-FINAL-

HEALTH AND SAFETY PLAN
PERFORMANCE-BASED REMEDIATION (PBR)
2013 UPDATE

FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK

FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK

Prepared for:

Air Force Civil Engineer Center
706 Brooks Road
Rome, New York 13441

Prepared by:

10901 Lowell Ave., Ste. 271
Overland Park, KS 66210

In association with:

FPM Remediations, Inc.
584 Phoenix Drive
Rome, NY 13441

40 British American Boulevard,
Latham, NY 12110

Contract Number FA8903-10-D-8595

Delivery Order 0014

August 2013

HSP SIGNATURE PAGE

CAPE

HEALTH AND SAFETY PLAN

2013 UPDATE

FOR

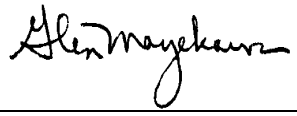
PERFORMANCE-BASED REMEDIATION (PBR)
AT
FORMER GRIFFISS AFB, NY

Project Number: JREZ20XX7208
Contract Number: FA8903-10-D-8595
Task Order Number: 0014

DEPARTMENT OF THE AIR FORCE
AIR FORCE CIVIL ENGINEER CENTER
2261 Hughes Ave., Suite 155
Lackland AFB, Texas 78236-9853

August 2013

Prepared by:



Glen Mayekawa, CIH
Safety and Health Manager
(714) 599-9071

This Health and Safety Plan has been prepared to meet the requirements of: Occupational Safety and Health Administration standards, 29 CFR Part 1910 and 1926; and the United States Department of the Air Force, Air Force Civil Engineer Center Performance Work Statement entitled *Performance-Based Remediation (PBR) at Former Griffiss AFB, NY*, dated 15 October 2010.

HSP APPROVAL PAGE

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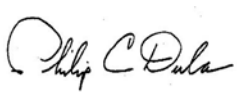
APPROVAL: HEALTH AND SAFETY PLAN

The following key CAPE project personnel have reviewed and have agreed to implement and comply with requirements of the Health and Safety Plan established by CAPE for the above-indicated contract and specified work activities.

Title	Name	Signature	Date
Project Manager	Philip Dula, PG, CHMM		4/10/13
Field Team Leader and Site Safety and Health Officer	TBD		
Safety and Health Manager	Glen Mayekawa, CIH		4/10/13

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ABBREVIATIONS AND ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
AECOM	AECOM Technical Services
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
ANSI	American National Standards Institute
AOC	area of concern
BBP	blood borne pathogen
BRAC	Base Closure and Realignment Act
BTEX	benzene, toluene, ethylbenzene and xylene
CAPE	Cape Environmental Management Inc
CDRL	Contract Data Requirements List
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CGI	Combustible Gas Indicator
CHSM	Corporate Health and Safety Manager
CIH	Certified Industrial Hygienist
COPC	chemicals of potential concern
COR	Contracting Officer's Representative
CP	competent person
CPR	cardiopulmonary resuscitation
CRZ	contamination reduction zone
CSHP	Corporate Safety and Health Program
CSP	Certified Safety Professional
dBA	decibels on the A-weighted scale
DOT	U.S. Department of Transportation
EPA	U.S. Environmental Protection Agency
EZ	exclusion zone
ºF	degrees Fahrenheit
FOST	Findings of Suitability to Transfer
FPM	FPM Remediations, Inc.
FTL	Field Team Leader
GFCI	ground fault circuit interrupter
GRIFFISS	Former Griffiss Air Force Base
HazWOPER	hazardous waste operations and emergency response
HSP	Health and Safety Plan
IAW	in accordance with
IDW	investigation-derived waste
kV	kilovolt
LEL	lower explosive limit
LO/TO	lockout/tagout
LRA	Local Reuse Authority
LTM	long-term monitoring
LUC/IC	land-use control/institutional control
MSDS	material safety data sheet
MTBE	methyl tertiary-butyl ether
NASBLA	National Association of Safe Boating Law Administrators

ABBREVIATIONS AND ACRONYMS (Cont.)

NFA	no further action
NFPA	National Fire Protection Association
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Commission
NYS	New York State
O&M	operations and maintenance
OPS	operating properly and successfully
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
PBR	performance-based remediation
PCB	polychlorinated biphenyl
PEL	permissible exposure limit
PFD	personal flotation device
PID	photoionization detector
PM	Project Manager
PMP	Project Management Plan
ppm	parts per million
POC	Point of Contact
PPE	personal protective equipment
ppm	parts per million
PVC	poly vinyl chloride
PWS	performance work statement
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
ROD	Records of Decision
S&H	safety and health
SHM	Safety and Health Manager
SOP	standard operating procedure
SSHO	Site Safety and Health Officer
STEL	short-term exposure limit
SVI	soil vapor intrusion
SVOC	semi-volatile organic compounds
TCE	trichloroethene
TLV	ACGIH threshold limit value
tsf	ton(s) per square foot
TWA	time-weighted average
USCG	U.S. Coast Guard
UST	underground storage tank
VOC	volatile organic compound

1.0 BACKGROUND

This Health and Safety Plan (HSP) presents the contractor safety and health (S&H) procedures, as updated for 2013 activities, to be implemented by Cape Environmental Management Inc (CAPE) for services associated with the Performance-Based Remediation (PBR) at the Former Griffiss Air Force Base (GRIFFISS), New York project. Services will be completed by CAPE for the Department of the Air Force, Air Force Civil Engineer Center (AFCEC). Work will be performed under Contract FA8903-10-D-8595; Task Order #0014.

CAPE has assembled a PBR team to perform services under this task order. The CAPE Team is composed of CAPE, FPM Remediations, Inc. (FPM), and AECOM Technical Services (AECOM). The CAPE Team has many years of experience at GRIFFISS and has worked extensively with the New York State Department of Environmental Commission (NYSDEC) and the U.S. Environmental Protection Agency (EPA) Region 2.

The HSP has been prepared to meet the requirements of: U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) standards, Title 29 Code of Federal Regulations (CFR) Part 1910 and 29 CFR Part 1926; and the AFCEC Performance Work Statement (PWS) *Performance Based-Remediation (PBR) at Former Griffiss AFB, NY,* dated 15 October 2010.

The purpose of the HSP is to identify and evaluate S&H hazards at the project worksite, to prescribe safety control measures to be implemented, and update for any new sites added to the task order and/or new site activities not addressed under the original plan. This plan:

- Provides background information related to the project
- Assigns responsibilities for HSP implementation
- Identifies site hazards and hazard control measures
- Describes the exposure monitoring program
- Establishes requirements for site control and personal protective equipment (PPE)
- Discusses standard safety procedures and designates emergency response plans
- Reviews training, medical surveillance, and record keeping programs to be implemented.

The HSP will be primarily implemented by the CAPE Project Manager (PM), Field Team Leader (FTL), Site Safety and Health Officer (SSHO), and Safety and Health Manager (SHM) in coordination with the Contracting Officer's Representative (COR) and Former Griffiss AFB Point of Contact (POC). Compliance with the HSP is required of all CAPE personnel, subcontractors, and associated third parties on site. A copy of the HSP will be maintained on site during work activities and will be available for inspection and review by site or agency personnel. Field personnel will review applicable aspects of the HSP before site work and will sign an "HSP Review" acknowledgment form (see Appendix A - HSP Forms) indicating that they have reviewed the pertinent aspects of the plan.

The content of the HSP may be revised and/or amended should additional information become available regarding the hazards present at the site and/or should significant changes occur in the scope of work, operational procedures, site hazards, and/or hazard control measures. This 2013 update is being submitted to address two new sites and revised goals for seven previously tasked sites per Contract Modification 02, awarded on August 29, 2012. This contract modification has revised the site goals for seven of the CERCLA sites to achievement of unrestricted closure by

the end date of this contract in 2015. These sites are: ST006-Building 101-UST (Yellow Sub) Battery Acid Disposal Cell, DP012-Building 301, DP013-Building 255, DP015-Building 219 Drywell, SS024-Fire Demo Area, FT030-Fire Training Area, and SD050-Building 214. Two additional sites, not included under the original contract award, were also included for closure under this modification and are AOI 72- Mobile Avenue Former Drum Storage Area, and DW-211-01-Building 211 Drywell.

The HSP may be modified by the SSHO upon review and approval of the COR, PM, and SHM. Field personnel are informed of changes to the HSP through safety meetings and written addendum or revision to the HSP.

1.1 Site Location and Description

GRIFFISS occupies approximately 3,552 acres in Oneida County, New York. The base is a former U.S. Air Force Air Combat Command installation situated within the city limits of Rome, New York, approximately 10 miles west of Utica, New York. The base was opened on February 1, 1942, as the Rome Air Depot. In 1987, the EPA added the base to the National Priorities List (NPL), and in 1990, the U.S. Air Force, the NYSDEC, and the EPA entered into a Federal Facilities Agreement. In 1993, GRIFFISS was designated for realignment under the federal Base Closure and Realignment Act and subsequently deactivated. This PBR project is part of the Base Realignment and Closure (BRAC) environmental restoration program. At the close of 2012 most of the base property was in the process of transfer to the Local Reuse Authority (LRA) for civilian reuse with the exception of Building 101 (Parcel F13 and F3p). The Finding of Suitability to Transfer (FOST) is at USEPA for final approval. All other deeds have been issued to the LRA and are in the process of final execution. Deed transfers are expected to be completed in 2013.

The objective of this project is to perform PBR services designed to reduce the overall liability and life-cycle costs for the Air Force at 45 GRIFFISS sites by obtaining closure with unrestricted reuse for the majority of sites; optimizing the exit strategy at other sites; and providing closures, with restricted use where it provides the best value for the Air Force for the remaining sites.

33 of the 45 sites included in this PBR contract are being addressed following the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process. The remaining 12 sites are petroleum sites requiring closure under the NYSDEC Spills Program. SD052 is listed twice as there are soil vapor intrusion (SVI) system operations and maintenance (O&M), land-use control/institutional controls (LUC/ICs), and Five Year Reviews at five groundwater remediation sites that are being operated and maintained under a different contract.

Nine CERCLA Records of Decisions (RODs) are pending completion, including Sites SD052, ST006, FT030, SS033, ST036, ST053, SD041 and ST037. The Proposed Plan process has been completed for Sites SD041, SS033, ST036, ST037 and ST053. Three of the nine CERCLA's have pending RODs. RODs have recently been executed for Sites ST-51 Building 100, FT030 Fire Protection Training Area and SD-62 Area of Concern (AOC) 9. Site ST051 is not included in this project because the ROD has been executed for no further action (NFA) and no future activities are expected at this site.

The sites are divided into several physical/regulatory categories (CERCLA Landfills; CERCLA Creeks; CERCLA SVI Sites; CERCLA LUC/IC Sites; and Petroleum Sites). Information regarding these sites is reviewed below. More detailed information is provided in the CAPE Project Management Plan (PMP).

1.1.1 CERCLA Landfills

Five landfills are capped/covered under Resource Conservation and Recovery Act (RCRA) requirements, and are presently undergoing long-term groundwater monitoring. The RODs together with NYSDEC Part 360 landfill regulations dictate that landfill closure is not possible. The CAPE Team will implement optimized exit strategies at these sites based on our extensive NY experience with landfill post-closure monitoring and maintenance.

1.1.2 CERCLA Creeks

Three Mile Creek and Six Mile Creek were originally proposed to undergo long-term monitoring to include surface water/sediment sampling, fish tissue sampling, and Qualitative Benthic Community Evaluation (Sites SD031 and SD032). The RODs require that discharges to the two creeks be eliminated while the Long-Term Monitoring (LTM) Work Plans specify assessing trending data with respect to stabilization and Remedial Investigation (RI) observed contaminant levels to assess when monitoring can cease. These two sites will be closed ahead of schedule in early 2013 and LTM sampling is no longer required.

1.1.3 CERCLA SVI Sites

The pending RODs and the ongoing remediation of the sites constrain the SVI sites to an optimized exit strategy outcome. The CAPE Team will strive to develop an SVI exit strategy that is accepted by the Air Force, EPA, and NYSDEC; however, given that the underlying sources will be present through 2015, closure of the SVI sites is not feasible.

The SVI sites consist of four buildings that will require air volatile organic compound (VOC) sampling. SVI remedy installation is not part of this project; however, determination of Operating Properly and Successfully (OPS), if required, and long-term O&M will be performed at SVI sites under this contract. FPM will be performing onsite sampling activities.

1.1.4 CERCLA LUC/IC Sites

RODs that the Air Force negotiated with the EPA and NYSDEC over many years typically constrain LUC/ICs to either status quo or optimized exit strategy. LUC/ICs are classified as “hard-wired” and “soft” sites.

Hard-wired LUC/ICs include non-residential LUC/ICs driven by the underlying RIs that cannot be removed without returning to the RI phase of the CERCLA process. Engineering controls will be used to ensure that implemented remedies remain effective.

The CAPE Team was tasked to remove soft LUC/ICs that include groundwater use restrictions that can be lifted when the groundwater concentrations attain New York State (NYS) groundwater standards or guidance values, and LUC/ICs that can be removed

without re-opening the RODs. As of February 2013 six of these seven sites have been approved for deletion of their respective groundwater restrictions. These sites are: DP012, DP013, DP015, SD050, SS017, and DP022. Site SS025 will achieve groundwater restriction deletion status by mid 2013.

The CAPE Team is a member of Dig Safely New York and we are notified as dig permits are submitted at GRIFFISS. This ensures that the LUC/ICs are maintained and practiced as work is conducted. This also creates an early warning system for the Air Force regarding potential noncompliance with the LUC/ICs.

Annual LUC/IC inspections and Five Year Reviews are included in this project for five chlorinated plume sites; remedy installation and OPS determinations will be completed under a different contract by others. 19 additional CERCLA sites require LUC/IC monitoring and only Five-Year Reviews. Five sites without executed RODs also require LUC/IC monitoring and Five-Year Reviews.

1.1.5 Petroleum Sites

The 12 petroleum sites are constrained by the site-specific environmental setting, residual contamination levels, and the contract period of performance. The CAPE Team's strategy is to aggressively allocate sufficient resources commensurate to complexity level of the respective sites to achieve NYSDEC spill closure within the contract period. Some sites have only required additional optimized monitoring to support closure while others have required substantial remedial system modifications. Biosparging systems and/or bioventing systems have been installed at Sites Apron 1&2, SS054 Bldg 781 Pumphouse 1, and SS069 Bulk Fuel Storage Area. The remaining spill sites are undergoing monitoring. Annual LUC/IC inspections will be performed at all petroleum spill sites.

2.0 PROJECT ORGANIZATION

This section of the HSP provides information on project personnel, key CAPE Team project personnel, and a description of CAPE Team personnel S&H responsibilities.

2.1 Key Project Personnel

Key project personnel are identified in the project "Emergency Contact List" (Appendix B). Personnel that will be listed include those individuals serving in the following functions:

- Contracting Officer (AFCEC)
- Contracting Officer's Representative (AFCEC)
- Base Point of Contact (Former Griffiss AFB)
- Project Manager (CAPE)
- Field Team Leader (CAPE Team)
- Site Safety and Health Officer (CAPE Team)
- Safety and Health Manager (CAPE).

2.2 CAPE Personnel Health and Safety Responsibilities

2.2.1 Project Manager

The PM is responsible for overall direction, coordination, technical consistency, and review of the project contract. PM S&H responsibilities are:

- Direct, coordinate, and implement the project delivery order
- Review and approve the site-specific HSP
- Emphasize safety and hold personnel accountable for safe work performance
- Enforce implementation and compliance with the HSP and S&H procedures
- Provide support to the FTL and SSHO for completion of duties
- Monitor and evaluate S&H performance of project operations
- Communicate with the COR to evaluate and resolve S&H issues.

2.2.2 Field Team Leader

The FTL is charged with the overall responsibility for the successful completion of CAPE field operations. FTL S&H responsibilities are:

- Prepare and organize project activities on site
- Review and approve the site-specific HSP
- Provide equipment and materials for project operations
- Emphasize safety and hold personnel accountable for safe work performance
- Enforce implementation and compliance with the HSP and S&H procedures
- Ensure correction of unsafe work conditions and/or unsafe work practices
- Monitor and evaluate S&H performance of project operations
- Communicate with the COR to evaluate and resolve S&H issues.

2.2.3 Site Safety and Health Officer

The SSHO is the onsite project S&H supervisor and is present during fieldwork activities. Per EM 385-1-1 requirements, the SSHO must be present at the site any time work is

performed. If the SSHO must be absent from the site, the S&H duties must be delegated to another qualified responsible party at the site (e.g., FTL). The SSHO must ensure that the person assuming this temporary role is first-aid/CPR certified and is fully aware of their role and responsibilities during the SSHOs absence. If a qualified replacement is not available, then work shall stop for a safety stand down until a qualified/certified person is available. SSHO S&H responsibilities are:

- Review and approve the site-specific HSP
- Maintain copies of the HSP on site during field activities
- Implement provisions of the HSP and the CAPE Safety and Health Program
- Require that site personnel meet training and medical surveillance requirements
- Conduct site orientation training, HSP review, and daily safety meetings
- Emphasize safety and hold personnel accountable for safe work performance
- Review site hazards and establish safety control measures
- Maintain a hazardous substance inventory list
- Maintain copies of material safety data sheets (MSDSs)
- Maintain safety equipment and supplies
- Perform inspections for safe work operations
- Enforce implementation and compliance with the HSP and S&H procedures
- Direct decontamination procedures to be used
- Perform and/or coordinate site exposure monitoring
- Report safety violations or S&H concerns promptly to the PM
- Ensure correction of unsafe work conditions and/or unsafe work practices
- Monitor and evaluate S&H performance of project operations
- Maintain S&H records
- Report and investigate accidents and incidents
- Communicate with the COR to evaluate and resolve S&H issues.

2.2.4 Safety and Health Manager

The SHM is a Certified Industrial Hygienist (CIH) or Certified Safety Professional (CSP). SHM S&H responsibilities include:

- Develop the site-specific HSP
- Conduct S&H inspections and audits as scheduled by the PM
- Provide S&H technical assistance to the PM, FTL, and SSHO.

2.2.5 Subcontractors

Subcontractors will be used to provide selected services associated with performance of project work. Subcontractors who come on site to perform fieldwork and/or enter controlled areas of the site are subject to HSP requirements. Subcontractor S&H responsibilities are:

- Provide required S&H training and certification documents to the SSHO
- Provide, before site work, a hazardous substances inventory list to the SSHO
- Provide applicable MSDSs for hazardous substances to be brought on site
- Enforce applicable HSP requirements with subcontractor employees
- Review, understand, and comply with the HSP
- Follow safety instructions from the SSHO, or other competent authority

- Observe the buddy system during work activities
- Promptly report unsafe work conditions/work practices to the SSHO
- Immediately report injuries/illnesses to your supervisor and the SSHO.

2.2.6 Site Personnel

Site personnel S&H responsibilities are listed below:

- Understand and comply with the HSP
- Follow instructions of the SSHO or other competent authority
- Promptly report any unsafe work conditions or unsafe work practices
- Immediately report all injuries or illnesses to their supervisor and SSHO.

3.0 SITE HAZARDS

Site hazards and hazard control measures for chemical, physical, and biological hazards that are likely to be encountered during project work are reviewed in this section of the HSP.

3.1 Chemical Hazards

3.1.1 Hazardous Substances Potentially Present at the Site

The chemicals of potential concern (COPC) that may be encountered on this project include: Landfill gases such as methane and carbon dioxide; Free product (gasoline and jet fuel) and petroleum hydrocarbons associated with degradation of fuel oil, diesel, gasoline, and jet fuel products such as benzene, toluene, ethylbenzene and xylene (BTEX) that will be present as volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs); Solvents and chlorinated compounds such as trichloroethene (TCE), methyl tertiary-butyl ether (MTBE), and vinyl chloride; Pesticides such as dieldrin; and metals such as cadmium, chromium, lead, and mercury.

Table 1 provides, Basewide Monitoring Sites – Sampling Identification, Table 2 provides Basewide Monitoring Sites – COPC information, and Table 3 provides chemical hazard information for anticipated COPCs. The table includes a summary of the health effects, potential routes of entry, and the OSHA permissible exposure limits (PELs) or American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit values (TLVs) for these hazardous substances (lowest value).

3.1.2 Hazardous Substances with Anticipated Use at the Site

A listing of hazardous substances with anticipated use during site fieldwork is provided below. A Hazardous Substances Inventory List will be prepared by the SSHO. The SSHO will maintain MSDSs for hazardous substances to be used during site work.

- Fuels: Diesel and gasoline fuel for vehicles and equipment
- Lubricants: Oil, grease, and other lubricants for vehicles and equipment
- Paint: Spray paint for marking of locations
- Fire Extinguishing Agent: Dry chemical for fire extinguishers
- Calibration Gas: Isobutylene, methane, carbon monoxide, hydrogen sulfide
- Sample Preservative: Hydrochloric acid
- Decontamination Solution: Alconox, or equivalent
- Grout: Bentonite
- Cement: Concrete
- Compressed Gases: Oxygen and acetylene gases for hot work (if conducted).

3.2 Physical Hazards

The primary physical hazards that may be encountered during site work are indicated below. The following information describes physical hazard safety control measures to be used.

Fire Protection: Fire extinguishers will be available on site. Hot work (work that uses a flame or creates sparks) is not expected for site work. If hot work is needed, hot work permit procedures will be implemented for hot work operations.

