories identified.
SARA Title III Sections 313 (40 CFR Part 372)	This product contains the following components in concentrations above de minimis levels that are listed as toxic chemicals in 40 CFR Part 372 pursuant to the requirements of Section 313 of SARA: No components were identified.
U.S. Inventory (TSCA)	This product and/or its components are listed on the Toxic Substances Control Act (TSCA) inventory.
CWA	This material is classified as an oil under Section 311 of the Clean Water Act (CWA) and the Oil Pollution Act of 1990 (OPA). Discharges or spills which produce a visible sheen on waters of the United States, their adjoining shorelines, or into conduits leading to surface waters must be reported to the EPA's National Response Center at (800) 424-8802.
California Proposition 65	This material may contain the following components which are known to the State of California to cause cancer, birth defects or other reproductive harm, and may be subject to the requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5): Toluene: 0.001%
New Jersey Right-to-Know Label	Petroleum Oil (Hydraulic Fluid)
Additional Regulatory Remarks	No additional regulatory remarks

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16.0 OTHER INFORMATION

Refer to the top of Page 1 for the HMIS and NFPA Hazard Ratings for this product.

ABBREVIATIONS

AP = Approximately, EQ = Equal, > = Greater Than, < = Less Than, NA = Not Applicable, ND = No Data, NE = Not Established

ACGIH = American Conference of Governmental Industrial Hygienists
IARC = International Agency for Research on Cancer
NIOSH = National Institute of Occupational Safety and Health
NPCA = National Paint and Coating Manufacturers Association
NFPA = National Fire Protection Association
AIHA = American Industrial Hygiene Association
NTP = National Toxicology Program
OSHA = Occupational Safety and Health Administration
HMIS = Hazardous Materials Information System
EPA = Environmental Protection Agency

Prepared By	Graco, Inc.

This Material Safety Data Sheet and the information it contains is offered to you in good faith as accurate. We have reviewed any information contained in this data sheet which we have received from sources outside our company. We believe that information to be correct, but cannot guarantee its accuracy or completeness. Health and safety precautions in this Data Sheet may not be adequate for all individuals and/or situations. It is the users' obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a permission or recommendation for the use of any product in a manner that might infringe existing patents. No warranty is made, either express or implied.

NOTES: NA = Not Applicable; NE = Not Established; UN = Unavailable

All written and visual data contained in this document reflects the latest product information available at the time of publication.
Graco reserves the right to make changes at any time without notice.
Sales Offices: Minneapolis, Detroit,
International Offices: Belgium, Korea, Hong Kong, Japan

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Material Safety Data Sheet

Issue Date: March 25, 2010
Revised Date: April 21, 2010 Reason: Correct Part Numbers

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product name:
Super Lube® Silicone Lubricating Grease

Item No's: 92003, 92150, 92016, 92005, 92030, 92400

Product use: Lubricant, Dielectric Compound

Company address:
Synco Chemical Corporation
24 DaVinci Dr., P.O. Box 405
Bohemia, NY 11716

Contact Information:
Telephone: 631-567-5300
Emergency telephone: 800-424-9300
Internet: www.super-lube.com
E-Mail: info@super-lube.com

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Physical state: Semi-solid
Color: Translucent
Odor: Mild

WHMIS hazard class: Not Hazardous
HMIS codes: Health - 1
Fire – 1
Physical - 0

WARNING:
MAY CAUSE SKIN OR EYE IRRITATION

Relevant routes of exposure: Skin, Eyes

Potential Health Effects

Inhalation: Not expected to cause respiratory tract irritation during normal conditions of use.

Skin contact: Repeated or prolonged contact may be irritating to skin.

Eye contact: Contact with eyes may cause irritation.

Ingestion: Not expected under normal conditions of use.

Existing conditions aggravated by exposure: None generally recognized.

See Section 11 for additional toxicological information.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	%	ACGIH TLV	OSHA PEL	OTHER
Polydimethylsiloxane 63148-62-9	<90	None	None	None
Silane, dichlorodimethyl-, reaction products with silica 68611-44-9	<9	10mg/m³ TWA	6mg/m³ TWA	None
Polytetrafuoroethylene 9002-84-0	<7	None	None	
Polyglycol 025322-69-4	<1	None	None	AIHA WEEL is 50 ppm Total 10mg/m³ aerosol only

4. FIRST AID MEASURES

Inhalation: Inhalation not likely.

Skin contact: After contact with skin, wash immediately with plenty of water (using soap, if available). Get medical attention if symptoms develop and persist.

Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Ingestion: Do not induce vomiting. Get medical attention.

5. FIRE-FIGHTING MEASURES

Flash point: >572° F (300° C) TCC

Auto ignition temperature: Not Determined

Flammable/Explosive limits-lower %: No Data

Flammable/Explosive limits-upper %: No Data

Extinguishing media: Carbon dioxide (CO2). Dry chemical. Foam.

Special fire fighting procedures: None

Unusual fire or explosion hazards: None

Hazardous combustion products: Oxides of carbon, silica, formaldehyde.

Sensitivity to mechanical impact: Not Determined

Sensitivity to static discharge:	Not Determined

6. ACCIDENTAL RELEASE MEASURES

Environmental precautions:	Spilled material may make surface slippery. Do not flush to drain.
Clean-up methods:	Scrape up and dispose of in accordance with local and national regulations.

7. HANDLING AND STORAGE

Handling:	Good manufacturing procedures should be followed in handling and storage.
Storage:	Keep in cool, dry area.
Incompatible products:	Oxidizing agents.

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls:	Local exhaust ventilation is recommended when general ventilation is not sufficient to control airborne contamination.
Respiratory protection:	If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH.
Skin protection:	Chemical resistant, impermeable gloves.
Eye/face protection:	Safety glasses with side-shields.

See Section 3 for exposure limits.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Semi-solid
Color:	Translucent
Odor:	Mild
Odor Threshold:	Not available
Vapor pressure:	Not determined
pH:	Not applicable
Boiling point/range:	Not available
Melting point/range:	Not available
Specific gravity:	.96
Vapor density:	Not available
Evaporation rate:	Not available
Solubility in water:	Not soluble
Partition coefficient (n-octano/water):	Not determined
VOC content:	Essentially zero

10. STABILITY AND REACTIVITY

Stability:	Stable
Hazardous polymerization:	Will not occur.
Hazardous decomposition products:	Thermal: Dimethylcyclosiloxanes, Hydrogen fluoride. Oxidative/Thermal: Formaldehyde
Incompatibility:	Oxidizing agents.
Conditions to avoid:	None known

11. TOXICOLOGICAL INFORMATION

Product toxicity data:	Not available
Toxicologically synergistic products:	Not available

Refer to the following for irritancy of Product, Sensitization to Product, Carcinogenicity, Reproductive Toxicity, Teratogenicity, and Mutagenicity.

Ingredient Toxicity Data & Carcinogen Status

Components	LD50s & LC50s	Other LD50s and LC50s	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen	ACGIH-Carcinogen
Polydimethyl-siloxane 63148-62-9	Oral LD50 (Rat) >5000 mg/kg	Dermal LD50 (Rat) >2000 mg/kg	No	No	No	No
Silane, dichlorodimethyl reaction products with silica 68611-44-9	Oral LD50 (Rat) >5000 mg/kg	Inhalation LC50 (Rat) >0.477 mg/l/4h	No	No	No	No
Polytetrafuoroethylene 9002-84-0	Not Determined	None	No	No	No	No
Polyglycol 025322-69-4	Oral LD50 (Rats) >2,000 mg/kg	None	No	No	No	No

Literature Referenced Target Organ & Other Health Effects

Components	Health Effects/Target Organs
Polydimethyl-siloxane 63148-62-9	No target organs
Silane, dichlorodimethyl reaction products with silica 68611-44-9	No target organs
Polytetrafuoroethylene 9002-84-0	Irritant
Polyglycol 025322-69-4	No target organs

12. ECOLOGICAL INFORMATION

Ecological information: General Notes: Water hazard class 1 (self assessment): slightly hazardous for water. Do not allow undiluted product or large quantities of it to reach ground or sewage systems.

13. DISPOSAL CONSIDERATIONS

Information provided is for unused product only.

Recommended method of disposal: Dispose of in accordance with federal and local regulations.

14. TRANSPORT INFORMATION

Transportation of Dangerous Goods – Ground:

Proper shipping name:	Not regulated
Hazardous class or division:	None
Identification number:	None
Packing group:	None

International Air Transportation (ICAO/IATA):

Proper shipping name:	Not regulated
Hazardous class or division:	None
Identification number:	None
Packing group:	None

Water Transportation (IMO/IMDG):

Proper shipping name:	Not regulated
Hazardous class or division:	None
Identification number:	None
Packing group:	None
Marine pollutant:	None

15. REGULATORY INFORMATION

Canada Regulatory Information

CEPA DSL/NDSL Status: All components are listed on or are exempt from listing on the Domestic Substances List.

United States Regulatory Information

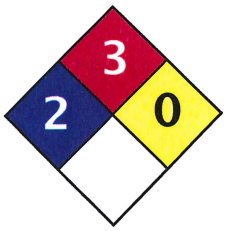
TSCA 8 (b) Inventory Status: All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.

SECTION 16: OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Product Regulations.

Data prepared by Environment protection department.

ScienceLab.com
Chemicals & Laboratory Equipment



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Benzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Benzene

Catalog Codes: SLB1564, SLB3055, SLB2881

CAS#: 71-43-2

RTECS: CY1400000

TSCA: TSCA 8(b) inventory: Benzene

CI#: Not available.

Synonym: Benzol; Benzine

Chemical Name: Benzene

Chemical Formula: C6-H6

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Benzene	71-43-2	100

Toxicological Data on Ingredients: Benzene: ORAL (LD50): Acute: 930 mg/kg [Rat]. 4700 mg/kg [Mouse]. DERMAL (LD50): Acute: >9400 mg/kg [Rabbit]. VAPOR (LC50): Acute: 10000 ppm 7 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of eye contact (irritant), of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC.
MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE].
The substance is toxic to blood, bone marrow, central nervous system (CNS).
The substance may be toxic to liver, Urinary System.
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

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

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

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

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 497.78°C (928°F)

Flash Points: CLOSED CUP: -11.1°C (12°F). (Setaflash)

Flammable Limits: LOWER: 1.2% UPPER: 7.8%

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

Fire Hazards in Presence of Various Substances:
Highly flammable in presence of open flames and sparks, of heat.
Slightly flammable to flammable in presence of oxidizing materials.
Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.
Explosive in presence of oxidizing materials, of acids.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Extremely flammable liquid and vapor. Vapor may cause flash fire.
Reacts on contact with iodine heptafluoride gas.

Dioxygenyl tetrafluoroborate is as very powerful oxidant. The addition of a small particle to small samples of benzene, at ambient temperature, causes ignition.
Contact with sodium peroxide with benzene causes ignition.
Benzene ignites in contact with powdered chromic anhydride.
Virgorous or incandescent reaction with hydrogen + Raney nickel (above 210 C) and bromine trifluoride.

Special Remarks on Explosion Hazards:
Benzene vapors + chlorine and light causes explosion.
Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate.
Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion.
Interaction of nitryl perchlorate with benzene gave a slight explosion and flash.
The solution of permanganic acid (or its explosive anhydride, dimaganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene.
Peroxodisulfuric acid is a very powerful oxidant. Uncontrolled contact with benzene may cause explosion.
Mixtures of peroxomonsulfuric acid with benzene explodes.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid.
Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

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

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

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

Exposure Limits:

TWA: 0.5 STEL: 2.5 (ppm) from ACGIH (TLV) [United States]
TWA: 1.6 STEL: 8 (mg/m3) from ACGIH (TLV) [United States]
TWA: 0.1 STEL: 1 from NIOSH
TWA: 1 STEL: 5 (ppm) from OSHA (PEL) [United States]
TWA: 10 (ppm) from OSHA (PEL) [United States]
TWA: 3 (ppm) [United Kingdom (UK)]
TWA: 1.6 (mg/m3) [United Kingdom (UK)]
TWA: 1 (ppm) [Canada]
TWA: 3.2 (mg/m3) [Canada]
TWA: 0.5 (ppm) [Canada]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor:
Aromatic. Gasoline-like, rather pleasant.
(Strong.)

Taste: Not available.

Molecular Weight: 78.11 g/mole

Color: Clear Colorless. Colorless to light yellow.

pH (1% soln/water): Not available.

Boiling Point: 80.1 (176.2°F)

Melting Point: 5.5°C (41.9°F)

Critical Temperature: 288.9°C (552°F)

Specific Gravity: 0.8787 @ 15 C (Water = 1)

Vapor Pressure: 10 kPa (@ 20°C)

Vapor Density: 2.8 (Air = 1)

Volatility: Not available.

Odor Threshold: 4.68 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:
Miscible in alcohol, chloroform, carbon disulfide oils, carbon tetrachloride, glacial acetic acid, diethyl ether, acetone.
Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles.

Incompatibility with various substances: Highly reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Benzene vapors + chlorine and light causes explosion.
Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate.
Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion.
Interaction of nitryl perchlorate with benzene gave a slight explosion and flash.
The solution of permanganic acid (or its explosive anhydride, dimaganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene.
Peroxodisulfuric acid is a very powferful oxidant. Uncontrolled contact with benzene may cause explosion.
Mixtures of peroxomonsulfuric acid with benzene explodes.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

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

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.
Acute oral toxicity (LD50): 930 mg/kg [Rat].
Acute dermal toxicity (LD50): >9400 mg/kg [Rabbit].
Acute toxicity of the vapor (LC50): 10000 7 hours [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC.
MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.
DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE].
Causes damage to the following organs: blood, bone marrow, central nervous system (CNS).
May cause damage to the following organs: liver, Urinary System.

Other Toxic Effects on Humans:
Very hazardous in case of inhalation.
Hazardous in case of skin contact (irritant, permeator), of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects (female fertility, Embryotoxic and/or foetotoxic in animal) and birth defects.
May affect genetic material (mutagenic).
May cause cancer (tumorigenic, leukemia))
Human: passes the placental barrier, detected in maternal milk.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: Causes skin irritation. It can be absorbed through intact skin and affect the liver, blood, metabolism,and urinary system.
Eyes: Causes eye irritation.
Inhalation: Causes respiratory tract and mucous membrane irritation. Can be absorbed through the lungs. May affect behavior/Central and Peripheral nervous systems (somnolence, muscle weakness, general anesthetic, and

other symptoms similar to ingestion), gastrointestinal tract (nausea), blood metabolism, urinary system.
Ingestion: May be harmful if swallowed. May cause gastrointestinal tract irritation including vomiting. May affect behavior/Central and Peripheral nervous systems (convulsions, seizures, tremor, irritability, initial CNS stimulation followed by depression, loss of coordination, dizziness, headache, weakness, pallor, flushing), respiration (breathlessness and chest constriction), cardiovascular system, (shallow/rapid pulse), and blood.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Benzene UNNA: 1114 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Benzene
California prop. 65 (no significant risk level): Benzene: 0.007 mg/day (value)
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Benzene
Connecticut carcinogen reporting list.: Benzene
Connecticut hazardous material survey.: Benzene
Illinois toxic substances disclosure to employee act: Benzene
Illinois chemical safety act: Benzene
New York release reporting list: Benzene
Rhode Island RTK hazardous substances: Benzene
Pennsylvania RTK: Benzene
Minnesota: Benzene
Michigan critical material: Benzene
Massachusetts RTK: Benzene
Massachusetts spill list: Benzene
New Jersey: Benzene
New Jersey spill list: Benzene
Louisiana spill reporting: Benzene
California Director's list of Hazardous Substances: Benzene

TSCA 8(b) inventory: Benzene
SARA 313 toxic chemical notification and release reporting: Benzene
CERCLA: Hazardous substances.: Benzene: 10 lbs. (4.536 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R11- Highly flammable.
R22- Harmful if swallowed.
R38- Irritating to skin.
R41- Risk of serious damage to eyes.
R45- May cause cancer.
R62- Possible risk of impaired fertility.
S2- Keep out of the reach of children.
S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S39- Wear eye/face protection.
S46- If swallowed, seek medical advice immediately and show this container or label.
S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:35 PM

Last Updated: 11/06/2008 12:00 PM

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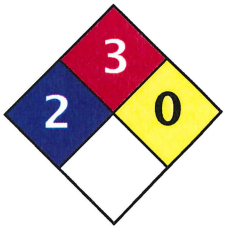

Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Toluene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Toluene

Catalog Codes: SLT2857, SLT3277

CAS#: 108-88-3

RTECS: XS5250000

TSCA: TSCA 8(b) inventory: Toluene

CI#: Not available.

Synonym: Toluol, Tolu-Sol; Methylbenzene; Methacide; Phenylmethane; Methylbenzol

Chemical Name: Toluene

Chemical Formula: C6-H5-CH3 or C7-H8

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Toluene	108-88-3	100

Toxicological Data on Ingredients: Toluene: ORAL (LD50): Acute: 636 mg/kg [Rat]. DERMAL (LD50): Acute: 14100 mg/kg [Rabbit]. VAPOR (LC50): Acute: 49000 mg/m 4 hours [Rat]. 440 ppm 24 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance may be toxic to blood, kidneys, the nervous system, liver, brain, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

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

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

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

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 480°C (896°F)

Flash Points: CLOSED CUP: 4.4444°C (40°F). (Setaflash) OPEN CUP: 16°C (60.8°F).

Flammable Limits: LOWER: 1.1% UPPER: 7.1%

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

Fire Hazards in Presence of Various Substances:
Flammable in presence of open flames and sparks, of heat.
Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable liquid, insoluble in water.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray or fog.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards:
Toluene forms explosive reaction with 1,3-dichloro-5,5-dimethyl-2,4-imidazolididione; dinitrogen tetraoxide;

concentrated nitric acid, sulfuric acid + nitric acid; N_2O_4; $AgClO_4$; BrF_3; Uranium hexafluoride; sulfur dichloride. Also forms an explosive mixture with tetranitromethane.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

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

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

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

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

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

Exposure Limits:
TWA: 200 STEL: 500 CEIL: 300 (ppm) from OSHA (PEL) [United States]
TWA: 50 (ppm) from ACGIH (TLV) [United States] SKIN
TWA: 100 STEL: 150 from NIOSH [United States]
TWA: 375 STEL: 560 (mg/m3) from NIOSH [United States]
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweet, pungent, Benzene-like.

Taste: Not available.

Molecular Weight: 92.14 g/mole

Color: Colorless.

pH (1% soln/water): Not applicable.

Boiling Point: 110.6°C (231.1°F)

Melting Point: -95°C (-139°F)

Critical Temperature: 318.6°C (605.5°F)

Specific Gravity: 0.8636 (Water = 1)

Vapor Pressure: 3.8 kPa (@ 25°C)

Vapor Density: 3.1 (Air = 1)

Volatility: Not available.

Odor Threshold: 1.6 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.7

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:
Soluble in diethyl ether, acetone.
Practically insoluble in cold water.
Soluble in ethanol, benzene, chloroform, glacial acetic acid, carbon disulfide.
Solubility in water: 0.561 g/l @ 25 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources (flames, sparks, static), incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Incompatible with strong oxidizers, silver perchlorate, sodium difluoride, Tetranitromethane, Uranium Hexafluoride.
Frozen Bromine Trifluoride reacts violently with Toluene at -80 deg. C.
Reacts chemically with nitrogen oxides, or halogens to form nitrotoluene, nitrobenzene, and nitrophenol and halogenated products, respectively.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

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

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.
Acute oral toxicity (LD50): 636 mg/kg [Rat].
Acute dermal toxicity (LD50): 14100 mg/kg [Rabbit].
Acute toxicity of the vapor (LC50): 440 24 hours [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC.
May cause damage to the following organs: blood, kidneys, the nervous system, liver, brain, central nervous system (CNS).

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of ingestion, of inhalation.
Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals:
Lowest Published Lethal Dose:
LDL [Human] - Route: Oral; Dose: 50 mg/kg
LCL [Rabbit] - Route: Inhalation; Dose: 55000 ppm/40min

Special Remarks on Chronic Effects on Humans:
Detected in maternal milk in human. Passes through the placental barrier in human. Embryotoxic and/or foetotoxic in animal. May cause adverse reproductive effects and birth defects (teratogenic). May affect genetic material (mutagenic)

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: Causes mild to moderate skin irritation. It can be absorbed to some extent through the skin.
Eyes: Cauess mild to moderate eye irritation with a burning sensation. Splash contact with eyes also causes conjunctivitis, blepharospasm, corneal edema, corneal abraisons. This usually resolves in 2 days.
Inhalation: Inhalation of vapor may cause respiratory tract irritation causing coughing and wheezing, and nasal discharge. Inhalation of high concentrations may affect behavior and cause central nervous system effects characterized by nausea, headache, dizziness, tremors, restlessness, lightheadedness, exhilaration, memory loss, insomnia, impaired reaction time, drowsiness, ataxia, hallucinations, somnolence, muscle contraction or spasticity, unconsciousness and coma. Inhalation of high concentration of vapor may also affect the cardiovascular system (rapid heart beat, heart palpitations, increased or decreased blood pressure, dysrhythmia,), respiration (acute pulmonary edema, respiratory depression, apnea, asphyxia), cause vision disturbances and dilated pupils, and cause loss of appetite.
Ingestion: Aspiration hazard. Aspiration of Toluene into the lungs may cause chemical pneumonitis. May cause irritation of the digestive tract with nausea, vomiting, pain. May have effects similar to that of acute inhalation.
Chronic Potential Health Effects:
Inhalation and Ingestion: Prolonged or repeated exposure via inhalation may cause central nervous system and cardiovascular symptoms similar to that of acute inhalation and ingestion as well liver damage/failure, kidney damage/failure (with hematuria, proteinuria, oliguria, renal tubular acidosis), brain damage, weight loss, blood (pigmented or nucleated red blood cells, changes in white blood cell count), bone marrow changes, electrolyte imbalances (Hypokalemia, Hypophostatemia), severe, muscle weakness and Rhabdomyolysis.
Skin: Repeated or prolonged skin contact may cause defatting dermatitis.

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 313 mg/l 48 hours [Daphnia (daphnia)]. 17 mg/l 24 hours [Fish (Blue Gill)]. 13 mg/l 96 hours [Fish (Blue Gill)]. 56 mg/l 24 hours [Fish (Fathead minnow)]. 34 mg/l 96 hours [Fish (Fathead minnow)]. 56.8 ppm any hours [Fish (Goldfish)].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may

arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Toluene UNNA: 1294 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Toluene
California prop. 65 (no significant risk level): Toluene: 7 mg/day (value)
California prop. 65 (acceptable daily intake level): Toluene: 7 mg/day (value)
California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Toluene
Connecticut hazardous material survey.: Toluene
Illinois toxic substances disclosure to employee act: Toluene
Illinois chemical safety act: Toluene
New York release reporting list: Toluene
Rhode Island RTK hazardous substances: Toluene
Pennsylvania RTK: Toluene
Florida: Toluene
Minnesota: Toluene
Michigan critical material: Toluene
Massachusetts RTK: Toluene
Massachusetts spill list: Toluene
New Jersey: Toluene
New Jersey spill list: Toluene
Louisiana spill reporting: Toluene
California Director's List of Hazardous Substances.: Toluene
TSCA 8(b) inventory: Toluene
TSCA 8(d) H and S data reporting: Toluene: Effective date: 10/04/82; Sunset Date: 10/0/92
SARA 313 toxic chemical notification and release reporting: Toluene
CERCLA: Hazardous substances.: Toluene: 1000 lbs. (453.6 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R11- Highly flammable.
R20- Harmful by inhalation.
S16- Keep away from sources of ignition - No smoking.
S25- Avoid contact with eyes.
S29- Do not empty into drains.
S33- Take precautionary measures against static discharges.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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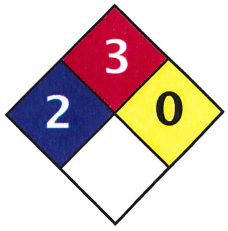

Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Ethylbenzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Ethylbenzene

Catalog Codes: SLE2044

CAS#: 100-41-4

RTECS: DA0700000

TSCA: TSCA 8(b) inventory: Ethylbenzene

CI#: Not available.

Synonym: Ethyl Benzene; Ethylbenzol; Phenylethane

Chemical Name: Ethylbenzene

Chemical Formula: C8H10

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Ethylbenzene	100-41-4	100

Toxicological Data on Ingredients: Ethylbenzene: ORAL (LD50): Acute: 3500 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (irritant, sensitizer).
CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC.
MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance may be toxic to central nervous system (CNS).
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

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

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

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

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 432°C (809.6°F)

Flash Points:
CLOSED CUP: 15°C (59°F). (Tagliabue.) OPEN CUP: 26.667°C (80°F) (Cleveland) (CHRIS, 2001)
CLOSED CUP: 12.8 C (55 F) (Bingham et al, 2001; NIOSH, 2001)
CLOSED CUP: 21 C (70 F) (NFPA)

Flammable Limits: LOWER: 0.8% - 1.6%UPPER: 6.7% - 7%

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

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.
Slightly explosive in presence of heat.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Vapor may travel considerable distance to source of ignition and flash back. Vapors may form explosive mixtures with air. When heated to decomposition it emits acrid smoke and irritating fumes.

Special Remarks on Explosion Hazards: Vapors may form explosive mixtures in air.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid.
Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Sensitive to light. Store in light-resistant containers.

Section 8: Exposure Controls/Personal Protection

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

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

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

Exposure Limits:
TWA: 100 STEL: 125 (ppm) from OSHA (PEL) [United States]
TWA: 435 STEL: 545 from OSHA (PEL) [United States]
TWA: 435 STEL: 545 (mg/m3) from NIOSH [United States]
TWA: 100 STEL: 125 (ppm) from NIOSH [United States]
TWA: 100 STEL: 125 (ppm) from ACGIH (TLV) [United States]
TWA: 100 STEL: 125 (ppm) [United Kingdom (UK)]
TWA: 100 STEL: 125 (ppm) [Belgium]
TWA: 100 STEL: 125 (ppm) [Finland]
TWA: 50 (ppm) [Norway]
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweetish. Gasoline-like. Aromatic.

Taste: Not available.

Molecular Weight: 106.16 g/mole

Color: Colorless.

pH (1% soln/water): Not available.

Boiling Point: 136°C (276.8°F)

Melting Point: -94.9 (-138.8°F)

Critical Temperature: 617.15°C (1142.9°F)

Specific Gravity: 0.867 (Water = 1)

Vapor Pressure: 0.9 kPa (@ 20°C)

Vapor Density: 3.66 (Air = 1)

Volatility: 100% (v/v).

Odor Threshold: 140 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether.

Solubility:
Easily soluble in diethyl ether.
Very slightly soluble in cold water or practically insoluble in water.
Soluble in all proportions in Ethyl alcohol.
Soluble in Carbon tetrachloride, Benzene.
Insoluble in Ammonia.
Slightly soluble in Chloroform.
Solubility in Water: 169 mg/l @ 25 deg. C.; 0.014 g/100 ml @ 15 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ingnition sources (flames, sparks, static), incompatible materials, light

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity:
Can react vigorously with oxidizing materials.
Sensitive to light.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation.

Toxicity to Animals: Acute oral toxicity (LD50): 3500 mg/kg [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC.
MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.
May cause damage to the following organs: central nervous system (CNS).

Other Toxic Effects on Humans:
Hazardous in case of ingestion, of inhalation.
Slightly hazardous in case of skin contact (irritant, permeator).

Special Remarks on Toxicity to Animals:
Lethal Dose/Conc 50% Kill:
LD50 [Rabbit] - Route: Skin; Dose: 17800 ul/kg
Lowest Published Lethal Dose/Conc:
LDL[Rat] - Route: Inhalation (vapor); Dose: 4000 ppm/4 H

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects and birth defects (teratogenic) based on animal test data.
May cause cancer based on animals data. IARC evidence for carcinogenicity in animals is sufficient. IARC evidence of carcinogenicity in humans inadequate.
May affect genetic material (mutagenic).

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: Can cause mild skin irritation. It can be absorbed through intact skin.
Eyes: Contact with vapor or liquid can cause severe eye irritation depending on concentration. It may also cause conjunctivitis. At a vapor exposure level of 85 - 200 ppm , it is mildly and transiently irritating to the eyes; 1000 ppm causes further irritation and tearing; 2000 ppm results in immediate and severe irritation and tearing; 5,000 ppm is intolerable (ACGIH, 1991; Clayton and Clayton, 1994). Standard draize test for eye irritation using 500 mg resulted in severe irritation (RTECS)
Inhalation: Exposure to high concentrations can cause nasal, mucous membrane and respiratory tract irritation and can also result in chest constriction and, trouble breathing, respiratory failure, and even death. It can also affect behavior/Central Nervous System. The effective dose for CNS depression in experimental animals was 10,000 ppm (ACGIH, 1991). Symptoms of CNS depression include headache, nausea, weakness, dizziness, vertigo, irritability, fatigue, lightheadedness, sleepiness, tremor, loss of coordination, judgement and conciousness, coma, and death. It can also cause pulmonary edema. Inhalation of 85 ppm can produce fatigue, insomnia, headache, and mild irritation of the respiratory tract (Haley & Berndt, 1987).
Ingestion: Do not drink, pipet or siphon by mouth. May cause gastroinestinal/digestive tract irritation with Abdominal pain, nausea, vomiting. Ethylbenzene is a pulmonary aspiration hazard. Pulmonary aspiration of even small amounts of the liquid may cause fatal pneumonitis. It may also affect behavior/central nervous system with

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 14 mg/l 96 hours [Fish (Trout)] (static). 12.1 mg/l 96 hours [Fish (Fathead Minnow)] (flow-through)]. 150 mg/l 96 hours [Fish (Blue Gill/Sunfish)] (static). 275 mg/l 96 hours [Fish (Sheepshead Minnow)]. 42.3 mg/l 96 hours [Fish (Fathead Minnow)](soft water). 87.6mg/l 96 hours [Shrimp].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Ethylbenzene UNNA: 1175 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Ethylbenzene
Illinois toxic substances disclosure to employee act: Ethylbenzene
Illinois chemical safety act: Ethylbenzene
New York release reporting list: Ethylbenzene
Rhode Island RTK hazardous substances: Ethylbenzene
Pennsylvania RTK: Ethylbenzene
Minnesota: Ethylbenzene
Massachusetts RTK: Ethylbenzene
Massachusetts spill list: Ethylbenzene
New Jersey: Ethylbenzene
New Jersey spill list: Ethylbenzene
Louisiana spill reporting: Ethylbenzene
California Director's List of Hazardous Substances: Ethylbenzene
TSCA 8(b) inventory: Ethylbenzene
TSCA 4(a) proposed test rules: Ethylbenzene
TSCA 8(d) H and S data reporting: Ethylbenzene: Effective Date: 6/19/87; Sunset Date: 6/19/97
SARA 313 toxic chemical notification and release reporting: Ethylbenzene

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
CLASS D-2A: Material causing other toxic effects (VERY TOXIC).
CLASSE D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R11- Highly flammable.
R20- Harmful by inhalation.
S16- Keep away from sources of ignition - No smoking.
S24/25- Avoid contact with skin and eyes.
S29- Do not empty into drains.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References:
-Manufacturer's Material Safety Data Sheet.
-Fire Protection Guide to Hazardous Materials, 13th ed., Nationial Fire Protection Association (NFPA)
-Registry of Toxic Effects of Chemical Substances (RTECS)
-Chemical Hazard Response Information System (CHRIS)
-Hazardous Substance Data Bank (HSDB)
-New Jersey Hazardous Substance Fact Sheet
-Ariel Global View
-Reprotext System

Other Special Considerations: Not available.

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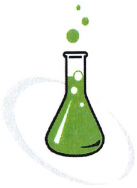

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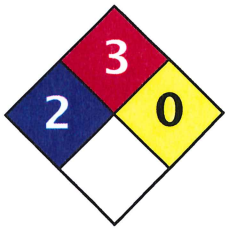

Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Xylenes MSDS

Section 1: Chemical Product and Company Identification

Product Name: Xylenes

Catalog Codes: SLX1075, SLX1129, SLX1042, SLX1096

CAS#: 1330-20-7

RTECS: ZE2100000

TSCA: TSCA 8(b) inventory: Xylenes

CI#: Not available.

Synonym: Xylenes; Dimethylbenzene; xylol; methyltoluene

Chemical Name: Xylenes (o-, m-, p- isomers)

Chemical Formula: C6H4(CH3)2

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Xylenes	1330-20-7	100

Toxicological Data on Ingredients: Xylenes: ORAL (LD50): Acute: 4300 mg/kg [Rat]. 2119 mg/kg [Mouse]. DERMAL (LD50): Acute: >1700 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance may be toxic to blood, kidneys, liver, mucous membranes, bone marrow, central nervous system (CNS).
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

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

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

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

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 464°C (867.2°F)

Flash Points: CLOSED CUP: 24°C (75.2°F). (Tagliabue.) OPEN CUP: 37.8°C (100°F).

Flammable Limits: LOWER: 1% UPPER: 7%

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

Fire Hazards in Presence of Various Substances:
Highly flammable in presence of open flames and sparks, of heat.
Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Slightly explosive in presence of open flames and sparks, of heat.