Overhead Utilities: Overhead utility lines may be present. The presence of overhead utilities will be surveyed before bringing equipment with high extensions (e.g., drill rig, heavy equipment, dump truck, roll-off bin truck) into a work area.

Underground Utilities: Underground utility lines may be present. Obtain a dig permit before any ground disturbance. Obtain and review base utility map. Marked locations of existing utilities will be approximate. Contact a utility locator to mark-out underground utilities in the work area. Review and inspect utility mark-outs before excavating. If utilities are indicated in an area to be excavated, hand dig (or pot hole by air knife or water injection) two feet on either side of the marked utility to locate it. Immediately contact the Contracting Officer should damage to underground utilities or subsurface construction occur.

Heavy Equipment Operation: Heavy equipment may be used for earthwork. Ground personnel will at times be working in the general vicinity of equipment operation. Heavy equipment will be inspected daily and documented. Ground personnel will position themselves out of the swing radius of operating heavy equipment whenever possible. Personnel will not be allowed to walk underneath loaded buckets. Ground personnel will wear high-visibility safety vests and be required to maintain visual contact with equipment operators. Hand signals will be established.

Excavation and Trench Safety: Excavation operations may involve personnel entry into trenches or excavations. Information is provided to ensure communication of hazards related to excavation and trench safety. Excavation activities involving personnel entry into trenches 4 feet or more in depth or excavations 5 feet or more in depth require strict implementation of excavation safety procedures. Such operations will require protective systems for excavation operations (sloping, benching, shielding, and/or shoring) and compliance with the OSHA "Excavation" standard. For these operations, a competent person (CP) will supervise operations, conduct daily inspections, and implement protective systems for excavation operations. Access to site excavation areas will be controlled and limited to authorized personnel only.

Vehicle and Equipment Traffic: Concurrent operation of mobile equipment, vehicles, and the presence of ground personnel, may occur during site work. As needed, traffic patterns will be established and reviewed during safety meetings. Personnel will wear high-visibility safety vests with reflective striping when working near traffic areas. Spotters will be used if needed for backing of vehicles into tight work areas.

Material Handling: Material handling involving lifting and carrying of materials will be required. Personnel will review proper lifting techniques during safety meetings.

Tools, Machinery, and Equipment Use: Hand and power tools will be used. Tools will be used according to design. Power tools requiring electrical cords will use ground fault circuit interrupters (GFCIs).

Electrical Equipment: Fuel-powered generators will be used to provide electrical power on site. Use GFCIs for portable electrical equipment. Inspect electrical extension cords for damage and ground plugs. Keep electrical equipment/cords away from water and fuel

materials. Electrical cords may not be used for raising or lowering equipment. Trained and licensed electricians will be used where required.

Lockout/Tagout: Lockout/Tagout (LO/TO) of electrical equipment for maintenance and servicing will be conducted as needed. Trained and licensed electricians will be used where required. Energy sources for equipment must be turned off or disconnected and switches locked out/tagged out before servicing. Standardized locks and tags are to be used to indicate the identity of the individual using them. Each LO/TO device is required to be removed by the individual who applied the device. The SSHO is responsible for ensuring proper implementation of LO/TO including approval of permits and maintenance of personal locks and a log of lock assignments.

Noise Exposure: Noise exposure above 85 decibels on the A-weighted scale (dBA) is expected when working near or operating machinery and equipment (e.g., generators, compressors). Earplugs will be used for worker protection.

Heat Stress: Heat stress conditions may occur from elevated ambient temperatures, heavy workloads, and impermeable protective clothing use. Provisions will be made to establish break areas, provide fluids, and adjust work-rest schedules, as needed.

Cold Stress: Ambient temperatures below 45 degrees Fahrenheit (ºF) may occur at times during site work (fall/winter/spring). Workers may be required to work outside in cold temperatures.

Drill Rig Safety: Drill rigs will be used. Drill rig safety procedures will be implemented for drilling work.

Compressed Gas Cylinder Safety: Gas cylinders may be used for hot work. Compressed gas cylinders will be moved with caps installed and stored upright and secured with rope or chain.

Forklift Operation: A forklift will be used for handling of materials. Qualified operators and use of forklift safety procedures are required.

Ladder Safety: Ladders may be used to access work locations. Standard ladder safety procedures will be applied during use.

Drum Handling: Drums may be used to collect and store investigation-derived waste (IDW) and other waste materials. Drum safety procedures must be used for drum handling.

Vacuum Truck Operation: A vacuum truck may be used to remove material from the well locations and for waste disposal. Vacuum trucks will be bonded and grounded during pumping. A hose will be connected to the pump exhaust and directed away from the work area as needed.

Pressure Washer Operation: Pressure washer equipment may be used for cleaning. Pressure washer/steam cleaner equipment may be operated at high pressures. Cleaning

with high-pressure water will require use of metatarsal guards for foot protection. Face and eye protection will be provided for splash protection.

Chain Saw Operation: Chain saws may be used during site work. Protective equipment (i.e., gloves, chaps, safety glasses, face shield) use will be required. Safety procedures for proper use of this equipment will be required.

Power Saw Operation: Power saws may be used. Safety procedures will be followed when operating concrete saws, reciprocating saws, chop saws, or similar equipment.

Hoisting and Rigging: Hoisting and rigging may be needed for the moving of materials. Slings and cables will be inspected for damage or deterioration. Rigging of materials will be checked before hoisting; tag lines used during hoisting, as needed. Personnel will not be allowed to walk under overhead loads.

Water Safety: Fish tissue sampling will occur on water. Sampling will not be conducted when there are strong winds, rain or other adverse weather conditions. Work on, over or within six feet of the edge of the water requires use of personal flotation devices by personnel. Boat operators must be trained and conduct boat inspections. Hands must be kept away from the outside of the boat where it could impact stationary objects. Care must be taken when boarding due to boat movement and wet and slippery surfaces.

Inclement Weather and Adverse Environmental Conditions: Heavy rain or lightning and strong winds could occur during outside work operations and provisions will be made to shut down outdoor operations should this occur.

Miscellaneous Physical Hazards: General safety hazards will be present during all project tasks. Notable primary hazards are: poor housekeeping, poor illumination, overhead obstructions; uneven or slippery walking surfaces and other slip, trip and fall hazards. General safety information will be communicated during safety meetings.

3.2.1 Fire Protection

Procedures for fire hazards and fire protection include:

- Smoking is not allowed in areas where flammable or combustible materials are present
- Fires and open flame devices must not be left unattended
- Portable multipurpose fire extinguishers must be maintained on site at all times, kept fully charged, inspected monthly, and serviced annually. Fire extinguishers are to be placed within 75 feet of active work areas where flammable or combustible materials are present
- OSHA-approved metal safety cans, painted red with a yellow stripe, that have self-closing lids and flame arrestors should be used to store small quantities of flammable liquids

- Static electricity generating equipment requires bonding and grounding whenever transferring flammable or combustible liquids or when working in areas where these materials are present

- Use of equipment that uses open flames or creates sparks (i.e., torch cutting, grinding) requires implementation of hot work procedures. Hot work is not allowed without approval by the SSHO and completion of a "Hot Work Permit." A Combustible Gas Indicator (CGI) is used to determine if combustible vapors or gases exceed 10 percent of the Lower Explosive Limit (LEL) before hot work in areas where flammable or combustible materials may be present. Hot work must be conducted under a fire watch with a dry chemical fire extinguisher or an equivalent. Hot work personnel should wear protective clothing (i.e., leather chaps, jacket) for protection from metal slag and sparks and eye protection with filtered lenses.

3.2.2 Overhead Utilities

Overhead utility safety precautions include:

- The work area must be surveyed for overhead utilities and safety measures established before bringing equipment with high extensions on site (e.g., heavy equipment, dump trucks). Equipment that has high overhead projections is not allowed to operate within a 10-foot radius (minimum distance) of overhead power lines. Overhead high-voltage power lines more than 50,000 volts require additional distance. Verify the voltage of the overhead lines and check against EM385-1-1 Section 11 (Table 11-1) to ensure that the required minimum distance from overhead lines is maintained. The following minimum clearance from energized overhead electrical lines are required: 0 to 50 kilovolts (kV) (10 feet); 51 to 200 kV (15 feet); 201 to 350 kV (20 feet); 351 to 500 kV (25 feet); 501 to 650 kV (30 feet); 651 to 800 kV (35 feet); 801 to 950 kV (40 feet); and 951 to 1100 kV (45 feet)
- When crossing underneath high-voltage power lines: use a spotter to help the equipment operator monitor the distance from overhead lines; post caution overhead line signs near the approach to the overhead lines; and set up and demarcate a designated crossing area for the equipment to cross underneath the power lines
- In the event of contact with a utility line: Remove personnel from the area and control access to the affected area. Contact the utility company for immediate service.

3.2.3 Underground Utilities

Underground utility safety precautions include:

- The work area must be surveyed to identify underground utilities before subsurface work activity (drilling, excavation, etc.)

- Prior to subsurface work, the FTL or SSHO will interface with the installation regarding the location of underground utilities. The local utility locating organization will be contacted and a dig permit issued before subsurface activity. Utility clearance procedures will mark out known existing underground utilities in

the work area. The FTL and SSHO shall review utility mark-outs and determine the location of underground utilities before excavation. Excavation by power-driven equipment should not be conducted within two feet of either side of the marked utility. Hand-excavation (or air knife or water injection) on each side of the mark-out to locate the indicated obstruction should be conducted and continued until uncovered or clearance for the new grade is assured

- In the event of contact with a utility line: Remove personnel from the area and control access to the affected area. Contact the utility company for immediate service.

3.2.4 Heavy Equipment Operation

Heavy equipment operation safety procedures include:

- Only experienced personnel will operate excavation equipment on site

- Heavy equipment will have rollover protection, seat belts, good functioning brakes, fire extinguisher, and operating backup alarms and horns. Equipment will be checked daily at the beginning of each work shift and recorded by the equipment operator on a "Heavy Equipment Inspection Report" form so that the following systems and parts are in good working order: Service, emergency and parking brakes; tires/tracks; horn; steering mechanism; coupling devices; seat belts; operating controls; safety devices; fire extinguisher; and backup alarms

- Excavation work areas will be properly marked and guarded with barriers and/or caution tape to prevent unauthorized personnel entry and to prevent personnel from falling into open holes

- Workers will be required to wear high-visibility safety vests with reflective striping when working around heavy equipment

- To avoid moving equipment, workers will be cautioned to look carefully where they walk. Concurrent operations will be curtailed to prevent workers from being placed in dangerous proximity to moving heavy equipment

- Before entering the swing radius of operated heavy equipment, ground personnel must gain unobstructed eye contact with the equipment operator. Unobstructed eye contact with the equipment operator must be maintained at all times while working within the swing radius of the equipment. As a courtesy, ground personnel should "signal" the equipment operator when they are exiting the swing radius of the heavy equipment

- Personnel are not permitted to ride as passengers on heavy equipment

- Whenever equipment is parked, the parking brake will be set, and wheels will be chocked when on inclines. Bulldozer blades, hoe buckets, truck beds and the like will be fully lowered or blocked when not in use. Parts of machinery held aloft, such as hoe buckets or truck beds, will be blocked or cribbed before employees are allowed to work under or between them

- Dust control measures (i.e. water application) will be used as needed to minimize airborne dust during heavy equipment operation.

3.2.5 Excavation and Trench Safety

Excavation and trenching activities must comply with OSHA excavation requirements. Compliance with these requirements must be maintained when installing trenches 4 feet or more in depth and/or excavations 5 feet or more in depth into which personnel are required to descend. Excavation and trenching safety procedures and precautions include the following:

- Conducting and/or reviewing utility clearance information and determine the location of overhead and underground utilities before excavation
- Contacting the local utility locating organization within 48 hours prior to excavation operations, obtaining a permit (as required), and re-notifying them if an extended excavation period is required
- Delineating the areas to be excavated with white paint or other suitable markings. Before excavating, checking for the local utility location markings with the following color code: Red (electric power); Yellow (gas distribution); Orange (telephone and communications); Blue (water installation); and Green (sewer)
- Finding the exact location of substructures by hand excavation methods if sensitive underground substructures are present. It is recommended that a 24-inch excavation zone on exterior walls of subsurface installations be maintained, as required by the SSHO or CP
- Ensuring that no construction equipment or personnel come closer than 10 feet from an energized overhead high-voltage line. Overhead high-voltage power lines greater than 50,000 volts require additional distance
- Properly marking and guarding excavations to prevent personnel from falling into an open hole. Fencing, barricading, taping off, or otherwise securing open trenches during non-work periods
- Surface encumbrances near the excavation (e.g., trees, boulders, poles) must be removed
- A designated OSHA CP must provide onsite supervision during excavation activities and must be present at all times when personnel are in the excavation. The CP must examine the excavation before work in the excavation, must make daily inspections of excavations, adjacent areas, and protective systems where employee exposures exist, and must inspect the excavation after a rainstorm or other hazard-increasing occurrence. Daily inspections are to be recorded by the CP on the "Excavation Safety Checklist" and "Excavation Safety Soil Analysis Checklists"
- Use of protective systems such as shoring, sloping, benching, or shielding, is required for personnel entry into trenches 4 feet or more in depth and/or excavations 5 feet or more in depth

- Access to an excavation is required within 25 feet of lateral travel for trenches 4 feet or more in depth into which persons will descend. Stairways, ladders, or ramps must be provided for excavation access
- Persons exposed to equipment and vehicle traffic are required to wear high-visibility safety vests with reflective striping
- Mobile equipment warning systems are required when equipment operators do not have a clear and direct view of the edge of the excavation
- Soil must be placed no closer than 2 feet from the edge of trenches and excavations
- Trenches shall be crossed only if safe crossing is provided and for excavations greater than 7.5 feet deep, standard guardrails and toe boards are required on walkways or bridges
- Persons are not permitted underneath loads handled by digging equipment and employee protection from falling into the vicinity of operating excavation equipment is required
- Water accumulation in or adjacent to excavations must be prevented by diversion ditches or dikes
- Excavation work is not allowed to be conducted at the base of foundations, retaining walls or other structures until inspected by a CP and found that no hazard of undermining exists
- Existing walls or other structures are not to be used as retaining walls to hold part of an excavation or backfill unless it will safely withstand all expected loads
- Braces or other supports are required for excavations adjacent to streets, railroads or other sources of vibration or superimposed loads
- Atmospheric testing is required in excavations where oxygen-deficient or hazardous atmospheres exist or could reasonably be expected to exist. If hazardous atmospheres are present, ventilation, respiratory protection, and atmospheric testing must be used and emergency equipment (e.g., self-contained breathing apparatus, safety harness and line, basket stretcher) must be readily available
- Each soil and rock deposit must be classified by a CP as either stable rock, Type A soil, Type B soil, or Type C soil. Soil classification is made based on the results of at least one visual test and one manual test to identify the properties, factors, and conditions affecting the classification of the soil
- Layered systems are classified per their weakest layer or by each layer individually where a more stable layer lies under a less stable layer
- Changes in the properties, factors, or conditions of a deposit must be evaluated by a CP and reclassified, as necessary
- Type A soil is cohesive soil with an unconfined compressive strength of 1.5 tons per square foot (tsf) or greater (≥1.5 tsf) and includes clay, silty clay, sandy clay, clay loam, caliche, and hardpan. Soil is not classified Type A if: the soil is fissured; the soil is subject to vibration from heavy traffic, pile driving, or similar

effects; the soil has been previously disturbed; the soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater; and the material is subject to other factors that would require classification as a less stable material

- Type B soil is cohesive soil with an unconfined compressive strength greater than 0.5 tsf but less than 1.5 tsf. Type B soil includes: granular cohesion less soils such as angular gravel, silt, silty loam, sandy loam, and silty clay loam; previously disturbed soils except those that would otherwise be classified as Type C soil; soil that meets Type A unconfined compressive strength or cementation requirements but is fissured or subject to vibration; dry rock that is not stable; and material part of a sloped, layered system where layers dip into the excavation on a slope less steep than 4H:1V, but only if the material would otherwise be classified as Type B
- Type C soil is cohesive soil with an unconfined compressive strength of 0.5 tsf or less (≤ 0.5 tsf). Type C soil includes: granular soils including gravel, sand, and loamy sand; submerged soils or soil from which water is freely seeping; submerged rock that is not stable; and material in a sloped, layered system where the layers dip into the excavation or a slope of 4H:1V or steeper
- A CP shall complete a visual soil classification test by observing the excavated soil, estimating the particle size range and relative amounts, and checking the excavation and the area adjacent to the excavation for: soil cohesion; tension cracks that could indicate fissured material; chunks of soil that spall off a vertical side that could indicate fissures; existing utility and other underground structures; previously disturbed soil; layered systems that slope toward the excavation; evidence of surface water or water seeping from sides of the excavation; and sources of vibration
- A CP shall complete at least one of the following manual soil classification tests to determine qualitative and quantitative information for soil and rock deposit classification: plasticity test, dry strength test, thumb penetration test, pocket penetrometer test, hand-operated shear vane test, and drying test
- Visual and manual soil classification tests will be recorded on the "Excavation Safety Soil Analysis Checklist" form
- A Registered Professional Engineer (PE) is required to design sloping, benching, or other protective systems for excavations greater than 20 feet deep
- Maximum allowable sloping (horizontal to vertical) when used as an excavation protection system is classified according to the soil or rock type below:

  Stable rock: Maximum allowable slope of vertical (90º)
  Type A soil: Maximum allowable slope of ¾ : -1 (53º)
  Type B soil: Maximum allowable slope of 1 : 1 (45º)
  Type C soil: Maximum allowable slope of 1-1/2 : 1 (34º).

3.2.6 Vehicle and Equipment Traffic Control

Vehicle and equipment traffic control procedures are required due to the presence of concurrent vehicle, equipment, and/or pedestrian traffic. Vehicle and equipment traffic safety procedures include the following:

- Personnel are required to wear high-visibility safety vests with reflective striping where exposure to vehicle or equipment traffic exists
- Workers will be cautioned to look carefully where they walk to avoid vehicles and moving equipment and to maintain eye contact with equipment operators
- Use traffic signs, barricades, flashers, delineators, traffic cones, caution tape, or flagmen (as needed) around work areas with vehicle or equipment traffic
- The PM, FTL, and/or SSHO will establish vehicle and equipment traffic patterns to be used. Traffic haul routes will be identified during daily safety meetings and will take into account times and locations of concern for vehicle, equipment, and pedestrian traffic exposures in the work area
- Drivers will observe DOT requirements for transport of hazardous materials and hazardous waste
- Drivers will ensure areas are clear before backing vehicles and will use a spotter if needed
- Drivers will watch for overhead utility line clearance
- When outside of vehicles, drivers will wear hard hats and other prescribed PPE, as directed
- Drivers will keep vehicle windshields and mirrors clean
- Drivers will watch their step when exiting vehicles to avoid ankle sprains.

3.2.7 Material Handling

Procedures for material handling, storage, and disposal include:

- Material handling devices should be used for handling heavy or bulky items whenever possible over manual material handling. Whenever handling heavy or bulky items, the material handling needs should be evaluated in terms of weight, size, distance, and path of movement. The following hierarchy for selection of material handling means should be used: elimination of material handling needs by engineering; movement of material by mechanical device (i.e., lift truck, overhead crane, conveyor); movement by manual means with handling aid (i.e., dolly, cart); and movement using safe lifting techniques
- Personnel must be trained in safe lifting procedures including: size up the load first; get help if the load is bulky, heavy, or of unwieldy length; be sure of footing;

lift with your legs while keeping your back straight; keep your balance; do not twist under strain or jerk the load; and keep the load close to your body

- When two or more persons are carrying long material together, all persons must carry the material on the same shoulder and lift or lower the material in unison.

3.2.8 Tools, Machinery, and Equipment Use

Tools, machinery, and equipment use safety procedures include:

- Use the right tool for the job. Never use a tool for a job it was not designed to do. Make sure that you are familiar with the tool and know how to use it properly

- Equipment and tool inspection and maintenance are required to promote safe condition for the intended use. Tools and equipment should be inspected daily or before and after each use for defects. Check them for sharpness, chips, mushrooming, wear, and metal fatigue. Make sure guards and handles are in place and bolts, nuts, and screws are tight. Tools that are burred, broomed, mushroomed, have split or loose handles, worn or sprung jaws, or are generally unsafe should be turned in to the SSHO

- Check power tools and cords daily for cracks, exposed wire, and breaks in the insulation. Check for colored tape indicating last assured grounding conductor inspection and make sure it is current

- Make sure power tools have guards on their blades, bits, rollers, chains, gears, sprockets, and other dangerous moving parts. Never remove guards or handles on equipment

- Defective or unsafe equipment must be tagged as defective until repaired or otherwise made acceptable. Defective or unsafe equipment must be removed to a secure place to prevent inadvertent use until repaired. Repaired items must be re-inspected by the SSHO before being placed back into service

- Equipment must be used only for the purpose for which it was designed. Use tools properly (do not use a wrench for a hammer, screwdriver for a chisel, pliers for a wrench, pipe or stilson wrenches as a substitute for other wrenches, a pipe handle-extension or a “cheater” on a wrench). All modifications, extensions, replacement parts, or repairs of equipment must maintain at least the same factor of safety as the original equipment

- Equipment containing liquid systems (i.e., fuel, hydraulic, lubrication) are to be inspected daily so that liquid-containing systems (e.g., hoses, tubing, hydraulic lines) are in good operating condition and that plugs, stoppers, valves, etc., are properly seated

- Tools, equipment, or material should not be thrown up or down from one working level to another. A hand line should always be used to lift or lower tools

- Nails or spikes should not be left protruding from planks, boards, or other timbers. Nails or spikes should be pulled out or clinched (bend them over) into the wood

- Machinery or equipment must not be operated without proper training and special permission unless it is a regularly assigned duty

- Loose or frayed clothing, dangling ties, rings, etc., must not be worn around moving machinery or other mechanical sources of entanglement. Long hair should be worn in a hairstyle that eliminates the risk of entanglement in moving machinery or as a general risk to the individual. Hair should be tied back, worn under a hat/hard hat etc. to eliminate this risk

- Work should not be performed under vehicles supported by jacks or chain hoists, without protective blocking that will prevent injury if jacks or hoists fail

- Air hoses should not be disconnected from compressors until the air within the hoses has been bled off

- Electrical power tools, lighting equipment, etc. to be used must be properly grounded by using three-wire receptacles and extension cords rated for the amperage required. GFCIs should be used with temporary electrical systems or other proper grounding system. An assured equipment grounding conductor program should be implemented if GFCIs are not exclusively used

- Portable electric tools must not be lifted or lowered by means of a power cord. Electrical equipment cords should be kept coiled when not in use. When electrical equipment is in use, cords should be protected and positioned to avoid being run over by vehicles or equipment

- Machinery must not be repaired or adjusted while in operation. Oiling of moving parts must not be attempted except on equipment that is designed or fitted with safeguards to protect the person performing the work.

3.2.9 Electrical Equipment

Electrical equipment procedures include:

- Trained and licensed electricians will be used for electrical installation services

- Personnel must use GFCIs in conjunction with portable electric tools or other equipment connected to electrical extension cords. An assured equipment grounding conductor program must be implemented if GFCIs are not exclusively used

- Portable electric tools must not be lifted or lowered by their power cord

- Electrical extension cords must be rated for the amperage required. The plugs must not be altered or used incorrectly (such as the addition of non-grounded plug adapters). Electrical equipment cords should be kept coiled when not in use. When electrical equipment is in use, cords should be protected and positioned to

avoid being run over by vehicles or equipment. Inspect electrical extension cords for damage and ground plugs. Keep electrical equipment/cords away from water and fuel materials. Electrical cords may not be used for raising or lowering the equipment. Electrical cords may not be fastened with staples or otherwise hung in such a fashion that could damage the outer jacket or insulation.

3.2.10 Lockout/Tagout

Equipment use requires positive control of hazardous energy during servicing and maintenance of equipment where unexpected energization, startup of equipment, or release of stored energy could occur. LO/TO procedures include:

- LO/TO of electrical equipment for maintenance and servicing will be conducted by an electrical subcontractor as needed. Trained and licensed electricians will be used where required
- Energy sources for equipment must be turned off or disconnected and switches locked out and tagged out before servicing of equipment
- Standardized locks and tags are to be used to indicate the identity of the individual using them
- Each LO/TO device is required to be removed by the individual who applied the device
- The SSHO is responsible for ensuring proper implementation of LO/TO including approval of permits and maintenance of personal locks and a log of lock assignments.

3.2.11 Noise Exposure

The operation of equipment at the site may generate excessive noise levels and requires:

- Site personnel working in the immediate area of operating equipment are required to use hearing protection (e.g., foam ear plugs) whenever noise exposures exceed 85 dBA
- Noise exposures in excess of 85 dBA are assumed to be present when voices must be raised to be heard in normal conversation at 3 feet apart and also whenever working in the immediate areas of operating generators, compressors, and similar equipment.

3.2.12 Heat Stress

Heat stress precautions and prevention measures include:

- Personnel must be made aware that heat stress can occur during periods of elevated ambient temperatures, moderate to heavy workloads, and when impermeable protective clothing is in use

- Personnel will be informed about the various forms of heat stress (e.g., heat cramps, heat exhaustion, heat stroke) and the symptoms of exposure which are: Heat Cramps and Heat Exhaustion: initial symptoms are cramps, faintness, dizziness or disorientation, and pale, clammy skin. Heat Stroke: Heat stroke is an extremely serious medical emergency with sudden onset and symptoms that include dilated pupils, dry and hot skin, loss of consciousness, and convulsions

- Initial phases of work activity must be closely monitored by the SSHO because workers may not be acclimatized to hot conditions. The SSHO will try to identify personnel who are more susceptible to heat exposure

- Workers are responsible for observing each other and themselves for development of heat stress symptoms. Personnel will be encouraged to drink generous amounts of water and electrolyte replacement fluids (even if not thirsty) to prevent dehydration. Adequate shelter will be provided to protect personnel from direct sun exposure. Sufficient breaks will be provided so that personnel can remove protective clothing and cool down. Work/rest regimens will be adjusted as required to avoid heat stress.

3.2.13 Cold Stress

Cold stress can occur upon exposure to cold environments where there is heat loss to the body, feet, hands, and/or head. Primary cold stress injuries are hypothermia and frostbite. Cold can also adversely affect mental capabilities resulting in accidents or injuries. The body's initial responses to cold are: shivering, vasoconstriction, increased oxygen consumption, accelerated respiration and pulse, and increased heart output and blood pressure. Cold stress precautions and prevention measures include:

- Personnel will be informed about the various forms of cold stress (e.g., hypothermia, frostbite) and the symptoms of exposure, which are:

  Hypothermia: Hypothermia occurs when the body core temperature falls below 96.8ºF. Symptoms include intense uncontrollable shivering, sluggish thinking, difficulty speaking, muscular rigidity, blue puffy skin, poor coordination, cessation of shivering, dulled thinking, irrational stupor, unconsciousness, erratic heartbeat, slowed respiration, cardiac and/or respiratory failure, lung edema, and death. Treatment for hypothermia is to re-warm the body trunk, immerse in warm water (105ºF) or use heat packs.

  Frostbite: Frostbite occurs due to freezing of fluid that surrounds tissues. It occurs at less than 30ºF, and more rapidly with wind exposure. Frostbite affects the ears, chin, nose, fingers, and toes. Frostbite first appears as blanched skin or waxy or white skin that is firm to the touch with resilient tissue beneath. With deep frostbite, tissues are cold, pale, solid, and may turn black. Treatment for frostbite is to re-warm with warm water (105ºF) and prevent refreezing of affected body parts. Use personal protection by dressing for warmth, wind, and wet conditions. Wear layered clothing (i.e., wear thinner, lighter clothing next to the body with heavier clothing layered outside the inner clothing)

- Stay active, as activity generates heat

- Provide a warm break area when working in cold environments
- Have first-aid equipment available
- At temperatures lower than 25ºF, do not permit continuous cold exposure to exposed skin. At temperatures lower than 45ºF, wear warm clothing to include as needed: Boots; heavy socks (e.g. wool or polypropylene), mittens, insulated gloves, insulated head covers, thermal underwear, and insulated coveralls
- Provide for a change of clothing for workers who are immersed in water or whose clothing becomes soaked through. In this situation, treat for hypothermia if symptoms become evident.

3.2.14 Drill Rig Safety

Drill rig safety procedures include:

- Conduct utility clearance procedures before drilling activity to identify overhead and subsurface utilities. Contact the local utility locating organization before drilling, obtain permit (as required), and re-notify if extended drilling period is required. Identify locations of utilities on site layout plan and review before drilling
- Inspect travel routes for presence of overhead power lines, subsurface utilities, uneven terrain, rocks, trees, soil erosion, steep grades, etc
- Drill rig equipment will not be allowed to operate within a ten-foot radius (minimum distance) of overhead power lines. Overhead high-voltage power lines greater than 50,000 volts require additional distance
- Lower drill rig mast and secure loads when moving rig
- Remove passengers from cab of drill rig before moving onto rough or sloped terrain. Engage multiple-drive power trains on drill rig when mobilizing off-road. Travel directly up or down grade on slopes when possible and avoid off-camber or traverse approaches to drill sites. Approach changes in grade squarely to avoid shifting loads
- Use a spotter to assist in directing drill rig into tight areas
- Block the drill rig as necessary
- Inspect wire ropes, swivels, hooks, bearings, sheaves, guides, rollers, etc. for damage or deterioration before use. Periodically inspect wire ropes for kinking, fraying, or separation
- Establish 30-foot-diameter area around drill rig and section off with caution tape to prevent entry of unauthorized personnel into drilling work area

- Check for the drill rig “kill switch” which may be a handle, button, or cable. There should be one accessible to the operator and one to the helper available on the rig. The drill rig "kill switch" must be tested before drilling
- Establish effective communication system between driller, driller's helper, and geologist
- Wear PPE and conduct monitoring for combustible gases and airborne contaminants, as required
- Begin auger borings slowly with drill rig drive engine operating at low speed
- Do not wear loose clothing or jewelry around drill rig
- Avoid placing hands or feet underneath auger in case of sudden shifting of drill rig
- See that drill rig is in neutral and augers are not rotating before cleaning augers
- Maintain good housekeeping around drill rig
- Store diesel and gasoline only in approved flammable liquid safety cans
- Shut down drilling operations during adverse weather conditions involving high winds, heavy rain, heavy snow, or lightning storms.

3.2.15 Compressed Gas Cylinder Safety

Work operations involving compressed gas cylinder handling require:

- Compressed gas cylinders (i.e., breathing air, oxygen, and acetylene) must be protected from physical damage, electric current, and temperature extremes (storage below 130 ºF required). Smoking is prohibited is areas of compressed gas cylinder storage or use. Compressed gas cylinders must not be stored or used in a confined space or other poorly ventilated areas
- Ground movement of compressed gas cylinders must be completed with the valve closed, valve cap installed, by upright cylinder rolling technique, and by a hand truck with securing chain in place for longer distance travel
- Compressed gas cylinders in storage must be substantially secured by rope, chain, cylinder cart, or equivalent
- Vehicle transport of compressed gas cylinders require cylinders to be substantially secured by rope, chain with come-a-long, or equivalent. Drivers are required to carry shipping papers and have vehicles placarded as required by the U.S. Department of Transportation (DOT).

3.2.16 Forklift Operation

Forklift operation safety requirements include:

- Only trained and experienced personnel will operate forklifts
- Forklifts are required to be inspected before use and have seat belts, good functioning brakes, and operating backup alarms and horns. Forklift operators will complete a "Forklift Inspection Report" to document inspections. Forklifts must be equipped with canopies for overhead protection
- Forklift operators will look in the direction of travel and must not move the forklift until all persons are clear
- Forks of forklifts will be carried as low as possible during operation
- Forklift operators will lower the forks, place controls in neutral, and set brakes (or block wheels if on incline) when a forklift is dismounted and the operator is in view of and within 25 feet of the forklift. Additionally, the engine must be shut off before leaving a forklift unattended (operator out of sight or 25 feet or more away from the forklift)
- Forklift forks may be left in a raised position for loading and unloading of materials provided that the forks are raised no more than 42 inches above the level where the operator/loaders are standing and the forklift controls are in neutral, brakes set (or wheels blocked if on incline), and the engine is shut off
- Workers will be cautioned to look carefully where they walk to avoid forklift equipment and to maintain eye contact with forklift operators
- Personnel are not permitted to ride on the forks of a forklift
- Personnel are not permitted to go underneath the forks of a forklift (unless forks are blocked)
- Forklifts will not be used to elevate personnel unless a platform with guardrails, a back guard, and a kill switch are provided (personal fall arrest systems are required if guardrails are not possible).

3.2.17 Ladder Safety

Ladder safety requirements include:

- Ladders must be of sound construction and are to be inspected before use. Metal ladders are not allowed near electrical equipment. Wooden ladders are not to be used if painted over in such a way that cracks or defects can be hidden
- Extension ladders must be placed so a minimum 4:1 angle ratio (4 feet up and 1 foot out) is used. Extension ladders must have anti-slip footings and be secured by substantial rope or other means. Extension ladders must extend a minimum 3 feet above the landing to be used
- The top two rungs of a ladder are not to be used to stand on

- Personnel are not allowed to stand below occupied ladders where tools and objects could fall.

3.2.18 Drum Handling

Work operations involving drum handling require:

- Personnel will be made aware of potential hazard associated with drum handling and safe work practices to minimize risk of injury during daily safety meetings
- Drum dollies, forklifts, and/or heavy equipment should be used to move drums when possible instead of manual movement of drums
- If manual movement of drums is needed, complete the following: inspect the drum condition and check for secure closure (i.e., drum ring/bolt, bungs). Survey the path of movement. Look for sloped ground, uneven surfaces, rocks, and soft ground (can use plywood sheet on the ground for drum movement over soft ground). Clear the pathway of debris, materials and equipment. Wear gloves for drum handling to avoid cuts on sharp edges and to obtain a good grip. Check the weight of the drum and if safely manageable: place the body close to the drum; have one foot close to the base of the drum and one foot set back slightly; grasp the top of the drum on the near and opposite side; use a forward/backward rocking motion and use momentum to move the drum weight onto the near side bottom rim of the drum; keep the drum balanced on the near side bottom rim at a 35- to 45-degree angle; move the drum slowly maintaining the drum balance on the near side bottom rim without crossing over the feet or hands; watch of nearby objects (i.e., walls, drums) that may crush fingers before setting the drum down.

3.2.19 Vacuum Truck Operation

Vacuum truck operation safety requirements include:

- Only experienced personnel will operate vacuum trucks and equipment is required to have seat belts, good functioning brakes, fire extinguisher, and operating backup alarms and horns
- Workers will maintain visual contact with vacuum truck operator during vacuum truck movement and will look carefully where they walk to avoid moving equipment
- Traffic cones and caution tape may be used around work areas with vehicle traffic
- Grounding of the vacuum truck will be implemented during transfer of flammable or combustible liquid products to prevent discharge of static electricity sparks
- A vacuum hose will be attached to the vacuum truck pump exhaust to vent exhaust downwind, as needed.

3.2.20 Pressure Washer Operation

The use of pressure washer equipment requires:

- Only trained and experienced personnel will operate pressure-washing equipment

- All electrical equipment will be shut off and locked out/tagged out before application of water in affected work areas
- Pressure washing equipment operators will barricade/tape off around work areas as needed
- Pressure washing equipment operators will wear protective boots, protective clothing, hearing protection, face shields, goggles and/or safety glasses, and other appropriate PPE
- Metatarsal foot guards will be used when using high-pressure water (greater than 1,200 pounds per square inch)
- A fire extinguisher will be maintained on each pressure washer unit.

3.2.21 Chain Saw Operation

Chain saw use can be dangerous if proper procedures are not used:

- Chain saws will have an automatic chain brake or anti-kickback device
- The idle speed of chain saws will be adjusted so that the chain does not move when the engine is idling
- Chain saw operators will wear PPE to include eye, ear, hand, foot, and leg protective equipment
- Chain saws will not be fueled while running, while hot, or near an open flame. Chain saws will not be started within ten feet of a fuel container. Gasoline and mixed gas fuels for chain saws will be stored in OSHA-approved metal cans with self-closing lids and flame arrestor
- Chain saw operators will hold the saw with both hands during cutting operations
- A chain saw must never be used to cut above the operator's shoulder height.

3.2.22 Power Saw Operation

Use of power saws (i.e., chop saw, cut-off saw, reciprocating saw, circular saw) is dangerous unless proper procedures are used:

- Power saw operators will wear PPE to include eye, ear, hand, foot, and leg protective equipment
- Power saws must not be fueled while running, while hot, or near an open flame. Power saws must not be started within 10 feet of a fuel container. Gasoline and mixed gas fuels for power saws will be stored in OSHA-approved metal cans with self-closing lids and flame arrestor
- Power saw operators will hold the saw with both hands during cutting operations

- A power saw must never be used to cut above the operator's shoulder height.

3.2.23 Hoisting and Rigging

Hoisting and rigging safety procedures include:

- Hoisting and rigging activities are to be conducted according to applicable OSHA regulations and American National Standards Institute (ANSI) specifications
- Operators of powered, self-propelled equipment used for hoisting are required to have a Medical Examiner's Certificate stating that the operator meets physical qualification requirements
- The hoisting and rigging equipment operator must provide to the SSHO copies of the following records: equipment manufacturer operating, maintenance, and inspection instructions; equipment load tests in accordance with (IAW) applicable OSHA and ANSI standards; written approval from the equipment manufacturer to modify hoisting equipment or attachments which alter the capacity of the equipment and the corresponding operating instructions and altered capacities; equipment inspection reports; and qualifications of crane operators and other hoisting equipment operators
- Only qualified personnel are allowed to perform hoisting and rigging operations. Hoisting and rigging personnel must know the capacities and operating characteristics of equipment to be used
- The operator is responsible for ensuring that daily (pre-use or pre-operation), monthly, and annual inspections are current before using any hoisting and rigging equipment. The operator must know the total weight of all loads, including rigging and other components, which contribute to the overall weight being lifted, before attempting the lift of any load. The operator must know the manufacturer's specified load rating for the equipment in the particular configuration to be used to lift or move a load. Equipment is not to be loaded beyond the manufacturer's specified load rating. Load charts, rated capacities, recommended operating parameters, and special hazard warnings are to be posted in a location accessible by the operator while working at the controls of the equipment. The operator must not bypass, override, or disable any equipment safety feature
- Auxiliary attachments to be used with hoisting and rigging equipment that affects the capacity, safe operation, or operating characteristics for the equipment must be used only per recommended instructions from the original equipment manufacturer
- The operator must respond to standard hand signals and/or continuous voice communication from a qualified signal person. If visual or voice contact is interrupted, the hoisting and rigging operation must immediately cease. The operator must obey a stop signal given at any time by anyone. The operator must never leave the control station of the equipment being operated while a load is suspended, unless required to do so by an approved emergency procedure
- Hoisting equipment (cranes, winch trucks, etc.) must not be moved unless suspended loads are secured to prevent swinging

- Persons are not allowed to ride on the ball or hook of any crane or derrick, nor on equipment, rigging, or on any loads being moved by heavy equipment
- All personnel have the authority to stop any unsafe hoisting and rigging activity observed
- A suspended load must never be moved over personnel or personnel allowed to stand or pass under a suspended load
- Barricades and flagging must be erected when the swing radius of rotating equipment (superstructure or counterweight) might create a hazard to personnel in the area. If the rotating equipment is eight feet above the surrounding personnel access level, barricades or flagging are not required
- Load lines must be carefully inspected each time they are rigged and each time they are taken down
- Slings must be protected from a load's sharp edges and corners, and shall not be jerked when moving a load (jerking may triple the load on a sling). Cable slings must be inspected regularly, destroyed if defective, and hung up when not in use
- Tag lines are required on all loads to minimize shifting or swaying while being hoisted or lowered unless use of a tag line creates an additional safety hazard (i.e., potential for entanglement, contact with energized lines, etc.) As many tag lines as are necessary are to be used to control the load
- Specific hoisting requirements for crane suspended personnel platforms must be followed if used
- If hoisting and rigging equipment is damaged while in use or becomes defective, the equipment must be immediately tagged as defective, removed from service, and reported to the SSHO. Defective or damaged rope or cable is to be cut immediately to prevent further use.

3.2.24 Water Safety

Safety requirements are necessary for work in, on or around waterways and operating watercraft. Most non-fatal accidents occur either by boating collisions or fires on-board due to proper fueling procedures not being followed. The most common fatal boating accidents are capsizing or falling overboard. The following requirements apply to field personnel working in, on, or near waterways, including but not limited to, stream gauging and water quality sampling:

- For work operations involving a hazard of drowning (i.e., work on, or within 6 feet of the edge of the water: Personnel must properly wear a U.S. Coast Guard (USCG)-approved Type I personal floatation device (PFD), Type II PFD, Type III PFD, or equivalent PFD, while working on, over or within 6-feet of the edge of the water. PFDs shall be inspected for operational condition and appropriate USCG approvals and ratings
- For watercraft operation, know and abide with Federal, state, and local regulations that apply to watercraft use and the waters that will be operated in. Personnel

working from motorboats must complete a boating safety course (or provide documentation of an equivalent or higher level of boating safety training) prior to working onboard a boat. Power boats must have a valid state registration. Registration shall be maintained on the boat and made available for USCG or marine inspection. Have the safety equipment on board required by law. Keep it in good operating condition and know how to properly use these devices. Have complete knowledge of the boat and its handling characteristics. The operator must accept responsibility for the actions of persons on board the watercraft. Be aware of changing weather conditions that may threaten safety

- Boat inspections must be conducted by the boat operator daily prior to use. Inspections must be conducted according to accepted USCG or applicable state boating safety inspection procedures
- Ensure that the appropriate type and quantity of PFDs is on board
- Power boats must have a multi-purpose dry chemical fire extinguisher maintained onboard each motorboat. At least one USCG-approved 30-inch life ring with no less than 90 feet of 600-pound capacity line attached must be kept in a convenient accessible place. Travel distance to a life ring must not exceed 200 feet
- Personnel in boats on the water shall maintain communication by two-way radio, or other equivalent means, to contact to other boat and/or land personnel
- An audible signal/alarm (i.e., compressed air horn) must be onboard for distress call signaling along with a visual display signal/device such as flares or a distress flag
- Boats shall not be overloaded with equipment or personnel beyond their allowable weight capacity
- Equipment and personnel must be distributed evenly within the boat to maintain balance and to avoid tipping
- Personnel should not stand in a motor boat
- Personnel must be aware of personnel transfer boarding dangers, shifting equipment, moving surfaces, unsteady footing, and other hazards due to boat movement
- Personnel are to be cautioned not to place hands along the outside of the boat to prevent smashing against another object. Personnel shall not be allowed to place hands near the outboard motor propeller of the boat under any circumstances
- Boats shall not be operated at night without required lighting and visual distress signals

3.2.25 Inclement Weather and Adverse Environmental Conditions

In cases of inclement weather for outside work locations or other adverse environmental conditions (i.e., strong winds, rain, snow, lightning, hurricane, tornado, earthquake) the following safety instructions are required:

- Presence of strong winds requires stoppage of affected work activities at elevated work locations (e.g., towers, roofs, ladders, scaffolds, platforms) and stoppage of use of equipment whose safe operation can be affected by high winds (i.e., drill rigs, man lifts, scissor lifts, cranes)

- Presence of heavy rain or snow requires stoppage of affected work activities where the heavy rain or snow can create safety hazards due to limited visibility, wet work surfaces, slippery equipment controls, increased electrical hazards, cold stress, etc.