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

Special Remarks on Fire Hazards: Vapors may travel to source of ignition and flash back.

Special Remarks on Explosion Hazards:
Vapors may form explosive mixtures with air.
Containers may explode when heated.

May polymerize explosively when heated.
An attempt to chlorinate xylene with 1,3-Dichloro-5,5-dimethyl-2,4-imidazolidindione (dichlorohydrantoin) caused a violent explosion

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid.
Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

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

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

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

Exposure Limits:
TWA: 100 (ppm) [Canada]
TWA: 435 (mg/m3) [Canada]
TWA: 434 STEL: 651 (mg/m3) from ACGIH (TLV) [United States]
TWA: 100 STEL: 150 (ppm) from ACGIH (TLV) [United States]
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweetish.

Taste: Not available.

Molecular Weight: 106.17 g/mole

Color: Colorless. Clear

pH (1% soln/water): Not available.

Boiling Point: 138.5°C (281.3°F)

Melting Point: -47.4°C (-53.3°F)

Critical Temperature: Not available.

Specific Gravity: 0.864 (Water = 1)

Vapor Pressure: 0.9 kPa (@ 20°C)

Vapor Density: 3.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 1 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.1

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Insoluble in cold water, hot water.
Miscible with absolute alcohol, ether, and many other organic liquids.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles

Incompatibility with various substances: Reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Store away from acetic acid, nitric acid, chlorine, bromine, and fluorine.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

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

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.
Acute oral toxicity (LD50): 2119 mg/kg [Mouse].

Acute dermal toxicity (LD50): >1700 mg/kg [Rabbit].
Acute toxicity of the vapor (LC50): 5000 4 hours [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC.
May cause damage to the following organs: blood, kidneys, liver, mucous membranes, bone marrow, central nervous system (CNS).

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant, permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals:
Lowest Lethal Dose:
LDL [Human] - Route: Oral; Dose: 50 mg/kg
LCL [Man] - Route: Oral; Dose: 10000 ppm/6H

Special Remarks on Chronic Effects on Humans:
Detected in maternal milk in human. Passes through the placental barrier in animal. Embryotoxic and/or foetotoxic in animal.
May cause adverse reproductive effects (male and femael fertility (spontaneous abortion and fetotoxicity)) and birth defects based animal data.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: Causes skin irritation. Can be absorbed through skin.
Eyes: Causes eye irritation.
Inhalation: Vapor causes respiratory tract and mucous membrane irritation. May affect central nervous system and behavior (General anesthetic/CNS depressant with effects including headache, weakness, memory loss, irritability, dizziness, giddiness, loss of coordination and judgement, respiratory depression/arrest or difficulty breathing, loss of appetite, nausea, vomiting, shivering, and possible coma and death). May also affects blood, sense organs, liver, and peripheral nerves.
Ingestion: May cause gastrointestinal irritation including abdominal pain, vomiting, and nausea. May also affect liver and urinary system/kidneys. May cause effects similar to those of acute inhalation.
Chronic Potential Health Effects:
Chronic inhalation may affect the urinary system (kidneys) blood (anemia), bone marrow (hyperplasia of bone marrow) brain/behavior/Central Nervous system. Chronic inhalation may alsocause mucosal bleeding.
Chronic ingestion may affect the liver and metabolism (loss of appetite) and may affect urinary system (kidney damage)

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Xylenes UNNA: 1307 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Xylenes
Illinois chemical safety act: Xylenes
New York acutely hazardous substances: Xylenes
Rhode Island RTK hazardous substances: Xylenes
Pennsylvania RTK: Xylenes
Minnesota: Xylenes
Michigan critical material: Xylenes
Massachusetts RTK: Xylenes
Massachusetts spill list: Xylenes
New Jersey: Xylenes
New Jersey spill list: Xylenes
Louisiana spill reporting: Xylenes
California Director's List of Hazardous Substances: Xylenes
TSCA 8(b) inventory: Xylenes
SARA 302/304/311/312 hazardous chemicals: Xylenes
SARA 313 toxic chemical notification and release reporting: Xylenes
CERCLA: Hazardous substances.: Xylenes: 100 lbs. (45.36 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R10- Flammable.
R21- Harmful in contact with skin.
R36/38- Irritating to eyes and skin.
S2- Keep out of the reach of children.
S36/37- Wear suitable protective clothing and gloves.
S46- If swallowed, seek medical advice immediately and show this container or label.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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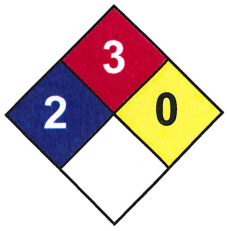

Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Methyl tert-butyl ether MSDS

Section 1: Chemical Product and Company Identification

Product Name: Methyl tert-butyl ether

Catalog Codes: SLM2152

CAS#: 1634-04-4

RTECS: KN5250000

TSCA: TSCA 8(b) inventory: Methyl tert-butyl ether

CI#: Not available.

Synonym:

Chemical Name: Methyl tert-Butyl Ether

Chemical Formula: C5-H12-O

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Methyl {tert-}butyl ether	1634-04-4	100

Toxicological Data on Ingredients: Methyl tert-butyl ether: ORAL (LD50): Acute: 4000 mg/kg [Rat]. 5960 mg/kg [Mouse]. VAPOR (LC50): Acute: 23576 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Extremely hazardous in case of eye contact (irritant), of ingestion. Very hazardous in case of skin contact (irritant), of inhalation. Hazardous in case of skin contact (permeator). Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Extremely hazardous in case of eye contact (irritant), of ingestion. Very hazardous in case of skin contact (irritant), of inhalation. Hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, the nervous system, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged inhalation of vapors may lead to chronic respiratory irritation.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 224°C (435.2°F)

Flash Points: CLOSED CUP: -28°C (-18.4°F).

Flammable Limits: LOWER: 2.5% UPPER: 15.1%

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

Fire Hazards in Presence of Various Substances: Flammable in presence of open flames and sparks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

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

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes

Storage:
Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 37.8°C (100°F).

Section 8: Exposure Controls/Personal Protection

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

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

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

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Characteristic. (Strong.)

Taste: Not available.

Molecular Weight: 88.15 g/mole

Color: Clear Colorless.

pH (1% soln/water): Not available.

Boiling Point: 55.2°C (131.4°F)

Melting Point: -109°C (-164.2°F)

Critical Temperature: Not available.

Specific Gravity: 0.7405 (Water = 1)

Vapor Pressure: 245 mm of Hg (@ 20°C)

Vapor Density: 3.1 (Air = 1)

Volatility: 100% (v/v).

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether.

Solubility:

Soluble in methanol, diethyl ether. Partially soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 4000 mg/kg [Rat]. Acute toxicity of the vapor (LC50): 23576 ppm 4 hour(s) [Rat].

Chronic Effects on Humans: The substance is toxic to lungs, the nervous system, mucous membranes.

Other Toxic Effects on Humans:
Extremely hazardous in case of ingestion. Very hazardous in case of skin contact (irritant), of inhalation. Hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Class 3: Flammable liquid.

Identification: : Methyl tert-butyl ether : UN2398 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Pennsylvania RTK: Methyl tert-butyl ether Massachusetts RTK: Methyl tert-butyl ether TSCA 8(b) inventory: Methyl tert-butyl ether SARA 313 toxic chemical notification and release reporting: Methyl tert-butyl ether CERCLA: Hazardous substances.: Methyl tert-butyl ether

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R11- Highly flammable. R38- Irritating to skin. R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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ALCONOX MSDS

Section 1 : MANUFACTURER INFORMATION

Product name: Alconox

Supplier: Same as manufacturer.

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Manufacturer emergency phone number: 800-255-3924.
813-248-0585 (outside of the United States).

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Supplier MSDS date: 2009/04/20

D.O.T. Classification: Not regulated.

Section 2 : HAZARDOUS INGREDIENTS

C.A.S.	CONCENTRATION %	Ingredient Name	T.L.V.	LD/50	LC/50
25155-30-0	10-30	SODIUM DODECYLBENZENESULFONATE	NOT AVAILABLE	438 MG/KG RAT ORAL 1330 MG/KG MOUSE ORAL	NOT AVAILABLE
497-19-8	7-13	SODIUM CARBONATE	NOT AVAILABLE	4090 MG/KG RAT ORAL 6600 MG/KG MOUSE ORAL	2300 MG/M3/2H RAT INHALATION 1200 MG/M3/2H MOUSE INHALATION
7722-88-5	10-30	TETRASODIUM PYROPHOSPHATE	5 MG/M3	4000 MG/KG RAT ORAL 2980 MG/KG MOUSE ORAL	NOT AVAILABLE
7758-29-4	10-30	SODIUM PHOSPHATE	NOT AVAILABLE	3120 MG/KG RAT ORAL 3100 MG/KG MOUSE ORAL >4640 MG/KG RABBIT DERMAL	NOT AVAILABLE

Section 2A : ADDITIONAL INGREDIENT INFORMATION

Note: (supplier).
CAS# 497-19-8: LD50 4020 mg/kg - rat oral.
CAS# 7758-29-4: LD50 3100 mg/kg - rat oral.

Section 3 : PHYSICAL / CHEMICAL CHARACTERISTICS

Physical state: Solid

Appearance & odor: Almost odourless.
White granular powder.

Odor threshold (ppm): Not available.

Vapour pressure (mmHg): Not applicable.

Vapour density (air=1): Not applicable.

By weight: Not available.

Evaporation rate (butyl acetate = 1): Not applicable.

Boiling point (°C): Not applicable.

Freezing point (°C): Not applicable.

pH: (1% aqueous solution).
9.5

Specific gravity @ 20 °C: (water = 1).
0.85 - 1.10

Solubility in water (%): 100 - > 10% w/w

Coefficient of water\oil dist.: Not available.

VOC: None

Section 4 : FIRE AND EXPLOSION HAZARD DATA

Flammability: Not flammable.

Conditions of flammability: Surrounding fire.

Extinguishing media: Carbon dioxide, dry chemical, foam.
Water
Water fog.

Special procedures: Self-contained breathing apparatus required.
Firefighters should wear the usual protective gear.

Auto-ignition temperature: Not available.

Flash point (°C), method: None

Lower flammability limit (% vol): Not applicable.

Upper flammability limit (% vol): Not applicable.

Not available.

Sensitivity to mechanical impact: Not applicable.

Hazardous combustion products: Oxides of carbon (COx).
Hydrocarbons.

Rate of burning: Not available.

Explosive power: None

Section 5 : REACTIVITY DATA

Chemical stability: Stable under normal conditions.

Conditions of instability: None known.

Hazardous polymerization: Will not occur.

Incompatible substances: Strong acids.
Strong oxidizers.

Hazardous decomposition products: See hazardous combustion products.

Section 6 : HEALTH HAZARD DATA

Route of entry: Skin contact, eye contact, inhalation and ingestion.

Effects of Acute Exposure

Eye contact: May cause irritation.

Skin contact: Prolonged contact may cause irritation.

Inhalation: Airborne particles may cause irritation.

Ingestion: May cause vomiting and diarrhea.
May cause abdominal pain.
May cause gastric distress.

Effects of chronic exposure: Contains an ingredient which may be corrosive.

LD50 of product, species & route: > 5000 mg/kg rat oral.

LC50 of product, species & route: Not available for mixture, see the ingredients section.

Exposure limit of material: Not available for mixture, see the ingredients section.

Sensitization to product: Not available.

Carcinogenic effects: Not listed as a carcinogen.

Reproductive effects: Not available.

Teratogenicity: Not available.

Mutagenicity: Not available.

Synergistic materials: Not available.

Medical conditions aggravated by exposure: Not available.

First Aid

Skin contact: Remove contaminated clothing.
Wash thoroughly with soap and water.
Seek medical attention if irritation persists.

Eye contact: Check for and remove contact lenses.
Flush eyes with clear, running water for 15 minutes while holding eyelids open: if irritation persists, consult a physician.

Inhalation: Remove victim to fresh air.
Seek medical attention if symptoms persist.

Ingestion: Dilute with two glasses of water.
Never give anything by mouth to an unconscious person.
Do not induce vomiting, seek immediate medical attention.

Section 7 : PRECAUTIONS FOR SAFE HANDLING AND USE

Leak/Spill: Contain the spill.
Recover uncontaminated material for re-use.
Wear appropriate protective equipment.
Contaminated material should be swept or shoveled into appropriate waste container for disposal.

Waste disposal: In accordance with municipal, provincial and federal regulations.

Handling procedures and equipment: Protect against physical damage.
Avoid breathing dust.
Wash thoroughly after handling.
Keep out of reach of children.
Avoid contact with skin, eyes and clothing.
Launder contaminated clothing prior to reuse.

Storage requirements: Keep containers closed when not in use.
Store away from strong acids or oxidizers.
Store in a cool, dry and well ventilated area.

Section 8 : CONTROL MEASURES

Precautionary Measures

Gloves/Type:



Neoprene or rubber gloves.

Respiratory/Type:



If exposure limit is exceeded, wear a NIOSH approved respirator.

Eye/Type:



Safety glasses with side-shields.

Footwear/Type: Safety shoes per local regulations.

Clothing/Type: As required to prevent skin contact.

Other/Type: Eye wash capability should be in close proximity.

Ventilation requirements: Local exhaust at points of emission.

EcoVac Services, Inc.

Date Updated: 8/30/12

MATERIAL SAFETY DATA SHEET (EFS™-A)

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name:	**EcoVac Formulated Surfactant (EFS™)**
Chemical Family:	**Anionic Sulfosuccinate and sulfonate blend**
Molecular Formula:	**Dioctyl sulfosuccinate/ Diphenyl oxide sulfonate**
Molecular Weight:	**Site specific mixture average 428 gm/mol**

EcoVac Services, Inc. 105 Weatherstone Drive, Suite 610, Woodstock, Georgia 30188.
For Product Information call 770-592-1001.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Component / CAS No.	% (w/w)	OSHA (PEL)	ACGIH (TLV)	Carcinogen
Dioctyl sulfosuccinate /577-11-7	**63 – 77%**	Not Established	Not Established	--
Diphenyl oxide sulfonate/53467-00-9	**27-33%**	Not Established	Not Established	--

3. HAZARDS IDENTIFICATION

APPEARANCE AND ODOR:

Color:	Colorless
Appearance:	Hazy liquid gel
Odor:	soap like

HAZARD:

WARNING!	CAUSE EYE AND SKIN IRRITATION

TOXICOLOGICAL INFORMATION

Oral LD50 (Rat):	1,600 mg/kg
Dermal LD50 (Rabbit):	3,600 mg/kg

4. FIRST AID MEASURES

Ingestion:
If swallowed, call a physician immediately. Only induce vomiting at the instruction of physician. Never give anything by mouth to an unconscious person.

Skin Contact:
Remove contaminated clothing and shoes, and then wash with plenty of water immediately. Get medical attention if irritation persists after washing.

Eye Contact:
Rinse immediately with plenty of water for 15 minutes. Obtain medical advice if there are persistent symptoms.

Inhalation:
Remove to fresh air. If breathing is difficult, give oxygen. Obtain medical advice if there are persistent symptoms.

5. FIRE-FIGHTING MEASURTES

Extinguishing Media:
Use water spray or fog, carbon dioxide or dry chemical.

Protective Equipment:
Firefighters should wear full fire-fighting turn-out gear including NIOSH-approved self-contained breathing apparatus with full face-piece operated in the pressure demand or other positive pressure mode.

Special Hazards:
Keep containers cool by spraying with water if exposed to fire.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions:
Where exposure level is known, wear approved respirator suitable for level of exposure. Where exposure level is not known, wear approved, positive pressure, self-contained respirator. Wear impermeable boots.

Methods for Cleaning Up:
Cover spills with inert absorbent material; sweep up and place in a waste disposal container. Flush spill area with water.

7. HANDLING AND STORAGE

HANDLING
Precautionary Measures:
Avoid contact with eyes, skin and clothing. Wash thoroughly after handling. As with all chemicals, good industrial hygiene practices should be followed when handling this material.

Storage Temperature:
Store at > 10 °C for integrity.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Measures:
Use general ventilation. Local exhaust is suggested for use, where possible, especially in enclosed or confined spaces.

Respiratory Protection:
For operations where inhalation exposure can occur, use an approved respirator recommended by an industrial hygienist after an evaluation of the operation. A full face-piece respirator also provides eye and face protection.

Eye Protection
Wear eye/face protection such as chemical splash proof goggles or face shield. Eyewash equipment and safety shower should be provided in areas of potential exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	colorless
Appearance:	hazy liquid gel
Odor:	soap like
Boiling Point:	not available
Melting Point:	not available
Vapor Pressure:	not available
Specific Gravity:	~1.1@25 C
Vapor Density:	estimated heavier than air
Percent Volatile:	not available
Solubility in Water:	not available
VOC Content:	not applicable
pH:	5.0 – 8.0 (3% aqueous solution)
Evaporation Rate:	Negligible
Solubility in Water:	> 3% @25 C
Flash Point:	not available
Flammable Limits:	not available
Autoignition Temp:	not available
Decomposition Temp:	not available
Partition Coefficient:	not available
Odor Threshold:	not available

10. STABILITY AND REACTIVITY

Stability:	stable
Conditions to Avoid:	unknown
Polymerization:	will not occur
Conditions to Avoid:	unknown
Material Incompatibility:	strong oxidizing agents, strong acids and alkalis.
Hazardous Decomposition:	carbon monoxide
Products:	carbon dioxide, oxides of sulfur

11. TOXICOLOGICAL INFORMATION

Toxicological information for the product is found under Section 3. HAZARD IDENTIFICATION.

12. ECOLOGICAL INFORMATION

Ecotoxicity
Aquatic LC50: 10 – 100 mg/L

Environmental Fate: readily biodegradable

13. DISPOSAL CONSIDERATIONS

Disposal Instructions
Treatment, storage, transportation and disposal must be in accordance with applicable Federal, State/Provincial and Local regulations. Regulations may vary in different locations. Characterization and compliance with applicable laws are the responsibility of the generator.

14. TRANSPORT INFORMATION

DOT Proper Shipping Name
Refer to bill of lading or container label for DOT or other transportation hazard classification, if any.

15. REGULATORY INFORMATION

United States:
All components of this product are included on the TSCA Chemical Inventory or not required to be listed on the TSCA Chemical Inventory.

16. OTHER INFORMATION

NFPA Hazard Rating (National Fire Protection Association)

Health: 2
Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.
Fire: 1
Materials that must be preheated before ignition can occur.
Reactivity: 0
Materials that in themselves are normally stable, even under fire exposure conditions.

Completed On
May 21, 2009

Completed By
EcoVac Services, Inc.

Attachment 3

Training Certifications

Project Title: Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia

Certifications

Name	40-Hour HAZWOPER	8-Hour Refresher	Respirator Fit Test	Medical	CPR	First Aid/ BBP	Supervisor	Construction and other training
SpecPro Environmental Services Employees								
Chris Napoleon	2005	12/2012	10/2012	10/2012	10/2011 2-year	10/2011 2-year BBP 9/2012	2008	2011
Leann Taylor McNeal	2001	3/2013	1/2013	Resp: 1/2013 HTW: 8/2012	9/2011 2-year	9/2010 3-year BBP 9/2012	2010	OSHA 30-Hour 10/2009 Excavation 4/2012 7/2011
Doug Hawn	1989	12/2012	1/2013	6/2013	2/2012 2-year	2/2012 2-year BBP 10/2012	2013	
Richard Rathnow		4/2013		10/2012	6/2012 2-year	6/2012 2-year BBP 10/2012		OSHA 30-Hour Trainer 1/2010

Please note: All certifications will be renewed prior to expiration.

Project Title: Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia

Certifications (continued)

Name	40-Hour HAZWOPER	8-Hour Refresher	Respirator Fit Test	Medical	CPR	First Aid/ BBP	Supervisor	Construction and other training
Major Drilling Employees								
David Dicksinson	2008	12/2012	8/2012	8/2012 2-year				
Ricky Davis	1989	6/2012	7/2012	7/2012 2-year				
Jimmy Harris	2003	10/2012	10/2012	10/2012 2-year				
David Chamblee	2004	8/2012	8/2012	8/2012 2-year				

Please note: All certifications will be renewed prior to expiration.

THE NATIONAL ENVIRONMENTAL TRAINERS

Chris Napoleon

has satisfactorily passed an exam and completed a 40 hour training course entitled
Hazardous Waste Operations and Emergency Response
meeting the requirements identified in Title 29 CFR 1910.120 (OSHA HAZWOPER Regulations). This course has been awarded 5.0 Industrial Hygiene CM Points by the American Board of Industrial Hygiene-Approval Number 13334. This course is eligible for 3.33 Continuance of Certification (COC) points from the Board of Certified Safety Professionals.

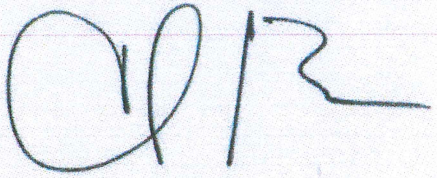
NATIONAL ENVIRONMENTAL TRAINERS, Inc.

June 23, 2005

Course Number 1003, Awarded 40 PDH's
Florida Board of Professional Engineers CEU Provider Number 0004284

www.nationalenvironmentaltrainers.com

Signature of Instructor



Clay A. Bednarz, MS, RPIH

Association of
Bay Area Governments

ABAG Training Center
www.hazmatschool.com

CERTIFICATE OF COMPLETION

Christopher Napoleon

has successfully completed the course titled

OSHA 8-hr Annual HAZWOPER Refresher

Satisfies 29 CFR 1910.120(e)(8)
on
December 3, 2012

and has earned
0.8 CEUs (Continuing Education Units) (8Course hours) from the program

Certificate No 99718
(verify at www.hazmatschool.com)

Brian Kirking, Training Director
Chanell Gumbs, Training Coordinator
www.abag.ca.gov; (510) 464-7964

Paul W. Gantt, CSP, REA
Safety Compliance Management, Inc.

Respirator Fit Test

Name: Christopher Napoleon
ID: 2412
Test Date: 10/4/12
Next Test Due: 5/4/13

Respirator
Mfg: 3m
Model: 6000
Style: Full Face
Size: Large

Results
Overall FF: 42648
FF Pass level: 1000
Pass: YES
Operator: Connie

Protocol: OSHA 29CFR1910.134
Fit Test Method: QNFT using TSI PortaCount®
Fit Test provided by MMC HealthWorks

Respirator Fit Test

Name: Christopher Napoleon
ID: 2412
Test Date: 10/4/12
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Fit Test Method: QNFT using TSI PortaCount®
Fit Test provided by MMC HealthWorks

MMC HealthWorks

988 Oak Ridge Turnpike, Ste L-50, Oak Ridge, TN 37830

Name: Chris Napoleon SES

s completed medical surveillance for:

- (X) Asbestos – 29 CFR 1910.1001 / 1926.58
- (X) HAZWOPER – 29 CFR 1910.120 / 1926.65
- (X) Resp Protection – 29 CFR 1910.134 / 1926.103
- ( ) Beryllium – 10 CFR 850
- ( ) Lead – 29 CFR 1910.1025 / 1926.62
- ( ) Non-reactor nuclear – DOE O 5480.20A
- (X) Confined Space – 29 CFR 1910.146 / 1926.21
- (X) Hearing conservation – 29 CFR 1910.95 / 1926.52
- (X) Thermal stress
- ( ) Other:

MMC HealthWorks

988 Oak Ridge Turnpike, Ste L-50, Oak Ridge, TN 37830
865.835.4320

Limitations / recommendations:

- ( ) wear corrective lenses
- ( ) limit respirator use:
- ( ) positive pressure respirator only
- ( ) use hearing protection
- ( ) use double hearing protection
- ( ) other:

Examiner: Date: 10/4/12

B78650012 (01/08)

MMC HealthWorks
Your Health Management Partner

Multiple Medical Surveillance
Written Opinion

Name	Employee or SSAN	Today's Date
Napoleon, Chris		10/04/2012
Company	Department	
SES		

The above named employee underwent medical surveillance on 10/04/2012. The employee was informed of the results of this surveillance and any detected conditions that require further evaluation or treatment. Unless otherwise noted, this employee has been found physically suitable for the time period noted below.

	This is a temporary clearance; **expiration date:** / /

1. Type of surveillance conducted (mark all that apply):

X	Asbestos (29 CFR 1910.1001, 29 CFR 1926.58, 40 CFR 763)
X	HAZWOPER: Hazardous Waste Worker / Hazardous Materials Handler (29 CFR 1910.120, 29 CFR 1926.65)
	Beryllium (10 CFR 850.34)
	OSHA Toxic Substances (29 CFR 1910, Subpart Z) specific substance(s):
	Lead (29 CFR 1910.1025, 29 CFR 1926.62) Blood Lead Level: _____ ug/dl
X	Respiratory Protection (29 CFR 1910.134, 29 CFR 1926.103)
X	Hearing conservation (29 CFR 1910.95, 29 CFR 1926.52)
	Non-reactor nuclear (DOE O 5480.20A)
X	Confined space entry (29 CFR 1910.146, 29 CFR 1926.21)
X	Thermal stress
	Other:

2. Based on this assessment, the employee has the following medical conditions which could result in increased risk of material health impairment from exposure to the occupational hazard (do not reveal conditions unrelated to occupational exposures):

X	None		Smoking		Pulmonary		Hearing Loss		Other:

3. Recommendations:

	Hearing protection		Remove from _____ work
	Discontinue smoking		Unable to use respirator
	Limit respirator use:		Positive pressure respirator only
X	Reevaluation X 12 months ☐ 6months ☐ other:		Wear corrective lenses

4. In the case of asbestos exposure, the employee has been informed of the increased health risk associated with smoking and inhalation of asbestos fibers.

5. Employee and employer are reminded to use all available protective measures appropriately. Should employee health or site work conditions change appreciably, consultation with MMC HealthWorks is recommended.

6. A copy of these recommendations has been provided to the employee: | | yes | X | no |

7. Additional comments:

Examiner
(06.10.2005)

Physician's Plaza Suite L-50, 988 Oak Ridge Turnpike, Oak Ridge, TN 37830
Phone (865) 835-4320, Fax (865) 835-4328

American Heart Association

Learn and Live

Heartsaver® First Aid

Christopher Napoleon

This card certifies that the above individual has successfully completed the objectives and skills evaluations in accordance with the curriculum of the AHA for Heartsaver First Aid Program.

Modules Completed: (A) (B) (C) (D) (E)

10/6/2011
Issue Date

October 2013
Recommended Renewal Date

Training Center **Cintas Corporation** **OH20246**

TC Address/Contact Info **Mason OH** **45040** **865-966-4701**

Course Location **Cintas FAS 248 Knoxville, TN**

Instructor **Sheri Shanks** **1112227285**

Holder's Signature

© 2008 American Heart Association. *Tampering with this card will alter its appearance.* 80-1202

ProBloodborne

a ProTrainings.com company

This card certifies that the individual has successfully completed the education in OSHA Bloodborne Pathogens Standard 29 CFR 1910.1030

CHRISTOPHER NAPOLEON

has completed Bloodborne Pathogens training

Date Issued: 26 Sep 2012 Renew By: 26 Sep 2013

Certificate # 134866926968

This course includes the following objectives and is consistent with OSHA Bloodborne Pathogens Standard 29 CFR 1910.1030

- Universal Precautions
- Identification of pathogens of primary concern
- Ways pathogens can enter the body
- Use of personal protective equipment
- Importance of handwashing
- Work practices that help eliminate or reduce exposure risks
- Procedures if an exposure occurs

Instructor: ROY W. SHAW

1-888-406-7487 www.probloodborne.com support@protrainings.com

International Union of Operating Engineers
National HAZMAT Program

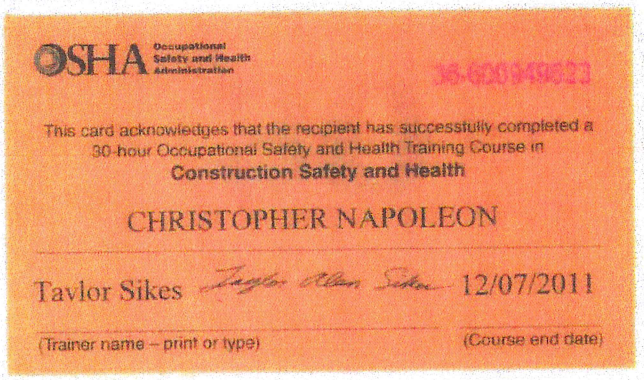
Christopher R. Napoleon

has successfully completed an

8-HOUR MANAGEMENT AND SUPERVISOR TRAINING PROGRAM

specifically designed for managers and supervisors in accordance with OSHA at 29 CFR 1910.120(e)(4).

Completion Date **07/17/2008**



OSHA Occupational Safety and Health Administration

36-[illegible]

This card acknowledges that the recipient has successfully completed a 30-hour Occupational Safety and Health Training Course in

Construction Safety and Health

CHRISTOPHER NAPOLEON

Taylor Sikes 12/07/2011

(Trainer name – print or type) (Course end date)

Certificate of Completion

Presented to:

CHRISTOPHER NAPOLEON

On 12/7/2011, CHRISTOPHER NAPOLEON successfully completed the OSHA 30 Hour Outreach Training for the Construction Industry.

Taylor Allen Sikes

OSHA Training Institute Education Center

USF University of South Florida

American Safety Council .com

OSHA Authorized Trainer

As an OSHA authorized trainer, I verify that I have conducted this OSHA outreach training class in accordance with OSHA Outreach Training Program requirements. I will document this class to my authorizing OSHA training organization. Upon successful review of my documentation, I will provide each student their completion card within 30 days of the end of the class.

FitTest Results

SES

FitTrack 3000

1/23/2013

Last Name	McNeal	**First Name**	LeAnn	**Middle Initial**	T
Personnel ID		**Department**		**Job Code**	
Medical Eval Date	01/23/2013				
Test Date	1/23/2013	**Test Time**	2:25:00 PM	**Min FitFactor**	500
Mask Mfg.	3M	**Mask Model**	6700	**Mask Size**	Small
Mask Type	Full Mask	**Work Rate**	Normal	**CartType**	Not Applicable
Notes					
Protocol Name	REDON	**Challenge Pressure**	0.58 " H2O	**Respirator Rate**	53.80 L/Min.

Step Num	Step Description	Fit Factor	Leak Rate
1	Don & Face Forward	597	90
2	Bend at the Waist & Face Forward	1,237	44
3	Shake Head & Face Forward	1,076	50
4	Redon & Face Forward	843	64
5	Redon & Face Forward	542	99

Test Results PASS **Equivalent Fit Factor** 775 **Average Leak Rate** 69

_____ This is a change in mask size/type from previous fit tests on record

Operator : Debbie S. Hunter, MT(ASCP)

Subject : LeAnn T. McNeal

WORKWell
OCCUPATIONAL HEALTH CENTER
7736 Madison Boulevard, Huntsville, AL 35806
Phone (256) 830-8930 Fax (256) 830-9166

Date: 1/23/13

Name: LeAnn T. McNeal **DOB:** 10/12/76

Company: SES

Work Clearance

- [x] Approved for work without need for work limitations/accommodations
- [ ] Approved for work with limitations/accommodations due to impairment
- [ ] Not approved for work until impairment is corrected
- [ ] Not approved for work due to a condition that poses a direct threat to health or safety
- [x] Must wear corrective lenses
- [ ] Able to lift _____ pounds
- [ ] Must return for recheck

- [ ] See separate report for recommendations/accommodations

Respirator Clearance

Per OSHA 29 CFR 1910.134, I have determined this worker is medically able to use a respiratory protection device while performing job duties [x] without restrictions [ ] with restrictions:

- [ ] The worker is not medically able to use a respirator
- [ ] The worker requires further testing/evaluation

My evaluation was based on:

- [x] Review of the OSHA-prescribed questionnaire
- [ ] Medical testing
- [x] Physical examination

- [x] The worker has been informed of the results of the medical evaluation for fitness to wear a respirator and has been given a copy of the recommendation.

Hazmat Clearance

Per the requirements of Section (f)(6) and (7) of the OSHA Hazardous Materials Standard (29 CFR 1910.120), this worker has undergone a physical examination and medical testing to determine any medical condition that would place the worker at increased risk of material health impairment from work in hazardous waste operations or emergency response.

- [ ] This worker is medically qualified to engage in this work
- [ ] This worker is **NOT** medically qualified to engage in this work

Mask Fit

- [ ] Fit test not requested
- [ ] Fit test was requested, but no mask was available for testing
- [x] Fit test performed satisfactorily—see attached results
  Skin under the mask seal:
  - [ ] Clean shaven
  - [ ] 1-2 days beard growth
  - [ ] >2 days beard growth
- [ ] Fit test performed unsatisfactorily due to:

- [x] The worker requires corrective lenses. A prescription eyewear adapter may be needed to accommodate a full-face respirator.