- Presence of lightning requires stoppage of affected work activities where lightning presents an increased safety hazard of electrocution (e.g., cranes, heavy equipment, drill rigs, tanks, towers)

- Occurrence of a hurricane, tornado, or earthquake requires stoppage of affected work activities and evacuation of personnel from excavations and trenches, confined spaces, and buildings of questionable stability

- In case of work stoppage due to inclement weather conditions or other adverse environmental conditions, work will not resume until an all clear signal has been communicated by the SSHO to affected personnel. In case of work stoppage due to lightning, stay under shelter 30 minutes after last show of lightning or sound of thunder clap

- In the case of severe weather conditions, emergency evacuation procedures shall be established where high winds, strong storms, tornadoes, hurricanes, and floods are a potential occurrence. The SSHO shall monitor the local weather conditions and advise the PM when the U.S. Weather Service issues severe storm warnings. When a severe weather warning is issued, the FTL and SSHO will begin taking actions to secure the worksite. In the event of impending severe weather conditions, personnel will be advised of the hazard, and an evacuation order will be issued by the SSHO. All site personnel shall immediately evacuate the work area to a designated location (i.e., hotel). The SSHO will notify the PM and advise him that all site personnel are evacuating the area. The SSHO shall maintain contact with site personnel and provide the PM with periodic updates as to the whereabouts of all site personnel. Site personnel shall remain outside the evacuation area at a designated location until notified by the PM that it is safe to return to the work area. After severe weather conditions have passed, the FTL and SSHO will mobilize to the worksite, inspect the condition and security of the site, and make any necessary response actions to correct unacceptable conditions.

3.2.26 Miscellaneous Physical Hazards

Miscellaneous physical hazards and safety procedures to be followed are reviewed with personnel in safety meetings and may include discussion of the following topics:

- Poor housekeeping
- Poor illumination
- Overhead obstructions
- Sharp objects
- Uneven walking surfaces
- Slippery work surfaces
- Tripping hazards
- Fall hazards.

3.3 Biological Hazards

Biological hazards that may potentially be encountered during site work include:

- Poisonous plants
- Venomous snakes
- Venomous spiders
- Rodents
- Ants and bees
- Ticks
- Mosquitoes.

3.3.1 Poisonous Plants

Contact with poisonous plants such as poison oak, poison ivy, or poison sumac can result in dermatitis. Poison oak is a biological hazard that causes reaction in more than 50 percent of the population. Poison oak has green leaves in the spring and summer, and red and yellow leaves in the fall that are found in sets of three. This trait is easily remembered by an old rhyme "leaves of three, let them be." Black dots of dried sap (resin) on the leaves are also characteristic of the plant. It is the resin called "urushiol," derived from the Japanese word for "sap," that poses a threat to sensitive individuals. The skin reacts to the resin upon contact causing dermatitis characterized by linear streaks and red bumps where the plant has brushed against the skin. Contact with the smoke from burning poison oak also causes severe reactions in the respiratory tract and exposed skin in sensitive individuals. Signs and symptoms of exposure are redness, swelling, blisters, and intense itching. Blisters form within 24 hours, weeping, crusting and scaling of the blisters within a few days, and complete healing occurs in about 10 days.

Poison oak first-aid procedures are: Washing, without scrubbing, of the affected area with mild soap and water, application of a paste of baking soda and water on the area several times a day, or application of an anti-cortical cream or lotion, such as Calamine or Caladryl, to help soothe the area. Antihistamines, such as Benadryl, may also help dry up the sores. If the condition worsens or persists and affects large areas of the body or the face, see a doctor. It may be necessary to give anti-inflammatory drugs, such as corticosteroids, or other medications to relieve discomfort

3.3.2 Venomous Snakes

Venomous snakes (i.e., rattlesnake) may be encountered during site work. The rattlesnake has a series of dark and light bands near the tail just before the rattles that are different from the rest of the body. Rattlesnake bite signs and symptoms of envenomation include: fang marks; metallic or rubbery taste in mouth; tingling of the tongue; numbness; swelling within 10 minutes of bite; nausea, weakness, temperature change; and discoloration within 3 hours to 6 hours.

Rattlesnake precautions include: Avoid walking in areas known to be populated with snakes; avoid traveling on foot at night; avoid traveling off trails or paths in grassy or brush-laden areas; do not climb into rocky areas without visual inspection for snakes; be alert when moving debris as snakes seek shelter in shaded areas; wear high-top boots and long pants when walking in grassy areas; clear brush from around buildings, check/repair leaky faucets, and keep trash in containers with secure lids. If a snake is encountered, look around, there may be others, then turn around and walk away on the same path traveled.

Rattlesnake bite first-aid procedures are: Summon emergency medical help immediately; have victim stay calm and remain motionless, if possible; position victim so that bite is kept below heart level. Do not use ice, cold packs, sprays, alcohol, or any drugs. Do not use a tight tourniquet, instead apply a light constricting band above bite (be able to insert finger under band). Do not release band unless too tight from swelling. Do not make incision across bite to suck out venom. Do not wait to see if symptoms develop, seek medical attention as soon as possible.

3.3.3 Venomous Spiders

Venomous spiders, such as the black widow spider or the brown recluse spider, may be encountered during site work. Spiders are usually found in dark, cool, protected areas and such areas should be inspected before placing hands or feet in these areas. Poisonous spiders are commonly found in woodpiles, sheds, basements, garages, and privies.

The primary species of black widow spider encountered has a glossy black appearance with an orange-red hourglass shape on the underside of the body. Black widow spider bite signs and symptoms are: Initial pain followed by dull, occasionally numbing pain in the affected extremity; pain and cramps in one or several of the large body muscles; abdominal pain and cramping; sweating, increased salivation, anxiety, weakness, headache, and dizziness; and severe cases can result in uncontrollable muscle spasms, coma, and respiratory failure. Black widow spider bite first-aid procedures are: wash wound; apply a cold pack; and get medical care (e.g., muscle relaxants; antivenin)

The brown recluse spider is also known as the “violin or fiddle back” spider and is light brown in color with a darker brown violin-like marking on the top of the body. The brown recluse spider is non-aggressive, and most bites occur when the spider is trapped in clothing being put on, stepped on, and when areas where the spider resides are disturbed. Brown recluse spider bite signs and symptoms are: Localized burning sensation within 2 hours to 8 hours with itching and redness; small blanched area around immediate bite area appears; reddened area enlarges and becomes purple during subsequent 1 hour to 8 hours; fever, malaise, stomach cramps, nausea, vomiting, and

some cases have resulted in death. Brown recluse spider bite first-aid procedures are: wash wound; apply a cold pack; and seek immediate medical care.

3.3.4 Rodents

Rodents include rats, mice, squirrels, and other related mammals and are characterized by gnawing and nibbling traits. Rodents can act as a vector for many diseases that may be transmitted directly or through other vectors such as fleas or ticks. Diseases that can be transmitted include plague, typhus, Leptospirosis, relapsing fever, and others including Hantavirus pulmonary syndrome.

3.3.5 Ants and Bees

Ant bites and bee stings can be deadly to those who are hypersensitive. Anaphylactic shock can occur to sensitized individuals upon repeated stinging. Signs and symptoms of envenomation are usually local pain, redness, itching, and swelling. Sensitive individuals may have more serious symptoms such as welts, itching palms and feet, headache, nausea, vomiting, labored breathing, and in severe cases respiratory paralysis or heart failure. Individuals who are hypersensitive should carry a kit containing an antihistamine and epinephrine.

3.3.6 Ticks

Infected wood ticks and dog ticks can act as a vector for many diseases including Rocky Mountain spotted fever, Q fever, relapsing fever, Lyme disease, and tularemia. Adult ticks are reddish brown in color and may have white markings on the back. They are usually 1/4-inch long, are oblong or seed-shaped, and have eight legs. The adult wood tick appears during the spring and early summer months in the northwestern states, and the dog tick appears throughout the summer in the eastern and southern states. The disease-carrying organism is transmitted to humans through the bite of the tick or by contact with crushed tick blood or feces through a scratch or wound.

The early signs and symptoms of Lyme disease are a bull's eye rash, fever or chills, and fatigue or body aching. Later skin lesions may develop as well as heart, neurological or muscle complications. It is often difficult to diagnose since people often do not notice the tick bite, rashes may not appear, or symptoms imitate other diseases or infections.

To avoid contact with ticks, wear clothing that fully covers the legs, arms and hands. Avoid walking in wooded or brush-laden areas whenever possible. Inspect the body and clothing during rest periods and immediately remove any ticks found, being careful not to crush them. Have someone else help to inspect the neck, back, head, and other hard-to-see areas of the body. If ticks are found on the body, try to remove the tick without crushing or leaving any part of the tick in the wound. Use fine-pointed tweezers for tick removal by insertion under the tick. Do not crush the tick on your body or between the fingers. Apply gentle but firm traction on the tick, being careful not to leave the mouthparts in the skin. Do not use force; a slow steady pull is required. Wash hands thoroughly with soap and warm water after handling ticks, apply antiseptic to the wound with iodine, Mercurochrome, or Merthiolate and apply a corticosteroid lotion.

3.3.7 Mosquitoes

Infected mosquitoes can act as a vector for many diseases including West Nile Virus. West Nile encephalitis is caused by the West Nile virus. Encephalitis is an inflammation of the brain and can be caused by viruses and bacteria, including viruses transmitted by mosquito bites. Transmission is a vicious circle. Mosquitoes become infected when they feed on infected birds. The virus gets into the mosquito's salivary glands. Then the mosquito bites a human or an animal, injecting the virus, which can multiply and cause illness. Symptoms vary depending on the severity of the infection. Mild infections include flu-like symptoms: fever, headaches and body aches, skin rash, and swollen lymph glands. Severe infections include symptoms such as higher fever, neck stiffness, disorientation, coma, paralysis, convulsions and muscle weakness.

The methods of reducing risks of transmission of West Nile Virus include staying indoors at dawn, dusk, and in the early evening, wearing long-sleeved shirts and long pants when outdoors, spraying clothing with repellents containing Permethrin or DEET, and applying insect repellent sparingly to exposed skin.

3.4 Dust Control

Dust will be primarily controlled at work sites using water spray application.

3.5 Activity Hazard Analyses

Dust Activity Hazard Analyses (AHAs) are prepared before beginning each major phase of work operations. The AHAs summarize and review hazards and control measures for primary site tasks. The AHA defines the activities to be performed and identifies, in summary form, the sequence of work, specific hazards anticipated, and control measures to be implemented to eliminate or reduce each hazard to an acceptable level. Work does not proceed on that phase of work until the AHA has been accepted by the COR and the AHA has been reviewed with personnel involved with the activity. The AHA is periodically reviewed and modified when appropriate to address changing site conditions or operations. AHA modification occurs only with the concurrence of the SHM, PM, FTL, SSHO, and COR.

AHAs for the following major project tasks are provided in Appendix C:

- Mobilization and Site Preparation
- Excavation, Soil Removal and Disposal
- Sampling
- Fish Tissue Sampling
- Operations and Maintenance
- Monitoring Well Installation
- Monitoring Well Decommissioning
- Free Product Recovery
- Site Cleanup and Demobilization.

4.0 EXPOSURE MONITORING

Air monitoring will be necessary to determine personnel exposures to chemical contaminants and/or physical agents during various project activities. The SSHO, or designee, will be responsible for completing air monitoring activities during field operations where there is potential exposure to combustible gases, oxygen deficiency, and/or airborne contaminants above OSHA 8-hour time-weighted average (TWA) and 15-minute short-term exposure limit (STEL) PELs or ACGIH TLVs. A description of the plan for air monitoring to be implemented during the project is provided in this section of the SSHP (see Table 4).

4.1 Air Contaminants

The primary air contaminants that may be encountered during project fieldwork are petroleum-related VOCs.

4.2 Air Monitoring Plan

Combustible gas and VOC monitoring are expected to be conducted during the project scope of work (see Table 4). The SSHO or designee completes exposure monitoring. Should action level concentrations be exceeded, response actions will be initiated to implement engineering controls, safe work practices, upgrade or downgrade in PPE, work stoppage, emergency evacuation, and notification and evaluation by the PM and SSHO. The SSHO is responsible for maintaining copies of applicable monitoring records at the site for the duration of the project. The SSHO notifies site personnel of air monitoring results through correspondence or posting of information.

4.3 Combustible Gases and Oxygen

A combination CGI and oxygen indicator will be used during operations where the presence of combustible vapors, oxygen-deficient, and/or oxygen-enriched atmospheres is suspected (i.e., landfill gas sampling; hot work if conducted in an area where combustible or flammable liquids or gases may be present or are stored). Oxygen measurements are conducted before combustible gas measurements to ensure that adequate oxygen is present for proper combustible gas sensor operation. Work will not be allowed, or if in progress, stopped, if combustible gas concentrations exceed 10 percent of the LEL or if oxygen concentrations are below 19.5 percent or above 23.5 percent oxygen by volume.

Combustible gases and oxygen are measured with a combination CGI and oxygen indicator. This type of multi-gas monitor is capable of detecting and indicating combustible vapor and gas concentrations of 0 to 100 percent of the LEL and oxygen in percent by volume. The combination CGI and oxygen indicator is calibrated before use to a known concentration of combustible gas and nitrogen according to instrument manufacturer instructions.

Combustible Gas Monitoring Action Level:

- Combustible gas concentrations exceed 10 percent LEL. ACTION: Stop work. Isolate ignition sources. Ventilate area. Contact the SSHO to evaluate.

Oxygen Monitoring Action Levels:

- Oxygen concentrations are below 19.5 percent or are above 23.5 percent. ACTION: Stop work. Ventilate area. Contact the SSHO to evaluate.

4.4 Volatile Organic Compounds

Monitoring for VOCs is conducted during operations where the presence of VOCs is suspected and there is a need to determine if respiratory protection is required. If VOCs are detected or suspected to be present in an area, sampling of the work area and breathing zone of workers is conducted periodically during work. VOC measurements that are below 5 parts per million (ppm) will be considered acceptable for Level D protection work.

VOCs will be measured with a photoionization detector (PID). The PID uses photoionization to detect compounds that have an ionization potential below the energy of the lamp installed in the instrument. Lamp energy is measured in electron volts (eV) and most PIDs have a standard 10.6-eV lamp installed. The PID is calibrated before use to a known concentration of isobutylene calibration gas (or equivalent).

VOC Monitoring Action Levels:

- VOC concentrations in the workers breathing zone are equal to 5 ppm above background for sustained period of 15-minutes. ACTION: Contact the SSHO to evaluate

- VOC concentrations in the workers breathing zone are greater than 5 ppm, sustained over a 15-minute period in the breathing zone, and less than 50 ppm. ACTION: Use Level C protection. Contact the SSHO to evaluate

- VOC concentrations in the workers breathing zone are greater than, or equal to, 50 ppm. ACTION: Stop work. Contact the SSHO to evaluate.

5.0 SITE CONTROL

Site control procedures are established to: restrict access to controlled areas of the worksite, identify means for site communication, and establish measures for site security.

5.1 Site Work Zones

Site work zones are established based on the type of operations to be conducted in the work zone, potential for exposure to contaminants, and potential for contact with other safety hazards. The establishment of controlled work zones (i.e., exclusion zone [EZ], contamination reduction zone [CRZ], and support zone) may be required only during specific operations identified by the SSHO. Site work zone requirements are established to limit access to work areas to authorized personnel, prevent the spread of contamination from the work area, establish site communication, and site security measures. Work zone demarcation will be established through use of caution tape or other means (e.g., barricades, fencing, signs) as approved by the SSHO.

5.1.1 Exclusion or Hot Zone

The EZ is the work zone that represents the area of highest contamination at the site. The EZ will be identified by the SSHO for each work area. The level of protection used within the EZ may vary dependent upon the various work tasks to be conducted and is determined by the SSHO.

5.1.2 Contamination Reduction Zone

The CRZ is the work zone that represents the transition area between the EZ and the support zone at the site. Entry to/exit from the EZ will be through a designated location in the CRZ. Upon exit from the EZ, workers will be required to pass through the CRZ before entering the support zone. Personnel decontamination will occur within the decontamination station in the CRZ.

5.1.3 Support Zone

The support zone is the work zone outside of the CRZ that represents the clean areas established at the site. The command post, medical station, equipment and supplies, and other support facilities will be located in the support zone. All breaks, lunch, and meetings will take place in the support zone. Whenever possible, support zone activities will be located upwind of the EZ to reduce the possibility of vapor and/or dust exposures.

5.1.4 Location of Site Work Zones

The EZ generally coincides with the extent of contamination/excavation. The CRZ is located between the EZ and the support zone. The CRZ comprises the personnel and equipment decontamination area.

For sampling events, the EZ will be defined by the SSHO and will be, at a minimum, a 30-foot radius about the sampling point. This work zone may be extended if, in the judgment of the SSHO, site conditions warrant a larger work zone. Each work zone will be established by placing traffic cones or delineators at the work zone outer boundary. One entrance/exit to the work zone will be established to control access to the work zone (access control point). If personnel decontamination procedures become necessary as a

result of upgrading to Level C equipment, the decontamination will occur at the access control point.

5.2 Site Control Log

A log of personnel visiting, entering, or working at the site will be maintained. A "Site Control Log" form will be completed daily. This log includes entries for the date, name, organization, and time entering and exiting the site. The Site Control Log is maintained by the SSHO in the CAPE field office. All personnel are required to report and sign in at the CAPE field office upon arrival at the site. Personnel who wish to enter a controlled area at the site must provide to the SSHO copies of required training, medical fitness for duty, and respirator fit testing documentation before entry is authorized.

5.3 Site Communications

Site communications are critical to allow for expedient communication of operational instructions, safety information, and emergency communications, and include:

- A telephone will be maintained on site with the FTL and/or SSHO
- Emergency communication instructions are in the emergency response plan section of the HSP.

5.4 Site Security

Site security measures are required to prevent unauthorized access to controlled areas of the site. Site security measures include:

- Personnel are required to check-in at the project office and sign in on the "Site Control Log" before entering controlled areas of the site. Unauthorized persons are not allowed into the controlled areas of the site
- Temporary fencing, barricades, signs, and/or caution tape will be used for delineation of controlled areas, if needed
- Protection is required around open holes during off hours (e.g., temporary fencing, barricades with flashing lights and signs/caution tape)
- Site personnel are required to comply with military base security measures when working on these facilities. Certain project work activities may be conducted within a restricted portion of the facilities.

6.0 PERSONAL PROTECTIVE EQUIPMENT

PPE will be required for certain field operations based on the potential for contaminant exposures. The SSHO and SHM will establish appropriate levels of protection for each work activity based on review of historical site information, existing contaminant data, and evaluation of the potential for exposure. The SSHO and SHM will establish action levels for upgrade or downgrade in the initial minimum levels of protection.

PPE requirements will be referenced to the U.S. Environmental Protection Agency (EPA) levels of protection system that consists of four levels of protection (A-D) as described below:

Level A Protection: Level A protection is worn when the highest level of respiratory, eye, and skin protection is needed. Level A protection is used for initial entry into confined spaces, entry into areas with extensive skin and respiratory hazards, and entry into areas where the hazard of significant exposure to unknown contaminant concentrations exists.

Level B Protection: Level B protection is worn when the highest level of respiratory and eye protection is needed, but a lesser level of skin protection is needed than for Level A. Level B protection is used for initial entry into confined spaces, entry into areas with significant skin and respiratory hazards, and entry into areas where the hazard of significant exposure to unknown contaminant concentrations exists.

Level C Protection: Level C protection is worn when a similar level of skin protection as Level B is needed, but a lower level of respiratory protection is needed. Level C protection is used when limited skin hazards exist and concentrations of contaminants are within the protection factor of an air-purifying respirator.

Level D Protection: Level D protection is worn when minimal protection is needed and activities are not likely to involve direct contact with contaminated materials. Modified Level D protection is used when some skin protection is desired for protection against accidental skin contact with contaminants.

6.1 PPE Requirements

It is anticipated that Modified Level D, and Level D protection use will be required for project activities. Level A and B work is not expected. Level C protection information is provided should an upgrade in protection level be required due to elevated air monitoring results. The primary basis for the level of protection selection is as follows:

- Level C protection is used for work where there is potential for low-level exposure to air contaminants above exposure monitoring plan action levels and limited direct contact with contaminants
- Modified Level D protection for work where there is no potential for significant air contaminant exposure and protective clothing is used for protection from accidental contact with contaminants
- Level D protection for work where there is no significant potential for contaminant exposure.

6.2 Levels of Protection for Major Work Tasks

Anticipated levels of protection to be used for the following major project activities are identified below:

Mobilization and Site Preparation: Level D protection

Excavation, Soil Removal and Disposal: Modified Level D and Level D protection

Sampling: Modified Level D and Level D protection

Fish Tissue Sampling: Level D protection

Operations and Maintenance: Modified Level D and Level D protection

Monitoring Well Installation: Modified Level D and Level D protection

Monitoring Well Decommissioning: Level D protection

Free Product Recovery: Modified Level D protection

Site Cleanup and Demobilization: Modified Level D and Level D protection.

6.2.1 Level C Protection

Level C protection consists of:

- Air purifying respirator (APR) or powered air purifying respirator (PAPR), full-face, or half-face with organic vapor cartridge (if fuel exposure) and/or P-100 filter (if dust exposure)
- Disposable coveralls, chemical-resistant (Kleenguard® or Tyvek® for dust exposure; Polyethylene Tyvek® for incidental splash protection; polyvinyl chloride [PVC] for liquid contact protection)
- Boots, steel-toed/shank, chemical-resistant (PVC or equivalent) with optional boot covers (PVC or latex)
- Gloves, inner, chemical-resistant (surgical nitrile or latex) and outer gloves, chemical-resistant (nitrile for dexterity; PVC for heavy work)
- Hard hat; safety glasses with side shields (for use with half-face respirator); goggles (for use with half-face respirator when liquid splash hazard present); ear protection (if noise levels more than 85 dBA); high-visibility safety vest with reflective striping (if vehicle or equipment traffic); and two-way radio communication (optional).

6.2.2 Modified Level D Protection

Modified Level D protection consists of:

- Disposable coveralls (Kleenguard® or Tyvek® for dust exposure; Polyethylene Tyvek® for incidental splash protection; PVC for liquid contact protection)
- Boots, steel-toed/shank, chemical-resistant (PVC or equivalent) or steel-toed work boots (leather) with boot covers (PVC or latex)
- Gloves, inner, chemical-resistant (surgical nitrile or latex) and outer gloves, chemical-resistant (nitrile for dexterity; PVC or neoprene for heavy work)
- Hard hat; safety glasses with side shields (for use with half-face respirator); goggles (for use with half-face respirator when liquid splash hazard present); ear protection (if noise levels more than 85 dBA); and high-visibility safety vest with reflective striping (if vehicle or equipment traffic).

6.2.3 Level D Protection

Level D protection consists of:

- Coveralls or standard work clothing
- Steel-toed work boots (leather)
- Gloves (if material handling-cotton or leather)
- Hard hat; safety glasses with side shields; goggles (if liquid splash hazard); face shield (polycarbonate for pressure washing); ear plugs (if noise levels more than 85 dBA); and high-visibility safety vest with reflective striping (if vehicle or equipment traffic).

6.3 PPE Maintenance

PPE is required as directed by the HSP or the SSHO

- Personnel are responsible for proper use of required PPE
- Torn protective clothing or damaged PPE will be immediately repaired or replaced
- Contaminated PPE will be disposed of properly (as contaminated waste)
- Maintenance of reusable personal issue PPE (e.g., hardhats, safety glasses, steel toe PVC boots) is the responsibility of each worker for individually assigned equipment.

6.4 Respiratory Protection

Respiratory protection will be selected, used, and maintained IAW the CAPE Safety and Health Program Respiratory Protection Standard Operating Procedure (SOP). The SSHO is responsible for implementing the respiratory protection program at the site. The SSHO is responsible for ensuring that workers have had required medical examinations,

respirator training, and respirator fit testing current within the past year. SSHO respiratory protection program duties include:

- Ensure workers complete medical exams and are approved for respirator use
- Arrange for and/or conduct respirator training
- Conduct and document respirator fit tests
- Ensure the availability of appropriate respirators and supplies
- Review tasks requiring the use of respiratory protection
- Monitor work areas and operations continually to identify respiratory hazards
- Monitor and enforce the proper use of respirators
- Ensure that respirators are properly cleaned, maintained, and stored
- Maintain respirator training and fit testing records.

6.4.1 Respirator General Use Procedures

Respiratory protection requirements include:

- Respirator users are evaluated first by a licensed physician to determine their physical ability to use a respirator. The licensed physician must provide a written fitness for duty statement that the worker may safely use a respirator. The SSHO is responsible for ensuring that workers have required medical exams and those copies of medical certifications are maintained and available according to OSHA recordkeeping requirements

- Personnel using APRs must have passed a qualitative fit-test within the past year. Qualitative fit testing will be conducted by the SSHO as needed and will be documented on a Respirator Fit Testing Record form

- Visitors will be required to provide documentation of respiratory protection instruction and fit testing for entry into controlled work zones that require respirator use

- Personnel must use respirators under conditions according to training and instruction received. Respirators shall be used according to manufacturer recommendations

- Personnel must conduct a user seal check each time that they don a respirator. Employees can use either a positive or negative pressure user seal check (depending on which test works best for them)

- Personnel are permitted to leave the work area to maintain their respirator (employees should notify their supervisor before leaving the area) for the following reasons: to clean their respirator if the respirator is impeding their ability to work; change filters or cartridges; replace parts; or to inspect respirator if it stops functioning as intended

- Whenever respirators are required, no person will remove a respirator in the EZ or CRZ, or enter these work zones without a respirator

- Personnel are not permitted to wear tight-fitting respirators if they have any condition, such as facial scars, facial hair, or missing dentures, that prevents them from achieving a good seal. Personnel are not permitted to wear headphones, jewelry, or other articles that may interfere with the respirator face piece-to-face seal

- For any malfunction of an APR (e.g., a breakthrough, face piece leakage, or improperly working valve), the respirator user should inform his or her supervisor that the respirator is not functioning properly and go to the designated safe area to maintain the respirator. The supervisor must ensure that the employee receives the needed parts to repair the respirator or is provided with a new respirator.

6.4.2 Respirator Cleaning

Respirators are to be regularly cleaned and disinfected after each use by the user. Respirators issued for the exclusive use of an employee shall be cleaned as often as necessary to maintain effective performance. Emergency use respirators are to be cleaned and disinfected after each use.

The following procedure is to be used when cleaning and disinfecting respirators: disassemble respirator, removing any filters, canisters, or cartridges; wash the face piece and parts in a mild detergent with warm water (do not use a solvent); rinse completely in clean warm water; wipe the respirator with anti-bacterial disinfectant wipes; air-dry in a clean area; reassemble the respirator and replace any defective parts; and place in a clean, dry plastic bag or other airtight container. Note: The Supervisor will ensure an adequate supply of appropriate cleaning and disinfecting supplies at the job site. If supplies are low, employees should contact their supervisor.

6.4.3 Respirator Maintenance

Respirators are to be properly maintained by the user at all times in order to ensure that they function properly and adequately protect the employee. Maintenance involves a thorough visual inspection for cleanliness and defects. Worn or deteriorated parts will be replaced prior to use. Components will not be replaced or repairs made beyond those recommended by the manufacturer. Repairs to regulators or alarms of atmosphere-supplying respirators will be conducted by the manufacturer.

The following items/parts will be inspected by the user before each use of a respirator:

- Face piece: Inspect for cracks, tears, holes, facemask distortion, and cracked or loose lenses/shield

- Head straps: Inspect for breaks, tears, loss of elasticity, and broken buckles

- Valves: Inspect for residue or dirt; cracks, tears, loss of elasticity

- Filters/cartridges: Inspect for approval designation; gaskets; cracks, dents in housing, proper cartridge for hazard, and end-of-service-life-indicator (if applicable).

6.4.4 Respirator Change-Out Schedules

Employees wearing APRs or Powered Air-Purifying Respirators (PAPRs) with P-100 filters for protection against airborne particulates shall change respirator cartridges if they experience difficulty breathing or resistance while wearing their respirator.

6.4.5 Respirator Storage

Respirators must be stored in a clean, dry area, and according to manufacturer recommendations. Employees will clean and inspect personal-issue APRs and store their respirator in a plastic bag kept in their possession. The employee will place his/her name on the bag and that bag will only be used to store that employee's respirator. New respirators in storage shall be kept in the original manufacturer's packaging until issue.

6.4.6 Defective Respirators

Respirators that are defective or have defective parts shall be taken out of service immediately. If, during an inspection, an employee discovers a defective respirator, he/she is to bring the defective respirator to his or her supervisor. The supervisor will decide whether to: Temporarily take the respirator out of service until it can be repaired; perform a simple fix on the spot such as replacing a head strap; or dispose of the respirator due to an irreparable problem or defect.

6.5 PPE Maintenance

PPE is required as directed by the SSHP or the SSHO. Personnel are responsible for proper use of required PPE. Torn protective clothing or damaged PPE will be immediately repaired or replaced. Contaminated PPE will be disposed of properly (as contaminated waste). Maintenance of reusable personal issue PPE (e.g., hard hats, safety glasses, steel-toed PVC boots) is the responsibility of each worker for individually assigned equipment. Personnel are responsible for proper maintenance, cleaning, storage, and use of individually assigned respirators. Respirators will be cleaned after each use, placed in a plastic bag, and inspected before using again.

7.0 DECONTAMINATION

Personnel and equipment decontamination measures will be required for site work. Personnel and equipment decontamination requirements will be identified by the SSHO. It is anticipated that dry decontamination measures will be used for site work.

7.1 Personnel Decontamination

The SSHO will determine the procedures to be used for personnel decontamination. A dry decontamination method will be used when there is limited contact with contaminants (i.e., soil excavation). A wet decontamination method will be used when there is significant contact with contaminants due to contact with liquid contaminants, muddy surface contamination, or other heavy contamination. General personnel decontamination requirements include:

- The SSHO must review specific decontamination procedures with personnel required to enter controlled work zones of the site and will monitor and ensure use of prescribed decontamination procedures
- Personnel will be instructed to minimize contact with contaminants, to the extent feasible, to reduce the potential for personal or equipment contamination
- Personnel decontamination occurs at the decontamination station established within the CRZ for each work location. Decontamination activities occur in the CRZ after working in the EZ and before entrance into the support zone
- Personnel must clean, remove, and place contaminated disposable protective clothing in marked containers before leaving the CRZ
- Workers will be instructed to practice good personal hygiene by washing the face, hands and forearms before eating, drinking, smoking, etc.

7.1.1 Dry Decontamination Procedures

A dry decontamination method will be used when there is limited contact with contaminants and when the SSHO has determined that a wet decontamination method is not necessary. The decontamination sequence should be completed as follows:

Station 1 - Equipment Drop: Deposit used equipment on sheet plastic or in container with plastic liner.

Station 2 - Outer Boot Covers and Outer Gloves Removal: Remove outer boot covers and outer gloves. Deposit in container with plastic liner.

Station 3 - Boots and Outer Garment Removal: Remove boots and suit and deposit in containers with plastic liners.

Station 4 - Respirator Face piece and Inner Gloves Removal: Remove respirator face piece (avoid touching face with fingers) and deposit on sheet plastic or in plastic bag. Remove inner gloves.

Station 5 - Field Wash: Wash hands and face thoroughly.

7.1.2 Decontamination Procedures – Wet Method

A wet decontamination method will be used when there is significant contact with contaminants (i.e., contact with liquid contaminants, muddy surface contamination, other heavy contamination), or when the SSHO has determined it is necessary. The decontamination sequence should be completed as follows:

Station 1 - Equipment Drop: Deposit used equipment on sheet plastic or in container with plastic liner.

Station 2 - Boots and Outer Garments Wash/Rinse: Scrub outer boots, outer gloves, and suit with detergent/water solution. Rinse off with water.

Station 3 - Outer Boot Covers and Outer Gloves Removal: Remove outer boot covers and outer gloves. Deposit in container with plastic liner.

Station 4 - Cartridge/Canister or Mask Change-Out: Change-out APR cartridges/canister or face piece as needed. For respirator change-out and return to EZ, don new outer gloves and boot covers, tape at joints, and return to EZ. For entry into the support zone, continue decontamination sequence.

Station 5 - Boots and Outer Garment Removal: Remove boots and suit and deposit on sheet plastic or in containers with plastic liners.

Station 6 - Respirator Face Piece and Inner Gloves Removal: Remove respirator face piece (avoid touching face with fingers) and deposit on sheet plastic or in plastic bag. Remove inner gloves.

Station 7 - Field Wash: Wash hands and face thoroughly.

7.2 Equipment Decontamination

Procedures are required to prevent the spread of contamination from vehicles and equipment used in the EZ into support zone and offsite areas. Equipment will be decontaminated by procedures established by the SSHO.

7.3 Equipment Decontamination Facilities and Procedures

A decontamination facility (decontamination pad) will be established as needed for decontamination of vehicles and equipment. Equipment will be decontaminated by procedures established by the SSHO and include:

- Vehicle and equipment use in the EZ and/or contact of vehicle and equipment tires with contaminated surfaces will be minimized to the extent possible
- Dirt will be brushed or scraped off of vehicles and heavy equipment to remove visible materials before moving from the CRZ off site

- Following decontamination, the equipment will be inspected and an Equipment Decontamination Release Authorization form will be prepared by the SSHO to document decontamination before equipment will be allowed to move off site.

8.0 SAFETY PROCEDURES

8.1 Safety Policy

It is the policy of CAPE to perform work in a safe manner. Our safety goal at CAPE is to have incident-free operations. This goal can only be achieved through total and demonstrated commitment to this safety policy from each individual CAPE staff member.

The effective realization of this policy and goal depends on three elements: Every accident is preventable; effective safety training is provided so that every CAPE staff member has the necessary knowledge to identify potential hazards to their own and their co-workers' safety, and the necessary protocols, tools and equipment to appropriately mitigate the identified hazards; and each CAPE staff member understands that we are each accountable for maintaining our own safety and the safety of our co-workers, at all times and in all situations.

The CAPE Safety and Health Program: Defines procedures and responsibilities needed to effectively implement this safety policy; establishes a basis for safety training, medical monitoring and record keeping; provides rewards for safe work performance via safety incentive programs; defines proper safety practices to be used during the performance of our work; and complies with governmental regulations in the implementation of safe work practices.

8.2 Standard Work Procedures

8.2.1 General Safe Work Practices

Site personnel must work in a safe manner and includes, but is not limited to, the following actions:

- Workers must obey directives from the SSHO and personnel who do not comply with safety requirements may be immediately dismissed from the site as required by the PM and SSHO
- The SSHO will conduct onsite daily safety meetings before starting work to review work operations and to discuss pertinent site safety topics
- Drugs, alcohol, and firearms are not allowed onsite
- Workers are not allowed to work if they are intoxicated or if their ability or alertness is impaired because of fatigue, illness or other conditions that may expose themselves or others to injury
- Use of personal radios or other items that may distract attention are not permitted
- Unsafe work conditions, work practices, and defective equipment must be immediately reported to the SSHO.

8.2.2 Hazard Communication

The SSHO will complete a “Hazardous Substance Inventory List” and maintain copies of MSDSs for hazardous substances that are to be used during project work. Site personnel

will be informed of the hazardous substances that they will be working with through HSP review and attendance at daily safety meetings. The CAPE "Hazard Communication Program" standard operating procedure will be referred to for additional guidance and requirements.

8.2.3 Illumination

Portable lights and/or light stands will be used to illuminate work areas in the absence of adequate lighting (5 to 10 foot-candles).

8.2.4 Sanitation

Food, beverages, tobacco products, or cosmetics are not allowed, in potentially contaminated areas. Eating, drinking, chewing gum or tobacco, and smoking are allowed only in designated areas. Good personal hygiene practices will be followed at all times. Site washing facilities will be provided and personnel will be required to wash their hands and face before breaks and lunch. Potable water will be made available for personnel and portable toilets will be provided when not available on site or within a short travel distance.

8.2.5 Visitors

Visitors must have prior approval from the COR and PM before being admitted to the site. Visitors must meet medical and training requirements and review pertinent aspects of the HSP.

8.3 Hazard Identification and Evaluation System

The PM, SSHO, and SHM are responsible for establishing a system for identification and evaluation of workplace hazards for the project. Hazard identification and evaluation is primarily accomplished through implementation of the site-specific HSP. Prior to project implementation, the PM, SSHO, and SHM review information relating to project work tasks to be completed; methods to be used; working conditions to be encountered; and chemical, physical and/or biological hazards present.

A written HSP is prepared that establishes site-specific safety protocols and contains information to protect employees from potential hazards. The HSP is revised should additional information become available concerning the hazards present at the site and/or should significant changes occur in the scope of work, operational procedures, site hazards, and hazard control measures. This information is reviewed with site personnel at the jobsite before work operations commence. Additional hazards associated with project operations are also identified and evaluated through daily safety meetings, periodic safety inspections, employee reporting of unsafe or hazardous conditions, and accident investigations and follow up.

8.4 Hazard Correction System

An effective hazard correction system must be established for correction of unsafe or unhealthful work conditions, work practices, and work procedures. These corrective measures are required to be completed in a timely manner.

If an imminent hazard is identified, the PM and SSHO are notified immediately. Corrective measures are then taken on an immediate basis to eliminate the hazard. If the imminent hazard cannot be immediately eliminated, personnel are to be removed from the work area and the SSHO will evaluate what safety procedures and corrective actions are to be implemented.

If a non-imminent hazard is identified, the SSHO is notified and corrective actions implemented in a timely manner. Evaluation of the time period allowed for correction of the hazard is at the professional judgment of the SSHO in conjunction with the PM and SHM. Documentation of the hazards identified and the hazard correction actions taken will be completed on a "Safety Inspection Report" form.

8.5 Safety Compliance System

A safety compliance system will be established to make sure that employees comply with safe work practices and S&H policies and procedures. The systems effectiveness is highly dependent upon the involvement, direct supervision, and enforcement of safety requirements by supervisory personnel. The system includes:

- S&H standard operating procedures
- Safety inspection program
- Recognition for employees who follow safe work practices
- Disciplinary actions for unsafe work performance.

8.5.1 Standard Operating Procedures

CAPE Corporate Safety and Health Program (CSHP) SOPs and site-specific S&H SOPs are developed and maintained to establish protocol for implementation of various safety programs and requirements. Employee compliance with these procedures is mandatory and is a condition of employment.

CSHP SOPs includes written programs for: Assignment of safety responsibilities; safety meetings; safety training; incident reporting and investigation; emergency action plans; hazard communication; medical surveillance; PPE; respiratory protection; Site Safety and Health Plans; hearing conservation; permit-required confined space; lockout/tagout; electrical safety; fall protection; ladder safety; scaffolding safety; heat and cold stress; medical services and first-aid; blood borne pathogens; fire prevention and hot work; excavation and trenching safety; heavy equipment operation; drill rig safety; water safety; ordnance and explosives safety; aerial lift and scissor lift operation; exposure monitoring; recordkeeping; health and safety forms; contractor safety qualification; process safety management; vehicle safety; powered industrial truck operation; housekeeping; unsafe condition reporting; equipment grounding conductor inspection; compressed gas cylinders; hand and power tool safety; back injury prevention; behavior-based safety; waste disposal; safety task analysis cards; emergency contact cards; field work safety incentive program; safety equipment purchase assistance; SSHO qualification, assignment and duties; tuberculosis prevention; and DOT drug and alcohol testing.

8.5.2 Safety Inspections

The SSHO completes periodic safety inspections of project sites and work areas. The SSHO will complete daily safety inspections of work sites to identify and correct hazards.

The SSHO will record identified safety and health issues and deficiencies and will indicate the actions, timetable, and responsibility for correction of deficiencies on the CAPE "Safety Inspection Report" form. The SSHO will conduct follow-up inspections to correct identified deficiencies and will document these inspections in a like manner.

Safety inspections will include work areas, equipment, work practices, and work procedures. Noncompliance items with HSP requirements are to be corrected immediately or in a timely manner based on the classification of the hazard as imminent or non-imminent. In the case of unsafe or hazardous machinery, the equipment or area will be "red-tagged" (shut down or evacuated) until the hazard has been corrected. Employees are responsible for inspecting their work areas and equipment for unsafe or hazardous conditions. Employees should correct all unsafe conditions and report them immediately to their supervisor. Maintenance employees must periodically inspect and/or test field equipment for safe and hazard-free operation.

The PM and/or SHM may also conduct independent field safety inspections/audits of projects on a periodic basis. The frequency of these inspections will be at the discretion of the PM and SHM based on the type of job activities and potential hazards to be encountered on the project. Safety inspection report forms completed will be reviewed by the PM and SHM to monitor hazards identified and corrective actions taken.

8.5.3 Disciplinary Action

CAPE policy requires that employees strictly adhere to established safe work practices and procedures. If employees violate safety procedures or rules, they will be disciplined according to the severity of the infraction. Employees who exhibit unsafe work performance will receive disciplinary action from the PM and SSHO in consultation with the SHM. Disciplinary action can include the following, depending upon the severity of the safety infraction:

- Verbal warning
- Written warning notice
- Termination of employment
- Other disciplinary action.

8.5.4 Safety Recognition

Safety recognition and safety incentive programs are initiated for specific projects where a significant improvement in safety compliance and/or safety performance can reasonably be achieved. Such programs are initiated as established by the PM and SSHO in consultation with the SHM.

8.6 Safety Communication System

A system for communication with employees regarding matters related to S&H will be established and will include employee reporting of identified hazards, safety training, daily safety meetings, safety information postings, and written communications.

8.6.1 Employee Reporting of Identified Hazards

Employees are encouraged and required to inform project supervisors of unsafe or hazardous conditions that are identified. Additionally, employees are encouraged to report observed unsafe work practices by employees, supervisors, or other individuals. Employees may communicate directly with the PM, SSHO, and/or SHM regarding any safety matter. No employee will be disciplined or otherwise discriminated against for reporting or correcting an unsafe condition. Employees may make anonymous reports of unsafe conditions or violations of safety rules to the SSHO or SHM for follow-up action.