Comments: 3m 6700 Small FF

Examiner's Signature: _____

Kristopher N. Jones, MD, MPH

Concentra Medical Centers (GA)
109 Minus Avenue, Suite C-10
Garden City, GA 31408

Multiple Medical Surveillance
Written Opinion

NAME	EMPLOYEE NUMBER	TODAY'S DATE
LeAnn McNeal		08/01/2012
COMPANY SES LLC, 1006 Floyd Culler Court, Oak Ridge, Tennessee 37830 — Phone 865 481 7897, Fax 865 483 7737	DEPARTMENT	

The above named employee underwent medical surveillance on 08/01/2012. The employee was informed of the results of this surveillance and any detected conditions the require further evaluation or treatment. Unless otherwise noted, this employee has been found physically suitable for the time period below.

	This is a temporary clearance; expiration date: 08/01/2013

1. Type of surveillance conducted (mark all that apply):

✓	Asbestos (29 CFR 1910, 1001, 29 CFR 1926.58, 40 CFR 763)
✓	HAZWOPER: Hazardous Waste Worker/Hazardous Materials Handler (29 CFR 1910.120, 29 CFR 1926.65)
✓	Beryllium (10 CFR 850.34)
✓	OSHA Toxic Substance (29 CFR 1910, Subpart Z) specified substance(s):
✓	Lead (29 CFR 1910.1025, 29 CFR 1926.62) Blood Levels _____ ug/dl
✓	Respiratory Protection (29 CFR 1910.134, 29 CFR 1926.103)
✓	Hearing Conservation (29 CFR 1910.95, 29 CFR 1926.52)
✓	Non-Reactor Nuclear (DOE O 5480.20A)
✓	Confined Space Entry (29 CFR 1910.146, 29 CFR 1926.21
✓	Thermal Stress
	Other:

2. Based on this assessment, the employee has the following medical conditions which could result in increased risk of material health impairment from exposure to the occupational hazard (do not revel conditions unrelated to occupational exposures):

✓	None		Smoking		Pulmonary		Hearing Loss		Other:

3. Recommendations

	Hearing Protection		Remove from _____ work
	Discontinue Smoking		Unable to Use Respirator
	Limit Respirator use:		Positive Pressure Respirator Only
✓	Reevaluation ✓ 12 Months ____ 6 Months ____ Other		Wear Corrective Lenses

4. In the case of asbestos exposure, the employee has been informed of the increased health risk associated with smoking and inhalation of asbestos fibers.

5. Employee and employer are reminded to use all available protective measures appropriately. Should employee health or site work conditions change appreciably, consultation with physician is recommended.

6. A copy of these recommendations has been provided to the employee: ✓ yes ____ no

7. Additional comments:

Examiner

Concentra Medical Center
109 Minus Ave #C10
Garden City, GA., 31408
Ph 912.966.5445 Fax 912.966.5955

PLEASE GIVE COMPLETED FORM TO EMPLOYEE AT END OF PHYSICAL.
SEND MEDICAL CARD TO ABOVE ADDRESS ATTENTION GAIL B. GOLSON

Concentra

109 Minus Ave., Suite C-10
Garden City, GA 31408

Certified that

LeAnn McNeal
Name

SSN

08/01/2012
Date Tested

Authorized Signature

SES LLC
Company Name

Cleared for (HAZWOPER) and/or (Respirator Fit Card)

912.966.5445

Association of
Bay Area Governments

ABAG Training Center
www.hazmatschool.com

CERTIFICATE OF COMPLETION

LeAnn McNeal

has successfully completed the course titled

OSHA Bloodborne Pathogens

Satisfies 29 CFR 1910.1030 (e)(5) + (g)(2)

on

September 26, 2012

and has earned

0.2 CEUs (Continuing Education Units) (2Course hours) from the program

Certificate No 98599
(verify at www.hazmatschool.com)

Brian Kirking, Training Director
Chanell Gumbs, Training Coordinator
www.abag.ca.gov; (510) 464-7964

Paul W. Gantt, CSP, REA
Safety Compliance Management, Inc.

IDENTIFICATION CARD	Card No. Exc 12 012
Name of Operator *(Not Transferable)*	
McNeal, LeAnn	
Date Issued	Date Expires
April 23, 2012	April 22, 2015
Signature *(Not valid until signed, ID required)*	
The holder of this card is qualified as competent person as specified on the reverse of this card. Card must be carried at all times. Valid for three (3) years	

QUALIFIED:

Type	Capacity	Size
Excavation competent person	Trenching	Shoring

Signature of Instructor

Sylvan Enterprises (865) 717-8582
PO Box 666, Kingston TN 37763

DISCLAIMER: This document issued by the Issuing Official is only for purposes of attesting to the satisfactory completion of classroom training with written examination as prescribed by OSHA and ASME as of the issue date.

Association of
Bay Area Governments

ABAG Training Center
www.hazmatschool.com

CERTIFICATE OF COMPLETION

LeAnn McNeal

has successfully completed the course titled

OSHA 8-hour HAZWOPER Annual Refresher Plus

Satisfies 29 CFR 1910.120(e)(8)

on

March 14, 2013

and has earned

0.8 CEUs (Continuing Education Units) (8Course hours) from the program

OSHA Requires recertification every year

Certificate No 101971

(verify at www.hazmatschool.com)

Brian Kirking, Training Director
Chanell Gumbs, Training Coordinator
www.abag.ca.gov; (510) 464-7964

Paul W. Gantt, CSP, REA
Safety Compliance Management, Inc.

Association of
Bay Area Governments

ABAG Training Center
www.hazmatschool.com

CERTIFICATE OF COMPLETION

LeAnn McNeal

has successfully completed the course titled

OSHA Excavation Safety

Satisfies 29 CFR 1926.650

on

July 19, 2011

and has earned

IACET authorized 0.2 CEUs (Continuing Education Units) from the program

Certificate No 89699
(verify at www.hazmatschool.com)

Brian Kirking, Training Director
Chanell Gumbs, Training Coordinator
www.abag.ca.gov; (510) 464-7964

Paul W. Gantt, CSP, REA
Safety Compliance Management, Inc.

FINDLAY

THE UNIVERSITY OF FINDLAY

Certificate of Achievement

awarded by

THE NATIONAL CENTER OF EXCELLENCE FOR ENVIRONMENTAL MANAGEMENT

ENVIRONMENTAL RESOURCE TRAINING CENTER

to

LEANN M. TAYLOR

for Successful Completion of

OSHA 40-HOUR SAFETY TRAINING WORKSHOP
(FULFILLS THE REQUIREMENTS OF 29 CFR 1910.120 COVERING HAZARDOUS WASTE OPERATIONS)
4.0 CEU'S
AUGUST 10, 2001

J. Rolle Van Dyne
EXECUTIVE DIRECTOR

Daniel Hahn
INSTRUCTOR

Certificate of Completion

This certifies that

LeAnn McNeal

Has Successfully completed

8 Hour HAZWOPER Supervisor Training

This certificate does not in itself indicate initial 24 or 40 Hour HAZWOPER Training

In Accordance With Federal OSHA Regulation 29 CFR 1910.120(e)(4)

And all State OSHA and EPA Regulations As Well

Julius P. Griggs	100917437800	9/17/2010
Julius P. Griggs Instructor #892	Certificate Number	Issue Date

SAFETY UNLIMITED, Inc.
OSHA Compliant Safety Training Since 1993

690A East Los Angeles Ave Suite 180 Simi Valley, CA 93065
888-309-7233 * 805-306-8027 * 866-869-7097 (F)
www.safetyunlimited.com

Want to be sure this certificate is valid? Visit safetyunlimited.com/verification

American Red Cross

This recognizes that

LEANN MCNEAL

has completed the requirements for

STANDARD FIRST AID

conducted by

SAVANNAH GA

Date Completed **09/18/2010**

The American Red Cross recognizes this certificate as valid for **3** year(s) from completion date.

www.RedCross.org

Instructor's Signature

Chapter

SAVANNAH CHAPTER

Holder's Signature

Stock No. 653999 (Rev. 5/08)

American Red Cross

This recognizes that

LeAnn McNeal

has completed the requirements for

Adult CPR

conducted by

Savannah Chapter

Date completed: **09/28/2011**

The American Red Cross recognizes this certificate is valid from completion date for: **2 Years**

redcross.org

Instructor's Signature

Chapter

GEORGIA TERRITORY

Holder's Signature

Stock No. 656799



OSHA 600431126

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

LeAnn McNeal

has successfully completed a 30-hour Occupational Safety and Health Training Course in

Construction Safety & Health

(Trainer) (Date) 10/17/09

GSWCC

Education and Training Certification Program
For Individuals Involved
In Land Disturbing Activities

Enclosed you will find your Level IA Certification Card

Your Certified Personnel card.....

- serves as proof of your certification in the Education and Training Certification Program.
- will be valid for three years from issue date.
- authorizes you to perform duties relating to land disturbance as a builder, developer, utility contractor, monitoring consultant, etc.

The Level IA Certification meets requirements for "Qualified Personnel" status as defined by Georgia's NPDES General Permit for Construction Activities.

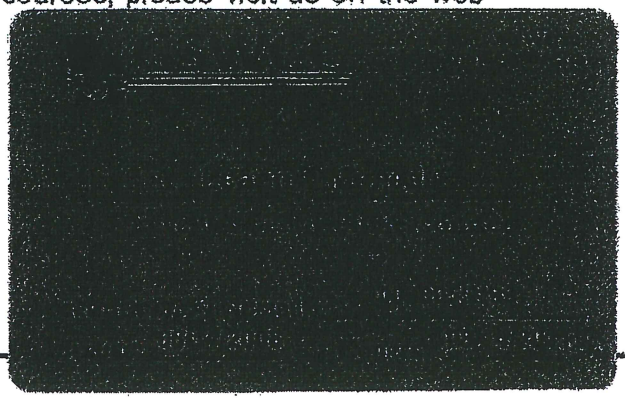
It is recommended that you have your certification card with you while on the job. You may be asked to present your card by an inspector or enforcement authority.

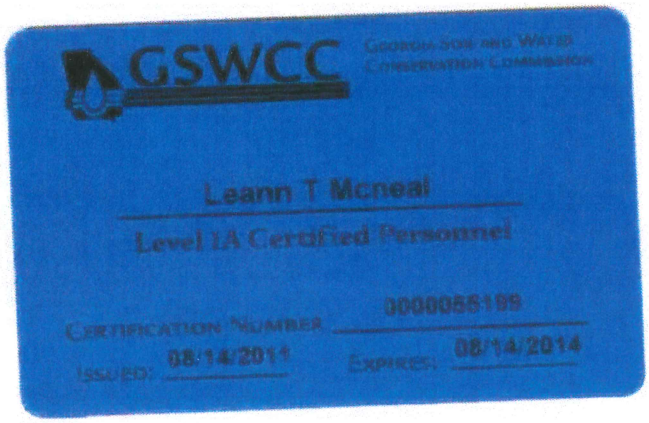
If you lose your certification card or need a new one issued, you must submit a written request to the E&SC Education and Certification Program.

If you have questions relating to your certification, please contact:

Georgia Soil & Water Conservation Commission
E&SC Education and Certification Program
certification@gaswcc.org
P.O. Box 1665
Athens, GA 30603-1665
706.542.1840
706.542.4242 FAX

For more information on upcoming certification courses, please visit us on the web at www.gaswcc.org.




GSWCC
Georgia Soil and Water Conservation Commission
Leann T Mcneal
Level IA Certified Personnel
Certification Number 0000058199
Issued: 08/14/2011
Expires: 08/14/2014

ERC Environmental and Energy Services Co.

Certify that

George Douglas Hawn

of

ERCE

Successfully Completed a

40 hour Equivalent Training Course

in

HEALTH AND SAFETY

and is Awarded this Certificate for

HAZARDOUS WASTE OPERATIONS
AND EMERGENCY RESPONSE

July 14, 1989

Date

Instructor

Executive Vice President

Association of
Bay Area Governments

ABAG Training Center
www.hazmatschool.com

CERTIFICATE OF COMPLETION

George Hawn

has successfully completed the course titled

OSHA 8-hr Annual HAZWOPER Refresher

on

December 7, 2012

and has earned

0.8 CEUs (Continuing Education Units) (8Course hours) from the program

Certificate No 99777
(verify at www.hazmatschool.com)

Brian Kirking, Training Director
Chanell Gumbs, Training Coordinator
www.abag.ca.gov; (510) 464-7964

Paul W. Gantt, CSP, REA
Safety Compliance Management, Inc.

Respirator Fit Test Card

Name: DOUG HAWN
ID: 6022

Test Date: 01/09/2013
Next Test Due: 01/09/2014

Respirator

Mfg: NORTH
Model: 5400
Style: FULL FACE
Size: M/L

Results

Overall FF: 11900
FF Pass Level: 1000
Pass: YES
Operator: JSTILTNEI

Protocol: OSHA 29CFR1910.134
Fit Test Method: QNFT using TSI PortaCount
Fit Test provided by Lynx Supply

01/09/2013

LAST NAME HAWN
FIRST NAME DOUG

FIT TEST REPORT

ID NUMBER	6022		
LAST NAME	HAWN	CUSTOM1	
FIRST NAME	DOUG	CUSTOM2	
COMPANY	SES	CUSTOM3	
LOCATION	OAK RIDGE	CUSTOM4	
NOTE			
TEST DATE	01/09/2013	PORTACOUNT S/N	17347
TEST TIME	10:10	N95-COMPANION	N
DUE DATE	01/09/2014		
RESPIRATOR	NORTH 5400 FULL FACE [10	PROTOCOL	OSHA 29CFR1910.134
MANUFACTURER	NORTH	PASS LEVEL	1000
MODEL	5400		
MASK STYLE	FULL FACE	APPROVAL	
MASK SIZE	M/L	EFFICIENCY <99%	N

EXERCISE	DURATION (sec)	FIT FACTOR	PASS
NORMAL BREATHING	60	11300	Y
DEEP BREATHING	60	8020	Y
HEAD SIDE TO SIDE	60	8300	Y
HEAD UP AND DOWN	60	13000	Y
TALKING	60	16600	Y
GRIMACE	15	Excl.	
BENDING OVER	60	11500	Y
NORMAL BREATHING	60	34500	Y

OVERALL FIT FACTOR 11900 Y

FITTEST OPERATOR JSTILTNER DATE 1/9/13

NAME DOUG HAWN DATE 01-09-13

MMC HealthWorks
988 Oak Ridge Turnpike, Ste L-50, Oak Ridge, TN 37830

Name: Hawn, George SES

completed medical surveillance for:

( ) Asbestos – 29 CFR 1910.1001 / 1926.58
(X) HAZWOPER – 29 CFR 1910.120 / 1926.65
(X) Resp Protection – 29 CFR 1910.134 / 1926.103
( ) Beryllium – 10 CFR 850
( ) Lead – 29 CFR 1910.1025 / 1926.62
( ) Non-reactor nuclear – DOE O 5480.20A
(X) Confined Space – 29 CFR 1910.146 / 1926.21
(X) Hearing conservation – 29 CFR 1910.95 / 1926.52
(X) Thermal stress
( ) Other:

MMC HealthWorks
988 Oak Ridge Turnpike, Ste L-50, Oak Ridge, TN 37830
865.835.4320

Limitations / recommendations:
( ) wear corrective lenses
( ) limit respirator use:
( ) positive pressure respirator only
(X) use hearing protection
( ) use double hearing protection
( ) other:

Examiner: [signature] Date: 6/7/13

B7865001Z (01/08)

MMC HealthWorks
Your Health Management Partner

Multiple Medical Surveillance Written Opinion

Name	Employee or SSAN	Today's Date
Hawn, George		06/07/2013
Company	Department	
SES		

The above named employee underwent medical surveillance on 06/07/2013. The employee was informed of the results of this surveillance and any detected conditions that require further evaluation or treatment. Unless otherwise noted, this employee has been found physically suitable for the time period noted below.

	This is a temporary clearance; **expiration date:** / /

1. Type of surveillance conducted (mark all that apply):

	Asbestos (29 CFR 1910.1001, 29 CFR 1926.58, 40 CFR 763)
X	HAZWOPER: Hazardous Waste Worker / Hazardous Materials Handler (29 CFR 1910.120, 29 CFR 1926.65)
	Beryllium (10 CFR 850.34)
	OSHA Toxic Substances (29 CFR 1910, Subpart Z) specific substance(s):
	Lead (29 CFR 1910.1025, 29 CFR 1926.62) Blood Lead Level: _____ ug/dl
X	Respiratory Protection (29 CFR 1910.134, 29 CFR 1926.103)
X	Hearing conservation (29 CFR 1910.95, 29 CFR 1926.52)
	Non-reactor nuclear (DOE O 5480.20A)
X	Confined space entry (29 CFR 1910.146, 29 CFR 1926.21)
X	Thermal stress
	Other:

2. Based on this assessment, the employee has the following medical conditions which could result in increased risk of material health impairment from exposure to the occupational hazard (do not reveal conditions unrelated to occupational exposures):

	None		Smoking		Pulmonary	X	Hearing Loss		Other:

3. Recommendations:

X	Hearing protection		Remove from _____ work
	Discontinue smoking		Unable to use respirator
	Limit respirator use:		Positive pressure respirator only
X	Reevaluation X 12 months ☐ 6months ☐ other:		Wear corrective lenses

4. In the case of asbestos exposure, the employee has been informed of the increased health risk associated with smoking and inhalation of asbestos fibers.

5. Employee and employer are reminded to use all available protective measures appropriately. Should employee health or site work conditions change appreciably, consultation with MMC HealthWorks is recommended.

6. A copy of these recommendations has been provided to the employee: | | yes | X | no |

7. Additional comments:

Examiner
(06.10.2005)

Physician's Plaza Suite L-50, 988 Oak Ridge Turnpike, Oak Ridge, TN 37830
Phone (865) 835-4320, Fax (865) 835-4328

HEARTSAVER FIRST AID CPR AED

Heartsaver®
First Aid CPR AED

American Heart Association.

Doug Hawn

This card certifies that the above individual has successfully completed the objectives and skills evaluations in accordance with the curriculum of the AHA Heartsaver First Aid CPR AED Program. Optional completed modules are those **NOT** marked out:

Child CPR AED ~~Infant CPR~~ ~~Written test~~

2/24/2012
Issue Date

February 2014
Recommended Renewal Date

Cintas First Aid and Safety

Certificate of Completion and Certification

American Heart Association

Doug Hawn

Has successfully completed the Bloodborne Pathogen Training Course.

Scott Burt
Occupational Safety Instructor
Cintas First Aid & Safety

October 5, 2012

CLICKSAFETY®

certifies that

Doug Hawn

has successfully completed ClickSafety's web-based training titled

C4 HAZWOPER Supervisor

29CFR 1910.120(e)(4) and 29 CFR 1926.65(e)(4)

January 11, 2013



7774128
Serial Number

Brian P. Tonry
Executive Vice President and
General Manager

U.S. ARMY CORPS OF ENGINEERS

USACE LEARNING CENTER
HUNTSVILLE, ALABAMA

CERTIFICATE

DOUG HAWN

has completed the Corps of Engineers Training Course

CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS

and is awarded
the continuing education credits indicated
*for **16** hours of organized instruction*

Certified Provider #199309
1.3 CEUs

Registered Provider #1009
13 LUs

Registered Provider
13 PDHs

Given at **AGC Mid-TN Branch** **05/6-7/2009**

Location **Date**

Director, USACE Learning Center

THIS CERTIFICATE EXPIRES FIVE YEARS FROM DATE OF ISSUE

MEMORANDUM CH2MHILL

40-hour Equivalent Training

TO: File

COPIES: Petra Scotti/COR
Rich Rathnow/MKE
Lynn Bong/MKE

FROM: Mollie Netherland/SEA
John Longo/NJO

DATE: October 12, 1999

This memorandum documents Rich Rathnow's 40-hour Initial Hazwoper training certification, based on his equivalent experience. Included are the regulatory requirements set forth in OSHA's Hazwoper standard and a summary of Rich Rathnow's experience and qualifications. Because the standard places the burden of equivalent training documentation on the employer, this certification is valid only while the individual is employed with CH2M HILL.

Regulatory Requirements

OSHA's Hazwoper standard is clear in establishing the provision for equivalent initial 40-hour training. 29 CFR 1910.120(e)(9) states: "Employers who can show by documentation or certification that an employee's work experience and/or training has resulted in training equivalent to that training required [below] shall not be required to provide the initial training ... Equivalent training includes any academic training or the training that existing employees might have already received from actual hazardous waste site experience.".

The training, or equivalent experience, must meet the following requirements:

- Names of personnel and alternates responsible for site safety and health;
- Safety, health and other hazards present on the site;
- Use of PPE;
- Work practices by which the employee can minimize risks from hazards;
- Safe use of engineering controls and equipment on the site;
- Medical surveillance requirements including recognition of symptoms and signs which might indicate over exposure to hazards; and
- The contents of the site safety and health plan.

Basis for Equivalent Certification – Employee Experience

Rich Rathnow's experience includes the following:

- 16 years of professional experience in the health and safety field
- CIH and CSP certifications
- BS in Occupational Safety and Health and an MS in Safety Management
- 10 years of professional experience in the hazardous waste site field
- Over two and a half years of experience as a CH2M HILL Health and Safety Manager, which includes site-specific plan development, subcontractor safety review, hazardous waste site field audits, and general implementation of CH2M HILL health and safety policies.
- 60+ days of hazardous waste site field experience with CH2M HILL
- 20+ days of Level C and B hazardous waste site field experience with CH2M HILL
- 60+ days of hazardous waste site safety supervisor field experience with CH2M HILL

- Attendance at CH2M HILL's internal 8-hour refresher and 16-hour site safety coordinator training classes

Based on Rich Rathnow's extraordinary level of experience in the hazardous waste site field, CH2M HILL considers that the initial 40-hour training requirements are adequately satisfied.

SES Group

To: File (October 30, 2012)

From: Basil Skelton CEO, Rich Rathnow CIH CSP

CC: Gail Golson, Fatima Hyder, Lorna Pace, Ashley Williams, Terri Clemens

This memorandum documents Rich Rathnow's 40-hour Initial Hazwoper training certification, based on his equivalent experience. Included are the regulatory requirements set forth in OSHA's Hazwoper standard and a summary of Rich Rathnow's experience and qualifications. The standard places the burden of equivalent training documentation on the employer.

Regulatory Requirements

OSHA's Hazwoper standard is clear in establishing the provision for equivalent initial 40-hour training, 29 CFR 191C.120(c)(9) states. "Employers who can show by documentation or certification that an employee's work experience and/or training has resulted in training equivalent to that training required [below] shall not be required to provide the initial training. Equivalent training includes academic training or the training that existing employees might have already revived from actual hazardous waste site experience"

The training, or equivalent experience, must meet the following requirement;

- Names of personnel and alternates responsible for site safety and health;
- Safety, health and other hazards present on the site,
- Work practices by which the employee can minimize risks from hazards;
- Safe use of engineering controls and equipment on the site.
- Medical surveillance requirements including recognition of symptoms and signs which might indicate over exposure to hazards; and
- The content of the site safety and health plan,

Basis for Equivalent Certification - Employee Experience

Rich Rathnow's related experience includes the following:

- 28+ years of professional experience in the health and safety field.
- Certified Industrial Hygienist (CIH) and Certified Safety Professional (CSP) certifications
- BS in Occupational Safety and Health
- MS in Safety Management
- 22 years of professional experience in the hazardous waste site field.

- Health and safety manager for a RCRA/TSCA Treatment Storage and Disposal facility/incinerator (TSD) where PPE protection levels, respiratory protection and other safe handling measures for all categories of hazardous waste were assigned. Developed curriculum for and delivered 24 hour and 8 hour refresher TSD Hazwoper Training.

- Coordinated H&S activities and wrote health and safety plans for an embayment project involving cleanup and containment of organo-metallic sludge waste for a rivet/lake in Oak Ridge TN,

- Coordinated H&S activities and wrote health and safety plan for lagoon clean up in Oak Ridge TN.

- Coordinated activities for the installation of RCRA cap in Oak Ridge TN.

- Directly supervised H&S employees who served as site health and safety coordinates for various remediation projects in Oak Ridge TN.

- Assessed and audited active remediation projects for health and safety compliance as a consultant to the O & M contractor for the Waste Management and Remedial Action Division at Oak Ridge National Laboratories.

- Supervised and coordinated health and safety activities/oversight at a voluntary compliance cleanup/decontamination and decomissioning project at Battle Labs in Columbus OH. Developed and delivered several sections of a project specific 40 hour Hazwoper course for remediation activities at the site, evaluated waste contaminant exposure potential and assigned proper protective measures.

- Twelve years of experience as a CH2M HILL Health and Safety Manager, which included site specific plan development, subcontractor safety review, hazardous waste site field audits, and general implementation of CH2M HILL health and safety policies.

- 105 + days **of** hazardous waste site field experience with CH2M HILL

- 25+ days **of** Level C and D hazardous waste site field experience with CH2M HILL

- 100 + days of hazardous wash; site safety supervisor field experience with CH2M HILL

- Attendance at CH2M HILL's internal annual 8-hour refreshers and 16-hour site safety coordinator training classes

- Conducted 8 hour Hazwoper refresher training for employees in the Southeast Region.

In his nearly 4 years at SES Group Mr. Rathnow has performed health and safety audits, developed site safety and health plans, developed and delivered training including 8 Hour Hazwoper Refresher courses,

In addition Mr. Rathnow has taken many courses relating to the 29 CFR 1910.120 Hazwoper including:

Toxicology; Adjustment of TLVs to Accommodate Specific Conditions in the Workplace; Groundwater and Soil Remediation; Case Studies Workshop in Biological Monitoring; Selecting the Most Effective Air Sampling Method for a Project; Appropriate IH Data Collection for Future Occupational Epidemiology Studies; Establishing Occupational Disease Causation; Aerosol Sampling for Micron and Nano Sized Bioaerosols; Surface Sampling for Metals; Issues, Methods and Strategy; and many more.

Based on Rich Rathnow's demonstrable level of experience and education in the hazardous waste site field, SES Group considers that the initial 40-hour training equivalency requirements are more than adequately satisfied.

MEMORANDUM

TO: John Longo, David McCormack, File

FROM: Larry Nee-ES& H Manager, Battelle Columbus Laboratories Decommissioning Project

DATE: March 28, 2000

Subject: Richard Rathnow - Experience Toward 40 Hour Hazardous Waste Operations and Emergency Response Training Exemption.

Mr Richard Rathnow was employed by Battelle Memorial Institute from March 8, 1993 until May 9, 1997. During that time he served as a health and safety consultant on a number of projects in a variety of professional health and safety related roles. Some of the responsibilities that Mr. Rathnow had that fulfill the experience clause contained in 29 CFR 1910.120 include the following:

- Served as a project manager for an environmental, safety, and health support contract for the Waste Management and Remedial Action Division at Oak Ridge National Laboratories. Assessed and audited active remediation projects for health and safety compliance in addition to a wide variety of other health and safety responsibilities.

- Coordinated and provided health and safety support activities for the Battelle Columbus Decontamination and Decommissioning Project that included HAZWOPER cleanup activities. Developed and delivered portions of the 40 hr. project specific HAZWOPER course for remediation activities at the labs. Evaluated waste contaminant properties and exposure potential and assigned proper protective measures. Developed the remediation plan for, and, supervised the safe removal of perchloric acid fume hoods at the labs.

Mr. Rathnow was exempted from the 29 CFR 1910.120 40 hr. training requirement while working at Battelle because of his professional certifications, education, and previous work experience. While at Battelle he maintained his 8 hr. refresher status as required by the standard.

It is my belief that Mr. Rathnow possesses the training and experience necessary to meet or exceed the requirements for initial training required by OSHA regulations (29 CFR 1910.120).

Thank you,

3-29-00

Mr. Larry Nee, JD, CSP
Battelle Columbus Laboratories Decommissioning Project
ES& H Manager
505 King Ave.
Columbus, OH 43201

Association of
Bay Area Governments

ABAG Training Center
www.hazmatschool.com

CERTIFICATE OF COMPLETION

Richard Rathnow

has successfully completed the course titled

OSHA 8-hr Annual HAZWOPER Refresher

Satisfies 29 CFR 1910.120(e)(8)
on
April 4, 2013

and has earned
0.8 CEUs (Continuing Education Units) (8Course hours) from the program

OSHA Requires recertification every year

Certificate No 101944
(verify at www.hazmatschool.com)

Brian Kirking, Training Director
Chanell Gumbs, Training Coordinator
www.abag.ca.gov; (510) 464-7964

Paul W. Gantt, CSP, REA
Safety Compliance Management, Inc.

MMC HealthWorks
Your Health Management Partner

Multiple Medical Surveillance
Written Opinion

Name	Employee or SSAN	Today's Date
Rathnow, Richard		10/17/2012
Company	Department	
SES		

The above named employee underwent medical surveillance on 10/17/2012. The employee was informed of the results of this surveillance and any detected conditions that require further evaluation or treatment. Unless otherwise noted, this employee has been found physically suitable for the time period noted below.

	This is a temporary clearance; **expiration date:** / /

1. Type of surveillance conducted (mark all that apply):

	Asbestos (29 CFR 1910.1001, 29 CFR 1926.58, 40 CFR 763)
X	HAZWOPER: Hazardous Waste Worker / Hazardous Materials Handler (29 CFR 1910.120, 29 CFR 1926.65)
	Beryllium (10 CFR 850.34)
	OSHA Toxic Substances (29 CFR 1910, Subpart Z) specific substance(s):
	Lead (29 CFR 1910.1025, 29 CFR 1926.62) Blood Lead Level: _____ ug/dl
X	Respiratory Protection (29 CFR 1910.134, 29 CFR 1926.103)
X	Hearing conservation (29 CFR 1910.95, 29 CFR 1926.52)
	Non-reactor nuclear (DOE O 5480.20A)
X	Confined space entry (29 CFR 1910.146, 29 CFR 1926.21)
X	Thermal stress
	Other:

2. Based on this assessment, the employee has the following medical conditions which could result in increased risk of material health impairment from exposure to the occupational hazard (do not reveal conditions unrelated to occupational exposures):

	None		Smoking		Pulmonary	X	Hearing Loss		Other:

3. Recommendations:

X	Hearing protection		Remove from _____ work
	Discontinue smoking		Unable to use respirator
	Limit respirator use:		Positive pressure respirator only
X	Reevaluation X 12 months ☐ 6months ☐ other:	X	Wear corrective lenses

4. In the case of asbestos exposure, the employee has been informed of the increased health risk associated with smoking and inhalation of asbestos fibers.

5. Employee and employer are reminded to use all available protective measures appropriately. Should employee health or site work conditions change appreciably, consultation with MMC HealthWorks is recommended.

6. A copy of these recommendations has been provided to the employee: | | yes | X | no |

7. Additional comments:

S. Ohsh L 10/18/12

Examiner
(06.10.2005)

Physician's Plaza Suite L-50, 988 Oak Ridge Turnpike, Oak Ridge, TN 37830
Phone (865) 835-4320, Fax (865) 835-4328

HEARTSAVER FIRST AID CPR AED

Heartsaver®
First Aid CPR AED

American Heart Association.

Richard Rathnuw

This card certifies that the above individual has successfully completed the objectives and skills evaluations in accordance with the curriculum of the AHA Heartsaver First Aid CPR AED Program. Optional completed modules are those **NOT** marked out:

Child CPR AED ~~Infant CPR~~ ~~Written test~~

6/15/2012	**June 2014**
Issue Date	Recommended Renewal Date

Cintas First Aid and Safety

Certificate of Completion and Certification

American Heart Association

Rich Rathnow

Has successfully completed the Bloodborne Pathogen Training Course.

Scott Burt
Occupational Safety Instructor
Cintas First Aid & Safety

October 5, 2012

CERTIFICATE

Richard N. Rathnow
Employee No.: 15779

Has completed the requirements of 12 hours of Supervisor Training in conformance with 29 CFR 1910.120.

June 26, 1997



Signed: M. Netherland

Mollie Netherland
CH2M HILL
Director, Health and Safety Program

(This certificate is valid only while the individual named above is employed by CH2M HILL.)

MKE

UNITED STATES DEPARTMENT OF LABOR

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
SOUTHEASTERN OSHA TRAINING INSTITUTE EDUCATION CENTER
NORTH CAROLINA STATE UNIVERSITY AND THE UNIVERSITY OF TENNESSEE

THIS IS TO CERTIFY THAT ON

JANUARY 29, 2010

Richard Rathnow

HAS DILIGENTLY AND WITH MERIT COMPLETED TRAINING IN

OTI #500: Trainer Course in Occupational Safety and Health Standards for Construction

Charles J. Thielda
DIRECTOR, OSHA TRAINIJNG INSTITUTE

Wendy W. Laing
PROGRAM MANAGER, SOUTHEASTERN OTI EDUCATION CENTER

U.S. ARMY CORPS OF ENGINEERS

USACE LEARNING CENTER
HUNTSVILLE, ALABAMA

CERTIFICATE

RICHARD RATHNOW

has completed the Corps of Engineers Training Course

CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS

and is awarded
the continuing education credits indicated
*for **16** hours of organized instruction*

Certified Provider #199309
1.3 CEUs

Registered Provider #1009
13 LUs

Registered Provider
13 PDHs

Given at **Louisville ABC** **6/23/10**

Location **Date**

Director, USACE Learning Center

THIS CERTIFICATE EXPIRES FIVE YEARS FROM DATE OF ISSUE

Certificate of Completion

Hazardous Waste Operations
And
Emergency Response

29 CFR 1910.120

This certifies that:

David Dickinson

Has completed the 40 HR. HAZWOPER course
Provided by Boart Longyear E&I

On February 16, 2008, Fife, WA

James W. Hesketh III,
Western Region EHS Manager/Instructor
Boart Longyear E&I Division

Certificate of Completion

This certifies that

David Dickinson

Has Successfully completed

8 Hour HAZWOPER Refresher Training

Refresher certification does NOT necessarily indicate initial 24 or 40 Hour HAZWOPER certification

In Accordance W/Federal OSHA Regulation 29 CFR 1910.120(e), (p) & (q)

And all State OSHA and EPA Regulations As Well

This course is approved for 8 Contact Hours (0.8 CEUs) of continuing education per the California Department of Public Health for Registered Environmental Health Specialist (REHS) issued by Safety Unlimited, Inc. (Accreditation # 044)

Julius P. Griggs
Julius P. Griggs
Instructor #892

121213572668
Certificate Number

12/13/2012
Issue Date

SAFETY **UNLIMITED, Inc.**
OSHA Compliant Safety Training Since 1993

2139 Tapo St., Suite 228 Simi Valley, CA 93063
888 309-SAFE (7233) or 805 306-8027 866-869-7097 (fax)
www.safetyunlimited.com

Proof of initial certification and subsequent refresher training is NOT required to take refresher training
Want to be sure this certificate is valid? Visit safetyunlimited.com/verification

U.S. HealthWorks MEDICAL GROUP

The Right Care, Right Away

MEDICAL RECOMMENDATIONS FOR USE OF RESPIRATORY PROTECTIVE EQUIPMENT

Applicant/Employee: David Dickinson **Age:** 26

Position Title: Driller

Date of Evaluation: 8-29-12 **Company:** Major Drilling Environmental

Contact: _____ **Contact Telephone:** _____

Evaluation Content: ☑ Questionnaire ☑ Physical ☑ PFT ☑ X-Ray ☐ Other: _____

Based on the elements indicated above, I have evaluated the aforementioned person in accordance with the provisions of OSHA 29 CFR 1910.134 and WAC 296-842, applicable to the use of respiratory protective equipment, and it is my opinion that he/she is: *(Check all that apply)*

☒ **Medically qualified for unrestricted use of the following respiratory protective devices:**
CATEGORY I Self-Contained; Air-Supplied (Continuous Flow, Demand and Pressure Demand); Canister Mask; Chemical Cartridge and Mechanical Filter with and without Blower.

☐ **Medically qualified for restricted use of respiratory protective devices as indicated below:**

☐ **CATEGORY II**

Self-Contained	1-2 hours per day
Air-Supplied	
Continuous Flow	Unlimited
Demand	Up to 4 hours / day
Pressure Demand	Up to 4 hours / day
Canister Mask	1-2 hours per day
Chemical Cartridge	1-2 hours per day
Mechanical Filter	1-2 hours per day
Mechanical Filter w/ Blower	Unlimited

☐ **CATEGORY III**

Self-Contained	Never
Air-Supplied	
Continuous Flow	Emergency only
Demand	Emergency only
Pressure Demand	Emergency only
Canister Mask	Never
Chemical Cartridge	Never
Mechanical Filter	Never
Mechanical Filter w/ Blower	Emergency only

☐ **In need of the following additional evaluation to assess qualification:** _____

☒ **In need of Medical Follow-Up Examinations every:**

☐ **5 years** ☒ **2 years** ☐ **1 year** ☐ _____

to include: _____

COMMENTS:

Fitting Considerations: ☐ Facial hair ☐ Glasses/Contact lenses ☐ Dentures/Facial deformity

I hereby certify that in accordance with OSHA 29 CFR 1910.134 and Washington Administrative Code (WAC 296-842), applicable to the use of respiratory protective equipment, I have informed the applicant/employee of the results of his/her evaluation and I have given him/her a copy of these recommendations.

Health Care Professional: Name: Stephanie Agostadter MD

Signature: _____ MD

Date: 8/29/12

This form complies with OSHA requirements and the Washington Administrative Code (WAC 296-842), requirements for the use of respirators.

© US HealthWorks (09/2006)

U.S. HealthWorks MEDICAL GROUP

2111 E Highland Ave, Suite B-245
Phoenix, AZ 85016
Ph 800-340-3810

Name: David Dickinson Exam Date 8-29-12
Exam:

Evaluating Physician's HazWoper Pre-placement, Periodic, Termination or Post-Exposure Medical Evaluation Summary

Type of Examination: ☐ Pre-placement ☒ Periodic ☐ Termination ☐ Post-Exposure

The results of the OSHA-mandated HazWoper Medical Evaluation performed on the above employee are as follows:

Y	N	Recommendations
	✓	There is / are condition(s) that would place the employee at risk of material health impairment from work in hazardous waste operations, emergency response, or respirator use.
	✓	Limitations are recommended for work in hazardous waste operations, emergency response, or respirator use.
	✓	Deferred pending further evaluation.
	✓	Employee has been informed of the results of this evaluation and of any conditions which require further examination or treatment

Re-evaluate in 24 months (not to exceed 24 months)

Additional OSHA compliance evaluations performed (additional documents attached):

☐ Respiratory Protection ☐ Asbestos ☐ Benzene
☐ Bloodborne Pathogens ☐ Hearing Conservation ☐ Lead
☐ Other: _____

Limitations:

☑ No limitations

☐ Restricted respirator use as defined on attached US HealthWorks *Respirator Use Clearance* form.

☐ Restrict from HAZMAT environment as described: _____

☐ Restrict from all HAZMAT environments

☐ Restrict from emergency response team

Physician: _____ Date: 09/0/12

Hazmat surveillance Baseline Legend: (√) = Exam done & normal; ~~Line-Out~~ = Exam not done; Circled = Exam done abnormal 11/30/00

Medical Examiner's Certificate

I certify that I have examined Dickinson David

In accordance with Federal Motor Carrier Safety Regulations (49 CFR 391.41-391.49) and with knowledge of the driving duties, I find this person is qualified; and, if applicable, only when:

- ☐ wearing corrective lenses
- ☐ wearing hearing aid
- ☐ accompanied by a _____ waiver/exemption
- ☐ driving within an exempt intracity zone (49 CFR 391.62)
- ☐ accompanied by a Skill Performance Evaluation Certificate (SPE)
- ☐ qualified by operation of 49 CFR 391.64

The information I have provided regarding this physical examination is true and complete. A complete examination form with any attachment embodies my findings completely and correctly, and is on file in my office.

☐ MD ☐ DO ☐ DC ☐ PA ☐ APN

Stepiani Amsladter, MD

PRINT NAME OF MEDICAL EXAMINER

406003114 (WA)	253-425-5908
LICENSE/CERTIFICATE NUMBER & ISSUING STATE	(AREA CODE) TELEPHONE NUMBER
	8/29/12
SIGNATURE OF MEDICAL EXAMINER	DATE
SIGNATURE OF DRIVER	
DICKIDE104R3	WA
DRIVER LICENSE NUMBER	ISSUING STATE
4911 South 93rd Street Tacoma WA 98444	
ADDRESS OF DRIVER	
8/29/14	
MEDICAL CERTIFICATE EXPIRATION DATE	

MAJOR
Drilling Environmental, LLC

RESPIRATOR FIT TEST RECORD

NAME: David DicKinson DATE: 8 / 29 / 2012

LOCATION OF TEST: Huntsville AL

MASK INFORMATION	TEST TYPE	RESULT
MANUFACTURE: SURVIVAIR MASK TYPE: FF/(HF) MODEL: OPTI-FIT S/M/(L)	ISOAMYL ACETATE (IRRITANT SMOKE)	PASS/ FAIL (PASS)/ FAIL
MANUFACTURE: MSA MASK TYPE: FF/(HF) MODEL: 3000 S/M/(L)	ISOAMYL ACETATE (IRRITANT SMOKE)	PASS/ FAIL (PASS)/ FAIL

COMMENTS:

40hour

Harmon Engineering Associates, Inc.

Certificate of Completion

presented to

RICKY DAVIS

in recognition of satisfactory completion
of the course of instruction entitled

HAZARDOUS WASTE SITE OPERATIONS & EMERGENCY RESPONSE

FEBRUARY 6-9, 1989
Date(s) of Instruction

Dan E. Schumacher CHMM, CET
Instructor

Certificate of Completion

This certifies that

RICKY DAVIS

Has Successfully completed

8 Hour HAZWOPER Supervisor Refresher Training

This certification alone does NOT indicate INITIAL 8 Hour OSHA Supervisor Training

In Accordance With Federal OSHA Regulation 29 CFR 1910.120

And all State OSHA/EPA Regulations as well

This course is approved for 8 Contact Hours (0.8 CEUs) of continuing education per the California Department of Public Health for Registered Environmental Health Specialist (REHS) issued by Safety Unlimited, Inc. (Accreditation # 044)

Julius P. Griggs
Julius P. Griggs
Instructor #892

120617563980
Certificate Number

6/17/2012
Issue Date

SAFETY UNLIMITED, Inc.
OSHA Compliant Safety Training Since 1993

690A East Los Angeles Ave Suite 180 Simi Valley, CA 93065
888-309-7233 * 805-306-8027 * 866-869-7097 (F)
www.safetyunlimited.com

Proof of initial certification and subsequent refresher training is NOT required to take refresher training
Want to be sure this certificate is valid? Visit safetyunlimited.com/verification

MAJOR
Drilling Environmental, LLC

RESPIRATOR FIT TEST RECORD

NAME: Ricky Davis DATE: 7 / 18 / 2012

LOCATION OF TEST: Huntsville AL

MASK INFORMATION	TEST TYPE	RESULT
MANUFACTURE: SURVIVAIR MASK TYPE: FF/HF MODEL: OPTI-FIT S/M/L	ISOAMYL ACETATE IRRITANT SMOKE	PASS/ FAIL PASS/ FAIL
MANUFACTURE: MSA MASK TYPE: FF/HF MODEL: 3000 S/M/L	ISOAMYL ACETATE IRRITANT SMOKE	PASS/ FAIL PASS/ FAIL

COMMENTS:

MEDICAL EXAMINER'S CERTIFICATE
PART 1 OF 2

I certify that I have examined **Ricky Allen Davis** in accordance with the federal Motor Carrier Safety Regulations (49 CFR 391.41-391.49) and with knowledge of the driving duties, I find this person is qualified; and, if applicable, only when:

- ☐ wearing corrective lenses
- ☐ wearing hearing aid
- ☐ accompanied by a _____ waiver/exemption
- ☐ driving within an exempt intracity zone (49 CFR 391.62)
- ☐ accompanied by a Skill Performance Evaluation Certificate (SPE)
- ☐ qualified by operation of 49 CFR 391.64

The information I have provided regarding this physical examination is true and complete. A complete examination form with any attachment embodies my findings completely and correctly, and is on file in my office.

SIGNATURE OF MEDICAL EXAMINER	DATE
	07/17/2012

MEDICAL EXAMINER'S CERTIFICATE
PART 2 OF 2

MEDICAL EXAMINER'S NAME (PRINT)	☒ MD ☐ DO ☐ Chiropractor ☐ Physician Assistant ☐ Advanced Practice Nurse
Kristopher N. Jones, MD, MPH	
ADDRESS OF MEDICAL EXAMINER	MED. LICENSE OR CERT. NO./ISSUING STATE
WorkWell Occupational Health Center 7736 Madison Blvd Ste 1 Huntsville, AL 35806	MD.26234 Alabama
	107 Woodside Lane Lawrenceburg, TN 38464
Medical Examiner's Telephone	Driver's License
(256)830-8930	063421022 TN
MEDICAL CERTIFICATE EXPIRATION DATE	DRIVER'S SIGNATURE
07/17/2014	

MAJOR Drilling Environmental, LLC

Major Drilling Environmental
Physician's Written Opinion for Hazardous Waste site Work

Date:	7/17/12	EID:	
Employee:	DAVIS, Ricky A.		

Respiratory Use

In accordance with 29 CFR 1910.134 and CCR Title 8 Section 5144, it is my medical opinion that this employee is:

☑ Medically qualified for respirator use.

☐ Not medically qualified for respirator use.

Comments:

Hazardous Materials / Emergency Response

In accordance with 29 CFR 1910.120, it is my medical opinion that this employee:

☑ Does not have a medical condition

☐ Has a medical condition

That would place him / her at increased risk when performing work in Hazardous Materials / Emergency Response activities.

Comments:

Clinic:	WORKWELL OCCUPATIONAL HEALTH CENTER
Address:	7736 MADISON BLVD., HUNTSVILLE, AL 35806
Phone:	256-830-8930

Physician:	Krystopher N. Jones, MD, MPH		
Signature:		Date:	7/17/12

CERTIFICATE OF TRAINING

To acknowledge the completion of

HAZWOPER 40 hour classroom training

JIMMY D. HARRIS

Student's Name

Has completed this course on

01/03/03

Date

Miller Drilling Company, Inc.
Company Name

Sabrina Arnold Sabrina Arnold
Instructor's Name/Signature

Certificate of Completion

This certifies that

Jimmy Harris

Has Successfully completed

8 Hour HAZWOPER Refresher Training

Refresher certification does NOT necessarily indicate initial 24 or 40 Hour HAZWOPER certification

In Accordance W/Federal OSHA Regulation 29 CFR 1910.120(e), (p) & (q)

And all State OSHA and EPA Regulations As Well

Julius P. Griggs
Julius P. Griggs
Instructor #892

121004569288
Certificate Number

10/4/2012
Issue Date

SAFETY UNLIMITED, Inc.
OSHA Compliant Safety Training Since 1993

2139 Tapo St., Suite 228 Simi Valley, CA 93063
888 309-SAFE (7233) or 805 306-8027 866-869-7097 (fax)
www.safetyunlimited.com

Proof of initial certification and subsequent refresher training is NOT required to take refresher training
Want to be sure this certificate is valid? Visit safetyunlimited.com/verification

MAJOR
Drilling Environmental, LLC

RESPIRATOR FIT TEST RECORD

NAME: Jimmy Harris DATE: 10 / 4 / 2012

LOCATION OF TEST: Huntsville AC

MASK INFORMATION	TEST TYPE	RESULT
MANUFACTURE: SURVIVAIR MASK TYPE: FF/(HF) MODEL: OPTI-FIT S/M/(L)	ISOAMYL ACETATE (IRRITANT SMOKE)	PASS/ FAIL (PASS)/ FAIL
MANUFACTURE: MSA MASK TYPE: FF/(HF) MODEL: 3000 S/M/(L)	ISOAMYL ACETATE (IRRITANT SMOKE)	PASS/ FAIL (PASS)/ FAIL

COMMENTS:

Major Drilling Environmental
Physician's Written Opinion for Hazardous Waste site Work

Date:	10/03/2012	EID:	
Employee:	Jimmy D. Harris Jr.		

Respiratory Use

In accordance with 29 CFR 1910.134 and CCR Title 8 Section 5144, it is my medical opinion that this employee is:

☑ Medically qualified for respirator use.

☐ Not medically qualified for respirator use.

Comments:

Hazardous Materials / Emergency Response

In accordance with 29 CFR 1910.120, it is my medical opinion that this employee:

☑ Does not have a medical condition

☐ Has a medical condition

That would place him / her at increased risk when performing work in Hazardous Materials / Emergency Response activities.

Comments:

Clinic:	WORKWELL OCCUPATIONAL HEALTH CENTER
Address:	7736 MADISON BLVD., HUNTSVILLE, AL 35806
Phone:	256-830-8930

Physician:	Kristopher N. Jones, MD, MPH		
Signature:		Date:	10/03/2012

MEDICAL EXAMINER'S CERTIFICATE
PART 1 OF 2

I certify that I have examined **Jimmy Douglas Harris Jr** in accordance with the federal Motor Carrier Safety Regulations (49 CFR 391.41-391.49) and with knowledge of the driving duties. I find this person is qualified and, if applicable, only when:

- [x] wearing corrective lenses
- [ ] wearing hearing aid
- [ ] accompanied by a _____ waiver/exemption
- [ ] driving within an exempt intracity zone (49 CFR 391.62)
- [ ] accompanied by a Skill Performance Evaluation Certificate (SPE)
- [ ] qualified by operation of 49 CFR 391.64

The information I have provided regarding this physical examination is true and complete. A complete examination form with any attachment embodies my findings completely and correctly, and is on file in my office.

SIGNATURE OF MEDICAL EXAMINER	DATE
	10/03/2012

MEDICAL EXAMINER'S CERTIFICATE
PART 2 OF 2

MEDICAL EXAMINER'S NAME (PRINT)	☒ MD ☐ DO ☐ Chiropractor ☐ Physician Assistant ☐ Advanced Practice Nurse
Kristopher N. Jones, MD, MPH	
ADDRESS OF MEDICAL EXAMINER	MED. LICENSE OR CERT. NO./ISSUING STATE
WorkWell Occupational Health Center 7736 Madison Blvd Ste 1 Huntsville, AL 35806	MD.26234 Alabama 2070 County Road 144 Killen, AL 35645
Medical Examiner's Telephone	Driver's License
(256)830-8930	5421031 AL
MEDICAL CERTIFICATE EXPIRATION DATE	DRIVER'S SIGNATURE
10/03/2014	Jimmy D Harris 10-3-12

BOART LONGYEAR

Environmental Drilling Division

This Certificate acknowledges that:

David Chamblee

Completed 40 Hour OSHA

training on:

July 23, 2004
@
Schofield, Wisconsin

in compliance with OSHA Standard CFR 1910.120

Keith Laszewski
Health & Safety Instructor

Certificate of Completion

This certifies that

David Chamblee

Has Successfully completed

8 Hour HAZWOPER Refresher Training

Refresher certification does NOT necessarily indicate initial 24 or 40 Hour HAZWOPER certification

In Accordance W/Federal OSHA Regulation 29 CFR 1910.120(e), (p) & (q)

And all State OSHA and EPA Regulations As Well

This course is approved for 8 Contact Hours (0.8 CEUs) of continuing education per the California Department of Public Health for Registered Environmental Health Specialist (REHS) issued by Safety Unlimited, Inc. (Accreditation # 044)

Julius P. Griggs
Julius P. Griggs
Instructor #892

120823567283
Certificate Number

8/23/2012
Issue Date

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www.safetyunlimited.com

Proof of initial certification and subsequent refresher training is NOT required to take refresher training
Want to be sure this certificate is valid? Visit safetyunlimited.com/verification

MAJOR Drilling Environmental, LLC

RESPIRATOR FIT TEST RECORD

NAME: David Chamblee DATE: 8 / 23 / 2012

LOCATION OF TEST: Huntsville AL

MASK INFORMATION	TEST TYPE	RESULT
MANUFACTURE: SURVIVAIR MASK TYPE: FF/(HF) MODEL: OPTI-FIT S/M/(L)	ISOAMYL ACETATE (IRRITANT SMOKE)	PASS/ FAIL (PASS)/ FAIL
MANUFACTURE: MSA MASK TYPE: FF/(HF) MODEL: 3000 S/M/(L)	ISOAMYL ACETATE (IRRITANT SMOKE)	PASS/ FAIL (PASS)/ FAIL

COMMENTS:

MAJOR Drilling Environmental, LLC

Major Drilling Environmental
Physician's Written Opinion for Hazardous Waste site Work

Date:	8/22/2012	EID:	
Employee:	David W. Chamblee		

Respiratory Use

In accordance with 29 CFR 1910.134 and CCR Title 8 Section 5144, it is my medical opinion that this employee is:

☑ Medically qualified for respirator use.

☐ Not medically qualified for respirator use.

Comments:

Hazardous Materials / Emergency Response

In accordance with 29 CFR 1910.120, it is my medical opinion that this employee:

☑ Does not have a medical condition

☐ Has a medical condition

That would place him / her at increased risk when performing work in Hazardous Materials / Emergency Response activities.

Comments:

Clinic:	WORKWELL OCCUPATIONAL HEALTH CENTER
Address:	7736 MADISON BLVD., HUNTSVILLE, AL 35806
Phone:	256-830-8930

Physician:	Kristopher N. Jones, MD, MPH		
Signature:		Date:	8/22/2012

MEDICAL EXAMINER'S CERTIFICATE
PART 1 OF 2

I certify that I have examined David Wayne Chamblee in accordance with the federal Motor Carrier Safety Regulations (49 CFR 391.41-391.49) and with knowledge of the driving duties, I find this person is qualified: and, if applicable, only when:

- ☐ wearing corrective lenses
- ☐ wearing hearing aid
- ☐ accompanied by a _____ waiver/exemption
- ☐ driving within an exempt intracity zone (49 CFR 391.62)
- ☐ accompanied by a Skill Performance Evaluation Certificate (SPE)
- ☐ qualified by operation of 49 CFR 391.64

The information I have provided regarding this physical examination is true and complete. A complete examination form with any attachment embodies my findings completely and correctly, and is on file in my office.

SIGNATURE OF MEDICAL EXAMINER	DATE
	09/09/2011

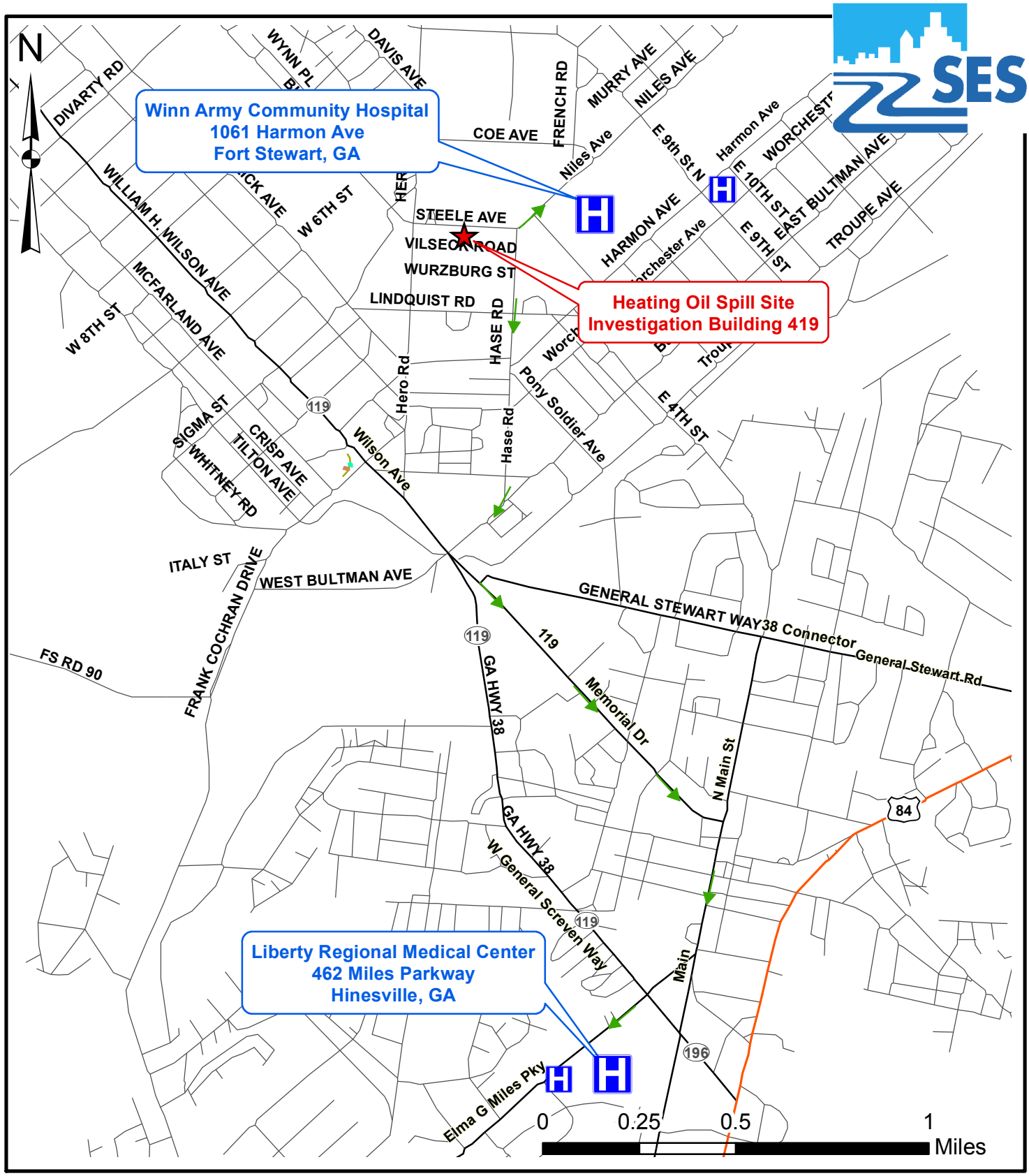
MEDICAL EXAMINER'S CERTIFICATE
PART 2 OF 2

MEDICAL EXAMINER'S NAME (PRINT)	☑ MD ☐ DO ☐ Chiropractor ☐ Physician Assistant ☐ Advanced Practice Nurse
Kristopher N. Jones, MD, MPH	
ADDRESS OF MEDICAL EXAMINER	MED. LICENSE OR CERT. NO./ISSUING STATE
WorkWell Occupational Health Center 7736 Madison Blvd Ste 1 Huntsville, AL 35806	MD.26234 Alabama
	105 Greenwood Circle Harvest, AL 35749
Medical Examiner's Telephone	Driver's License
(256)830-8930	6152006 AL
MEDICAL CERTIFICATE EXPIRATION DATE	DRIVER'S SIGNATURE
09/09/2013	

Attachment 4

Hospital Location Map

Emergency Contacts List



LEGEND

- Site Location
- Hospital
- Secondary Highway
- Local Road
- US Highway
- Route to Hospital

Job Title: Heating Oil Spill Site Investigation Building 419
Fort Stewart, Georgia
Source: Fort Stewart GIS

Attachment 4 Route to Hospitals

R:\Projects\E0209\E0209.0029\Graphics\Attach 4 Hospital Location Map.mxd (03/12/2013)

Fort Stewart Emergency Contacts

Contact	Telephone Number
Fort Stewart Military Police	911*
Fire Department	911*
Police	911*
Emergency Medical Services	911*
Hospital – Winn Army Community Hospital 1061 Harmon Avenue #2j11b Fort Stewart, Georgia 31314-5641	(912) 435-6666
Hospital – Liberty Regional Medical Center 462 Miles Parkway Hinesville, Georgia 31313	(912) 369-9400
USACE – Savannah District	(912) 652-6060
Range Control	(706) 791-5008
Environmental Compliance	(706) 791-6327
SES – Jim Madaj, Senior Program Manager	(865) 481-7837
SES SSHO Chris Napoleon	(865) 360-9910
SES Project Manager Doug Hawn	(865) 740-2907
SES – Rich Rathnow, Safety and Health Manager	(865) 481-7837 (865) 607-2197 (cell)
SES – Leah Taylor, Human Resources Manager	(865) 481-7837 ext. 227 (865) 388-9593 (cell)

*Must specify Fort Stewart cantonment area

Attachment 5

Designation of Competent Person and SSHO and Resumes of Key Personnel

Construction Safety Competent/Qualified Person Designation

August 17, 2012

This letter is to certify that Chris Napoleon is designated as the OSHA 30 Hour Construction Safety competent/qualified person for SES LLC on the upcoming Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia, project.

Mr. Napoleon has completed the OSHA 30 Hour Construction Industry Outreach Training as required by the USACE and has the experience and education to fulfill this role on this project. In addition to his training and experience, he has the authority to identify, initiate, and implement corrective actions for any construction hazards or safety concerns that arise during the course of this project work.

Please contact me if there are any questions or concerns.

Thank you.

Richard N. Rathnow MS, CIH, CSP
Corporate Safety and Health Manager
SpecPro Environmental Services LLC
1006 Floyd Culler Ct.
Oak Ridge TN 37830

Chris Napoleon
Excavation Competent Person/SSHO

Summary of Qualifications

Mr. Napoleon is a geologist with over seven years of experience in geotechnical, environmental, and construction projects. His specialties and responsibilities include: health and safety; trenching and excavations; field coordination and project planning; soil treatment and dewatering; Phase I and Phase II projects including ASTM standards; Geoprobe® direct-push and hollow-stem auger rig operation; air rotary rig operation, rotosonic rig operation, soil boring and monitoring well installation, sampling, and development; soil sampling/logging; field surveys; global positioning system equipment; and water treatment and monitoring including surface, storm water, and activated carbon treatment and system monitoring and maintenance.

Education

- BS, Geography and Geology, East Tennessee State University, 2005

Training

- 40-Hour HAZWOPER and 8-Hour Refreshers
- OSHA 30-Hour Outreach Training for the Construction Industry
- OSHA Competent Person for Excavation Trenching and Shoring
- 8-Hour HAZWOPER Management and Supervisor
- 40-Hour Asbestos Supervisor
- CPR/First Aid/AED

As a trained Competent Person in excavation and trenching Mr. Napoleon has applicable knowledge, training and experience in soil analysis and use of protective systems. He is experienced in detecting conditions that might result in cave-ins, failures in protective systems, hazardous atmospheres and other hazards including those associated with confined spaces. He is authorized to take prompt corrective measures to eliminate existing and predictable hazards and to stop work when required.

Mr. Napoleon has over five years of experience in health and safety oversight, trenching and excavation oversight, and he is the site safety and health officer (SSHO) with responsibility for project safety orientation, safety training, daily tailgate meetings, site and equipment safety inspections and incident investigation and reporting. Mr. Napoleon is experienced with area and personal air monitoring using instruments such as personal air pumps, Draeger Tubes, and vacuum air canisters, and is responsible for inspection of excavations, trench boxes, and trench installations.

Experience

SES group of companies, 2011–Present
Oak Ridge, Tennessee
Project Geologist

2011–Present: Kelley Hill Debris Removal, Fort Benning, GA. Project geologist and SSHO on the removal activities of 16,500 cubic yards of debris from a highly eroded area. Identified and mitigated potential health and safety issues during excavation activities and conducted daily pre-task safety meetings, briefed employees on activity hazard analysis (AHA) requirements, and performed weekly site condition inspections and equipment inspections

2012: Storm Water, Erosion, Sediment Controls Mirror Lake, Fort Gordon, GA. Performed SSHO duties on the repair to the standpipe and outlet pipe system at Mirror Lake, to properly convey storm water in compliance with state and federal regulations: conducted daily pre-task safety meetings, briefed employees on AHA requirements, and weekly site condition inspections and equipment inspections, and also acted in the capacity of excavation competent person.

2011–Present: Redstone Arsenal Drilling and Monitoring Well Installation, Huntsville, AL. Project geologist and SSHO, providing drilling and health and safety coordination and oversight during a $1.9 million drilling and monitoring deep bedrock and shallow well installation program at Redstone Arsenal under contract to Shaw Environmental. Evaluated potential project safety and health hazards and communicated awareness of, and/or mitigated concerns as necessary.

2011–Present: Former Skeet Range Polynuclear Aromatic Hydrocarbon (PAH) and Lead Testing, Fort Gordon, GA. Project geologist and SSHO providing Geoprobe® soil sampling support on a former skeet range: performed 26 soil borings over a two-week period while also providing health and safety site actions to identify, mitigate and/or correct potential safety risks.

Previous Experience

Tetra Tech, Inc., 2007–2011
Oak Ridge, Tennessee
Geologist/Site Superintendent

2010: Pond Liner Installation, McGuire Nuclear Station, Huntersville, NC. Site Superintendent and SSHO at the installation of a pond liner for a waste water treatment facility at Duke Energy's active McGuire Nuclear Station. Conducted daily safety tailgate meetings and oversight of excavation of radiological contaminated soils where he ensured slopes, compaction, and grade were within acceptable tolerances of engineer's design. During the project he supervised installation of 15 feet deep trenches and trench box installation for the new underground utilities and circulation piping associated with the pond. Subsequently provided oversight for an HDPE pond liner and oversight for testing procedures associated with plastic welding on the HDPE liner.

2010: Water Treatment, Iowa Army Ammunition Plant, Middletown, IA. Geologist and SSHO supervising water treatment, landfill excavation, trenching and capping, installation of carbon water filtration systems, treatment and dewatering of sludge at a former army ammunition plant. Conducted daily safety tailgate meetings and oversight of all project activities for safety and health concerns. Supervised the capping of an inert disposal landfill where he supervised trenching for characterization, and ensured all slopes, compaction, and grades were within acceptable tolerances of the engineer's design.

2008–2011: Groundwater Sampling, Volunteer Army Ammunition Plant, Chattanooga, TN. Lead Geologist and SSHO for semi-annual sampling activities at a former Army ammunition plant with TNT, DNT and metals contaminated groundwater. Performed sampling at both monitoring wells and underwater springs while maintaining crew's compliance with health and safety regulations through documented daily safety tailgate meetings.