8.6.2 Training and Safety Meetings

Employees receive safety training regarding potential hazards associated with their work assignments through site orientation briefings; daily safety meetings; and other training, which may include but won't necessarily be limited to: first-aid/CPR training, permit-required confined space training, excavation competent person training, forklift operator training, and OSHA health standard employee information and training. Safety meeting information is further reviewed in Section 10 of the HSP. Copies of certificates of S&H training for site personnel will be reviewed and maintained by the SSHO. Personnel are not allowed to conduct fieldwork that requires specific training until such documentation has been presented to the SSHO.

Site orientation briefings, that involve review of pertinent aspects of the HSP, are completed for personnel before initiation of project fieldwork.

Daily safety meetings are held at the job site and are presented by the PM, project supervisors, and/or SSHO and are designed to:

- Provide instruction regarding hazards specific to each employee's job assignment
- Act as S&H training program to instill safe and healthful work practices
- Remind employees that compliance with safe work practices is required
- Instill a constant sense of safety-consciousness among supervisors and employees
- Provide opportunity for employees to bring forward ideas about safety issues
- Reassure employees to inform supervisors of site hazards without fear of reprisal.

8.6.3 Safety Information Posting and Written Communications

Safety posters, articles, notices, and other safety-related information will be posted in an area designated for employee review within the project office. The SSHO will maintain safety postings and written safety communications for field projects where a project office is not available.

8.7 Incident Reporting and Investigation

Important requirements for accident reporting and follow up are described below.

- The Contracting Officer or COR, the installation POC, and the military installation's Safety Office shall be notified promptly (within 1 hour) of all available facts relating to each instance of damage to Government property or injury to a person

- Employees must immediately report all incidents, injuries and illnesses, property damage and liability exposure cases, spills and fires, and serious near miss incidents to their supervisor and/or the SSHO

- In the event of a serious incident, supervisors are responsible for notifying the FTL, SSHO, and SHM who in turn are responsible for notifying the CAPE PM, Corporate Risk Manager, and Corporate Health and Safety Manager (CHSM). The CHSM should be contacted immediately in injury or illness cases to assist with coordination of required medical assistance and related workers' compensation case management follow-up

- Should a serious injury occur during the project, the FTL and SSHO will immediately report the incident to the PM, SHM, COR, and the appropriate government agencies. The COR will receive verbal notification immediately following a lost workday injury and receive a written notification within 24 hours

- The SSHO and affected employee supervisor will make a complete investigation of all incidents and inspect the area or equipment involved (as applicable). This includes completing and filing a "Incident Report by Supervisor," "Incident Statement by Employee," "Incident Statement by Witness," "Injury and Illness Report," "Property Damage, Loss, and General Liability Report," and/or "Vehicle Accident Report" form, as applicable with the SHM within 24 hours of the injury (immediately for serious injury or fatality)

- All incidents involving hospitalization or a fatality require immediate notification and investigation by the SHM and the CHSM. The CHSM and the SHM are responsible for OSHA reporting of the incident and will act as the agency interface upon their investigation. The CHSM and the SHM are responsible for notifying the jurisdictional OSHA office as soon as possible and no later than 8 hours of the accident. (Note: This notification includes weekend days as 24-hour emergency reporting access is available). The report to OSHA must include: time and date of accident; employer's name, address, and telephone number; name and job title of person reporting the accident; address of the site of the accident; name of person to contact at the site of the accident; name and address of the injured employee; nature of injury; location where the injured employee was moved to; list and identity of other law enforcement agencies present at the site of the accident; and description of the accident and whether the accident scene has been altered.

- The SSHO, with the assistance of the PM and FTL, will obtain a doctor's first report of injury for every injury or illness requiring medical treatment and will immediately forward to the CHSM

- An injured worker is not allowed back to work until a return-to-work notice issued by the treating physician and negative drug and/or alcohol test documentation (as applicable) are presented to the SSHO. Injured workers issued a work restriction shall be under the direct supervision of the SSHO and shall assign work activities until a full duty status clearance has been received

- The CHSM will make a telephone report for all claims covered under the CAPE Workers' Compensation Policy. Reports are made to the workers' compensation insurance claim-reporting center where an employer's first report of injury or illness form is completed over the phone. After reporting a claim to the reporting center, the information is faxed by the reporting center to the claims service office to handle the claim. Any subsequent medical bills and reports received for the claim are forwarded to the CHSM who will subsequently mail them to the claims service office

- When a worker returns to work after an injury or illness, the CHSM will contact the claims servicing office to advise them of the actual date of return to work. Questions or inquires are to be directed to the CHSM who will contact the claims service office or the CAPE insurance company, as needed

- The CHSM records each injury or illness on the OSHA Form No. 300 "Log of Work Related Injuries and Illnesses" and the OSHA Form 300A "Summary of Work-Related Injuries and Illnesses." The OSHA 300 form is posted annually no later than May 1 (of the following year) and is kept posted for 3 months (until April 30).

8.8 Site-Specific Procedures

8.8.1 Permits

The SSHO will determine and comply with Base requirements for dig permits, hot work permits, confined space permits, and other applicable work permits.

9.0 EMERGENCY RESPONSE PLAN

Emergency/contingency plans will be established to address possible site emergencies. For major emergency events (e.g., large fires, gas line or electrical line breaks, etc.) personnel will be evacuated to a designated refuge area and local fire, police, and/or emergency medical service personnel notified. The COR, PM, and SSHO will work cooperatively to resolve emergency events. All site personnel are required to immediately notify the SSHO and/or PM immediately in the event of any type of site emergency.

9.1 Site and Emergency Communications

Site and emergency communications include:

- Cellular telephones will be used for site and emergency communications. If not available, the closest land line telephone will be located before work being initiated. The site evacuation alarm will be a single long blast on a vehicle horn or a compressed air horn.
- The CAPE SSHO will maintain an "Emergency Contact List" (Appendix B). The SSHO is responsible for designating an emergency hospital and determining the route to the emergency hospital before the start of field operations
- The SSHO will establish emergency communications procedures before site work and will communicate this information to site personnel during site orientation briefings and safety meetings.

9.2 Emergency Evacuation Procedures

In the event of an emergency, an evacuation alarm will be sounded. The alarm will be a single long blast on a vehicle horn or a compressed air horn. Nonessential personnel will be evacuated from the work area until the SSHO determines that it is safe for work to resume. Personnel will evacuate to a refuge area that has been designated by the SSHO in the initial site safety orientation or tailgate safety meeting. Typically, the onsite assembly area will be at the project office and the offsite assembly area will be at a designated area outside the entrance gate to the facility. The SSHO will notify the facility emergency contact and local fire, police, and/or emergency medical services as necessary. The SSHO and FTL will complete a head count to make sure that all site personnel are accounted for. The SSHO, FTL, PM, and COR will work cooperatively to resolve emergency events.

9.3 Emergency Supplies

Emergency supplies will be immediately available at the site and will include:

- First-aid kit
- Eye wash supplies
- Fire extinguisher
- Supply of potable clean water
- Spill kit supplies.

9.4 Emergency Hospital and Route Information

The SSHO will select an emergency hospital and determine the route to the emergency hospital before site work. The designated emergency hospital, location and route map will remain on site during field operations.

9.5 Response to Fire

The SSHO will consult with the local fire department before initiating site activities regarding response to fire incidents associated with site work. In the event of a fire, the following will be implemented:

- Large fire (beyond the immediate control of a small onsite fire extinguisher): The site alarm will be sounded; personnel will immediately evacuate and assemble at a predetermined upwind site location; the fire department will be called; and personnel will not reenter the fire area and will wait for fire department arrival

- Small fire (within the immediate control of a small onsite fire extinguisher): The site alarm will be sounded; trained personnel will use an onsite fire extinguisher to put out the fire.

9.6 Response to Chemical Spill Incident

A spill kit will be available on site (located in designated area) with supplies for spill containment and control and includes: absorbent pads; solid absorbent; container.

In the event of a small chemical spill incident, the PM and SSHO will be immediately notified. If containment can be done safely without exposure to personnel, the following will be implemented:

- Containment of liquid chemical spills is accomplished through prompt application of absorbents (e.g., absorbent pads or solid absorbent) containment of the spill

- Containment of solid chemical spills is accomplished by covering with sheet plastic (or by an equivalent method). Spilled material is collected in bags, drums, or other suitable containers and disposed of as required.

In the event of a large uncontrolled chemical spill incident, the PM, SSHO, and COR will be immediately notified. The SSHO will obtain information regarding the spill and will respond immediately to the spill location.

9.7 Response to Medical Emergency

In the event of a medical emergency, the following procedures will be implemented:

- The exposed or injured person will be removed from immediate danger, first-aid and/or CPR will be administered by trained site personnel

- Emergency medical assistance will be called and will be informed of the following: name and location of person reporting; location of accident or incident; specific directions to the emergency location, as needed; phone number from which the person is calling; number persons needing help; what is currently being done for the victim (for life-threatening injuries, request instructions from

emergency services dispatcher); name and affiliation of injured party; description of injuries; details of any chemical involved; summary of the accident, including suspected causes and time of occurrence; and temporary control measures taken to minimize further risk

- Nonessential personnel will be evacuated from the work area until the SSHO determines that it is safe for work to resume
- A medical emergency involving chemical exposure will require communication between the SSHO and emergency hospital personnel regarding chemicals involved
- The SSHO will designate an individual to accompany or follow the victim to the emergency hospital to assist with any needs that arise and to report back regarding the victim's status.

10.0 TRAINING

Copies of S&H training certificates will be reviewed and maintained by the SSHO. Personnel will not be allowed to complete fieldwork until such documentation has been presented to the SSHO.

10.1 HazWOPER Training

Personnel involved in hazardous waste activities at the site must have completed hazardous waste operations training as required by the OSHA HazWOPER standard. Certificates of HazWOPER training will be maintained by the SSHO at the site. Copies of current training certification statements will be submitted before initial entry onto the work site. Required HazWOPER training includes: initial worker training consisting of 40 hours of initial training and 3 days of supervised field experience; manager and supervisor training consisting of 8 hours of additional specialized manager/supervisor training; and refresher training consisting of 8 hours of refresher training annually.

10.2 Site Orientation Briefing

New workers must receive a site orientation briefing and review the HSP before start of work. Personnel will sign a form documenting that they have reviewed the plan, understand the HSP requirements, and agree to follow the plan.

Personnel will provide training and medical fitness for duty documentation to the SSHO if required for site work activities.

Before start of work, the SSHO will provide a site orientation briefing to workers related to project operations and HSP requirements. The briefing will include review of (as applicable): provisions of the HSP; facility background and scope of work; key personnel and S&H responsibilities; site hazards anticipated; exposure monitoring program; site control procedures; PPE requirements; procedures for reporting unsafe conditions or unsafe work practices; procedures for reporting an injury/illness; emergency procedures including warning signals and evacuation procedures; location/Route to the emergency hospital; training requirements; medical surveillance requirements; and record-keeping procedures.

10.3 Daily Safety Meetings

Daily safety meetings will be conducted at the beginning of each work shift to discuss operational tasks to be completed and pertinent site safety topics. Meetings will be documented and those in attendance will be required to sign a “Tailgate Safety Meeting Record” or equivalent form.

10.4 First-Aid/CPR Training

Supervisory site personnel will have completed first-aid and CPR training within the past year. At least two persons trained in first-aid/CPR will be onsite during project activities.

10.5 Bloodborne Pathogen Training

Designated first-aid responders are required to complete blood borne pathogen (BBP) training as per the OSHA BBP regulation (29 CFR 1910.1030). BBP training is provided

to personnel who have potential exposure to blood or other potentially infections materials.

10.6 30-Hour OSHA Construction Safety and Health Training

Personnel who are assigned as a SSHO shall have attended a 30-Hour OSHA Construction S&H Training class. An equivalent course applicable to the work to be performed (i.e., OSHA 500 Trainer Course in Occupational S&H for the Construction Industry) is considered acceptable.

10.7 Boating Safety Training

Personnel working from motorboats are required to complete a boating safety course (or provide documentation of an equivalent or higher level of boating safety training) prior to working onboard a boat on site. The course must meet the criteria of the U.S. Coast Guard (USCG) National Association of Safe Boating Law Administrators (NASBLA), or equivalent. Operators must pass a written and operational test.

As a minimum, the course topics shall include:

- Proper boat and safety equipment inspection
- Content and frequency of equipment safety inspection
- Use of onboard safety equipment (fire extinguisher, radio, flares, horn, etc.)
- Procedures for completion and filing of a float plan
- Standard boating safety rules
- Emergency procedures in the event of capsizing or being thrown overboard
- Different types of PFDs and their inspection and use.

10.8 Emergency Response Plan Training

Emergency response plan training is conducted by the SSHO during initial site safety orientation briefings and elements are periodically reviewed during daily safety meetings. Emergency response plan training reviews: SSHP emergency response plan information that includes escape procedures and routes, critical plant operations, employee accounting following an emergency evacuation, rescue and medical duties, means of reporting emergencies, persons to be contacted for information or clarification, and off-site emergency support services and agreements.

11.0 MEDICAL SURVEILLANCE

Medical surveillance requirements exist for site personnel who will be entering Exclusion Zones of the site. Medical surveillance requirements include baseline, annual, reassignment, and termination (exit) medical examinations. Required medical qualification documentation consists of a written physician opinion regarding any detected medical conditions that may limit work ability as part of hazardous waste remediation activities and an opinion regarding protective clothing and respirator use. Copies of medical surveillance examination reports for site personnel will be reviewed by the SHM and SSHO and maintained by the SSHO and will be made available to the COR as required.

11.1 Medical Examinations and Reports

CAPE medical examinations for field personnel are completed before job assignment and annually thereafter. CAPE uses WorkCare for medical service outsourcing. WorkCare physicians, that are American Board of Preventive Medicine, Board-Certified (or Board-Eligible) provide occupational physician support services to CAPE.

The CAPE standard medical examination protocol consists of the following: Medical and occupational history; comprehensive physical examination; vision test; audiometric testing; pulmonary function tests; complete blood count with differential; blood chemistry panel; urinalysis with microscopic examination; chest x-ray (every 3 years for persons 40 years and younger; yearly for persons over 40 years old); and electrocardiogram (yearly for persons over 40 years old).

Medical examination reports personnel are presented in the form of work status medical reports. These reports indicate any detected medical conditions that would increase an individual's risk of material health impairment from occupational exposure or if the individual has limitations in the use of PPE such as protective clothing or respirator use. Copies of medical examination reports for site personnel will be maintained by the SSHO and will be provided to the COR as required.

11.2 Drug and Alcohol Testing Program

CAPE has a substance abuse policy that establishes requirements for a drug-free workplace and pre-employment drug testing. CAPE requires that post-accident drug and/or alcohol testing be conducted when employees have caused or contributed to an on-the-job injury resulting in loss of work time or damage to property. Post-accident drug and/or alcohol testing must be conducted immediately following a job-related injury or accident. If there are extenuating circumstances preventing an employee from going for drug and/or alcohol testing immediately, the testing must be conducted within 24 hours of the incident. Workers are not allowed back to work until documentation has been provided to the SSHO in the form of a negative drug and/or alcohol test.

12.0 RECORDKEEPING

S&H records associated with implementation of the HSP are maintained by the SSHO.

12.1 Health and Safety Documentation

Health and safety documentation records, as applicable, include: MSDSs; S&H training documentation; medical surveillance examination documentation; respirator fit testing forms; HSP review and safety meeting records; safety inspection reports; equipment inspection forms; confined space entry permits; hot work permits; exposure monitoring records and employee notifications; accident reporting and investigation records; and other S&H documents.

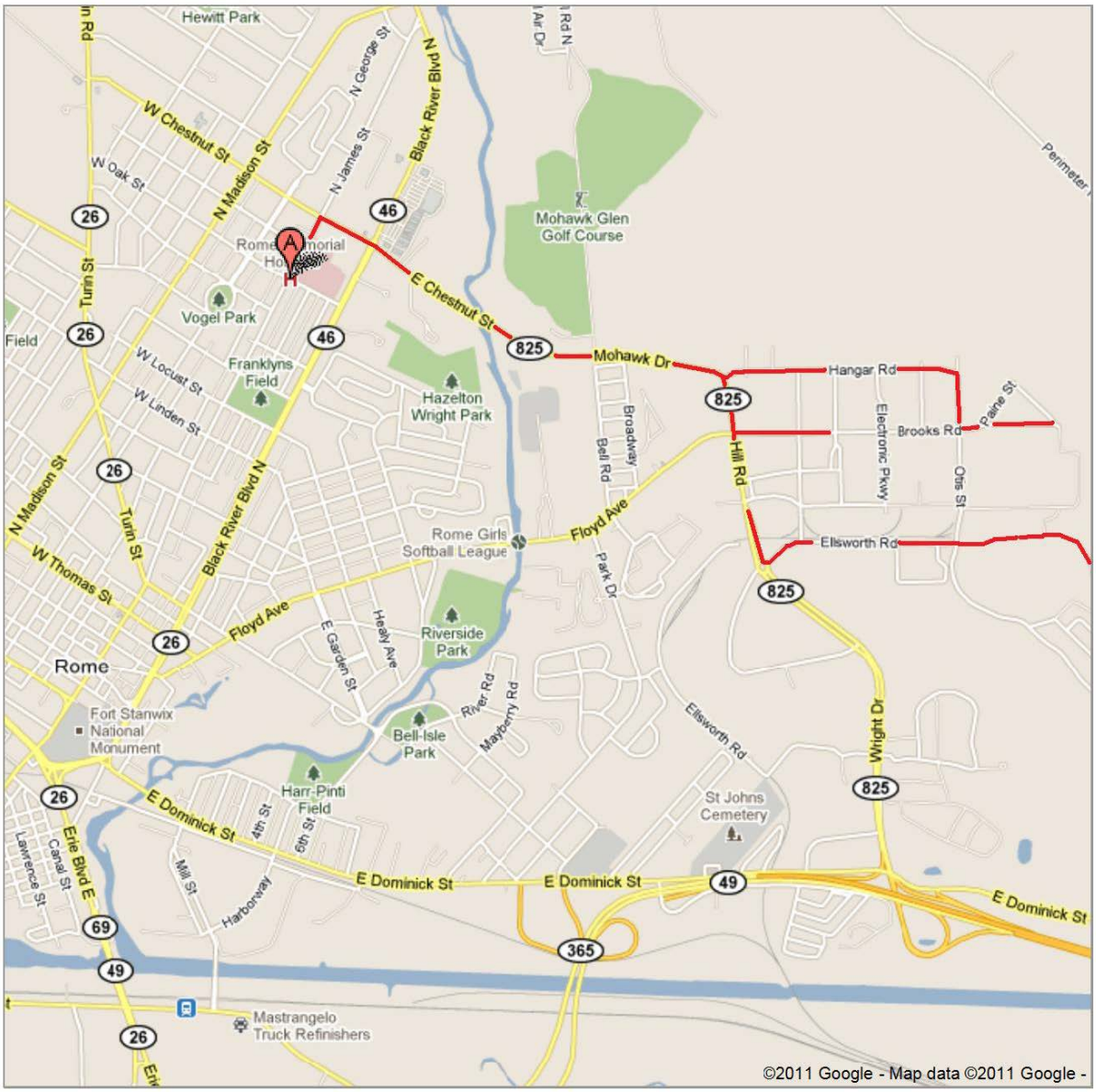
12.2 Health and Safety Plan Forms

Completed HSP forms are maintained on site by the SSHO for the duration of the project. HSP forms (Appendix A) that may be used during the project are indicated below:

- Air Monitoring Log
- Calibration Log: Direct-Reading Monitoring Instrument
- Emergency Medical Notification Form
- Equipment Decontamination Release Authorization
- Hazardous Substance Inventory List
- Health and Safety Plan Distribution to Subcontractor
- Health and Safety Plan Review
- Heavy Equipment Inspection Report
- Hot Work Permit
- Incident Reporting and Investigation Procedures Posting
- Incident Report by Supervisor
- Incident Statement by Employee
- Incident Statement by Witness
- Injury and Illness Report
- Inspection Checklist: Boat Pre-Departure Inspection
- Inspection Form: Forklift
- Property Damage, Loss, and General Liability Report
- Safety Inspection Report
- Site Control Log
- Tailgate Safety Meeting Record
- Training Attendance Roster
- Vehicle Accident Report.