2007–2009: Soil Remediation, Volunteer Army Ammunition Plant, Chattanooga, TN. At this former Army ammunition plant contaminated with TNT, DNT, and metals, Mr. Napoleon's activities included worker oversight, trenching and excavation oversight, health and safety monitoring and evaluation of safety hazards, field coordination, sampling, water treatment, storm water monitoring, and rainfall monitoring. Provided excavation oversight of large scale three-acre by 20-feet deep excavations where soil was removed for treatment with alkaline hydrolysis. Mr. Napoleon also supervised the trenching for removal of contaminated process sewer lines. He was responsible for ensuring worker safety and maintaining a safety program for proper trenching procedures.

MACTEC Engineering and Consulting, 2005–2007
Knoxville, Tennessee
Geologist

2007: Core Sample Drilling, Dominion Power Plant, Castlewood, VA. Geologist providing safety oversight and guidance for drilling to obtain 500-ft. core samples to compile data to determine how an area would support a 300-ft. deep ash pile. Activities included logging core, packer testing, running and maintaining water lines for winter coring conditions, and driller oversight.

2007: Drilling Oversight at John Sevier Fossil Plant, Tennessee Valley Authority (TVA); Rogersville, TN. Provided oversight of drillers installing monitoring wells and collected geotechnical data from core and soil drilling. Wells were installed by hollow-stem auger and air-rotary drill rigs. Activities included soil logging, driller oversight, and relaying information to the TVA project manager. He also acted as the site SSHO while providing safety oversight and completing all necessary health and safety documentation.

2006–2007: Drilling Oversight, Cumberland Fossil Plant, TVA, Cumberland City, TN. Performed drilling oversight on ash piles with activities including: directing placement of monitoring wells; oversight of drillers; and relaying of information from drilling events back to the TVA project manager. He also acted as the site SSHO while providing safety oversight and completing all necessary health and safety documentation.

2006: Installation of Granite and Sand Pillars, Bull Run Steam Plant, TVA; Oak Ridge, TN. Provided oversight for installation of granite sand pillars in fly ash landfills to promote more efficient dewatering of ash piles. Activities included worker oversight, soil logging, geosynthetic fabric installation oversight, and implementation design. Provided oversight for all excavation work completed on this project to maintain acceptable tolerances with the engineer's designs. He also acted as the site SSHO while providing safety oversight and completing all necessary health and safety documentation.

2005–2006: Deep Soils Sampling, Volunteer Army Ammunition Plant, Chattanooga, TN. In his capacity as geologist, assisted with deep soils Geoprobing. Work included deep soil borings to depths of 110 feet below ground surface, sampling, soil logging and decontamination of equipment. As site safety officer ensured compliance with site safety and health activities and procedures.

Construction Safety Competent/Qualified Person Designation

August 17, 2012

This letter is to certify that LeAnn McNeal is designated as the alternate OSHA 30 Hour Construction Safety competent/qualified person for SES LLC on the upcoming Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia, project.

Ms. McNeal has completed the OSHA 30 Hour Construction Industry Outreach Training as required by the USACE and has the experience and education to fulfill this role on this project. In addition to her training and experience, she has the authority to identify, initiate, and implement corrective actions for any construction hazards or safety concerns that arise during the course of this project work.

Please contact me if there are any questions or concerns.

Thank you.

Richard N. Rathnow MS, CIH, CSP
Corporate Safety and Health Manager
SpecPro Environmental Services LLC
1006 Floyd Culler Ct.
Oak Ridge TN 37830

LeAnn Taylor McNeal
Environmental Scientist/SSHO

Summary of Qualifications

Ms. McNeal is an environmental scientist with over eleven years of experience providing technical and field support for multiple environmental and construction projects on U.S. Army and Air Force sites in the southeast region. She prepares, reviews, and analyzes documents, work plans, and site, safety and health plans; conducts environmental sampling of surface water, storm water, groundwater and soil; and assists in the installation of groundwater monitor wells, and various soil and groundwater remedial actions on cleanup sites. Ms. McNeal coordinates activities with subcontractors and vendors and regularly interfaces with the U.S. Army Corps of Engineers (USACE). She has been instrumental in the successful completion of underground storage tank (UST) projects at Fort Stewart and Hunter Army Airfield (HAAF), Georgia, and in support of an environmental impact statement (EIS) at Fort Stewart where she provided valuable coordination with business and public entities and the news media.

Since 2001, Ms. McNeal has supported site safety and health (SSHO) initiatives, regularly reviewing health and safety plans to ensure regulatory compliance, and is fully conversant with all aspects of health and safety codes and practices.

Education

- BS, Earth Science, Eastern Michigan University, 2000

Training

- OSHA 40-Hour HAZWOPER and 8-Hour Refreshers
- OSHA 40-Hour HAZWOPER for Site Workers
- OSHA 30-Hour Construction Safety and Health
- OSHA 8-Hour HAZWOPER Site Supervisor
- Environmental Compliance Officer
- Unexploded Ordnance Basic
- Georgia Utilities Protection Center Web Entry
- Georgia Soil and Water Conservation Commission, Level 1A Certification
- Environmental Restoration Liabilities
- Remedial Action Cost Engineering & Requirements
- Dept. of the Army Computer Users Security
- The Effective Facilitator
- Army Environmental Database-Restoration and Compliance-Related Cleanup Systems Training
- Underground and Aboveground Storage Tank Inspection
- First Aid/CPR/AED

Experience

SES group of companies, 2008–Present
Oak Ridge, Tennessee
Environmental Scientist/SSHO

2012–Present: Evaluation of Soil and Groundwater at Potential Construction Sites, Fort Stewart and HAAF, GA. Environmental scientist and SSHO on the rapid response evaluation, over a two-year period, of soil and groundwater at five proposed construction sites: groundwater wells were installed on a site-by-site basis with up to three sediment samples and three surface water samples to be collected from each site as applicable.

2011–Present: Building 7008 Sampling and Maintenance Support, HAAF, GA. Project manager providing environmental services including groundwater and air sampling in support of an SAIC contract on multiphase remediation system at the airfield.

2011–2012: Direct Push Technology (DPT) Borings, Borehole Drilling, and Monitoring Well Installation, Redstone Arsenal, AL. Assisted with groundwater monitor well development and performed piezometer/soil boring sampling in support of Shaw Environmental's contract to install temporary wells, collect groundwater samples from temporary wells, install overburden, overburden/bedrock interface, and shallow bedrock wells at Redstone Arsenal.

2011–2012: Heating Oil Spill Site Investigation at Building 419, Fort Stewart, GA. Environmental scientist: installed soil borings, groundwater monitor wells, and performed soil and groundwater sampling to delineate contaminants of concern at the site; provided site oversight during monthly vacuum extraction events; and prepared Site Investigation report.

2011–2012: UST Corrective Action Plan–Part A at Victory Shoppette, Fort Stewart, GA. Environmental scientist: installed soil borings and groundwater monitor wells and performed soil and groundwater sampling to delineate contaminants of concern at an Army and Air Force Exchange site; and prepared Corrective Action Plan-Part A report.

2011: Fort Stewart 4th IBTC Land Use Controls. Supported the installation of land use controls in the form of 3,000 linear feet of chain link fencing. Coordinated with installation personnel and venders to obtain utility clearances, and provided support to field supervisors and crew.

2011: Interim Removal Action at USTs 208 and 209, Fort Stewart, GA. Environmental scientist and SSHO: performed groundwater sampling and free product recovery at USTs 208 and 209; installed soil borings and groundwater monitor wells; performed soil and groundwater sampling to delineate contaminants of concern at the site; performed health and safety compliance; and wrote project reports.

2011: EIS for Training Land Expansion Program, Fort Benning, GA. Provided support in public scoping meetings related to an environmental impact study.

2010–2011: Disposal of Contaminated Soil, Fort Bragg and Pope Air Force Base (AFB), NC. Field manager on the removal and disposal of 3,700 cubic yards of stockpiled petroleum-contaminated soil: responsible for collecting one soil sample for every 200 cubic yards removed and, following analysis results, for overseeing the final disposal at a local soil farm.

2010–2011: Excavation at Golf Pro Shop, Install Shredder and Upgrade Paint Booth, Fort Bragg, NC. Prepared the Accident Prevention Plan and the Site Safety and Health Plan for the removal and proper disposal of debris from the basement of a former building that was covered with a parking lot, demolition of an incinerator, and installation of a bulk paper shredder and a paint spray booth.

2010: Oil-Water Separator (OWS) Closures, Robins Air Force Base (AFB), GA. Environmental scientist and SSHO at three OWS closures: performed closure sampling, and prepared the work plan, health and safety report and closure report.

2009–2011: Site Investigation at Small Arms Range, Fort Stewart, GA. Environmental scientist and SSHO: performed soil and water sampling on delineation of contaminants of concern at a former small arms firing range, and supported the project's safety and health initiatives.

2009–2011: RCRA Facility Investigation (RFI) at Former Skeet Range, Fort Gordon, GA. Prepared RFI report for a soil delineation project at solid waste management unit (SWMU) 046 in Fort Gordon.

2009–2010: Curb Washrack Implementation and Hazardous Waste Satellite Covers, Fort Stewart, GA. Provided project support during installation of concrete curbing to divert storm water away from washracks and to provide secondary containment at tanker parking areas, and installation of hazardous waste satellite covers. Coordinated with installation personnel and venders to obtain utility clearances and provided support to field supervisors and crew.

2009: Diamond Head Avenue Low Impact Development (LID), Fort Stewart, GA. Environmental specialist responsible for storm water sampling activities during rain events and for measuring turbidity.

2009: UST Removals, Building 1330, Fort Stewart, GA. Environmental scientist and SSHO at the removal site of two unregistered USTs: performed soil sampling; health and safety oversight and compliance; and prepared project reports.

2008–2010: Training Range and Garrison Support Facilities Construction and Operation EIS, Fort Stewart, GA. Responsible for coordination of public scoping meetings and media announcements related to an environmental impact study at Fort Stewart.

2008–2010: Renovation of Fuel Purging Facility, Ft. Stewart, GA. Environmental scientist and SSHO at an environmental upgrade of the fuel purging facility: coordinated with installation personnel and obtained utility clearances; performed closure sampling and closure reports for two OWS; and performed safety and health oversight and compliance duties.

2008–2009: Remedial Action Pilot Study, Camp Blanding, FL. Environmental scientist and SSHO at a pilot study investigating two remedial methods and the delineation of a trichloroethylene plume. Performed groundwater sampling and provided health and safety oversight and compliance.

2008–2009: USTs 208, 209, 210 and Well Installation at SWMU 13, Fort Stewart, GA. Environmental scientist and SSHO: performed groundwater sampling at USTs 208, 209 and 210; monitored well installation; performed free product recovery at USTs 208 and 209; provided health and safety oversight and compliance; and prepared project reports.

2008–2009: LID Projects, Fort Stewart, GA. Coordinated with installation personnel and obtained utility clearances for two LID projects. Provided support to field supervisors and crew and wrote project reports.

2008: UST Closure and Aboveground Storage Tank (AST) Replacement, Robins AFB, GA. Performed closure sampling at a UST closure and monitored the installation of a replacement 2,000 gallon AST. Prepared work plan, health and safety report and closure report.

Engineering and Environment, Inc., 2004–2007
Virginia Beach, Virginia
Facilitator/Technical Coordinator for U.S. Army Environmental Command (USAEC)

- Coordinated with Army installations and USAEC prior to the environmental cleanup workshop. Generated agendas, timelines, facilitated meetings, and after-action reports that were used to track the entire progress of the Installation Action Plan (IAP) document;
- Prepared cost estimates for Army installations and National Guard Bureau environmental cleanup sites;
- Reviewed relevant site documentation and prepared cost estimates for site investigations, feasibility studies, remedial designs, remedial actions, and long term management projects. Assisted installations with uploading cost estimates and backup documentation into the Department of the Army's databases of record (AEDB-R and AEDB-CC);
- Created draft IAP documents prior to the workshop, updated/finalized IAP documents following the workshop. Gathered and compiled IAP document comments from the installations, accessed AEDB-R and AEDB-CC for data input, reviewed and finalized IAP documents.

Engineering and Environment, Inc., 2001–2004
Virginia Beach, Virginia
Installation Restoration Program Manager at Fort Stewart and HAAF, Georgia

- Contractor to Fort Stewart and HAAF Directorate of Public Works, Environmental and Natural Resources Division;
- Provided technical expertise and program management to the USAEC on various aspects of the Installation Restoration Program (IRP), Compliance Related Cleanup Program, and the Military Munitions Rule Program (MMRP) at Fort Stewart and HAAF, Georgia;
- Assisted with the implementation of a Performance Based Contract at HAAF: reviewed work plans and schedules, analyzed short and long term implications, assisted with the development of selection criteria;
- Oversaw the cleanup of numerous environmental restoration sites, resulting in the modification of the Installation's Hazardous Waste Permit for approval of 28 sites for No Further Action and another six sites for Institutional Controls;
- Prepared, reviewed, and analyzed documents, plans, scopes of work (SOWs), databases, and tracked the financial status and progress of the environmental programs at the two installations;
- Prepared and submitted reports regarding site investigations and cleanup activities to environmental regulatory agencies. Prepared correspondence and met with representatives of federal and state environmental regulatory agencies, Department of the Army personnel, and contractors;
- Prepared and submitted project funding requests, SOWs, work plans, and updated Army databases for site investigations, remedial actions, and long-term management projects;
- Reviewed reports and work plans generated by contractors, prepared and submitted written comments;
- Served as SSHO: reviewed health and safety plans, ensuring compliance with all regulations; provided safety and health oversight for subcontractor activities including inspections, incident investigation and reporting, implementation of corrective actions, and program communications.

Hull and Associates, Inc., 2000–2001
Toledo, Ohio
Scientist I

- Provided technical support for various environmental engineering projects ranging from groundwater sampling of petroleum release sites to quality control and safety inspections during the construction of state regulated landfills;
- Prepared correspondence to, and met with, state regulators and local citizens;
- Collected soil and groundwater samples for laboratory analysis, and worked with various groundwater remediation units on cleanup sites.

Attachment 6

SES S&H Manual

(In SES Safety and Health Manual; copy to be maintained on site.)

Tool Box Safety Meetings
Material Handling
Hand and Power Tools
Hazard Communication
Personal Protective Equipment
Worksite Emergency Procedure

Attachment 7

Activity Hazards Analysis

Date Prepared: March 7, 2013
Project: Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia
Task: Mobilization/Site Preparation
Prepared By: Doug Hawn
Construction Safety Competent Person: Chris Napoleon
SSHO: Chris Napoleon
Reviewed By: Rich Rathnow, CIH, CSP

Overall Risk Assessment Code (RAC): L

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Severity	Probability: Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Heating Oil Spill Site Investigation Building 419
Fort Stewart, Georgia
ACTIVITY HAZARD ANALYSIS – Mobilization/Site Preparation

Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
Mobilization/ site preparation	Traversing uneven, wet, or rough terrain. Use of worn or unrated safety footwear.	• Be aware of poor footing, potential slipping/tripping hazards in the work area, such as wet/steep slopes, stumps/roots, unprotected holes, ditches, riprap, utilities, and ground protrusions. Observe and avoid areas of unprotected holes, ramps, and ground penetrations or protrusions (stumps, roots, holes curbs, utility structures etc). Use sturdy hard-toe work boots with sufficient ankle support. • Institute and maintain good housekeeping practices.	Level D PPE (Work clothes, ANSI Type II reflective vests/ high-visibility clothing, hard hat, safety glasses and sturdy safety-toe work boots, leather gloves and hearing protection) RAC - L
Loading and unloading / manual lifting, carrying, and/or handling of objects.	Carrying loads or objects that are heavy, bulky, hard to carry	• SES or subcontract personnel must notify supervisors or safety representatives of pre-existing medical conditions that may be aggravated or re-injured by lifting activities. • Lift objects using knees, not back. For repetitive lifting tasks, consider using lifting	Level D PPE (see above) RAC-L

Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Mobilization/Site Preparation			
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**RAC**
	Using improper lifting technique Lifting objects >50 lbs. alone	braces/ supports. If heavy equipment isn't available, get help to lift heavy (> 50 lbs.) or awkward loads. Use heavy equipment to transfer heavy or awkward loads when possible. • Plan storage and staging to minimize lifting or carrying distances. Make sure the path of travel is clear before lifting. • Avoid carrying heavy objects above shoulder level.	
	Working in areas where noise levels exceed 85 dBA without hearing protection properly worn.	• Personnel exposed to loud working environments must wear hearing protection. • The minimum NRR for hearing protection used on this project is 32. Hearing protection with an NRR of 32 should be adequate for noise levels up to 105 dBA using a buffer factor of 5 dBA. If noise levels consistently exceed 105 dBA, double hearing protection is required. **Guideline**: Individuals who realize that it is difficult to hear conversation-level voices at 3 feet or less don hearing protection with a minimum NRR of 32 immediately.	RAC-
	Working in temperature extremes – high temperatures	• Provide fluids to prevent worker dehydration. • Monitor for heat stress in accordance with APP (maintain use of buddy system). • Institute a conservative work-break regimen that complies with OSHA and ACGIH to avoid heat stress symptoms and overexertion. • Document physiological measurements (radial pulse rates, rest times, work times, and results) in SSHO daily log book. • Workers must minimize or avoid alcohol intake the night before working in heat stress situations. • Shift work to early hours or evenings/nights if possible to avoid peak outdoor temperature times.	Level D PPE (light-colored clothing) RAC - M
	Working in temperature extremes – low temperatures	• Workers are trained to recognize cold stress and appropriate actions to take. • Workers must watch others for signs and symptoms of cold stress (shivering, numbness, sluggishness). • Take breaks in heated shelters. • Drink warm liquids to reduce the susceptibility to cold stress. • Wear layered clothing. • Cover extremities -- such as ears, fingers, nose -- during very low temperature situations. • Remove outer layer of clothing and loosen other layers to promote evaporation of perspiration upon entering shelter.	Level D PPE – layered clothing with high thermal properties RAC - M

Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Mobilization/Site Preparation			
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**RAC**
	Working in the vicinity of heavy equipment or vehicles Working near untrained operators Working while under a suspended load	• Wear ANSI Type II reflective warning vests or high-visibility clothing. • Isolate equipment swing areas from workers, fixed objects, or other equipment. • Make/maintain eye contact with operators before approaching equipment. Do not approach equipment from rear or from blind spot of operator. • Understand and review hand signals. Designate one person to provide hand signals to equipment operators. • Ensure equipment has operable back-up alarms. • Avoid standing or walking between fixed objects and operating equipment. • Do not walk under or in front of suspended loads. Only tagged, load rated, and inspected rigging shall be used to lift loads. Become familiar with vertical, basket, and choker load ratings of rigging.	Level D PPE RAC - L
	Walking or working near or in biological elements native to the work environment	• Observe ground surfaces, especially in wet or grassy areas, tree trunks, and rock piles for evidence and presence of snakes (poisonous). • Observe ground surfaces or surrounding vegetation or structures for presence of fire ants, spiders, bee/wasp hives, etc. • Observe areas for presence of stinging insects. **Notify supervisors of known allergies to stinging insects and location of antidotes.** • Use OFF! Family Care Insect Repellent (Does not contain DEET) on exposed skin. Tape pant legs to boots. Frequently check body and clothing for ticks, chiggers, spiders. Avoid using DEET where there is potential for sample contamination. • Use permythrin-containing insect repellents on exterior of clothing and PPE only. Do NOT use permythrin directly on skin. • Use a buddy system to check for ticks. • Avoid potential exposure to bloodborne pathogens. Have bloodborne pathogen kit available with first aid kit. • Watch for snakes in tall grass. If working in tall grass or other habitat where snakes are prone to be, wear snake chaps.	Level D PPE RAC - L
Electrical equipment and tools operation	Working with electrical equipment in outdoor or wet locations.	• If/when electrical extension cords are required to complete work, extension cords must be - Equipped with third-wire grounding; - Covered, elevated, or protected from damage when passing through work areas; - Protected from pinching if routed through doorways; - Not fastened with staples, hung from nails, or suspended with wire; and	Level D PPE RAC - M

Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Mobilization/Site Preparation			
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**RAC**
		- Rated to handle the voltage/amperage of equipment. • Extension cords and electrical power tools must have ground fault circuit interrupters.	
Refueling equipment and motors,	Improperly storing or handling flammable liquids. Use of smoking materials in no-designated areas.	• Use only metal safety cans to store and transfer fuel. • Use funnels and nozzles during fueling operations. • Allow warm engine parts (generator motor) to cool before refueling. • Appropriately sized, easily accessible ABC fire extinguisher in work area. • Review and be cognizant of base fire prevention procedures and requirements. • Designated and safe smoking areas will be established. NO SMOKING while working in wooded or brushy areas.	Level D PPE RAC - L
Driving vehicles	Operation of vehicles too fast for conditions, disobeying traffic control devices. Operating during extreme weather or hazardous road conditions. Operating under the influence of alcohol or drugs.	• Always use a seat belt while driving. Always observe posted speed limits, traffic signs, and signals. Never use a cell phone or two-way radio while driving. No text messaging while driving. Violating these rules may result in loss of military/ government facility driving privileges. • Operate vehicles cautiously and with regard to wet, icy, or snowy conditions. • Inspect vehicles before use. Perform 360 degree walk around. Adjust and check mirrors to ensure maximum visibility. Perform visual shoulder check as well as using mirror for lane changes. • Ensure that vehicle maintenance schedule is followed. • First aid kit and fire extinguisher in vehicle • Drive with caution where there is limited visibility because of weather, such as rain, fog, darkness, snow, or sleet. Stop vehicle at rest area if conditions are too extreme to safely continue. Consider potential weather conditions for each long-distance trip. • Enforce alcohol and drug testing protocol.	RAC - L
• Site preparations	Failure to identify underground utilities prior to the start of soil intrusive operations Working during extreme weather	• Verify underground utilities locations and ensure utilities are not in areas impacted by mobilization activities. • Shut down operations in heavy rain and/or lightning. • Buddy system maintained for all phases of work. • Base Emergency Dispatch numbers programmed into SES personnel cellular phones. Have hospital route maps readily available. • Report all unsafe conditions and acts, injury/illness, or property damage to supervisors immediately.	RAC - L

Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Mobilization/Site Preparation			
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**RAC**
	phenomenon, Driving during Emergency situations on base		

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
• Fire extinguisher (with fuel and electrical sources) • Eye wash (small portable type) • Miscellaneous power and manual hand tools. • Miscellaneous rigging. • Direct push drill rig	• Inspection of all emergency equipment (such as first aid kits, fire extinguishers) • Daily equipment inspections and maintenance. • Inspections of hand tools (power) and extension cords if used. • Inspect work area daily for changes in work conditions that may pose new physical hazards.	• Review AHA with all task personnel. • Review accident prevention plan for new site personnel. • Review operations/safety manuals for all equipment used. • CPR/first aid training for supervisors. • HAZWOPER supervisor training for SSHO.

Task Name: Mobilization and Site Preparation

Project Name and Location: Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia

	PRINT	SIGNATURE	
Supervisor's Name:			Date/Time:
Safety Officer Name:			Date/Time:
Site Personnel:			Date/Time:
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Date Prepared: March 7, 2013
Project: Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia
Task: Direct Push Geoprobe Drilling Activities
Prepared By: Doug Hawn
Construction Safety Competent Person: Chris Napoleon
SSHO: Chris Napoleon
Reviewed By: Rich Rathnow, CIH, CSP

Overall Risk Assessment Code (RAC): L

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Severity	Probability: Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Heating Oil Spill Site Investigation Building 419
Fort Stewart, Georgia
ACTIVITY HAZARD ANALYSIS – Direct Push Geoprobe Drilling Activities

Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
Direct Push Geoprobe drilling activities	Traversing uneven, wet, or rough terrain. Use of worn or unrated safety footwear.	• Be aware of poor footing, potential slipping/tripping hazards in the work, such as wet/steep slopes, stumps/roots, exposed holes, ditches, riprap, utilities, and ground protrusions. Observe and avoid areas of unprotected holes, ramps, and ground penetrations or protrusions (stumps, roots, holes, curbs, utility structures, etc.). Use sturdy safety-toe work boots with sufficient ankle support. • Institute and maintain good housekeeping practices. • Wear sturdy leather safety-toe boots with slip-resistant soles. • Avoid areas with extreme slope and loose soil. Emphasize personal awareness of uneven walking and working surfaces.	Modified Level D *Work clothes, ANSI Type II reflective vests/ high-visibility clothing, hard hat, safety glasses and sturdy safety toed work boots, hand protection (inner and outer chemical resistant gloves), chemical resistant suit, boot covers RAC – L

Heating Oil Spill Site Investigation Building 419
Fort Stewart, Georgia
ACTIVITY HAZARD ANALYSIS – Direct Push Geoprobe Drilling Activities

Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
	Failure to identify underground utilities prior to the start of soil intrusive operations	• Locate underground utilities before excavating and coordinate with Installation utility locating service. • Where a second party or private utility locating service is used to locate Installation utilities, an SES representative shall be on site to verify locations where the accuracy of a utility mark-out is in doubt. • Utility mark-out locations should be photo documented in relation to the location of where penetrations to the ground surface will be made. • Determine if an installation excavation permit is required before performing excavation operations. Secure excavation permit if required. • Review available installation records, plans, or drawings for presence of underground utilities in the designated work area.	Modified Level D RAC - L
Direct Push Geoprobe drilling activities refueling equipment	Drilling Rig Operation: • Positioning and operating drill rig • Operating drill rig in an unauthorized manner (no training, PPE missing, ignoring established protocol) • Operating rig with poor communication and coordination of activities • Improper refueling of drill rig	• Hard hats worn at all times. • Protective eyewear with side shields that meet the ANSI Z-87.1 standards worn at all times. • Hearing protection worn when noise levels exceed 85dBA. • Sturdy, leather safety-toe footwear required. • Leather gloves worn when handling sharp, rough, or slippery materials. • Basic housekeeping requirements must apply to all construction sites. Cords covered or elevated when crossing pathways. • Only trained and authorized personnel operate and/or assist in drilling operations. • Drill rigs have protective guarding on all rotating shafts, belts, and pulleys. • No loose-fitting clothing or jewelry worn that can become entangled in machinery. • Long hair secured to prevent entanglement in machinery. • Drill rods and drill bit stabilizer transported properly either by a rack, the rig, or a utility trailer. • If transported on a trailer, the rods or stabilizers held securely in place. • Rig and wheeled equipment have chocks placed under the wheels to prevent rolling. • Rigs inspected daily and documented by the equipment operator. • Wire inspected daily, and cables with broken strands, weak spots, kinks, or mashed areas replaced prior to use. • Driller inspects thread connections prior to start of fieldwork and weekly thereafter. • The mast and cables capable of supporting all equipment and drill rods.	Modified Level D RAC L

Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Direct Push Geoprobe Drilling Activities			
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**RAC**
		• Rigs must be maintained in good working order. • All rotating shafts, pulleys, or chains covered with protective guards. • All drill rigs equipped with an emergency kill switch, which is readily accessible to personnel at the rear of the rig. All personnel know the kill switch locations and how to use them. • Rig shut down during refueling operations. • Rig refueled using an OSHA-compliant portable fuel container. • Personnel performing refueling operations exercise caution to avoid spillage. • Fire extinguishers fully charged and inspected monthly and recorded on inspection tag. • Fuels stored in appropriate containers. • Sampling stops when rain or other weather factors interfere with the safety of the operators. • Activities stop during lightning, and personnel will take shelter in vehicles. • For work near an overhead line, caution taken to ensure when raising the mast. • While working near power lines, drill rods not be leaned against the mast.	
	Working in areas where noise levels exceed 85 dBA without hearing protection properly worn.	• Wear hearing protection when noise levels exceed 85 decibels. • The minimum NRR for hearing protection used on this project is 32. Hearing protection with an NRR of 32 should be adequate for noise levels up to 105 dBA using a buffer factor of 5 dBA. If noise levels consistently exceed 105 dBA, double hearing protection will be required.	Modified Level D RAC - L
	Using utility knives or razor knives to cut materials	• Wear cut-resistant work gloves when the sharp/cut edges or the use of hand tools could cause lacerations or other injury (for example, when splitting the sleeve). • Avoid use of razor knives. When cutting with knives, cut away from the body and never towards another worker.	Modified Level D RAC - L
	Working with electrical equipment in outdoor or wet locations.	• Do not set tools on/in mud, water, soil, or other surfaces that could damage tools. • Tools are inspected before use. Maintain all tools in a safe condition. • Electric cords are free from defects. • All required guards are in place and functional. • Hand-held powered tools equipped with constant pressure switch. • Electric power-actuated tools are double-insulated and properly grounded. • Hoses or cords are not used to lower or hoist tools.	Modified Level D RAC - L

Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Direct Push Geoprobe Drilling Activities			
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**RAC**
		• Disconnect tools from energy source when not in use. • Only personnel qualified by training or experience should use power tools.	
	Handling cores, drill rods or IDW during monitor well installation and abandonment Handling IDW using inadequate procedures Handling IDW without proper training	• All personnel performing this task shall be trained in accordance with 29 CFR 1910.120 and be deemed "fit for duty" by a licensed occupational physician. • All personnel working with potential exposure to the COCs shall have been trained on chemical properties, exposure symptoms, and hazard control measures. • Follow PPE task hazard analysis and air monitoring action level requirements identified in the APP and SSHP. • Do not allow dermal contact or incidental ingestion of impacted soil or groundwater. Skin contact with contaminated water, soils, debris, or equipment shall be avoided at all times. Do not kneel or step in potentially contaminated media (soil or groundwater). Wear uncoated Tyvek, gloves and rubber boots to avoid gross dermal contact with potentially contaminated soils. • Exercise good hygiene practices. Always wash hands before eating, drinking, smoking, and leaving site. Only eat, drink, smoke, or chew tobacco in designated areas. • After sample collection, sample container lids should be tightened securely to prevent any leaks, and the containers should be rinsed with clean water to ensure they are free of chemical constituents. • ANSI-approved eyewash station will be provided on site and maintained in the event there is an accidental splash of materials to the eyes • Use dust control methods during excavation and other soil-intrusive activities where there will be dust generation.	Modified Level D RAC - L
	Working in a hot environment without preparation – High temperatures -	• Provide adequate water with clean disposable cups and collection means to prevent worker dehydration. • Monitor for heat stress in accordance with APP and SSHP (maintain use of buddy system). • Institute a conservative work-break regimen that complies with OSHA and ACGIH to avoid heat stress symptoms and overexertion. • Document all physiological measurements (pulse rates, break times, work times, results of program) on Heat Stress Monitoring data sheet.	Modified Level D RAC - M
	Working in a cold environment	• Workers will be trained to recognize cold stress and appropriate actions to take. • Workers will watch others for signs and symptoms of cold stress (shivering,	Level D PPE – layered clothing

Heating Oil Spill Site Investigation Building 419
Fort Stewart, Georgia
ACTIVITY HAZARD ANALYSIS – Direct Push Geoprobe Drilling Activities

Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
	- low temperatures without preparation	numbness, sluggishness). • Take breaks in heated shelters. • Drink warm liquids to reduce the susceptibility to cold stress. • Wear layered clothing. • Be certain to cover extremities -- such as ears, fingers, nose -- during very low temperature situations. • Remove outer layer of clothing and loosen other layers to promote evaporation of perspiration upon entering shelter.	with high thermal properties RAC - M
	Carrying loads or objects that are heavy, bulky, hard to carry Using improper lifting technique Lifting objects >50 lbs. alone	• SES or subcontract personnel must notify supervisors or safety representatives of pre-existing medical conditions that may be aggravated or re-injured by lifting activities. • Lift objects using knees, not back. For repetitive lifting tasks, consider using lifting braces/supports. If heavy equipment isn't available, get help to lift heavy (> 50 lbs.) or awkward loads. Use heavy equipment to transfer heavy or awkward loads when possible. • Plan storage and staging to minimize lifting or carrying distances. Make sure the path of travel is clear before lifting. • Avoid carrying heavy objects above shoulder level.	Modified Level D RAC - L
	Improperly storing or handling flammable liquids. Use of smoking materials in no-designated areas.	• Use only metal safety cans to store and transfer of fuel. • Use funnels and nozzles during fueling operations. • Allow warm engine parts (generator motor) to cool 15 minutes before refueling. • 10 lb ABC fire extinguisher in work area. • Review and be cognizant of base fire prevention procedures and requirements. • Designated and safe smoking areas will be established. There will be NO SMOKING while working in wooded or brushy areas.	Standard Level D RAC - L
	Walking or working near or in biological elements native to the work environment	• Observe ground surfaces, especially in wet or grassy areas, tree trunks, and rock piles for evidence and presence of snakes (poisonous). • Observe ground surfaces or surrounding vegetation or structures for presence of fire ants, spiders, bee/wasp hives, etc. • Observe areas for presence of stinging insects. **Notify supervisors of known allergies to stinging insects and location of antidotes.** • Use insect repellant. Tape pant legs to boots. Frequently check body and clothing for ticks, chiggers, spiders.	Modified Level D RAC - L

Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Direct Push Geoprobe Drilling Activities			
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**RAC**
		• Avoid possible exposure to bloodborne pathogens. Have a bloodborne pathogens kit available with first aid kit.	
	Working with electrical equipment in outdoor or wet locations.	• If/when electrical extension cords are required to complete work, extension cords must be - Equipped with third-wire grounding; - Covered, elevated, or protected from damage when passing through work areas; - Protected from pinching if routed through doorways; - Not fastened with staples, hung from nails, or suspended with wire; and - Rated to handle the voltage/amperage of equipment. • Extension cords and electrical power tools must have ground fault circuit interrupters (GFCIs).	Modified Level D RAC - M
	Generating dust while performing site operations.	• In dust-generating activities, suppression methods will be used to avoid creating visible dust.	Standard Level D RAC - L
	Operation of vehicles too fast for conditions, disobeying traffic control devices Operating during extreme weather or hazardous road conditions Operating under the influence of alcohol or drugs	• Always use a seat belt while driving on military/government facilities. Always observe posted speed limits, traffic signs, and signals. Never use a cell phone or two-way radio while driving on military/government facilities. Violating these rules may result in loss of military/ government facility driving privileges. • Operate vehicles cautiously and with regard to wet, icy, or snowy conditions. • Inspect vehicles before use. Perform 360 degree walk around observation. Adjust and check mirrors to ensure maximum visibility. Perform visual shoulder check as well as using mirror for lane changes. • First aid kits and fire extinguishers in all vehicles. • Ensure that vehicle maintenance schedule is followed. • Drive with caution when visibility is limited because of weather, such as rain, fog, darkness, snow, or sleet. Stop vehicle at rest area if conditions are too extreme to safely continue. Plan each long-distance trip with regard for potential weather conditions.	RAC - L
	Working during extreme weather phenomenon Driving during	• Shut down operations in heavy rain and lightning. • Maintain buddy system for all phases of work. • Base Emergency dispatch numbers programmed into SES personnel cellular phones. Have hospital route maps readily available. • Report all unsafe conditions and acts, injury/illness, or property damage to	RAC - L

Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Direct Push Geoprobe Drilling Activities			
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**RAC**
	Emergency situations on base	supervisors immediately.	
Equipment decon	Pressure washing and wiping down equipment to remove potentially contaminated material.	• Wear chemical protective Tyvek boots, gloves, and face shield for splashes. • Only direct spray at object to be cleaned. • Collect decon water and store for disposal or collect in designated area for future remediation and transport. • Decon areas are part of contamination reduction zone with access to boot wash and PPE disposal containers. • Allow engine to cool 15 minutes before refueling. • Have metal gas cans with spring closing cap and flash arrestor.	Modified Level D RAC - L

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
• Fire extinguisher (with fuel and electrical sources) • Eye wash (small portable type) • Miscellaneous power and manual hand tools. • Miscellaneous rigging. • Direct push drill rig	• Inspection of all emergency equipment (i.e.: first aid kits, fire extinguishers) • Daily Equipment inspections and maintenance. • Inspections of hand tools (power) and extension cords if used. • Inspection of work area daily for changes in work conditions that may pose new physical hazards.	• Review AHA with all task personnel. • Review accident prevention plan for new site personnel. • Review operations/safety manuals for all equipment used. • CPR/first aid training for supervisors. • HAZWOPER supervisor training for SSHO.

Task Name: Direct Push Geoprobe Drilling

Project Name and Location: Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia

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Supervisor's Name:			Date/Time:
Safety Officer Name:			Date/Time:
Site Personnel:			Date/Time:
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Date Prepared: March 7, 2013
Project: Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia
Task: Soil and Groundwater Sampling and IDW Management
Prepared By: Doug Hawn
Construction Safety Competent Person: Chris Napoleon
SSHO: Chris Napoleon
Reviewed By: Rich Rathnow CIH CSP

Overall Risk Assessment Code (RAC): L

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Severity	Probability: Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Heating Oil Spill Site Investigation Building 419
Fort Stewart, Georgia
ACTIVITY HAZARD ANALYSIS – Soil and Groundwater Sampling and IDW Management

Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
Soil and groundwater Sampling and IDW management	Traversing uneven, wet or rough terrain. Use of worn or unrated safety footwear.	• Be aware of poor footing, potential slipping/tripping hazards in the work, such as wet/steep slopes, stumps/roots, exposed holes, ditches, riprap, utilities, and ground protrusions. Observe and avoid areas of unprotected holes, ramps and ground penetrations or protrusions (stumps, roots, holes, curbs, utility structures, etc.). Use sturdy safety-toe work boots with sufficient ankle support. • Institute and maintain good housekeeping practices.	Modified Level D * *Work clothes, reflective vests/ high visibility clothing, hard hat, safety glasses and sturdy hard toed work boots, hand protection (inner and outer chemical resistant gloves), chemical resistant suits and boot covers RAC – L (see table at beginning)

Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Soil and Groundwater Sampling and IDW Management			
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**RAC**
	Performing soil and groundwater monitoring and IDW management	• All personnel performing this task trained in accordance with 29 CFR 1910.120 and deemed "fit for duty" by a licensed occupation physician. • All personnel working with potential exposure to the COCs shall have been trained on chemical properties, exposure symptoms, and hazard control measures. • Follow PPE task hazard analysis and air monitoring action level requirements identified in the SSHP. • Follow PPE and action level requirements identified in the SSHP. • Do not allow dermal contact or incidental ingestion of impacted soil or groundwater. Skin contact with contaminated water, soils, debris, or equipment shall be avoided at all times. Do not kneel or step in potentially contaminated media (soil or groundwater). • Use good hygiene. Always wash hands before eating, drinking, smoking, leaving site. Only eat, drink, smoke, or chew tobacco in designated areas.	Modified Level D RAC - L
	Working in a hot environment without preparation – high temperatures	• Provide fluids to prevent worker dehydration. • Monitor for heat stress in accordance with APP and SSHP (maintain use of buddy system). • Institute a conservative work-break regimen that complies with OSHA and ACGIH to avoid heat stress symptoms and overexertion. • Document all physiological measurements (pulse rates, break times, work times, results of program) in SSHO daily logbook.	Modified Level D Light-colored cotton clothing RAC - L
	Working in a cold environment - low temperatures without preparation	• Workers are trained to recognize cold stress and appropriate actions to take. • Workers trained to watch others for signs and symptoms of cold stress (shivering, numbness, sluggishness). • Take breaks in heated shelters. • Drink warm liquids to reduce the susceptibility to cold stress. • Wear layered clothing. • Be certain to cover extremities -- such as ears, fingers, nose -- during very low temperature situations. • Remove outer layer of clothing and loosen other layers to promote evaporation of perspiration upon entering shelter.	Standard Level D PPE – layered clothing with high thermal properties RAC - L
	Carrying loads or objects that are	• SES or subcontract personnel must notify supervisors or safety representatives of pre-existing medical conditions that may be aggravated or re-injured by lifting	Modified Level D RAC - L

Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Soil and Groundwater Sampling and IDW Management			
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**RAC**
	heavy, bulky, hard to carry Using improper lifting technique Lifting objects >50 lbs. alone	activities. • Lift objects using knees, not back. For repetitive lifting tasks, consider using lifting braces/supports. If heavy equipment isn't available, get help to lift heavy (> 50 lbs.) or awkward loads. Use heavy equipment to transfer heavy or awkward loads when possible. • Plan storage and staging to minimize lifting or carrying distances. Make sure the path of travel is clear before lifting. • Avoid carrying heavy objects above shoulder level.	
	Walking or working near or in biological elements native to the work environment	• Observe ground surfaces, especially in wet or grassy areas, tree trunks, and rock piles for evidence and presence of snakes (poisonous). • Observe ground surfaces or surrounding vegetation or structures for presence of fire ants, spiders, bee/wasp hives, etc. • Observe areas for presence of stinging insects. **Notify supervisors of known allergies to stinging insects and location of antidotes.** • Use insect repellant. Tape pant legs to boots. Frequently check body and clothing for ticks, chiggers, spiders. DEET should be worn by personnel where it cannot potentially impact analytical results. Permythrin should be worn on external clothing; however, do NOT use permythrin directly on skin. • Avoid potential exposure to bloodborne pathogens. Have bloodborne pathogen kit available with first aid kit. • Avoid possible exposure to bloodborne pathogens. Have a bloodborne pathogens kit with the first aid kit.	Modified Level D RAC - L
	Operation of vehicles too fast for conditions, disobeying traffic control devices. Operating during extreme weather or hazardous road conditions.	• Always use a seat belt while driving on military/government facilities. Always observe posted speed limits, traffic signs, and signals. Never use a cell phone or two-way radio while driving on military/government facilities. Violating these rules may result in loss of military/ government facility driving privileges. • Operate vehicles cautiously and with regard to wet, icy, or snowy conditions. • Inspect vehicles before use. Adjust and check mirrors to ensure maximum visibility. Perform visual shoulder check as well as use mirror for lane changes. • Ensure that vehicle maintenance schedule is followed. • Drive with caution when visibility is limited because of weather, such as rain, fog, darkness, snow or sleet. Stop vehicle at rest area if conditions are too extreme to safely continue. Plan each long-distance trip with regard for potential weather conditions.	RAC - M

Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Soil and Groundwater Sampling and IDW Management			
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**RAC**
	Working during extreme weather phenomenon Driving during Emergency situations on base	• Shut down operations in heavy rain and lightning. • Maintain buddy system for all phases of work. • Base Emergency Dispatch numbers programmed into SES personnel cellular phones. Have hospital route maps readily available. • Report all unsafe conditions and acts, injury/illness, or property damage to supervisors immediately.	RAC - L

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
• Fire extinguisher (with fuel and electrical sources) • Eye wash (small portable type) • Miscellaneous power and manual hand tools. • Miscellaneous rigging. • Direct push drill rig	• Inspection of all emergency equipment (such as first aid kits, fire extinguishers). • Daily equipment inspections and maintenance. • Inspections of hand tools (power) and extension cords if used. • Inspection of work area daily for changes in work conditions which may pose new physical hazards.	• Review AHA with all task personnel. • Review accident prevention plan for new site personnel. • Review operations/safety manuals for all equipment used. • CPR/first aid training for supervisors. • HAZWOPER supervisor training for SSHO.

Task Name: Soil and Groundwater Sampling and IDW Management

Project Name and Location: Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia

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Safety Officer Name:			Date/Time:
Site Personnel:			Date/Time:
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Date Prepared: May 3, 2013
Project: Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia
Task: Well Abandonment
Prepared By: Doug Hawn
Construction Safety Competent Person: Chris Napoleon
SSHO: Chris Napoleon
Reviewed By: Rich Rathnow CIH CSP

Overall Risk Assessment Code (RAC): L

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Severity	Probability: Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Heating Oil Spill Site Investigation Building 419
Fort Stewart, Georgia
ACTIVITY HAZARD ANALYSIS –Well Abandonment

Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
Well Abandonment • Mixing bentonite and grout with water to backfill well.	• Dropping bag of bentonite or grout/cement with silica content. • Tearing bag of bentonite or grout/cement with silica content • Failure to wear or properly wear required PPE while handling materials with silica content. • Lifting or twisting while handling	• Administrative and engineering controls are to be used as priority control measures. • Avoid generation of any airborne dust from bags of bentonite or grout/ cement. • Water and water spray used in mixing process for airborne dust suppression. • Have portable eye wash station and washing facility in the direct vicinity. • All non-essential personnel for the mixing process will remain upwind of mixing operations and at least 20 feet away. • Keep all mixing operations a minimum of 50 ft. from pedestrian traffic areas. • Avoid bending or twisting while handling heavy bags of materials. Get assistance for material or objects weighing more than 50 lbs. • Stage material bags so that transporting them manually is minimized and that lifting is avoided by placing materials close to waist height.	NIOSH-Approved P100 Rated Particulate Full Facepiece Respirator, ANSI approved safety-toe boots, ANSI-approved safety glasses with side shields with face shield, safety goggles, hearing protection, chemical protective gloves (Neoprene, Nitrile), long sleeves, and hard hat

Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS –Well Abandonment			
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**RAC**
	material bags		RAC - L
• Over-drill top 5 feet of well	Drilling Rig Operation: • Positioning and operating drill rig • Operation of drill rig in an unauthorized manner (no training, PPE missing, ignoring established protocol) • Operating rig with poor communication and coordination of activities • Improper refueling of drill rig	• Equipment shall only be operated by personnel qualified by prior training or experience. • Inspect equipment daily. • Maintain eye contact with operator. • Use water spray for over drilling to suppress dust. • Do not wear loose clothing, long hair, or jewelry near drill operations. • Wear ANSI Type II safety vest when working in vicinity of heavy equipment. • Avoid operator blind spots. • Wear hearing protection when noise levels exceed 85 decibels and in identified noise exclusion area. • The minimum NRR for hearing protection used on this project will be 32. Hearing protection with an NRR of 32 should be adequate for noise levels up to 105 dBA using a buffer factor of 5 dBA. If noise levels consistently exceed 105 dBA, double hearing protection will be required. • Discuss details of operation and worker roles in the daily Pre-Task Safety Plan. • Allow equipment to cool for 15 minutes prior to refueling. • Bond all containers of flammable liquids to the grounded tank system prior to transfer of liquids. • No smoking in any work areas. No spark producing equipment or other potential ignition sources in immediate vicinity of flammable liquid transfer.	NIOSH Approved P100 Rated Full Facepiece Respirator, impact resistant goggles, hearing protection, hard hat, and safety toed boots. RAC – L
• Pour concrete into top of well.	• Dropping bag of bentonite or grout/cement with silica content. • Tearing bag of bentonite or grout/cement with silica content • Failure to wear or	• Administrative and engineering controls are to be used as priority control measures. • Avoid generation of any airborne dust from bags of bentonite or grout/ cement. • Water and water spray used in mixing process should be used for airborne dust suppression. • Have portable eye wash station and washing facility in the direct vicinity • All nonessential personnel for the mixing process will remain upwind of mixing operations and at least 20 feet away.	NIOSH-Approved P100 Rated Particulate Full Facepiece Respirator, ANSI approved safety toed boots, ANSI approved safety glasses with side shields with face shield, safety goggles,

Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS –Well Abandonment			
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**RAC**
	properly wear required PPE while handling materials with silica content. • Lifting or twisting while handling material bags • Splashing concrete mix while preparing or pouring	• Keep all mixing operations a minimum of 50 ft. from pedestrian traffic areas. • Avoid bending or twisting while handling heavy bags of materials. Get assistance for material or objects weighing more than 50 lbs. • Stage material bags so that transporting them manually is minimized and that lifting is avoided by placing materials close to waist height.	hearing protection, chemical protective gloves (neoprene, nitrile), long sleeves, and hardhat RAC – L

EQUIPMENT REQUIRED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
• Fire extinguisher (with fuel and electrical sources) • Eye wash (small portable type) • Miscellaneous power and manual hand tools • Miscellaneous rigging • Direct push drill rig	• Inspection of all emergency equipment (such as first aid kits, fire extinguishers) • Daily equipment inspections and maintenance • Inspections of hand tools (power) and extension cords if used. • Inspection of work area daily for changes in work conditions that may pose new physical hazards.	• Review AHA with all task personnel. • Review accident prevention plan for new site personnel. • Review operations/safety manuals for all equipment used. • CPR/first aid training for supervisors. • Hazardous waste supervisor training for SSHO.

Task Name: Well Abandonment

Project Name and Location: Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia

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Safety Officer Name:			Date/Time:
Site Personnel:			Date/Time:
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Date Prepared: May 14, 2013
Project: Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia
Task: Enhanced fluid recovery and Surfac® injection
Prepared By: Doug Hawn
Construction Safety Competent Person: Chris Napoleon
SSHO: Chris Napoleon
Reviewed By: Rich Rathnow, CIH, CSP

Overall Risk Assessment Code (RAC): M

E = Extremely High Risk
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Severity	Probability: Frequent	Likely	Occasional	Seldom	Unlikely
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Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Heating Oil Spill Site Investigation Building 419
Fort Stewart, Georgia
ACTIVITY HAZARD ANALYSIS – Enhanced Fluid Recovery and Surfac® Injection

Task Breakdown	Potential Hazards	Critical Safety Practices	RAC
Site setup, vacuum truck/ vehicle/ICE placement, safety equipment emplacement, extraction point connections	Being struck by vehicle or equipment because of inattention to pedestrian traffic rules or operator error	• Discuss site-specific hazards daily at tailgate safety meeting. • Inspect all equipment daily. • Use a spotter when moving equipment or backing up. • Watch for cross traffic when setting up control zones. • Set up barricades around work zone with "Danger Do Not Enter" signs. Use vehicles as barricades when possible. • Do not allow pedestrian traffic in the delineated work zone. • Wear ANSI Type II reflective warning vests or high-visibility clothing. • Chock wheels if parked on an incline.	L
	Contacting overhead utilities	• Use a spotter when moving equipment or backing up.	L
	Traversing uneven, wet, or rough terrain. Use of worn or unrated footwear.	• Be aware of proper footing, potential slipping/ tripping hazards in the work area, such as wet/ steep slopes, stumps/ roots, unprotected holes, ditches, riprap, utilities, and ground protrusions. Observe and avoid areas of unprotected holes, ramps, and ground penetrations or protrusions (stumps, roots, holes, ramps	L

Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Enhanced Fluid Recovery and Surfac® Injection			
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**RAC**
	Reaction of incompatible materials in truck	• Ensure that truck has been thoroughly purged of any incompatible materials prior to use.	L
Data collection	Being struck by vehicle or equipment because of inattention to pedestrian traffic rules or operator error	• Set up barricades around the monitoring point and stay alert when crossing traffic if collecting data from points outside the work zone. • Use flash or headlights when working in the dark. • ANSI Type II reflective safety vest worn at all times by personnel on foot. • Trained and qualified drivers and operators.	L
	Improper lifting or lifting vault covers that weigh more than 50 pounds	• Use pry bars to remove vault covers. • SES or subcontract personnel must notify supervisor or safety representatives of pre-existing medical conditions that may be aggravated or re-injured by lifting activities. • Lift objects using knees, not back. For repetitive lifting tasks, consider using lifting braces/ supports. If heavy equipment isn't available, get help to lift loads over 50 pounds or awkward loads. Use heavy equipment to transfer heavy or awkward loads when possible. • Avoid carrying heavy objects above shoulder level. • Wear ANSI-approved safety-toe boots. • Keep fingers and hands out of pinch and crush points.	L
	Being bitten by a spider or insect hiding in a well vault	• Inspect well vaults with flashlight before operation. • Use a stick or other tool to disperse insects prior to inserting hands into well vault. • Apply insect repellent that does not contain Deet around the well vault opening prior to initiating operations	L
Truck operation, data collection, surfactant emplacement	Operating malfunctioning vehicle	• Provide the location of and proper use of all emergency shutoff switches during the tailgate safety meeting. • Stay alert and monitor equipment operation frequently. • Do not leave the truck unattended. • Thoroughly inspect equipment daily and correct deficiencies.	M

Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Enhanced Fluid Recovery and Surfac® Injection			
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**RAC**
	Striking a person or an object when backing because of visual obstruction or operator error	• Use a spotter when backing up. • Ensure the back-up alarm is working during daily inspections and random checks. • Do not leave the truck unattended. • ANSI Type II reflective safety vest worn at all times by personnel on foot. • Perform vehicle walk around prior to initial backing.	L
	Being struck by traffic between work zones because of inattention to pedestrian traffic rules	• ANSI Type II reflective safety vest worn at all times by personnel on foot. • Cross at designated crosswalks where provided on signal prompt. Do not "jaywalk." • Make eye contact with equipment operators in work zone • Avoid equipment mirror blind spots.	L
	Working in areas where noise levels exceed 85 dBA without hearing protection properly worn	• Wear hearing protection when noise levels exceed 85 decibels. • The minimum NRR for hearing protection used on this project is 32. Hearing protection with an NRR of 32 should be adequate for noise levels up to 105 dBA using a buffer factor of 5 dBA. If noise levels consistently exceed 105 dBA, double hearing protection will be required.	L
	Carrying loads or objects that are heavy, bulky, hard to carry Using improper lifting technique Lifting objects that are more than 50 pounds alone	• SES or subcontract personnel must notify supervisors or safety representatives of pre-existing medical conditions that may be aggravated or re-injured by lifting activities. • Lift objects using knees, not back. For repetitive lifting tasks, consider using lifting braces/ supports. If heavy equipment isn't available, get help to loads that weigh more than 50 pounds or awkward. Use heavy equipment to transfer heavy or awkward loads when possible. • Plan storage and staging to minimize lifting or carrying distances. Make sure the path of travel is clear before lifting. • Avoid carrying heavy objects above shoulder level	L
Mixing surfactant	Splashing surfactant onto skin or in eyes	• Discuss hazard communication requirements for the MSDS for the surfactant during the tailgate safety meeting; require workers to sign documentation stating they understand the hazards. • Wear ANSI-approved safety glasses, face shields, chemical-resistant clothing steel-toe shoes with PVC/ rubber covers, and PVC/ rubber gloves, full face	Modified D PPE M

Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Enhanced Fluid Recovery and Surfac® Injection			
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**RAC**
		respirator with P100/ organic vapor cartridges when action levels are exceeded during sampling or vacuum truck operation activities. • Wear gloves and long sleeves.	
Injecting surfactant	Operating injection array without prescribed PPE	• Mixing and injection equipment-specific training is required for all operators. • Spill containment measures and kit shall be readily available to contain spill and prevent chemical mixing and/ or migration off site. • Plan and prepare work area prior to transferring chemicals to minimize the potential for slip, trip, and fall during transfer.	Modified D PPE M
	Failure of pressurized injection system component	• Verify the competency and integrity of the injection hose. • Verify the cam-lock fitting on the injection hose and well head are structurally sound and free of defects. • When injecting under pressure, personnel must stand more than 20 feet from the injection well head. • Remove all unnecessary equipment and material in the area. • All hoses at each connection will be secured with either hose whip checks or hose grips.	M
	Hose/ piping rupture	• Inspect and leak test equipment prior to initiating injection. • Materials shall be readily available to contain spills and prevent chemical mixing and/ or migration off site. • Ample water shall be readily available to contain spill and prevent chemical mixing and/ or migration off site.	L
Ladder and platform usage	Slip and/or fall from a ladder because of improper use, environmental conditions, or lack of training	• Use the three-point guideline (three points must always be connected to the ladder). • Grip both rails securely. • Always face the ladder. • Check that boots are not greasy, muddy, or slippery. • Never carry tools or material in hand. • Never stand on platform or on top of tank. • Do not lean over the side of the rail. The belt buckle should not be further than the side of the rail. • Never allow more than one person on the ladder or platform.	L
Site shutdown	Striking a person or	• Hold a five-minute safety refresher to discuss proper procedure for site shutdown,	L

Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia ACTIVITY HAZARD ANALYSIS – Enhanced Fluid Recovery and Surfac® Injection			
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**RAC**
	an object when backing because of visual obstruction or operator error	outline responsibilities, and address any changes in site conditions. • Completely shut down and stow equipment inside work zone before removing traffic/ pedestrian control devices. • Watch for cross traffic while shutting down control zones.	
	Improper lifting technique, lifting an object that exceeds 50 lbs without employing mechanical means Hand injuries from sharp or jagged edges Foot injuries from dropping materials on feet	• Lift with legs; do not bend or twist while lifting or carrying. Keep load close to body. • Wear sturdy leather safety-toe boots. • Wear leather work gloves for manual material handling activities. • Get assistance for awkward size loads or loads more than 50 lbs. • Use mechanical lifting devices when available.	L

Task Name: Enhanced Fluid Recovery and Surfac® Injection

Project Name and Location: Heating Oil Spill Site Investigation Building 419 Fort Stewart, Georgia

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Supervisor's Name:			Date/Time:
Safety Officer Name:			Date/Time:
Site Personnel:			Date/Time:
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Attachment 8

Site-Specific Safety and Health Plan

Final
Site-Specific Safety and Health Plan
for Heating Oil Spill Site Investigation
Building 419
Fort Stewart, Georgia

May 2013

Submitted to:
U.S. Army Corps of Engineers
Savannah District

Prepared by:
SpecPro Environmental Services LLC
1006 Floyd Culler Court
Oak Ridge, Tennessee 37830
under
Contract No. W912HN-10-D-0001
Delivery Order No. 0029

SIGNATURE PAGE

Site-Specific Safety and Health Plan
for Heating Oil Spill Site Investigation Building 419
Fort Stewart, Georgia

Contract No. W912HN-10-D-0001
Delivery Order No. 0029

Prepared By:	Doug Hawn	05/20/13
	Doug Hawn, Project Manager (plan preparer)	Date
	SpecPro Environmental Services LLC	(865) 481-7837

Plan Approval:	Jim Madaj	5-20-13
	Jim Madaj, Senior Program Manager (company officer)	Date
	SpecPro Environmental Services LLC	(865) 481-7837

Plan Concurrence:	Richard Rathnow CIH, CSP	5-20-2013
	Richard Rathnow, CIH, CSP	Date
	Safety and Health Manager, CIH, CSP	
	SpecPro Environmental Services LLC	(865) 481-7837 ext. 305

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Acronyms and Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
AHA	activity hazard analysis
ANSI	American National Standards Institute
APP	accident prevention plan
APR	air-purifying respirator
Ca	confirmed human carcinogen
CF	calibration factor
CFR	*Code of Federal Regulations*
CIH	Certified Industrial Hygienist
CPR	cardiopulmonary resuscitation
CRZ	contamination reduction zone
CSP	Certified Safety Professional
dBA	A-weighted decibels
DRO	diesel range organic
eV	electron volt
ES&H	environmental safety and health
EZ	exclusion zone
HAZWOPER	hazardous waste operations and emergency response
HTRW	hazardous, toxic, and radioactive waste
IDLH	immediately dangerous to life or health
ISEA	International Safety Equipment Association
lpm	liters per minute
m^3	cubic meters
mg	milligrams
MEC	munitions of explosive concern
MSDS	material safety data sheet
MTBE	methyl tert-butyl ether
NA	not applicable
ND	not determined
NL	not listed
NRR	noise reduction rating
OSHA	Occupational Safety and Health Administration
OVM	organic vapor monitor
PAH	polynuclear aromatic hydrocarbon
PID	photoionization detector
PIP	photoionization potential
PPE	personal protective equipment
ppm	parts per million
REL	recommended exposure level
RF	response factor
S&H	safety and health
SCBA	self-contained breathing apparatus
SES	SpecPro Environmental Services LLC
SES S&H Manual	*SpecPro Environmental Services LLC Safety and Health Program Manual*
SSHO	site safety and health officer
SSHP	site-specific safety and health plan
STEL	short-term exposure limit
SZ	support zone
TLV	threshold limit value

UK	unknown
USACE	U.S. Army Corps of Engineers
UXO	unexploded ordnance

1. INTRODUCTION

1.1 GENERAL

SpecPro Environmental Services LLC (SES) conducts activities in accordance with its corporate Environmental Safety and Health (ES&H) Program, which is intended to ensure safe operation and regulatory compliance during all fieldwork. SES is committed to compliant operation under provisions of this program. The corporate policy states, "It is the policy of SES to take every reasonable precaution to protect the health and safety of our employees, the public, and the environment."

The SES Safety and Health (S&H) Program, which is contained in *SpecPro Environmental Services LLC Safety and Health Program Manual* (SES, June 2009), hereinafter referred to as the SES S&H Manual, and site-specific safety and health plans (SSHPs) present the requirements for safely performing fieldwork. This SSHP sets forth the basic procedures required to protect SES and subcontractor personnel involved in the fieldwork phase of the Heating Oil Spill Site Investigation Building 419, Fort Stewart, Georgia, project.

This plan represents a good-faith effort to identify, evaluate, and prescribe controls for the hazards that will be posed by this work. The site safety and health officer (SSHO) will perform daily safety inspections to verify that the controls in this plan are appropriate and sufficient and will revise these controls as necessary to ensure that the work is performed safely. Revisions to the SSHP will be documented, and the SES safety and health manager will approve those revisions that result in decreasing or eliminating a hazard control before they are implemented. SES subcontractors will be informed of the requirements of this plan and will be provided with copies of, or unrestricted access to, copies of this plan. SES subcontractors will be required to comply with the requirements of this plan. This plan does not relieve subcontractors of the regulatory requirement to provide a safe workplace, and SES subcontractors will be required to supplement the requirements of this plan, as necessary, to ensure that their employees perform their specific tasks safely.

This document is designed to satisfy the requirements of ER 385-1-92, *Safety and Occupational Health Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities* [U.S. Army Corps of Engineers (USACE), May 2007]; the requirements of EM-385-1-1, *Safety and Health Requirements Manual* [USACE, September 2008 (updated July 2012)]; relevant Occupational Safety and Health Administration (OSHA) regulations; and the SES S&H Manual.

This SSHP is included as an attachment to the project accident prevention plan (APP). In cases in which required information is contained in the work plan or in another portion of the APP, the information will be referenced rather than repeated in this SSHP; however, some repetition is unavoidable.

Under this scope of work, SES and its subcontractors will

- Install soil borings and monitor wells,
- Collect soil samples from the borings,
- Collect groundwater samples,
- Conduct free product removal, and
- Properly store and dispose of the investigative-derived waste (IDW)

This project will be performed in Level D modified personal protective equipment (PPE) unless one of several action levels specified in this plan is exceeded or the potential for increased risk becomes apparent during field activities. The SSHO will upgrade protective procedures, including protective clothing, as necessary based on established action levels or judgment.

Site visitors will not be allowed inside areas controlled by SES without the specific approval of the SSHO and the SES field manager. Site visitors must meet all regulatory and site health and safety requirements (such as training and medical surveillance) to be considered for entry into exclusion or contamination-reduction zones. Site visitors are requested to contact the SES project manager or field manager before visiting.

1.2 SITE BACKGROUND

Fort Stewart is in portions of Long, Evans, Tattnall, Bryan, and Liberty counties, Georgia, approximately 40 miles southwest of Savannah, Georgia. The nearest city is Hinesville, approximately 1½ miles to the south. Building 419 is near the intersection of Hero Road and Steele Avenue and is in the PX complex (Figure 2-1 of the APP). According to the fuel delivery inventory, 4,500 gallons of heating oil were released into the ground behind Building 419 and Steele Avenue on the west side of the loading dock. Heating oil (known in the United States as No. 2 heating oil) is similar to diesel fuel, and both are classified as distillates. For this investigation and cleanup, the heating oil will be categorized as a diesel range organic (DRO) and personal protection measures will be designed accordingly. Soil samples will be analyzed for benzene, toluene, ethylbenzene, and xylenes; DRO; and polynuclear aromatic hydrocarbons (PAHs).

2. HAZARD/RISK ANALYSIS

The site task hazard analysis identifies and assesses potential hazards that site personnel could encounter; the analysis also prescribes required controls. In general, the site tasks will consist of activities required to install monitor wells and collect water and soil samples. Overexposure to site contaminants appears to be very unlikely.

Site tasks present some possible physical hazards, including operating heavy equipment, drill rigs, site vehicles, hand and power tool accidents, and inclement weather. Exposure to heating oil during drilling, sampling, and other related activities is a possible hazard as well. Exposure to temperature extremes may be a concern and will be considered for the purpose of this plan. No record or other indication exists of unexploded ordnance (UXO) use or disposal in this area, so there does not appear to be any potential to encounter UXO. However, precautionary measures will be communicated to site workers relating to any potential for such items. If additional tasks or significant hazards are encountered during the work, work will stop and this document will be modified by addendum or field change order to include the additional information. Any changes to the SSHP will be submitted to the SES safety and health manager for approval before they are implemented.

2.1 POTENTIAL EXPOSURES

Information on the significant suspected contaminants and chemicals that will be used for the project is contained in Table 2-1. Note that this list does not include all the contaminants that have been detected. Only those contaminants with relatively low exposure limits that are present in relatively high concentrations have been listed in Table 2-1. If additional contaminants or chemicals that pose new or significantly greater hazards are identified before or during site activities, additional hazards analyses will be provided as an addendum to this document.