FIGURES

FIGURE 1
EMERGENCY HOSPITAL ROUTE MAP

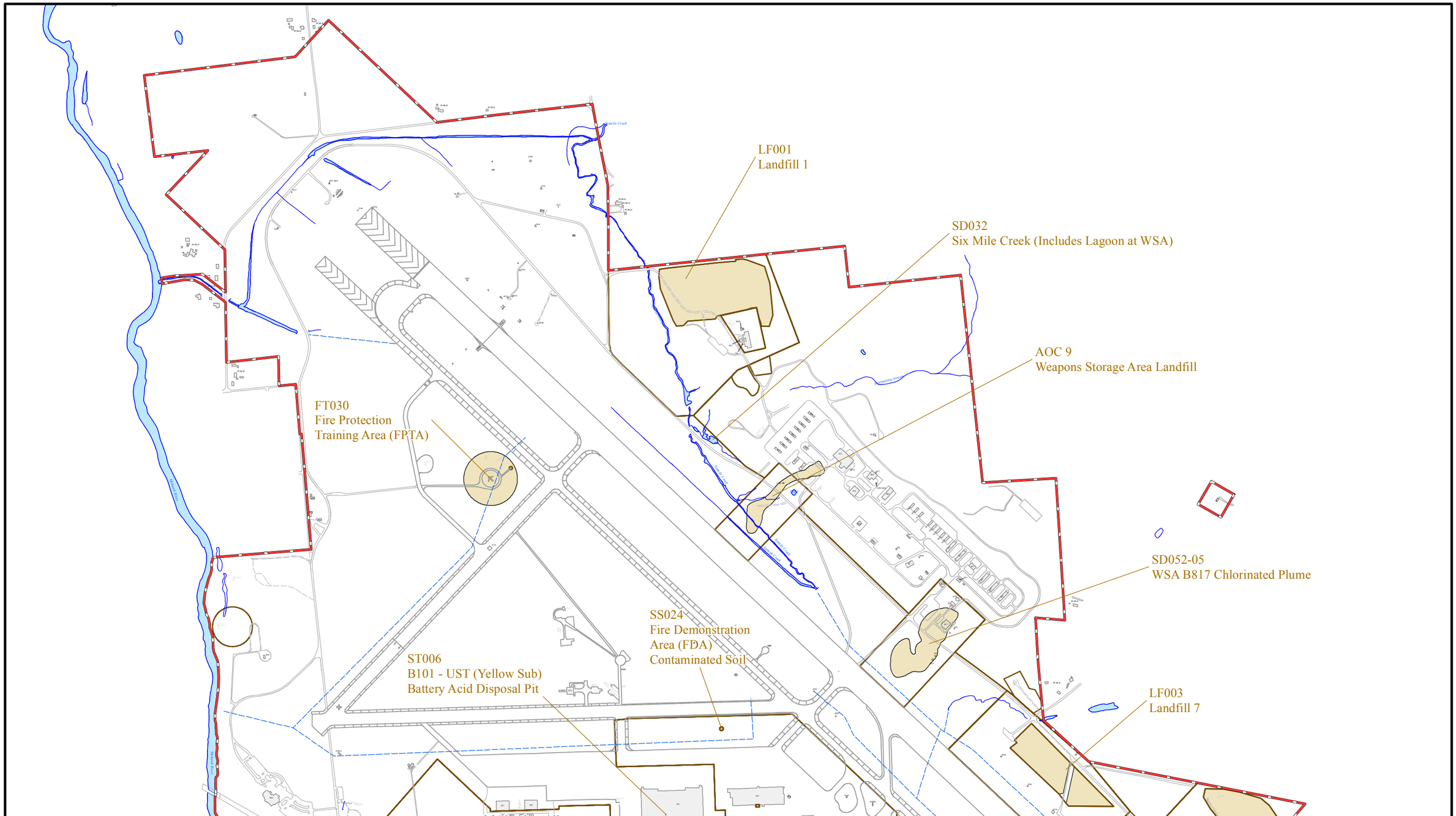


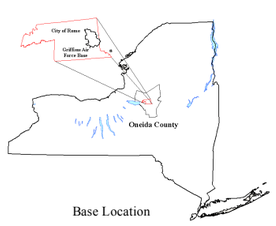
Emergency Hospital:

Rome Memorial Hospital
1500 N. James Street, Rome, New York
(315) 338-7000

Emergency Hospital Route:

Based on site location proceed to Griffiss exit at Route 825
Note that Brooks Road is not a through road due to restricted access at Rome Labs Complex.
Continue to follow RT-825 N (1.1 miles);
Continue on E. Chestnut Street (0.2 miles);
Turn LEFT on N. James Street (0.2 miles);
Arrive at 1500 N. James Street, Rome, NY.





Base Location

N

Map is projected in accordance with the State Plane New York Central - 3102 (NAD 83, Feet)



Northhern Quad

Key to Features

- Base Boundary
- Culvert / Ditch
- Surface Water
- Existing Roads / Airfield
- Demolished Roads / Airfield
- Demolished Facilities
- Existing Facilities
- Performance Based Remediation Sites

CAPE FPM Remediations, Inc

UNITED STATES AIR FORCE
FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK

Plate 1
Performance Based Remediation Sites
Former Griffiss Air Force Base
Northern Quad

February 7, 2011

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DP022
B222 - Battery Acid
Disposal Pit

DP015
B219 Drywell

SD050
B214; Former Vehicle
Mainenance Shop
Oil/Water Separator

ST006
B101 – UST (Yellow Sub)
Battery Acid Disposal Pit

LF003
Landfill 7

LF002
Landfill 2 and 3

SD-050
B214; Former Vehicle Maintenance Shop
Oil/Water Separator

DP013
B255 - Two Drywells

SS070
Building 150
(NYSDEC Spill #0800273)

Building 211

SS025
T-9 Storage Area
Contaminated Soil / Groundwater

SS008
B112 - PCB Dump Area
South Side PBC Trans Leak, Roof (FormerSS-19)

ST037
B771 - pumphouse 5
Free Product on Groundwater - Petroleum

SS033
Coal Storage Area
PCB Contamination

ST053
B133 - Underground Concrete Vault

SD041
Nosedocks 1 and 2
(NYSDEC Spill #9413416)

DP012
B301 -Former Entomology Shop Drywell

SS063
Apron 1
(NYSDEC Spill #9707954)

SS020
Tank Farm 1 & 3 Contamination

DP011
B3 - Drywell

SS060
STW1300
B35/36 HWSA

SS044
Substation, Electrical Power
PCB Site

SS064
Apron 2 Type II Fuel System
(NYSDEC Spill #9713631)

LF007
Landfill 5

SD032
Six Mile Creek

SD031
Three Mile Creek

SS067
B789 Type II Fuel System
(NYSDEC Spill #9810713)

SD052-04
Landfill 6
Chlorinated Plume

SS023
B20 - Locomotive Roundhouse
Contaminated Soil

SD052-02
B775 Pumphouse 3
TCE Contamination

SS064
Apron 2 Type II Fuel System
(NYSDEC Spill #9713631)

SS017
Lot 69 -Former Hazardous
Waste Storage Yard

Area of Interest 72

SS068
Building 7001
(NYSDEC Spill #9706957)

SD052-01
Apron 2
Chlorinated Plume

SS065
B15 (NYSDEC Spill #9709366)

SS069
Bulk Fuel Storage Area
(NYSDEC Spill #9507364/9810949/0009824)

SS066
B786 Jet Fuel Pipeline
(NYSDEC Spill #8910168)

SS054
B781 - Pumphouse
Free Product on Groundwater



Base Location

N

Map is projected in accordance with the
State Plane New York Central - 3102 (NAD 83, Feet)


Southern Quad

Key to Features

- Base Boundary
- Culvert / Ditch
- Surface Water
- Existing Roads / Airfield
- Demolished Roads / Airfield
- Demolished Facilities
- Existing Facilities
- Performance Based Remediation Sites

CAPE℠ FPM Remediations, Inc

UNITED STATES AIR FORCE
FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK

Plate 2
Performance Based Remediation Sites
Former Griffiss Air Force Base
Southern Quad

February 7, 2011

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TABLES

TABLE: 1
BASEWIDE MONITORING SITES 2013-2015 – SAMPLING IDENTIFICATION

Site	Groundwater	Surface Water	Soil/Sediment	Fish	Air	Inspection
CERCLA Sites						
LF001 Landfill 1	X	X			X	X
LF002 Landfills 2&3	X	X			X	X
LF003 Landfill 7	X	X			X	X
LF007 Landfill 5	X	X			X	X
LF009 Landfill 6	X	X			X	X
SD031 Three Mile Creek						X
SD032 Six Mile Creek						X
SD052 Soil Vapor Intrusion					X	X
SS060 Bldg 35/36	X					X
CERCLA Sites (LUC/IC Monitoring and Five Year Review Only)						
ST006 Bldg 101					X	X
SS008 Bldg 112						X
DP011 Bldg 3						X
DP012 Bldg 301			X			X
DP013 Bldg 255			X			X
DP015 Bldg 219			X			X
SS017Lot 69						X
DP022 Bldg 222						X
SS023 Bldg 20						X
SS024 Fire Demo Area			X			X
SS025 T-9 Storage Area						X
FT030 Fire Training Area					X	X
SS033 Coal Storage Area						X
ST036 Bldg 110						X
SS044 Substation-PCB Site						X
SD050 Bldg 214			X			X
SD52-01 Apron 2 Chlorinated Plume						X
SD52-02 Bldg 775 Chlorinated Plume						X
SD052-04 Landfill 6 Chlorinated Plume						X
SD52-05 Bldg 817 Chlorinated Plume						X
ST053 Bldg 133						X
SS062 AOC 9						X
AOI-72 Mobile Ave Former Drum Storage Area			X			
DW-211-01 Building 211 Drywell			X			
Contaminated Petroleum Spill Sites						
SD041: Nosedocks 1 and 2	X		X			
SS054 Bldg 781	X		X			
SS020 Tank Farm 1&3	X		X			
SS063 Apron 1	X		X			
ST037 Bldg 771			X			
SS064 Apron 2	X		X			

Site	Groundwater	Surface Water	Soil/Sediment	Fish	Air	Inspection
SS065 Bldg 15	X		X			
SS066 Bldg 786	X		X			
SS067 Bldg 789	X		X			
SS068 Bldg 7001	X		X			
SS069 Bulk Fuel Storage Area	X		X			
SS070 Bldg 150	X		X			

Red font indicates LUC/IC sites that have a revised objective to achieve unrestricted site closure by the December 2015 or are newly tasked to also achieve this objective. These sites were originally status quo.

TABLE 2
2013 SITE STATUS UPDATE

Site Name	Contract Objective	Original Objective and/or Revised Objective
Landfill 1 (LF001)	Optimized exit strategy.	Status Quo. Site Closure (SC) objective not under this contract period. Annual landfill LUC/IC Inspections and Annual Report through 2015.
Landfill 2&3 (LF002)	Optimized exit strategy.	Status Quo. SC objective not under this contract period. Annual landfill LUC/IC Inspections and Annual Report through 2015.
Landfill 7 (LF003)	Optimized exit strategy.	Status Quo. SC objective not under this contract period. Annual landfill LUC/IC Inspections and Annual Report through 2015.
Landfill 5 (LF007)	Optimized exit strategy.	Status Quo. SC objective not under this contract period. Annual landfill LUC/IC Inspections and Annual Report through 2015.
Landfill 6 (LF009)	Optimized exit strategy.	Status Quo. SC objective not under this contract period. Annual landfill LUC/IC Inspections and Annual Report through 2015.
Three Mile Creek (SD031) *Closure Pending*	Site Closure (with unrestricted reuse.	Original objective was to meet SC by 2015. With pending decision on RACR report, objective has been revised to close site ahead of schedule and achieve in early 2013.
Six Mile Creek (SD032) *Closure Pending*	Site Closure with unrestricted reuse.	Original objective was to meet SC by 2015. With pending decision on RACR report, objective has been revised to close site ahead of schedule and achieve in early 2013.
Soil Vapor Intrusion System (SD052)	Optimized exit strategy.	Status quo. Not under this contract period.
STW-1300 Building 35/36 (SS060)	Site Closure with restrictions.	Original objective was to achieve SC in 2012. Additional groundwater treatment will be completed to treat recalcitrant chlorinated hydrocarbons with follow up sampling in June 2013. *SC anticipated in late 2013.*
Building 101 (ST006)	Revised per 9/12 contract mod to change site goal to site closure with unrestricted reuse.	Original objective was status quo with Annual LUC/IC Inspections and Reporting. Objective revised to continue with LUC/IC requirements until closure goal is reached before or by 2015. Draft Closure Work Plan under AFCEC review.
Building 112/PCB Dump Area (SS008)	Status Quo.	Status Quo. Site Closure (SC) objective not under this contract period. Annual LUC/IC Inspections and Annual Report through 2015.
Building 3 Drywell (DP011)	Site closure with unrestricted reuse.	Original goal was to achieve SC by 2012. Draft Closure report submitted 5/24/2012 to NYSDEC and EPA. *Anticipate meeting SC objective in early 2013.*
Building 301 (DP012)	Revised per 9/12 contract mod to change site objective to site closure with unrestricted reuse.	Original objective was status quo with Annual LUC/IC Inspections &Reporting. Objective revised to continue with LUC/IC requirements until closure goal is reached before or by 2015. Groundwater restriction deletion approved 6/12/2012 by EPA. Draft Closure Work Plan under AFCEC review.
Building 255, 2 drywells (DP013)	Revised per 9/12 contract mod to change site objective to site closure with unrestricted reuse.	Original objective was status quo with Annual LUC/IC Inspections &Reporting. Objective revised to continue with LUC/IC requirements until closure goal is reached before or by 2015. Groundwater restriction deletion approved by EPA on 5/16/2012 and NYSDEC on 4/24/12. Draft Closure Work Plan under AFCEC review.

Site Name	Contract Objective	Original Objective and/or Revised Objective
Building 219, Drywell (DP015)	Revised per 9/12 contract mod to change site objective to site closure with unrestricted reuse.	Original objective was status quo with Annual LUC/IC Inspections &Reporting. Objective revised to continue with LUC/IC requirements until closure goal is reached before or by 2015. Groundwater restriction deletion approved by EPA on 5/16/2012 and NYSDEC on 4/24/12. Draft Closure Work Plan under AFCEC review.
Lot 69 Former Waste Storage (SS017)	Optimized exit strategy.	Annual LUC/IC Inspections & Reporting. Closure not under this contract period. Groundwater restriction deletion approved by NYSDEC on 4/24/12 and EPA on 6/7/12.
Building 222 (DP022)	Optimized exit strategy.	Annual LUC/IC Inspections & Reporting. Closure not under this contract period. Groundwater restriction deletion approved by EPA on 5/16/2012 and NYSDEC on 4/24/12
Building 20, Locomotive Roundhouse (SS023) *Closure Pending*	Site closure with unrestricted reuse.	Original objective was to achieve SC in 2012. Draft Site Closure Report submitted to Regulators on 11/4/2012. EPA review comment received 1/26/12. Draft Final Report submitted on 3/6/12. No comments Draft Final Report. Report is considered final as of 4/6/12. Anticipate formal closure letter from Regulatory Agencies in early 2013. Received email approval 2/12/13.
Fire Demo Area (SS024)	Revised per 9/12 contract mod to change site objective to site closure with unrestricted reuse.	Original objective was status quo with Annual LUC/IC Inspections &Reporting. Objective revised to continue with LUC/IC requirements until closure goal is reached before or by 2015. Draft Closure Work Plan under AFCEC review.
T-9 Storage Area (SS025)	Status Quo.	Status Quo. Site Closure (SC) objective not under this contract period. Annual LUC/IC Inspections and Annual Report through 2015. Groundwater restriction deletion approved 6/12/2012.
Fire Training Area (FT030)	Revised per 9/12 contract mod to change site objective to site closure with unrestricted reuse.	Original objective was status quo with Annual LUC/IC Inspections &Reporting. Objective revised to continue with LUC/IC requirements until closure goal is reached before or by 2015. Draft Closure Work Plan under AFCEC review.
Coal Storage Area (SS033)	Status Quo.	Annual LUC/IC Inspections and Reporting through 2015. Closure not an objective under this contract period.
Building 110 Aqua System (ST036)	Status Quo.	Annual LUC/IC Inspections and Reporting through 2015. Closure not an objective under this contract period.
Substation Electrical Power PCB Site (SS044)	Status Quo.	Annual LUC/IC Inspections and Reporting through 2015. Closure not an objective under this contract period.
Building 214 (SD050)	Revised per 9/12 contract mod to change site objective to site closure with unrestricted reuse.	Original objective was status quo with Annual LUC/IC Inspections and Reporting through 2015. Objective revised to continue with LUC/IC requirements until closure goal is reached before or by 2015. Draft Closure Work Plan under AFCEC review.
Apron 2 Chlorinated Plume (SD52-01)	Status Quo.	Annual LUC/IC Inspections &Reporting through 2015. Closure not under this contract period.
Building 775 Chlorinated Plume (SD052-02)	Status Quo.	Annual LUC/IC Inspections &Reporting through 2015. Closure not under this contract period.
Landfill 6 Chlorinated Plume (SD52-04)	Status Quo.	Annual LUC/IC Inspections &Reporting through 2015. Closure not under this contract period.
Building 817 Chlorinated Plume (SD52-05)	Status Quo.	Annual LUC/IC Inspections &Reporting through 2015. Closure not under this contract period.
Building 133 Underground Concre (ST053)	Site closure with unrestricted reuse.	2011 Closure in process at time of contract award. NFA ROD signed by AF and EPA in August 2011 and November 2011

Site Name	Contract Objective	Original Objective and/or Revised Objective
		respectively. Site closed late 2011.
AOC 9 (SS062)	Status Quo.	Annual LUC/IC Inspections and Reporting through 2015. Closure not under this contract period.
Building 782 Nosedock 1 (SD041)	Site closure with unrestricted reuse.	Objective for achieving SC was planned for 2012. Spill closure request and Closure Report submitted as Draft to NYSDEC Spills Group on 11/11/11. Collected additional sol samples February 2013. Anticipated SC objective attainment by early 2013.
Building 781 Pumphouse (SS054)	Optimized exit strategy.	Continue O&M of existing system through 2015. Closure not under this contract period.
Tank Farm 1&3 (SS020)	Site closure with unrestricted reuse.	Anticipate achievement of SC by 2015.
Apron 1 (NYSDEC Spill # 9707954) (SS063)	Site closure with unrestricted reuse	2013 Anticipate achievement of SC by 2015.
Building 771 (NYSDEC Spill # 8903144) (ST037) *Closed 4/23/12*	Site closure with unrestricted reuse.	Original objective was to achieve SC objective in 2011. Draft Closure Report submitted to NYSDEC 9/19/11. *Spill Closure Letter received from NYSDEC on 4/23/12.*
Apron 2 (NYSDEC Spill # 9713631) (SS064)	Site closure with unrestricted reuse.	Anticipate achievement of SC by 2014.
Building 15 NYSDEC Spill # 9709366) (SS065)	Site closure with unrestricted reuse.	Anticipate achievement of SC by 2015.
Building 786 NYSDEC Spill # 8910168) (SS066)	Site closure with unrestricted reuse.	Anticipate achievement of SC by 2015.
Building 789 NYSDEC Spill # 9810713) (SS067)	Optimized exit strategy.	Continue O&M of existing system. Closure not under this contract Period.
Building 7001 NYSDEC Spill # 9706957) (SS068)	Site closure with unrestricted reuse.	Anticipate achievement of SC by 2015.
Bulk Fuel Storage Area NYSDEC Spill # 9507364/9810949/00 (SS069)	Site closure with unrestricted reuse.	Original objective was to achieve SC by 2014.Draft Site Closure Report and closure request submitted to NYSDEC on 6/8/12. Collected additional soils samples February 2013 *Anticipate receipt of Spill Closure Letter from NYSDEC Spills Group by early 2013.*
Building 150 NYSDEC Spill # 0800273) (SS070) *Closed 2/11/13*	Site closure with unrestricted reuse.	Original objective was to achieve SC by 2011.Draft Site Closure Report and closure request submitted to NYSDEC on 5/15/12. Received formal Spill Closure Letter from NYSDEC Spills Group by 2/11/13.
Additional Unknown sites Unknown Site 1 AOI474 Unknown Site 2 Apron 1 Soil Pile	Site closure with unrestricted reuse	Draft Site Investigation and Cleanup Report submitted to NYSDEC and EPA on 10/5/12. SC by 2015.
New Sites		
Mobile Ave Former Drum Storage AOI 474	Site closure with unrestricted reuse	New sites tasked under contract mod. Objective is to achieve SC by 2015. Working Draft Work Plan in AFCEC review.
Building 211 DW-211-01	Site closure with unrestricted reuse	New sites tasked under contract mod. Objective is to achieve SC by 2015. Working Draft Work Plan in AFCEC review.