Table 2-1 Potential Exposures

Constituents	Maximum Concentration	Exposure TLV	IDLH ppm	Symptoms and Effects of Exposure	PIP (eV)
Benzene	UK	0.5 ppm STEL = 2.5 ppm	500 Ca	Eye, nose, skin, and respiratory irritation; headache; nausea; dermatitis; fatigue; giddiness; staggered gait; bone marrow depression	9.24
Diesel Range Organics	UK	100 mg/m^3 (REL)	NL	Primary system effect is CHS depression. Inhalation of vapors may cause nausea, confusion, drowsiness, convulsions, and coma. Liquid may cause skin and eye irritation.	UK
Ethylbenzene	UK	20 ppm	800	Eye, skin, and mucous membrane irritation; headache; dermatitis; narcotic; coma	8.76
Heating Oil (No. 2 heating oil, diesel fuel)	UK	200 mg/m^3	ND	Irritation to eyes, skin, nose throat; burning sensation in chest, head; nausea, lassitude, restlessness, incontinence, confusion, drowsiness; vomiting, diarrhea, dermatitis,; chemical pneumonia	UK
PAHs	UK	0.2 mg/m^3	80 Ca	Dermatitis and bronchitis	NA

Table 2-1 Potential Exposures (continued)

Constituents	Maximum Concentration	Exposure (TLV)	IDLH ppm	Symptoms and Effects of Exposure	PIP (eV)
Toluene	UK	20 ppm	500	Eye and nose irritation, fatigue, weakness, confusion, dizziness, headache, dilated pupils, excessive tearing, nervousness, muscle fatigue, paresthesia, dermatitis, liver and kidney damage	8.82
Xylenes	UK	100 ppm	900	Irritated eyes, skin, nose, and throat; dizziness; excitement; drowsiness; incoherence; staggering gait; corneal vacuolization; anorexia; nausea; vomiting; abdominal pain; dermatitis	8.56

Ca =confirmed human carcinogen
eV = electron volt
IDLH = immediately dangerous to life and health (units are the same as specified "Exposure Limit" units for that contaminant);
m^3= cubic meter
mg = milligrams
NA = not applicable
ND = not determined
NL = not listed
PAH = polynuclear aromatic hydrocarbon
PIP = photoionization potential
ppm = parts per million
REL =recommended exposure level
STEL = short-term exposure limit
TLV = Denotes ACGIH Threshold Limit Value unless otherwise identified.
UK = unknown

3. STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

In accordance with the OSHA General Duty Clause, SES is committed to providing each employee with a place of employment free from recognized hazards that cause or are likely to cause death or serious physical harm. SES will make every good faith effort to comply with EM 385-1-1, *Safety and Health Requirements Manual*; OSHA regulations; and referenced standards. In turn each employee is expected to and shall be required to comply with SES rules as well as occupational safety and health standards based on the OSHA regulations.

SES has established the policies and procedures set forth in its program to

- Provide a safe and healthful work environment for all SES employees and subcontractors;
- Prevent or minimize occupational injuries and illnesses;
- Eliminate damage to equipment and property; and
- Comply with all applicable Federal, state, local, and consensus safety and health standards.

SES's General Safety Program provides steps to protect the safety and health of our employees. This program is intended to provide safety-related tools and guidance for all employees as well as provide essential elements of regulatory and internal requirements.

This program includes general safety procedures and requirements as well as specific written programs to address actual or potential workplace hazards. It may be necessary during certain circumstances to consult appropriate OSHA regulations for more specific information.

The corporate S&H Manual is one tool necessary to achieve SES's health and safety program objectives. The manual, however, cannot ensure a safe and healthy work environment by itself. *The responsibility of conducting work in a manner that ensures our well-being and that of co-workers, clients, and the general public rests with management at all levels as well as each individual employee. Managers and site supervisory personnel will be held accountable for the successful implementation of program and project safety and health requirements and results for projects under their direction. Project management and supervision personnel's annual review includes an evaluation of their administration, implementation, and compliance with the corporate safety and health program. This evaluation and their dedication to the advancement of the safety culture are factored into any annual merit increase they receive.*

This section presents the lines of authority, responsibilities, and communication procedures related to site safety and health and emergency response. It includes key SES and subcontractor personnel. All fieldwork will be under the supervision of the SES field manager. The SES field manager will oversee normal and emergency work and will perform any required emergency notification. Table 3-1 identifies the individuals who will fill key roles for the project field activities.

The key personnel assigned to the field activity positions presented in Table 3-1 represent those individuals who are expected to participate in the project. Personnel availability, however, will dictate the actual roster of individuals who will perform field activities. If personnel other than those presented in Table 3-1 are assigned to the project, SES will provide the names of those individuals to the USACE Savannah District project manager before mobilizing for fieldwork. The USACE project manager is Ana Vergara, contracting officer's representative (COR) and project manager, (912) 652-5835. The technical manager is Zsolt Haverland, (912) 652-5815.

Table 3-1 Staff Organization

Position	Name	Telephone
Senior Program Manager	Jim Madaj	(865) 481-7837
Safety and Health Manager	Rich Rathnow, CIH, CSP	(865) 481-7837
Project Manager	Doug Hawn	(865) 481-7837
Field Manager	Chris Napoleon	(865) 360-9910
SSHO	Chris Napoleon	(865) 360-9910
Alternate SSHO	LeAnn McNeal	(912) 660-4782

CIH = Certified Industrial Hygienist
CSP = Certified Safety Professional
SSHO = site safety and health officer

No work shall be performed unless a designated competent person is present on the job site.

3.1 SES Senior Program Manager

SES Senior Program Manager Jim Madaj is the primary interface with the client and has ultimate responsibility for the project. The senior program manager provides progress reports and addresses client questions and concerns. In addition, he is responsible for ensuring conformance with the SES S&H program and USACE policies and procedures. Specific responsibilities of the senior program manager include the following:

- Coordinating with USACE personnel,
- Ensuring that project managers satisfy SES and USACE health and safety requirements,
- Ensuring that project staff implement project APPs, and
- Ensuring that projects have the resources necessary to operate safely.

3.2 SES Safety and Health Manager

SES Safety and Health Manager Rich Rathnow, CIH, CSP, oversees the SES S&H program. This includes establishing health and safety policies and procedures, supporting project and office activities, and verifying safe work practices and conditions. The SES safety and health manager is certified in the comprehensive practice of industrial hygiene by the American Board of Industrial Hygiene and has more than 20 years of hazardous waste experience. The specific responsibilities of the safety and health manager include the following:

- Coordinating with USACE health and safety personnel,
- Reviewing and approving APPs,
- Approving downgrades in PPE or protective procedures, and
- Collaborating with project personnel through routine communication and audit of selected projects.

3.3 SES Project Manager

The SES project manager is responsible for overall project execution. The responsibilities of the project manager include the following:

- Coordinating with USACE personnel (including reporting accidents and incidents to the USACE Savannah District project manager immediately and submitting written reports within five working days),
- Ensuring implementation of the project APP,
- Maintaining auditable project documentation of all required records,
- Ensuring that a qualified SSHO is designated, and
- Maintaining a current copy of the project APP.

3.4 SES Field Manager

The SES field manager is in charge of all SES and subcontractor field activities associated with this project. All SES and subcontractor personnel performing fieldwork on this project must report to the field manager.

The SES field manager is responsible for site accessibility, safety, and quality assurance. The field manager is responsible for enforcing the field requirements of this APP. Specific responsibilities of the field manager are

- Enforcing compliance with the project APP;
- Coordinating on-site operations, including subcontractor activities;

- Ensuring that subcontractors follow the requirements of this APP;
- Coordinating and controlling any emergency response actions;
- Ensuring that at least two people currently certified in first aid/ cardiopulmonary resuscitation (CPR) are on site during site operations;
- Performing a daily safety inspection and documenting the inspection on the daily safety inspection form (or ensuring that this inspection is performed), and
- Maintaining current copies of the project APP; EM 385-1-1, *Safety and Health Requirements Manual* [USACE, September 2008 (updated July 2012)]; and the SES S&H Manual (SES, June 2009) on site.

3.5 SITE SAFETY AND HEALTH OFFICER

SES SSHO Chris Napoleon will serve as the appointed competent person as required by EM 385-1-1, September 2008 (updated July 2012), Section 01.A.17. The SSHO will be on site during all fieldwork activities. The SSHO is responsible for making safety and health decisions, for specific safety and health activities, and for verifying the effectiveness of the S&H program. The SSHO's qualifications include at a minimum, completion of the OSHA 30 Hour Construction Safety course, five years of experience with similar projects, knowledge and understanding of the project APP, 24 hours of ongoing continued education every four years, and the ability to use required monitoring equipment. The SSHO has primary responsibility for the following:

- Implementing and verifying compliance with this APP and reporting to the project manager and safety and health manager any deviations from anticipated conditions;
- Conducting and documenting daily safety inspections;
- Stopping work or upgrading protective measures (including protective clothing) with the approval of the safety and health manager if uncontrolled safety and health hazards are encountered (Indications of uncontrolled safety and health hazards include monitoring instrument readings higher than established action limits, encountering liquids other than water, and soil staining suggestive of unexpectedly high concentrations of nonvolatile contaminants.);
- Authorizing resumption of work after adverse conditions have been corrected;
- Completing the safety and health debriefing based on SES S&H Manual Section 8.0, "Tool Box Safety Meetings";
- Documenting deficiencies listed in the daily inspections and identifying responsible parties, procedures, and timetables for correction;
- Ensuring that site personnel have access to this plan and are aware of its provisions;
- Conducting a site-specific pre-entry safety and health briefing covering potential chemical and physical hazards, safe work practices, and emergency procedures;
- Maintaining on-site auditable documentation of
    - Material safety data sheets (MSDSs) for applicable materials used at the site;
    - Training for site workers and visitors;
    - Calibration/ maintenance of field instruments, such as photoionization detectors, flame ionization detectors, or combustible gas indicators;
    - Environmental and personal exposure monitoring results as applicable; and
    - Notification of accidents/incidents.
- Confirming that all on-site personnel have received the training listed in Section 4 of this SSHP; and
- Issuing respirators as necessary and ensuring that all respirator users have received medical clearance.

3.6 SUBCONTRACTOR FIELD MANAGERS

The subcontractor field manager will oversee the field activities of the subcontractor employees. He/she is responsible for enforcing the field requirements of this APP and has the following responsibilities:

- Ensuring that subcontract personnel follow the requirements of the APP and any other applicable safety and health requirements,
- Verifying that this APP adequately addresses the hazards and controls of the subcontracted work,
- Ensuring the safe operation of subcontractor equipment,
- Coordinating the on-site operations of subcontract personnel, and
- Maintaining any required documentation specific to subcontract operations.

4. TRAINING

Personnel who participate in field activities associated with this project or who enter areas controlled by SES are subject to the training requirements in Table 4-1. Field activities include all tasks specified in Section 1 of this plan as well as any unspecified tasks that take place within the work area. Activities such as driving or walking on paved roads, performing paperwork or attending meetings inside routinely occupied buildings, and performing paperwork or similar activities inside office trailers are not subject to these training requirements. Casual visitors who access only the office or staging areas of the support zone are not subject to these training requirements.

Table 4-1 Training Requirements

Training	Worker[a]	Worker[b]	SSHO	Site Visitor[c]
40-Hour HAZWOPER	N	Y	Y	N
HAZWOPER Annual Refresher (8 hours)	N	Y	Y	N
HAZWOPER Supervisor (8 hours)	N	N	Y	N
30 Hour OSHA Construction Safety	N	N	Y	N
Hazard Communication	N	Y	Y	N
Hearing Conservation	N/Y	Y	Y	N
Respiratory Protection	N	2 workers	Y	N
Pre-Entry Briefing	Y	Y	Y	Y
Safety Briefing	Y	Y	Y	N
PPE	N	Y	Y	N
First Aid/CPR	2 workers	2 workers	Y	N
Bloodborne Pathogens	2 workers	2 workers	Y	N

Note: For the purposes of this table, the SSHO is considered a site worker.
[a]Workers performing nonintrusive tasks under conditions that present no possibility of exposure to hazardous waste or chemicals. This includes surveyors and USACE personnel who enter the site after closure. If workers are exposed to noise levels above 85 dBA, they must be enrolled in a hearing conservation program.
[b]Workers performing tasks inside SES-controlled areas under conditions that pose a potential risk of exposure to hazardous waste or chemicals. This includes all SES personnel and subcontractors performing work as part of the project, vendors, and similar personnel.
[c]Vendors and similar personnel

CPR = cardiopulmonary resuscitation
HAZWOPER = hazardous waste operations and emergency response
OSHA = Occupational Safety and Health Administration
PPE = personal protective equipment
SSHO = site safety and health officer

The following sections briefly summarize the training requirements. These summaries include a course description and guidance on who should take each course.

4.1 OFF-SITE TRAINING

The 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) course is required for general site workers engaged in HTRW activities that expose or potentially expose them to hazardous substances. Three days of relevant field experience are required in conjunction with this training.

The eight-hour HAZWOPER refresher is required annually to maintain currency in the above course.

HAZWOPER supervisor training is required for personnel who directly supervise hazardous waste site workers. This is an eight-hour course that must be taken once. The 40-hour course is a prerequisite for this training. As per 29 *Code of Federal Regulations* (CFR) 1910.120(e)(4), the HAZWOPER supervisor course covers the following topics:

- Site Safety and Health Officer Responsibilities,
- Site Safety and Health Plan Elements and Implementation;
- Direct Reading Instruments, Their Operation, Use, and Limitations;
- Equipment Calibration;
- Personal Protective Equipment Uses and Limitations and Respirator Selection;
- Safety Briefings and Effective Site Safety Communications; and
- Site Safety and Health Plan Management.

Hazard communication is required for all site workers. This training is designed to inform personnel of the characteristics of chemicals with which they will be working, the hazards presented by those chemicals, and methods of protection from exposure to the chemicals. This generalized training is supplemented by training on site-specific chemicals.

Hearing conservation is required annually for all employees enrolled in a hearing conservation program as mandated by 29 CFR 1910.95. This includes all employees exposed to occupational noise in excess of 85 dBA as a time-weighted average.

Respiratory protection training is required for all workers who wear respirators. This training requirement is met initially by taking the 40-hour HAZWOPER course. Subsequently the training is refreshed annually in the employee's 8 hour HAZWOPER refresher course.

4.1.1 OSHA 30 Hour Construction Safety Training

30 Hour OSHA Construction Safety Training is required by EM 385-1-1 [September 2008 (updated July 2012)] for an individual to serve as the site construction safety competent person and as the SSHO. The training requires the following content:

- Occupational Safety and Health Act/General Duty Clause;
- 29 CFR 1904, "Record Keeping";
- Subpart C: "General Safety and Health Provisions, Competent Person";
- Subpart D: "Occupational Health and Environmental Controls, Citations and Safety Programs";
- Subpart E: "PPE, Types and Requirements for Use";
- Subpart F: "Understanding Fire Protection in the Workplace";
- Subpart K: "Electrical";
- Subpart M: "Fall Protection"; and

- Rigging, welding and cutting, scaffolding, excavations, concrete and masonry, demolition, health hazards in construction, materials handling, storage and disposal, hand and power tools, motor vehicles, mechanized equipment, marine operations, steel erection, stairways and ladders, confined spaces, or any others that are applicable to the work being performed.

4.2 SITE-SPECIFIC TRAINING

On-site personnel must receive site-specific training. Site workers will receive information on site hazards, hazard controls, and emergency procedures. Visitors will receive information relevant to the purpose of their visit. Signatures of those attending and the type of briefing must be entered into the field logbook before site access will be granted. Site-specific training will include the following information, as appropriate:

- Names of health and safety personnel,
- Contents of the project APP,
- Hazards and symptoms of chemical exposure,
- Physical hazards on the site,
- Location and availability of the Hazard Communication Program documents,
- Site- and task-specific PPE,
- Site-specific respirator training,
- Safe work practices,
- Safe use of engineering controls and equipment,
- Medical surveillance requirements,
- Site control measures,
- Reporting requirements for spills and emergencies,
- Personnel decontamination procedures,
- Contingency plans, and
- Emergency equipment.

Pre-Task Safety Plan safety briefings will be held daily before the start of work activities and whenever conditions at the site change. The field manager or the SSHO will conduct these, and the briefings will be required for all site workers. These briefings will address site- and task-specific safety hazards and control measures and issues and will be used to refresh workers on specific procedures and controls.

4.3 DOCUMENTATION

Documentation of the required training will be maintained in the on-site project files. This documentation will include copies of personnel training certificates or other verifications, copies of the first aid/CPR and bloodborne pathogens certificates, and entries in the project logbook showing the topics covered and signatures of those attending on-site training. Copies of required training documentation for those individuals expected to perform fieldwork during this project are in Attachment 3 of the APP.

5. PERSONAL PROTECTIVE EQUIPMENT

5.1 PPE PROGRAM

SES's PPE program is detailed in SES S&H Manual Section 15.0, "Personal Protective Equipment Program." This program meets the requirements of 29 CFR 1910, Subpart I, and EM 385-1-1 Section 5. The level and type of PPE selected for particular tasks are based on the following:

- Potential for exposure: The potential for exposure to contaminants of concern for this project is anticipated to be minimal because of the historical contaminant levels, media type, and hazard control measures to be used, including engineering PPE.
- Route of exposure: The routes of exposure for this project would traditionally be from highest to lowest – primarily inhalation, secondarily skin absorption, and remotely ingestion or injection.
- Measured or anticipated concentration of contaminant can be based on several factors, including source concentration, the physical state of the contaminant, weather conditions, the phase of work being conducted, and more. For this project direct reading instruments will be used to monitor employees' breathing zones for any potential airborne contaminant levels, which are expected to be negligible or undetectable.
- Toxicity, reactivity, or other measure of adverse effects: Toxicity is anticipated to not be a concern for this project because of the negligible exposure potential. Contaminants of concern for this project are anticipated to be nonreactive overall.
- Physical hazards: Exposure to physical hazards for this project (for which PPE is required) include the potential for foot and toe injuries, hand injuries, eye injuries, and head injuries.

In situations where the type of chemical and/or concentration is not known, the appropriate protection is selected based on the judgment of the SES safety and health manager until hazards can be evaluated further.

Employees must wear PPE when actual or potential hazards exist and engineering controls or administrative practices cannot adequately control those hazards.

The safety and health manager has conducted a PPE assessment based on project tasks (see PPE specifications below). Verification and certification of assigned PPE by task is completed by the safety and health manager who approved this plan. Below are items that need to be followed when using any form of PPE:

- Employees must be trained to properly wear and maintain the PPE.
- In work areas where actual or potential hazards are present at any time, PPE must be worn by employees working or walking through the area.
- Areas requiring PPE should be posted or employees must be informed of the requirements in an equivalent manner.
- PPE must be inspected prior to use and after any occurrence to identify any deterioration or damage.
- PPE must be maintained in a clean and reliable condition.
- Damaged PPE shall not be used and must either be repaired or discarded.
- PPE shall not be modified, tampered with, or repaired beyond routine maintenance.

Table 5-1 outlines PPE to be used according to task based on project-specific hazard assessment. If a task other than the tasks described in this table needs to be performed, contact the safety and health manager so this table can be updated.

PPE requirements for this site are based on the site-specific physical and chemical hazards. In cases in which multiple hazards exist, a combination of protective equipment will be selected to provide adequate protection from each hazard. Task specifics are addressed in the activity hazard analysis (AHAs) in Attachment 7 of the APP.

Table 5-1 Personal Protective Equipment

Task	Level	Body	Head	Respirator
Mobilization Demobilization	D	Work clothes; safety-toe leather work boots and gloves	Hard hat Safety glasses with side shields Hearing protection	None required
Sampling activities with no potential for gross contamination with chemical constituents.	Modified D	Work clothes or cotton coveralls **Boots:** Safety-toe, chemical-resistant boots OR safety-toe, leather work boots with outer rubber boot covers **Gloves:** Inner surgical-style Nitrile and outer chemical-resistant Nitrile gloves.	Hard hat Safety glasses with side shields Hearing protection	None required
Sampling activities with potential for gross exposure to chemical constituents Geoprobe and drilling operations	Modified D	**Coveralls:** Uncoated Tyvek® **Boots:** Safety -toe, chemical-resistant boots OR Safety -toe, leather work boots with outer rubber boot covers **Gloves:** Inner surgical-style Nitrile and outer chemical-resistant Nitrile gloves.	Hard hat Splash shield Safety glasses with side shields Hearing protection	None required
Work near vehicular traffic ways or earth moving equipment.	All	ANSI Type II high-visibility safety vests.	Work near vehicular traffic ways or earth moving equipment.	
Equipment decontamination if using pressure washer	Modified D with splash protection	**Coveralls:** Polycoated Tyvek® **Boots:** 16-inch-high steel-toed rubber boots **Gloves:** Inner surgical-style Nitrile and outer chemical-resistant Nitrile gloves.	Hard hat Splash shield over safety glasses with side shields or splash goggles Hearing protection	None required

Table 5-1 Personal Protective Equipment (continued)

Task	Level	Body	Head	Respirator
Well closure activities while handling open containers of grout and bentonite outdoors or while mixing grout and bentonite outdoors using water spray for dust suppression	Modified D with NIOSH Approved P100 Rated Particulate Filtering Face piece Respirator	**Coveralls:** Uncoated Tyvek® **Boots:** Safety-toe, chemical-resistant boots OR safety-toe, leather work boots with outer rubber boot covers **Gloves:** Inner surgical-style Nitrile and outer chemical-resistant Nitrile gloves.	Hard hat Splash shield Safety glasses with side shields Hearing protection	NIOSH Approved P100 Rated Filter Respirator Full Face

ANSI = American National Standards Institute APR = air purifying respirator

5.2 TYPES OF EQUIPMENT

This section presents the types of protective clothing and equipment that may be used for this project. Levels of protection that will be used to protect workers against hazards anticipated at the site are contained in the following list.

With the approval of the safety and health manager, the SSHO may raise or lower the level of PPE worn by workers, depending on the site-specific hazards encountered in the field. Before the level of PPE is lowered, the field manager and the safety and health manager will be contacted and consulted. If site conditions indicate that the level of PPE is not sufficient or work must be stopped, the SSHO will take appropriate action immediately to suspend operations and will contact the site manager and/or the safety and health manager afterward. Table 5-2 lists reasons for upgrading or downgrading PPE with the approval of the safety and health manager.

Table 5-2 Reasons for Upgrading or Downgrading PPE with Approval of Safety and Health Manager

Upgrade	Downgrade
• Request from individual performing tasks. • Change in work tasks that will increase contact or potential contact with hazardous materials. • Occurrence or likely occurrence of gas or vapor emission. • Known or suspected presence of dermal hazards. • Instrument action levels in the Site Monitoring Section exceeded.	• New information indicating that situation is less hazardous than originally thought. • Change in site conditions that decrease the hazard. • Change in work task that will reduce contact with hazardous materials.

Note:
Performing a task that requires an upgrade to a higher level of protection (e.g., Level D to Level C) is permitted only when the PPE requirements have been approved by the safety and health manager, and an SSHO qualified at that level is present.

5.3 CLEANING AND STORAGE

If site tasks require the use of chemical protective clothing, contamination from reusable articles (typically outer rubber boots, hard hats, earmuffs, safety goggles, and glasses) will be removed by scrubbing, washing, and disinfecting before they are reused. Disposable equipment (typically Tyvek and

gloves) will be discarded in sealed containers and handled as contaminated waste. Unused chemical protective clothing will be stored in clean staging areas until needed. Specific decontamination procedures for PPE are detailed in Sections 11 and 13 of this SSHP.

5.4 RESPIRATORY PROTECTION

- The need for respiratory protection is limited for this project. Two individuals who are qualified to wear respiratory protection will be on site with respirators available for use in an emergency only. Respirator users must have completed appropriate respirator training within the past 12 months. Respirator users must complete the respirator medical monitoring protocol and be approved for the specific type of respirator used.
- Respirator use shall be limited to emergency use only for this project. If site conditions change warranting the use of specified respiratory protection, the safety and health manager shall be notified to amend the written plan and submit the amended plan to the GDA for review.

6. MEDICAL SURVEILLANCE

All employees performing on-site hazardous waste activities will be enrolled in a medical surveillance program in accordance with 29 CFR 1910.120(f) and 1910.134. The purpose of the medical surveillance program is to monitor and assess the workers' health and fitness. Copies of required medical clearances and current fit tests for those employees expected to perform fieldwork during this project are in Attachment 3 of the APP. Employees are provided with summaries of the medical examination results following each exam.

The frequency of employee medical exams shall occur as follows:

- Before assignment,
- Annually for every covered employee,
- At termination of employment or reassignment, and
- As soon as possible after the employee reports he/ she has developed signs or symptoms of exposure to a hazardous substance.

7. EXPOSURE MONITORING

Airborne chemical concentrations will be assessed during the course of the project to ensure that exposures do not exceed acceptable levels. It is not anticipated that site workers will be exposed to contaminants above established action levels. Table 7-1 outlines the SES exposure monitoring approach to be implemented for this project. Dust suppression and control measures will be used in potentially contaminated areas to reduce the risk of generating dust levels that might be of concern.

Table 7-2 presents calibration specifications. Refer to the respective manufacturer's instructions for proper instrument maintenance procedures.)

Calibrate air monitoring equipment daily (or before use) in accordance with the instrument's instructions. Document the calibration in the field logbook (or equivalent) and include the following information:

- Instrument name;
- Serial number;
- Owner of instrument (for example, SES);
- Calibration gas (including type and lot number);
- Type of regulator (for example, 1.5 lpm);

- Type of tubing (for example, direct or T-tubing);
- Ambient weather condition (for example, temperature and wind direction);
- Calibration/instrument readings;
- Operator's name and signature; and
- Date and time.

7.1 AIR MONITORING

Dust suppression and control measures will be used as mentioned above to avoid exposure to the constituents of concern. Integrated personal air sampling is not anticipated for this project scope.

Table 7-1 Direct Reading Monitoring Specifications

Instrument	Tasks	Action Levels[a]	Action to Be Taken when Action Level Reached	Frequency[b]	Calibration
PID: OVM with 10.2 eV lamp or equivalent	All soil intrusive and contaminated soil and groundwater handling and exposure activities	Up to 1 ppm 1-2.5 ppm 2.5 -10 ppm > 10 ppm	Level D Level D; collect benzene tube; benzene action level not exceeded Level D: collect benzene tube; benzene action level not exceeded Stop work and Contact CIH	Initially and periodically during task	Daily
Dust Monitor Visual Assessment	All activities	No Visible Dust Visible Dust	Level D Use dust suppression methods to control visible dust-if dust originating from offsite source stop work to determine path forward.	Initially and periodically during tasks	Not Applicable
Detector Tube: Draeger benzene specific 0.5/c (0.5 to 10 ppm range) with pre-tube, or equivalent	All Soil Intrusive Activities	<0.5 ppm 0.5-1 ppm >1 ppm	Level D Level C Level B – Stop work contact CIH	Initially and periodically when PID >1 ppm	Not applicable

Table 7-1 Direct Reading Monitoring Specifications

Instrument	Tasks	Action Levels[a]	Action to Be Taken when Action Level Reached	Frequency[b]	Calibration
Noise-Level Monitor [c]:	As necessary per the SSHO	<85 dB(A)	No action required Hearing protection required	Initially and periodically during task	Daily
		85-105 dB(A)	Stop; re-evaluate periodically		
		>105 dB(A)	Wear double hearing protection		

[a] Action levels apply to sustained breathing-zone measurements above background.

[b] The exact frequency of monitoring depends on field conditions and is to be determined by the SSHO; generally, every 5 to 15 minutes if acceptable; more frequently may be appropriate.

dB(A) = A-weighted decibels
eV =electron volt
PID = photoionization detector
SSHO = site safety and health officer
CIH = Certified Industrial Hygienist
OVM =organic vapor monitor
ppm = parts per million

Table 7-2 Calibration Specifications

Instrument	Gas	Span	Reading	Method
PID: OVM, 10.2 or 11.8 eV bulb	100 ppm isobutylene	RF = 1.0	100 ppm	1.5 lpm reg T-tubing
PID: MiniRAE, 10.2 eV bulb	100 ppm isobutylene	CF = 100	100 ppm	1.5 lpm reg T-tubing
PID: TVA 1000	100 ppm isobutylene	CF = 1.0	100 ppm	1.5 lpm reg T-tubing

CF = calibration factor
lpm = liters per minute
PID = photoionization detector
eV =electron volt
OVM = organic vapor monitor
RF = response factor

7.2 NOISE MONITORING

Hearing protection with a noise reduction rating (NRR) sufficient to reduce worker exposure below 85 dBA will be used. The minimum NRR for hearing protection on this project will be 32, which will be adequate for noise levels up to 105 dBA using a buffer factor of 5 dBA. If noise levels are suspected of exceeding 105 dBA, double-layer hearing protection will be required.

When double hearing protection is required (noise greater than 105 dBA), affected employees will switch from ANSI Z87.1-2010 standard safety glasses with side shields to safety goggles that meet the requirements of ANSI Z87.1-2010, where the elastic strap can be worn over the exterior of the earmuff rather than the stem of the safety glasses breaking the seal of the earmuffs.

A sound level survey with a dosimeter will be performed for Geoprobe operation at startup. Sound levels will be identified at the source and then again at intervals of every 10 feet concentrically. Using the results of the sound level survey along with the premise that every doubling of distance from the noise source reduces noise 6 dB, a boundary barrier zone will be established identifying

1. The zone where noise levels exceed 105 dB and double hearing protection is mandatory.

2. The zone where noise levels exceed 85 dB but do not exceed 105 dB and single layer hearing protection with a minimum NRR of 32 is required.

When double hearing protection is required (noise greater than 105 dBA), affected employees will switch from ANSI Z87.1-2010 standard safety glasses with side shields to safety goggles that meet the requirements of ANSI Z87.1-2010, where the elastic strap can be worn over the exterior of the earmuff rather than the stem of the safety glasses breaking the seal of the earmuffs.

Signs will be posted at these barrier zones alerting personnel and visitors/ the public to the hearing protection requirements. Personnel operating heavy equipment or other machinery will wear hearing protection.

8. INCLEMENT WEATHER AND HEAT/COLD STRESS MANAGEMENT

8.1 INCLEMENT WEATHER

Sudden inclement weather can rapidly encroach upon field personnel. Field crew members performing work outdoors should carry clothing appropriate for bad weather. In severe weather conditions (such as tornadoes, high wind, or electrical storms) the field crews should leave the area and find safe shelter until the weather abates and until a decision is made to resume the field activities. When there are warnings or indications of impending severe weather, the SSHO shall monitor the weather conditions using a weather station that is part of the National Oceanic and Atmospheric Administration weather radio all hazards network or similar notification system.

Severe weather triggers to alert the SSHO to monitor weather conditions are

- Storm on the horizon,
- Tornadoes,
- High winds,
- Driving rain,
- Lightning when thunder sounds within 30 seconds after the flash,
- Funnel clouds/tornadoes, or
- Communication from base authorities.

The site manager or SSHO shall monitor weather forecasts for predictions of storms in the area. At first sight of lightning, operations shall be stopped and only resumed when conditions permit. The site manager or SSHO shall monitor weather conditions to determine when it is appropriate to resume work. The lightning safety recommendation is 30-30: Seek refuge when thunder sounds within 30 seconds after a lightning flash, and do not resume activity until 30 minutes after the last thunder clap.

8.1.1 Training on Severe Weather Precautions and Actions

The SSHO will be knowledgeable about extreme weather conditions typically experienced in the region for the project. The SSHO will train site workers about what conditions to expect during the various seasons when work is being completed. This training will describe conditions that might occur, what can be expected, and the actions that personnel are to take in the event of each identified condition. Depending on the location of the current work site, the SSHO shall assess the nearest buildings for sheltering ability. This information shall be communicated during the project startup emergency training session and again daily at the Pre-Task Safety Plan sessions.

8.1.2 Identified Area of Retreat

The site evacuation assembly area and route are identified in Figure 9-1 of the APP. Field vehicles will be used as areas of retreat for the project. The SSHO will communicate this again at the start of the project. The SSHO shall assess nearby buildings for their sheltering capability in the event of tornadoes or similar storm situations. All workers will be made aware of actions to take during a weather emergency. These plans are further discussed in the Emergency Evacuation Section of the APP.

Some other general precautions in regard to areas of retreat include

- The inclination to see trees as enormous umbrellas is the most frequent and most deadly mistake. Do not go under a large tree that is standing alone. Likewise, avoid poles, antennae, and towers.
- Stay away from lakes, streams, pools, or any water.
- Stay away from railroad tracks, which can carry lightning charges for long distances.
- If the area is wide open, go to a valley or ravine, but be aware of flash flooding. Do not stand on top of a hill.
- If you are caught in a level open area during an electrical storm and you feel your hair stand on end, drop to your knees, bend forward, and put your hands on your knees or crouch. The idea is to make your body less vulnerable by being as low to the ground as possible and taking up as little ground space as possible. Lying down is dangerous because the wet earth can conduct electricity. Do not touch the ground with your hands.
- Do not use telephones during electrical storms except in an emergency.

8.2 HEAT/COLD STRESS MONITORING PLAN

8.2.1 Heat-Related Exposures

Heat-related illnesses are caused by more than just temperature and humidity factors. SES has implemented a heat-related exposure safety program that includes the exposure thresholds found in the American Conference of Governmental Industrial Hygienists' (ACGIH) "Threshold Limit Values and Biological Exposure Indices" as guidance as well as other references, including the U.S. Army (wind-chill index), and the National Safety Council.

In hot environments, the following guidelines will be followed to prevent heat-related injury.

- Drinking water shall be made available to employees and employees encouraged to frequently drink small amounts (one cup every 15-20 minutes; the water shall be kept cool).
- Tool box training in hot environments shall include training on the symptoms of heat-related problems, contributing factors to heat-related injuries, and prevention techniques.
- When possible, work should be scheduled for cooler periods during the day. SES employees shall be encouraged to take breaks in a cooler location and use cooling devices as necessary, such as cooling vests, to prevent heat-related injury. A buddy system shall be established to encourage fluid intake and watch for symptoms of heat-related injury.
- The SSHO shall monitor those individuals who have had a previous heat-related injury, are known to be on medication, or exhibit signs of possibly having consumed large amounts of alcohol in the previous 24 hours for signs or indicating symptoms of heat-related injuries.
- Individuals who are not acclimatized shall be allowed additional breaks. The SSHO will determine the period and number and provide them to the supervisor and employee.

In situations where heat stress may impact employee safety and health, employee acclimatization and workloads shall be assessed and work/rest regimens shall be established.

- For employees in permeable work clothing, Wet Bulb Globe Temperature Index or physiological monitoring shall be conducted and work/rest regimens established. The SSHO in coordination with the SES safety and health manager will assess the condition of the employees, specific weather conditions, work tasks, and other environmental factors and conditions to determine when to begin monitoring.
- For employees in impermeable work clothing, only physiological monitoring will be conducted, and work/ rest regimens and fluid replacement schedules shall be established.
- When employees are exposed to solar radiation and the potential exists for sunburn or long-term health effects, such as skin cancer, SES will provide sunscreen with a sun protection factor (SPF) appropriate for their skin type and exposure. Sunscreens shall be used only in accordance with the manufacturer's recommendations.

8.2.2 Cold-Related Exposures

- Employees working in air temperatures of minus 15 degrees Fahrenheit (minus 26 degrees Celsius) or less shall use the work-/warm-up regimen specified in the ACGIH's "Threshold Limit Values and Biological Exposure Indices."
- At air temperatures of 36 degrees Fahrenheit (2 degrees Celsius) or less, employees who become immersed in water or whose clothing becomes wet shall immediately change into dry clothing/ blankets and be treated for hypothermia. Blankets shall be included as part of the first aid equipment on such activities, and employees shall ensure they have a change of clothing.
- When manual dexterity is not required, employees shall wear thermally protective gloves when exposed to the following temperatures:
    - For light work, 40 degrees Fahrenheit (4 degrees Celsius) and below, and
    - For moderate and heavy work, 20 degrees Fahrenheit (minus 6.6 degrees Celsius) and below.
- When fine work is required to be performed with bare hands for more than 10-20 minutes in an environment below 50 degrees Fahrenheit (10 degrees Celsius), procedures will be established for keeping employees' hands warm.
- Metal handles and control bars will be covered by thermal insulating material at temperatures below 30 degrees Fahrenheit (minus 1 degree Celsius).
- Cold weather sheltering and clothing requirements:
    - If wind chill is a factor at a work location, the cooling effect of the wind shall be reduced by shielding the work area or SES employees will wear an outer windbreak layer garment. The project AHAs will include details for specific controls to minimize employee exposure to extreme cold.
    - Extremities, ears, toes, and nose shall be protected from extreme cold by proper clothing, such as hats, gloves, masks, etc.
    - Employees whose clothing may become wet will wear an outer layer of clothing that is impermeable to water.
    - Outer garments must provide for ventilation to prevent wetting of inner clothing by sweat.
    - If clothing is wet, the employee shall change into dry clothes before entering a cold environment.
    - Employees will change socks and removable felt insoles at regular daily intervals or use vapor barrier boots.
    - Because of the added danger of cold injury from evaporative cooling, employees handling evaporative liquid (such as gasoline, alcohol, or cleaning fluids) at air temperatures below 40 degrees Fahrenheit (4 degrees Celsius) will be trained in precautions to avoid soaking of clothing or contact with skin.

    - Eyewear providing protection against ultraviolet light, glare, and blowing ice crystals shall be provided to employees in snow and/ or ice-covered terrain.
- Environmental monitoring shall be conducted as follows:
    - At air temperatures below 45 degrees Fahrenheit (7 degrees Celsius) the temperature shall be monitored a minimum of every eight hours or as warranted.
    - At temperatures below 45 degrees Fahrenheit (7 degrees Celsius) and above 30 degrees Fahrenheit (minus 1 degree Celsius) the temperature and wind speed shall be monitored every four hours or as warranted.
    - At air temperatures below 30 degrees Fahrenheit (minus 1 degree Celsius) the temperature and wind speed shall be measured and recorded at least every four hours or more frequently if it begins to lower.
    - The equivalent chill temperature and frostbite precautions shall be determined by using Figure 8-1.
- SES employees who express concern about their ability to work in a cold environment shall provide medical documentation on their ability to work in cold weather [30 degrees Fahrenheit (minus 1 degree Celsius) or below]. If medical documentation is provided that shows they are suffering from diseases or taking medication that interferes with normal body temperature regulation or reduces tolerance to work in cold environments, they will be excluded from the cold weather tasks.

9. STANDARD OPERATING PROCEDURES

This section contains general safety rules that apply to all operations conducted by SES and its subcontractors. These requirements apply to all SES projects in general; therefore, some portions may not apply to this project specifically. The provisions of this plan are mandatory for all on-site employees and visitors.

9.1 SITE RULES/PROHIBITIONS AND GENERAL SAFETY RULES

- The SSHO or field manager will conduct daily safety meetings/ briefings, and all field workers are required to attend.
- The SSHO, field manager, or other SES management personnel are responsible for suspending or stopping work in the event of
    - Inadequate safety and health precautions on the part of any site personnel or
    - Potential significant environmental impact from planned activities.
- Personnel will perform only those tasks they believe they can do safely.
- Personnel will notify the SSHO of any medical conditions that require special consideration.
- Proper workplace housekeeping will be maintained at all times.
- Contact with potentially contaminated materials will be avoided unless directly related to a planned work task.
- All injuries and/ or accidents will be reported to the SSHO or field manager immediately.
- All site workers will adhere to a buddy system whenever in the exclusion zone (EZ) or when otherwise engaged in field activities.
- Horseplay is strictly prohibited on the project site.
- The manufacturer's operation and instruction manuals for operator qualification, safety training requirements, PPE, inspection, operating parameters, maintenance, calibration, and hazard control measures to be followed for the operation of any equipment that is used on site will be strictly followed.

Wind Chill Temperature Table

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

RISK OF FROSTBITE (see times on chart below)

GREEN	LITTLE DANGER (frostbite occurs in >2 hours in dry, exposed skin)
YELLOW	INCREASED DANGER (frostbite could occur in 45 minutes or less in dry, exposed skin)
RED	GREAT DANGER (frostbite could occur in 5 minutes or less in dry, exposed skin)

Wind Chill Category

Work Intensity	Little Danger	Increased Danger	Great Danger
High **Digging foxhole, running, marching with rucksack, making or breaking bivouac**	Increased surveillance by small unit leaders; Black gloves optional - mandatory below 0°F (-18°C);	ECWCS or equivalent; Mittens with liners; No facial camouflage; Exposed skin covered and kept dry; Rest in warm, sheltered area; Vapor barrier boots below 0°F (-18°C) Provide warming facilities	Postpone non-essential training; Essential tasks only with <15 minute exposure; Work groups of no less than 2; Cover all exposed skin, Provide warming facilities
Low **Walking, marching without rucksack, drill and ceremony**	Increased surveillance; Cover exposed flesh when possible; Mittens with liner and no facial camouflage below 10°F (-12°C); Full head cover below 0°F (-18°C). Keep skin dry - especially around nose and mouth.	Restrict Non-essential training; 30-40 minute work cycles with frequent supervisory surveillance for essential tasks. See above.	Cancel Outdoor Training
Sedentary **Sentry duty, eating, resting, sleeping, clerical work**	See above; Full head cover and no facial camouflage below 10°F (-12°C); Cold-weather boots (VB) below 0°F (-18°C); Shorten duty cycles; Provide warming facilities	Postpone non-essential training; 15-20 minute work cycles for essential tasks; Work groups of no less than 2 personnel; No exposed skin	Cancel Outdoor Training

These guidelines are generalized for worldwide use. Commanders of units with extensive extreme cold-weather training and specialized equipment may opt to use less conservative guidelines.

Source: USARIEM Technical Note "SUSTAINING HEALTH & PERFORMANCE IN COLD WEATHER OPERATIONS," October 2001

Figure 8-1 Wind Chill Temperature and Frostbite Precautions

9.2 WORK PERMIT REQUIREMENTS

SES will obtain or coordinate with the USACE project representative to obtain all necessary permits to safely execute this project. At a minimum, these will include excavation permits before any Geoprobe boring and other intrusive activities.

9.3 MATERIAL HANDLING PROCEDURES

- Never approach operating equipment from the rear. Always maintain eye contact with the operator, and confirm that the operator has stopped the motion of the equipment.
- Never approach the side of operating equipment; remain outside the swing and turning radius.
- Maintain distance from pinch points of operating equipment.
- Because heavy equipment may not be equipped with properly functioning reverse signal alarms, never turn your back on any operating equipment.
- Never climb onto operating equipment or operate contractor/ subcontractor equipment.
- Never ride contractor/ subcontractor equipment unless it is designed to accommodate passengers and equipped with a firmly attached passenger seat.
- Never work or walk under a suspended load.
- Never use equipment to lift personnel; do not ride excavator buckets or crane hooks.
- Always stay alert and maintain a safe distance from operating equipment, especially equipment on cross slopes and unstable terrain.

9.4 DRUM CONTAINER AND/OR TANK HANDLING

- Minimize transportation of drums.
- Individuals manually handling drums shall wear American National Standards Institute-approved safety-toe boots with metatarsal guards.
- Ensure that drums are secured to avoid tipping, falling, or spilling of contents.
- Use mechanical means for handling drums, including material handling equipment or a drum dolly.
- Transfer the content of drums using a method that minimizes contact with material.
- Spill-containment and PPE procedures must be appropriate for the material to be handled.
- Ensure that all drums are properly labeled and stored in identified appropriate waste storage areas.

9.5 COMPREHENSIVE AHA OF TREATMENT TECHNOLOGIES EMPLOYED AT THE SITE

No treatment technologies will be used in this phase of work; therefore, this section does not apply to this project.

9.6 PROJECT HAZARD CONTROLS

9.6.1 Confined Space Entry

Entry into a confined space is not expected during this project; however, if confined space entry becomes necessary, it will be performed in accordance with 29 CFR 1910.146, EM 385-1-1, and SES S&H Manual Section 14.0, "Confined Space Entry."

9.6.2 Hot Work and Fire Protection

No hot work activities are expected during this project.

9.6.3 Electrical Safety

All electrical work will be conducted in accordance with 29 CFR 1910, Subpart S, EM 385-1-1, Section 11, and SES S&H Manual Section 5.0, "Electrical Safety Program and Lockout/Tagout."

- All portable electrical equipment will be double-insulated or grounded and connected through a ground fault circuit interrupter.
- Conductive materials will be kept clear of energized power lines.
- Access to areas where high voltage is present will be restricted to authorized personnel.

9.6.4 Drilling Safety

- The drill rig is not to be operated in inclement weather.
- The driller is to verify that the rig is properly leveled and stabilized before raising the mast.
- Personnel should be cleared from the sides and rear of the rig before the mast is raised.
- The driller is not to drive the rig with the mast in the raised position.
- The driller must check for overhead power lines before raising the mast. A minimum distance of 15 feet between mast and overhead lines (<50kV) is recommended. Increased separation may be required for lines greater than 50kV.
- Personnel should stand clear before rig startup.
- The driller is to verify that the rig is in neutral when the operator is not at the controls.
- Become familiar with the hazards associated with the drilling method used (cable tool, air rotary, hollow-stem auger, etc.).
- Do not wear loose-fitting clothing, watches, etc., that could get caught in moving parts.
- Do not smoke or permit other spark-producing equipment around the drill rig.
- The drill rig must be equipped with a kill wire or switch, and personnel are to be informed of its location.
- Be aware and stand clear of heavy objects that are hoisted overhead.
- The driller is to verify that the rig is properly maintained in accordance with the drilling company's maintenance program.
- The driller is to verify that all machine guards are in place while the rig is in operation.
- The driller is responsible for housekeeping (maintaining a clean work area).
- The drill rig should be equipped with at least one fire extinguisher.
- If the drill rig comes into contact with electrical wires and becomes electrically energized, do not touch any part of the rig or any person in contact with the rig, and stay as far away as possible. Notify emergency personnel immediately.
- If any hoisting or rigging activities are necessitated during the course of work, the AHAs, EM 385-1-1 Sections 15 and 16 (2012 version), and 29 CFR 1926.251 and 1926.550 shall be consulted. A qualified rigger must be present to conduct rigging activities.

9.6.5 Machine Guarding

All equipment will be operated with all guards and safety devices provided by the manufacturer in place and in compliance with 29 CFR 1910, Subpart O, and EM 385-1-1, Section 16B. If a guard or device

must be removed for servicing or repair, the equipment will be disabled to prevent movement or unexpected energization.

9.6.6 Lockout/ Tagout

No lockout/ tagout activities are expected during this project; however, any nonroutine service and maintenance of equipment will be conducted in accordance with 29 CFR 1910.147 and SES S&H Manual Section 5.0, "Electrical Safety Program and Lockout/Tagout." The requirements of 29 CFR 1910.147, including locks (where possible) and tag systems, will be applied to all site equipment when maintenance and/or repair actions are required. All sources of energy, including hydraulic and pneumatic as well as electrical and kinetic, will be secured and locked (where possible) and tagged during performance of these activities to prevent inadvertent movement during the course of maintenance or other related work.

9.6.7 Fall Protection

Workers conducting activities subject to a fall of greater than 4 feet shall comply with the requirements of the SES Fall Protection Program found in Section 4.0 of the SES S&H Manual. Workers shall be protected by a standard rail or the use of a fall protection device. A standard rail consists of a top rail (42 inches nominal from the working surface), a mid-rail, and supporting posts at least 8 feet apart. The rail shall be capable of safely supporting a force of 200 pounds in any direction. Fall protection devices shall consist of a full-body harness and a lanyard attached to an anchorage point capable of withstanding a shock force of 5,400 pounds.

9.6.8 Unknown or Unanticipated Buried Objects

If unknown or unanticipated buried objects or site conditions [such as drums, tanks, cylinders, munitions of explosive concern (MEC)] are encountered during site operations, ongoing activities shall be immediately suspended. SES or subcontractor personnel encountering unknown or unanticipated buried objects shall

1. Secure equipment to the extent possible without causing bodily injury,
2. Evacuate the work area,
3. Immediately notify the person responsible for site operations of the encountered condition, and
4. Avoid generating any additional disturbance of the unknown condition or otherwise handling the buried object.

The SES individual responsible for site operations shall contact the SES project manager (overall) and SES SSHO to evaluate potential hazards associated with the specific situation encountered. The project team will then address the need for special procedures, engineering controls, PPE, or specialized subcontract personnel to safely mitigate the situation.

9.6.9 Unexploded Ordnance/ Munitions of Explosive Concern (Avoidance)

UXO/ MEC are a safety hazard that may constitute an imminent and substantial danger to the personnel performing environmental investigation and removal action activities and the public in general. UXO contamination must be considered a possibility on all formerly used defense sites and active military installations. In general, all non-UXO qualified personnel will follow the safe work practices listed below:

- **Stop all work**. Under no circumstances should work continue near the item(s).

- Retreat a safe distance from the object (minimum 25 yards).
- Non-UXO qualified personnel will not touch or disturb any object that could potentially be UXO or MEC-related and will immediately notify the resident officer in charge or the commanding officer.
- Mark the general location of the item for reference. Do not place anything on or near the item where it may come in contact with the item.
- If possible, take a picture of the item for reporting purposes.
- DO NOT attempt to move the item for any reason.
- DO NOT take items for souvenirs regardless of what you may think they are. UXO/ MEC items can be very deceiving by outward appearances.
- If project personnel have any questions or concerns about UXO/ MEC hazards, contact the safety and health manager.

9.6.10 Hazard Communication

Hazard communication will be governed by 29 CFR 1910.1200, EM 385-1-1, Section 8, and SES S&H Manual Section 13.0, "Hazard Communication." At a minimum, the following actions will be taken.

- All hazardous material containers will be labeled. Labels will include
    - Contents of the container;
    - Designation of health, flammability, and reactivity hazards; and
    - Name and address of the manufacturer.
- MSDSs for all hazardous materials that are present will be maintained on site.
- Site-specific training will include hazards posed by the materials, protective measures, and emergency procedures.

9.6.11 Illumination

All fieldwork will be conducted during daylight hours. Special requests for work during nondaylight hours along with additional hazard controls must be submitted to the contracting officer. Fieldwork conducted during nondaylight hours will be identified in the hazard assessment table. Artificial illumination will be used to ensure general work areas are illuminated to a level of at least 10 foot candles.

9.6.12 Sanitation

- Means for washing hands and faces will be provided at the work site through the use of a standalone portable sink station with soap and paper towels.
- Potable drinking water will be provided in labeled, sanitary dispensers.
- An adequate number of toilet facilities will be provided based on the number of workers through the use of a "porta potty" standard portable restroom.

10. SITE CONTROL MEASURES

The SSHO will be responsible for establishing the site control zones around SES-controlled areas that present physical or chemical hazards. SES and subcontractors will establish a perimeter using portable temporary safety fencing, cones, and signs to secure the area from inadvertent entry by personnel not associated with the project.

Implementation of control zones will minimize the number of workers potentially exposed to hazards and will minimize the spread of possible contamination from the site. The SSHO will monitor the implementation of the site control work rules and will report any deviations from prescribed practice to the field manager or stop work as appropriate.

SES will attempt to exclude all nonauthorized personnel from exclusion and contamination reduction zones. If unauthorized personnel enter and refuse to leave the SES-controlled control zones, work will be stopped and the USACE technical manager will be notified.

To prevent both exposure of unprotected personnel and migration of contamination, work areas and PPE requirements will be clearly identified when operations that fall under the requirements of 29 CFR 1910.120/ 29 CFR 19126.65 are executed. This SSHP requires that the area surrounding each of the work areas be divided into three distinct zones: the EZ, the contamination reduction zone (CRZ), and the support zone (SZ).

Figure 10-1 shows anticipated control zones. To prevent both exposure of unprotected personnel and migration of contamination, work areas and PPE requirements will be clearly identified when operations that fall under the requirements of 29 CFR 1910.120/29 CFR 19126.65 are executed. This SSHP requires that the area surrounding each work area be divided into three distinct zones: the EZ, the CRZ, and the SZ.

10.1 EXCLUSION ZONE

The EZ is that area where the greatest potential for exposure to contamination exists. Access to the EZ will be restricted to authorized SES and subcontractor personnel. The perimeter of the EZ will be marked by barricade tape, rope, or similar marking. The entry and exit locations for the EZ will be appropriately identified.

The standard rules below will apply to all entry into the EZ:

- The SSHO or field manager will approve and log entry into the EZ.
- All personnel entering the EZ will wear the prescribed level of protective clothing.
- All hand-to-mouth contact (food, drink, tobacco, etc.) is prohibited in the EZ.
- All personnel in the EZ will follow the buddy system.
- A sound level survey will be performed for Geoprobe operation at startup. Sound levels will be identified at the source and then again at intervals of every 10 feet concentrically. Depending on the results of the sound level survey and using the premise that for every doubling of distance from the noise source there is a 6 dB reduction in noise, a boundary/barrier zone will be established identifying
    1. The zone where noise levels exceed 105 dB and double-layer hearing protection is mandatory, and
    2. The zone where noise levels exceed 85 dB but do not exceed 105 dB and single-layer hearing protection with a minimum NRR of 32 is required.

  When double hearing protection is required (noise greater than 105 dBA), affected employees will switch from ANSI Z87.1-2010 standard safety glasses with side shields to safety goggles that meet the requirements of ANSI Z87.1-2010, where the elastic strap can be worn over the exterior of the earmuff rather than the stem of the safety glasses breaking the seal of the earmuffs.
- A minimum distance of 30 feet will be maintained as the EZ around the Geoprobe as shown in Figure 10-2.

EZs will be established around all drill rigs, areas of heavy equipment use, and all activities where contamination is a potential hazard.

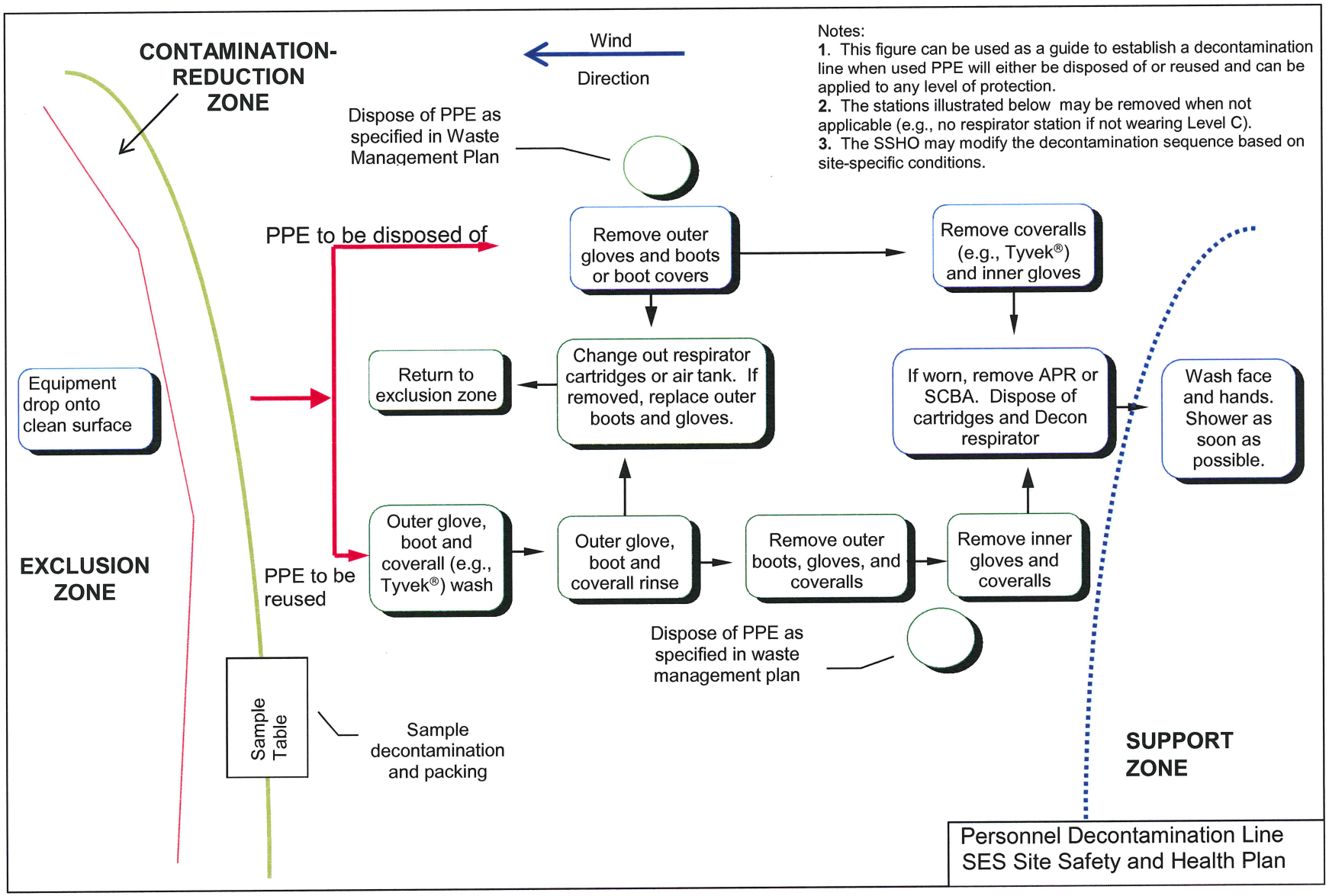
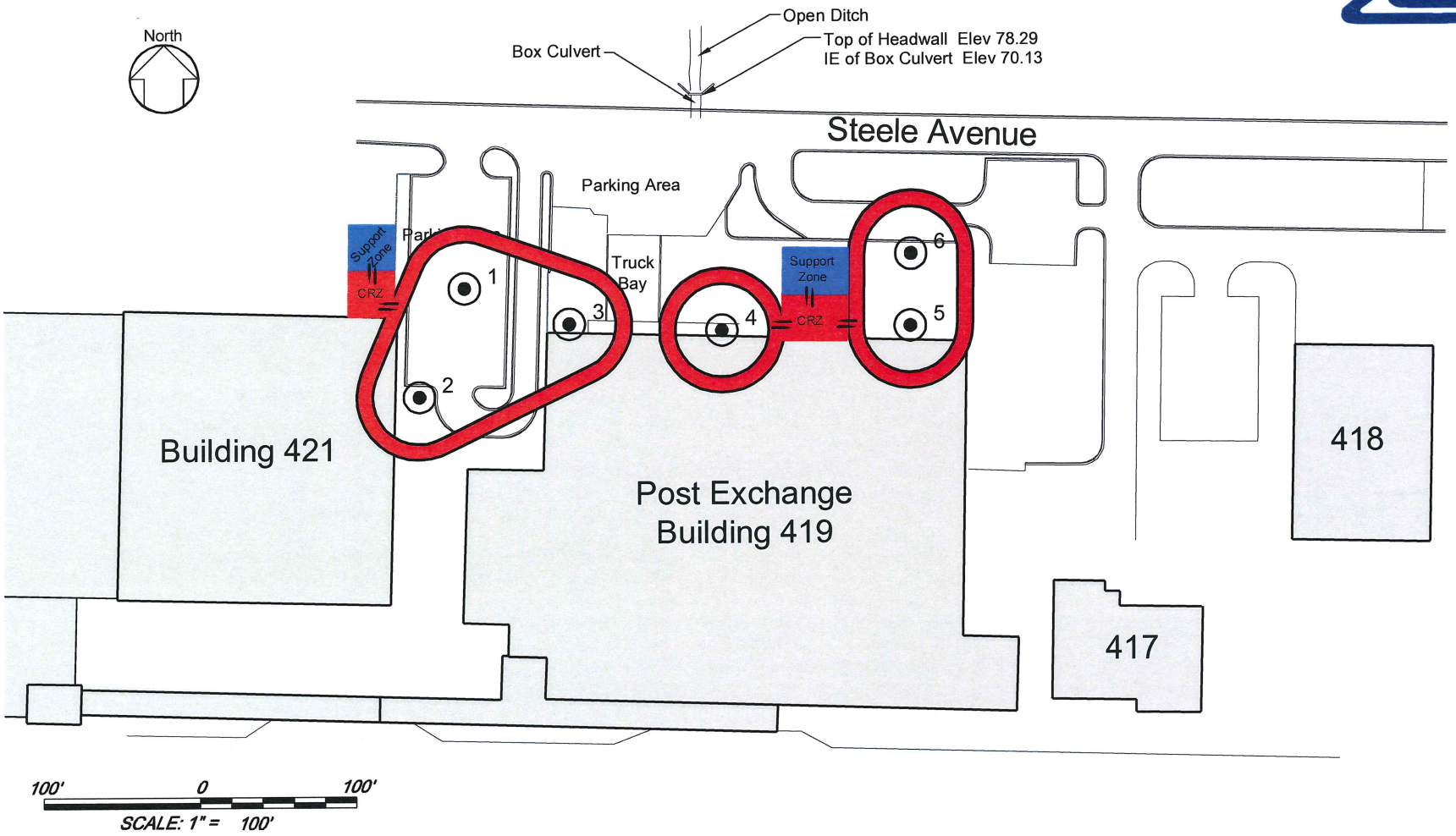


Figure 10-1 Representative Exclusion Zone / Contamination-Reduction Zone / Support Zone

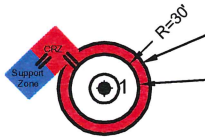
R:\E209\E209.0029\graphics\Fig 9-1 Evac and CRZ.dwg(03121/13)

E0209.0029



Legend

- 1 Proposed Soil Boring
- Evacuation Route
- CRZ - Contamination Reduction Zone
- Hazard Communication Inventory Storage Area
- Emergency Assembly Area



- Orange DOT Traffic Barriers with Caution Tape (typical)
- Orange Construction Fence (typical)

Job Title: Heating Oil Spill Site
Investigation Building 419
Fort Stewart, Georgia

Figure 10-2 Site Controls

3/14/1

10.2 CONTAMINATION REDUCTION ZONE

Each CRZ will be a clearly marked corridor between the EZ and the SZ. The CRZ for each area will be immediately adjacent to the EZ. This area will be identified with yellow tape, high-visibility construction fencing, or other suitable barriers.

The CRZ is where personnel will begin the sequential decontamination process when exiting the EZ. To prevent cross-contamination and for accountability, all personnel must enter and leave the EZ through the CRZ.

Contaminated personnel and equipment will exit the EZ directly to the CRZ. Each CRZ will contain constructed decontamination stations for personnel and equipment. If possible, the CRZ will be upwind of each EZ; however, because of site constraints, this may not be possible. Temporary SZs for each work area will be adjacent to the CRZs.

All personnel entering the CRZ will wear the prescribed level of protection, and hand-to-mouth activities will be prohibited.

10.3 SUPPORT ZONE

The SZ is the clean and relatively safe area surrounding the EZ and CRZ. The SZ is limited to the areas of the site associated with the project and generally does not include such areas as office trailers, roads, and buildings accessible to the public. The primary functions of the SZ are

- As staging areas for clean equipment and supplies and
- A location for support services.

Temporary SZs and staging areas will be established at the entrance of each control area. Potable water, an eye wash, and first aid supplies will be at each temporary SZ. No hazardous or potentially hazardous materials will be allowed in the SZ unless they are in a properly labeled container with no external contamination. Eating, drinking, and smoking will only be allowed at designated locations in this area.

Portable bathroom facilities will be near the work areas. In addition, potable water and water and soap for hand washing, containers for solid waste for use by site personnel, first aid stations, and administrative information will be available in the SZ.

10.4 SITE COMMUNICATIONS

Field personnel will be able to contact other field personnel and outside agencies. Communication on site may be accomplished verbally, using hand signals, or by hand held radios. If the size of the site dictates, portable air horns may be used to signal other site personnel. If telephone service is not readily available, project personnel may be equipped with cellular phones.

11. PERSONAL HYGIENE AND DECONTAMINATION

Specific procedures will be used to control the spread of contamination from the EZ and ensure that workers are sufficiently free of contamination to avoid adverse health effects. These procedures will include the doffing of PPE and personnel decontamination. The SSHO will ensure the construction of decontamination stations as necessary and ensure that site personnel follow acceptable decontamination

processes. The following sections present the basic requirements for personnel. The SSHO may modify these procedures if improvements are needed.

11.1 LEVEL D MODIFIED DECONTAMINATION

STEP 1: Remove disposable gloves and boot covers

Gloves and boot covers will be turned inside out and deposited in a designated container.

STEP 2: Field Wash

Wash face and hands with soap and water.

12. EQUIPMENT DECONTAMINATION

Any heavy equipment that has entered the EZ and made contact with potentially contaminated media shall be decontaminated prior to leaving the CRZ. Generally, decontamination will consist of steam cleaning or pressure washing affected equipment. Sampling equipment may undergo a dilute nitric acid rinse or methanol wash depending on the sampling being performed. All decontamination liquids or solids shall be contained and disposed in accordance with Federal, state, and local regulations.

13. PERSONAL PROTECTIVE EQUIPMENT DECONTAMINATION

Where and whenever possible, single-use, external protective clothing shall be used for work within the EZ or CRZ. This protective clothing shall be disposed of in marked containers. Depending upon subsequent analysis, this protective clothing may require disposal as hazardous waste.

Reusable protective clothing will be rinsed at the site with detergent and water. The rinseate will be collected for possible disposal as hazardous waste. The MSDS for Alconox, which will be used for decontamination of PPE and equipment, will be present on site and is available in Attachment 2 of the APP.

14. EMERGENCY EQUIPMENT AND FIRST AID

Emergency equipment and first aid requirements can be found in Section 9.b.6 of the APP.

15. EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

Emergency response and contingency procedures can be found in Section 9 of the APP.

16. LOGS, REPORTS, AND RECORD KEEPING

A system of logs and reports will be used to document activities related to site safety and health. The SSHO will generate a brief weekly summary of safety and health issues and resolutions. The report will include all injuries, accidents, near-misses, and interpretations of the SSHP.

In addition to the weekly reports, the following documents will be generated and submitted to the USACE Savannah District project manager.

- Certification records, including copies of the safety and health training, medical clearances, and respirator fit test records for on-site personnel. These records are included in Attachment 3 of the APP and will be kept on site;
- On-site training logs with the signatures of the trainer and all attendees. They will also include documentation of pre-entry briefings, safety meetings, and visitor training;
- Safety inspection logs with the dates of the inspection, the identity of the person conducting the inspection, the areas inspected, findings, and corrective actions;
- Sign-in log for all employees and visitors. It will contain the names of persons who perform on-site work or visit the site; and
- Environmental and personal exposure monitoring/ sampling results will be maintained in a log with the monitoring data, location and time, types of work being done, calibration records, and identity of person conducting the monitoring.

17. REFERENCES

American Conference of Government Industrial Hygienists, 2012. *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.*

National Institute of Occupational Safety and Health, September 2007. *NIOSH Pocket Guide to Chemical Hazards.*

SpecPro Environmental Services LLC, June 2009. *SpecPro Environmental Services LLC Safety and Health Program Manual.*

U.S. Army Corps of Engineers (USACE), May 2007. *Safety and Occupational Health Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities* (ER 385-1-92).

USACE, September 2008 (updated July 2012). *Safety and Health Requirements Manual* (EM-385-1-1).