TABLE: 3
BASEWIDE MONITORING SITES – CONTAMINANTS OF POTENTIAL CONCERN

Site	Free Product	Petroleum VOCs	Organic Solvents	Chlorinated Solvents	MTBE	CH_4	SVOCs	Pesticides	PCBS	Metals	Radiological Constituent
SS023/Bldg 20							X			X	
SS060/Bldg 35			X	X			X			X	
SS017/Lot 69										X	
SD52&SD52 SVI Sites -01,-02, -04, and -05				X							
DP012/Bldg 301							X			X	
SD41: Nose Docks 1&2	X	X	X	X							
SS062/AOC 9 TCE				X							
LF001/ Landfill 1		X	X			X				X	
LF002/ Landfill 2/3		X								X	
LF003/ Landfill 7		X	X							X	
LF007/ Landfill 5										X	
LF009/ Landfill 6			X	X						X	
SD031/ Three Mile Creek							X	X	X	X	
SD032/ Six Mile Creek		X					X	X	X	X	
ST036/ Bldg 110		X									
ST037/ Pumphouse 5		X					X		X	X	
SS020/ Tank Farms 1 &3		X									
FT030/ FPTA		X									
SS063/Apron 1		X									
SS064/Apron 2	X	X			X						
SS025/ T-9		X									
SS066/Bldg 786		X									
SS067/Bldg 789	X	X									
SS069/ BFSA		X									
ST053/Bldg 133		X									
SS065/Bldg 15		X									
SS008/Bldg 112		X							X		
DP022 Bldg 222		X								X	
SS024/Fire Demolition Area		X									
DP011/Bldg 3		X									
SS033/Coal Storage Area									X		
DP015/Bldg 219		X									
DP013/Bldg 255		X									
SS070/Bldg 150		X									
SS068/Bldg 7001		X									
ST006/Bldg 101		X									
SS054/Bldg 781		X									
SD050/Bldg 214		X									
SS044/Electrical Substation									X		
AOI-72 Mobile Ave Former Drum Storage Area							X	X		X	
DW-211-01 Building 211 Drywell										X	

TABLE: 4
CHEMICAL HAZARD INFORMATION

Compound	Exposure Limits	Route of Exposure/Primary Health Effects
Petroleum Products	400 mg/m^3 (AFOSH)	Inhalation, ingestion, and dermal routes of exposure. Eye and skin irritation; central nervous system depression; dermatitis.
Gasoline	300 ppm (TLV-TWA); 500 ppm (TLV-STEL)	Inhalation, ingestion and dermal routes of exposure. Eye, skin, and respiratory irritation; central nervous system depression. Possible liver and kidney damage; dermatitis.
Diesel Fuel, as total hydrocarbons	100 mg/m^3 (TLV-TWA) (SKIN)	Inhalation, ingestion, and dermal routes of exposure. Eye and skin irritation; central nervous system depression; dermatitis.
Benzene	0.5 ppm (TLV-TWA) (SKIN); 2.5 ppm (TLV-STEL). Note: see OSHA 29 CFR 1926.1128 (1 ppm PEL; 5 ppm STEL)	Inhalation, ingestion, and dermal routes of exposure. Eye, skin, and respiratory irritation; CNS depression; leukemia; dermatitis.
Ethyl benzene	100 ppm (TLV-TWA); 125 ppm (TLV-STEL)	Inhalation, ingestion, and dermal routes of exposure. Eye, skin, and respiratory irritation; CNS depression; dermatitis.
Toluene	50 ppm (TLV-TWA) (SKIN)	Inhalation, ingestion, and dermal routes of exposure. Eye, skin, and respiratory irritation; CNS depression; possible liver and kidney damage; dermatitis.
Xylenes	100 ppm (TLV-TWA); 150 ppm (TLV-STEL)	Inhalation, ingestion, and dermal routes of exposure. Eye, skin, and respiratory irritation; CNS depression; possible liver and kidney damage; dermatitis.
Methane	Not established (simple asphyxiant)	Inhalation route of exposure. Asphyxiation due to the displacement of oxygen; fire and explosion hazard.
Carbon dioxide	5,000 ppm (TLV-TWA); 30,000 ppm (TLV-STEL)	Inhalation route of exposure. Asphyxiation (simple asphyxiant - asphyxiation due to displacement of oxygen).
Trichloroethene (TCE)	10 ppm (TLV-TWA); 25 ppm (TLV-STEL)	Inhalation, ingestion and dermal routes of exposure. Eye, skin and respiratory irritation; CNS depression; possible liver, kidney, cardiovascular and gastrointestinal injury; dermatitis.

Compound	Exposure Limits	Route of Exposure/Primary Health Effects
Methyl Tertiary-Butyl Ether (MTBE)	50 ppm (TLV-TWA)	Inhalation, ingestion, and dermal routes of exposure. Acute exposure to MTBE can result in CNS depression, tremor and other neurotoxicity effects, eye and respiratory irritation, and liver and kidney effects. Chronic exposure may result in nervous system, reproductive, and kidney damage. MTBE is a confirmed animal carcinogen.
Trimethylbenzene (all isomers)	25 ppm (PEL)	Inhalation, ingestion, and dermal routes of exposure. Eye, skin, and respiratory irritation; CNS depression; dermatitis.
Polychlorinated biphenyl (PCB or chlorodiphenyl), 42% and 54% chlorine	42% chlorine PCB: 1 mg/m^3 (TLV-TWA) (SKIN); 54% chlorine PCB: 0.5 mg/m^3 (TLV-TWA) (SKIN)	Inhalation, ingestion and dermal routes of exposure. Eye, skin, and respiratory irritation; chloracne dermatitis; possible liver damage; suspected carcinogen.
Vinyl Chloride	1 ppm (TLV-TWA)	Inhalation, ingestion and dermal routes of exposure. Eye, skin and respiratory irritation; CNS depression; Acroosteolysis degeneration of terminal phalanges; liver damage; dermatitis; Angiosarcoma liver cancer and other cancers.
Dieldrin	0.1 mg/m^3 - inhalable fraction and vapor (TLV-TWA) (SKIN)	Inhalation, ingestion and dermal routes of exposure. The oral rat LD50 = 40-60 mg/kg. Acute exposure effects include headache, dizziness, nausea, vomiting, malaise, sweating, jerking of the limbs, convulsions, agitation, hyperactivity, and temporary personality changes, and coma; liver and skin effects; suspected liver carcinogen.
Polycyclic Aromatic Hydrocarbons (PAHs), as coal tar pitch volatiles (benzene or cyclohexane-soluble fraction)	0.2 mg/m^3 (PEL)	Inhalation, ingestion and dermal routes of exposure. Eye, skin, and respiratory irritation; Headache, nausea, and confusion; blood system effects; liver and kidney damage; cataracts and other eye damage; dermatitis; and suspected carcinogen. PAHs include acridine, anthracene, phenanthrene, and pyrene. Seven of the higher molecular weight PAHs are suspected carcinogens (benz[a]anthracene; benzo[b]fluoranthene; benzo[k]fluoranthene; benzo[a]pyrene; chrysene; dibenz[a,h]anthracene; and indeno[1,2,3-cd]pyrene).

Compound	Exposure Limits	Route of Exposure/Primary Health Effects
Cadmium, and compounds	2.5 µg/m^3 (action level); 5 µg/m3 (PEL); Note: see OSHA 29 CFR 1926.1127	Inhalation, ingestion and dermal routes of exposure. Eye, skin and respiratory irritation; Pulmonary edema; CNS effects; nasal perforation; kidney damage; anemia; Suspected carcinogen (lung and prostate cancer)
Chromium, metal and Cr III compounds	0.5 mg/m^3 (PEL)	Inhalation, ingestion and dermal routes of exposure. Eye, skin and respiratory irritation; Skin and nasal ulcerations; possible lung fibrosis
Chromium, hexavalent	2.5 µg/m^3 (action level); 5 µg/m^3 (PEL) Note: see OSHA 29 CFR 1926.1126	Inhalation, ingestion and dermal routes of exposure. Eye, skin and respiratory irritation; Pulmonary edema; Skin and nasal ulcerations; possible liver and kidney damage; Allergic dermatitis; suspected carcinogen (lung cancer)
Lead (metal & inorganic compounds)	0.05 mg/m^3 (PEL); Note: see OSHA 29 CFR 1926.62	Inhalation, ingestion and dermal routes of exposure. Gastrointestinal disturbances; anemia; Neuromuscular dysfunction; Encephalopathy; Nephropathy
Mercury, elemental and inorganic forms	0.025 mg/m^3 (TLV-TWA)(SKIN)	Inhalation, ingestion and dermal routes of exposure. Respiratory irritation; Bronchitis and pneumonitis; Gastrointestinal disturbances; Neuromuscular dysfunction and tremors; CNS and kidney damage; Weakness, fatigue, excitability, memory loss, insomnia; Behavioral and personality changes, delirium, hallucinations; Eye effects; Sensitization dermatitis

LEGEND:

µg/m^3:	Micrograms per cubic meter
mg/m^3:	milligrams per cubic meter
ppm:	parts per million
CNS:	central nervous system
OSHA:	Occupational Safety and Health Administration
PEL:	OSHA 8-hour time-weighted average (TWA) permissible exposure limit
PEL-C:	PEL ceiling value
ACGIH:	American Conference of Governmental Industrial Hygienists
TLV-TWA:	ACGIH 8-hour time-weighted average (TWA) threshold limit value
TLV-STEL:	ACGIH 15-minute short-term exposure limit
TLV-C:	ACGIH ceiling limit
SKIN:	Skin notation.

TABLE: 5
AIR MONITORING PLAN

Monitoring Type	**Activity / Monitoring Description**	**Action Levels / Action**
Combustible gases and oxygen	Tasks where combustible gases, oxygen-deficient, or oxygen-enriched atmospheres may be present (i.e., confined space entry, hot work in areas where combustible or flammable materials are present). Conduct initial and continuous monitoring during confined space entry. Conduct initial and periodic monitoring for hot work in areas where combustible or flammable materials are present. Monitor with RAE Systems EntryRAE, MultiRAE, QRAE, or equivalent multi-gas monitor.	>10% LEL; <19.5% oxygen; or >23.5% oxygen: Stop work. Isolate ignition sources. Ventilate the area. Contact the SSHO to evaluate.
Volatile Organic Compounds	Tasks where VOCs may be present (petroleum-impacted soil handling). Conduct initial and periodic monitoring of work areas and worker breathing zone. Monitor with RAE Systems MiniRAE, EntryRAE, or equivalent PID monitor.	5 ppm above background for sustained period of 15-minutes: Contact the SSHO to evaluate. >5 ppm to less than, or equal to, 50 ppm VOCs: Use Level C protection. Contact the SSHO to evaluate. >50 ppm: Stop work. Ventilate the area. Contact the SSHO to evaluate.

LEGEND:

LEL:	lower explosive limit
VOC:	volatile organic compound
PID:	photoionization detector
ppm:	parts per million
SSHO:	Site Safety and Health Officer.

APPENDIX A

HSP FORMS

AIR MONITORING LOG

Project Name:	
Project Location:	
Date:	
Conducted By:	
Page Number:	

Time	**Location**	_____ (____)	_____ (____)	_____ (____)	_____ (____)	_____ (____)

LEGEND:

VOC: Volatile organic compound
PID: Photoionization detector
FID: Flame ionization detector
LEL: Lower explosive limit
O_2: Oxygen meter
mg/m^3: Milligrams per cubic meter
ppm: Parts per million

CALIBRATION LOG: DIRECT-READING MONITORING INSTRUMENT

Project Name:	
Project Location:	
Conducted By:	
Instrument:	

Date: **Name:**	**Calibration Gas:** **Concentration:**
Initial Reading: **Adjusted Reading:**	**Comments:**

Date: **Name:**	**Calibration Gas:** **Concentration:**
Initial Reading: **Adjusted Reading:**	**Comments:**

Date: **Name:**	**Calibration Gas:** **Concentration:**
Initial Reading: **Adjusted Reading:**	**Comments:**

Date: **Name:**	**Calibration Gas:** **Concentration:**
Initial Reading: **Adjusted Reading:**	**Comments:**

Date: **Name:**	**Calibration Gas:** **Concentration:**
Initial Reading: **Adjusted Reading:**	**Comments:**

EMERGENCY MEDICAL NOTIFICATION FORM

Name:	
Company:	

EMERGENCY NOTIFICATION INFORMATION

IN CASE OF EMERGENCY NOTIFY:
Name / Relationship / Telephone:
Name / Relationship / Telephone:
ALLERGIES
List any health-threatening allergies (i.e., medications, food, bee stings):
MEDICATIONS
List current medications that may affect the ability to safely operate equipment and machinery:
OTHER INFORMATION
List any other information that should be known in case of an emergency:

Name (print):	
Signature:	
Date:	

EQUIPMENT DECONTAMINATION RELEASE AUTHORIZATION

Date / Day:	
Project Name:	
Project Location:	
Equipment Type:	
Mfr / Model:	

Item	Inspection Description	Clean	Not Clean	N/A
1	Tires / Rims, outside			
2	Tires / Rims, inside			
3	Buckets / Blades			
4	Rippers / Other			
5	Cross-members			
6	Undercarriage			
7	Tracks			
8	Drive carriage			
9	Drip pans			
10	Brush guards			
11	Belly pans			
12	Scraper can interior			
13	Truck beds			
14	Frames			
15	Engine compartment			
16	Cab			

Equipment Use:

Decontamination Description:

I certify that I have inspected the equipment indicated above and have observed that visible material has been removed from the equipment.

Inspected By:	
Signature:	
Date:	

HAZARDOUS SUBSTANCE INVENTORY LIST

Project Name:	
Project Location:	

MSDS on File	Product Name	Manufacturer	Location and Container Type

HEALTH AND SAFETY PLAN DISTRIBUTION TO SUBCONTRACTOR

Project Name:	
Project Location:	

A copy of the CAPE Health and Safety Plan for the site is being provided to subcontractors who may be affected by activities covered under the scope of this plan. Distribution of the Health and Safety Plan to subcontractor firms and their designated contact person is with the understanding that subcontractor personnel involved in this project will review this document, abide by its provisions, and comply with OSHA and other applicable health and safety rules and regulations for work onsite.

Date	Name	Signature	Organization

HEALTH AND SAFETY PLAN REVIEW

Project Name:	
Project Location:	
Conducted By:	

I have reviewed the CAPE Health and Safety Plan for the above indicated site and understand the hazards and control measures required on this project.

I agree to follow the procedures outlined in this plan and to inform the CAPE Project Manager, Field Team Leader (FTL), and/or Site Safety and Health Officer (SSHO) should any unsafe condition be noted.

I understand that failure to follow safety regulations can be reason for removal from this project.

Date	Name	Signature	Company

HEAVY EQUIPMENT INSPECTION REPORT

Date / Day:	
Project Name:	
Project Location:	
Equipment Type:	
Mfr / Model:	

Inspection Description	Checked	Observations (readings, levels, condition, damage, repairs needed)
General appearance		
Hour meter reading		
Engine operation / check belts		
Engine oil / water level		
Transmission oil level		
Hydraulic / misc. oil level		
Brake operation / fluid level		
Grease		
Batteries		
Fuel level (gas / diesel)		
Hoses & fittings (air, hydraulic…)		
Operation / controls		
Tires / tracks		
Cab (mirrors, seatbelt, glass, horn, turn signals, lights, wipers)		
Back-up lights and alarm		
Fire extinguisher condition		
Coupling devices and connectors		
Exhaust system		
Blade / boom / bucket		
Frame, ladders and walkway		
Steering		

Defects and Repairs Needed / Comments:

Inspected By: Signature:

HOT WORK PERMIT

Date:			
Project Name / Number:			
Specific Location:			
Work Description:			
Hot Work Hazards:			
Chemicals Present:			
Chemicals Introduced:			
Comments:			
HOT WORK PERSONNEL			
Hot Work Supervisor:	**Welder #1**:		
Fire Watch:	**Welder #2**:		
IGNITION SOURCES			
[____] Oxygen / Acetylene Torch Cutting	**[____] Grinding / Abrasive Saw**		
[____] Propane Torch Cutting	**[____] Drilling**		
[____] Electric Arc Welding	**[____] Electric Tools**		
[____] Other:	**[____] Soldering**		
HOT WORK CHECKLIST (Circle Applicable Items)		**YES**	**NO**	**N/A**
Remove Materials: Removed flammable and combustible materials from area				
Cover Materials: Covered and secured non-movable combustible materials				
Chemical Handling: Handling of flammables/combustibles in the area stopped				
Floor / Wall Openings: Floor and wall openings covered or protected				
Air Monitoring: Combustible gas test performed (must be less than 10% LEL)				
Control of Ignition Sources: Ignition sources isolated / Inert gas blanket				
Electrical equipment: De-energized / Locked out-tagged out / Blocked out				
Fire Protection Equipment: Fire extinguisher / Fire hose / Fire monitor				
Fire Watch: Fire watch equipped with fire extinguisher and/or fire hose				
Fire Watch Standby: Standby in area for 30 minutes after hot work completed				
General PPE: Hardhat / Safety glasses / Leather boots / Ear plugs				
Protective Clothing: Leather jacket / chaps / leather gloves / Leather boots				
Eye Protection: Welding hood / Welding goggles				
Respirators: HF APR / FF APR / FF PAPR / P-100 Cartridges / SAR / SCBA				
Safety Equipment: First-aid kit / Eyewash supplies				
Access / Egress: Means of access and egress identified and available				
Water Source: Water source available				
Contractors: Contractors in area advised of hot work operation and fire hazard				
Personnel Training: Hot work / Fire extinguisher / Emergency procedures				
Safety Briefing: Hot work operations / Emergency signals / Evacuation routes				
Postings: Hot work permit / Caution signs / Barricade tape / Other:				

LOG OF TESTS

Time	**LEL (%)**	**_____ (____)**	**_____ (____)**	**Time**	**LEL (%)**	**_____ (____)**	**_____ (____)**	**Comments**

Tester Name:
Instrument Type/ Model / Serial #:
Instrument Calibration Date/Method:
APPROVAL **Hot work conditions satisfied. The hot work permit is valid only for the conditions existing at the time the permit is issued. The permit expires if a change in activity or conditions that affect safety occurs.**
Hot Work Supervisor Name:
Time Permit Approved: **Signature**:
Time Permit Cancelled: **Signature**:

POST AT JOB SITE

INCIDENT REPORTING AND INVESTIGATION PROCEDURES

(Injury/Property Damage/Liability Exposure/Spills/Fires/Near Miss Incidents)

Notify the Site Supervisor or Site Safety and Health Officer (SSHO) immediately of injuries, property damage, liability exposure, spills, fires, and near miss incidents. The Site Supervisor or his/her representative shall:

- Take care of injured personnel immediately and secure the area
- Secure remaining dangerous conditions to prevent accidents and additional damage
- Secure the incident scene to preserve information
- Identify employees involved in the incident and witnesses and obtain initial information
- Notify the Project Manager (PM), Corporate Health and Safety Manager (CHSM), and Corporate Risk Manager (RM) about the incident and receive instructions. Drug/alcohol testing may be needed. **Notify as soon as possible - No later than 2 hours of the incident**
- Initiate fact finding. Investigate the site, interview witnesses, and document circumstances and facts. Take photos of the incident area and equipment involved. Complete preliminary documentation forms. Depending upon incident severity and complexity, fact finding may involve other investigators as determined by the CHSM
- Complete required CAPE forms: Incident Statement by Employee, Incident Statement by Witness, Incident Report by Supervisor, Injury and Illness Report, Vehicle Accident Report, and/or Property Damage, Loss and General Liability Report. Submit all forms (if a form is not applicable write N/A on the form.)
- **Submit completed forms to the CHSM, RM and PM within 24 hours of an incident and immediately forward additional information as it becomes available**.

NOTE: Accidents resulting in a fatality or multiple hospitalizations require reporting to the nearest OSHA office within 8 hours (1-800-321-OSHA). This report shall be made by the CHSM. A written report shall follow that provides OSHA with all details of the accident required by 29 CFR 1904.8. Any equipment, material, or related evidence that might help in an investigation must not be moved except to prevent further accidents.

INCIDENT REPORTING CONTACT INFORMATION:

PM: _____ - Office _____ – Fax _____ – Cell _____

CHSM: Glen Mayekawa – Office (714) 599-9071 – Fax (714) 599-9087 – Cell (714) 920-7483

RM: Chris Caviness – Office (770) 908-7200 – Fax (770) 908-7219

FAILURE OF A CAPE EMPLOYEE TO PROMPTLY REPORT A SAFETY INCIDENT OR FAILURE TO PRESERVE AN ACCIDENT SCENE UNTIL AN INVESTIGATION IS COMPLETED, IS GROUNDS FOR DISCIPLINARY ACTION.

INCIDENT REPORT BY SUPERVISOR

Date / Time of Incident:
Project Name / Project No.:
Client Name / Location:
Specific Location of Incident:
Employees Involved in Incident (if applicable):
Detailed Description of Incident:
Primary Cause of Incident:
Contributing Cause(s) of Incident:
Recommendation for Preventing Such Incidents in the Future:
Supervisor Name (print):
Signature:
Date:

INCIDENT STATEMENT BY EMPLOYEE

Employee Name:
Date / Time of Incident:
Project Name / Project No.:
Client Name / Location:
Specific Location of Incident:
Describe What You Were Doing Just Before the Incident:
Detailed Description of How the Incident Occurred:
Names of Witnesses:
Other Relevant Information:
How Can the Likelihood of this Happening Again Be Reduced:
Employee Name (print):
Signature:
Date:

INCIDENT STATEMENT BY WITNESS

Witness Name / Address / Telephone:
Employer / Telephone:
Date / Time of Incident:
Project Name / Project No.:
Client / Location:
Specific Location of Incident:
DETAILED DESCRIPTION OF INCIDENT BASED ON PERSONAL OBSERVATION
Describe where you were and what you were doing just before the incident:
Describe any injuries:
Describe any property damaged:
Describe what was the apparent nature of the injury and/or damage:
Describe what personnel and/or equipment were involved:
Describe what caused the injury and/or damage:
Describe the sequence of events:
List any observed unsafe acts or conditions:
Names of other witnesses:
Other relevant information:
Witness Name (print):
Signature:
Date:

INJURY AND ILLNESS REPORT

Injured Employee Name:	Date / Time of Injury:
Social Security Number:	Date of Birth / Age:
Sex: M ☐ F ☐ # of Dependents:	Date of Hire:
Job Title:	Pay Rate:
Home Address:	Home Telephone:
CAPE Home Office:	Injury on CAPE Premises: Yes☐ No☐
Client / Location:	Injury on Client Premises: Yes☐ No☐
Specific Accident Location:	
Nature of Injury:	
Exact Body Part Injured:	
Medical Attention: None ☐ First Aid ☐ Paramedics ☐ Doctor ☐ Hospital ER ☐ Overnight ☐	
Medical Attention Description:	
Hospital / Doctor Name / Telephone:	
Hospital / Doctor Address:	
Date / Time Injury Reported: By Whom:	
Time employee began work:	Avg. # of hours worked per week:
Did employee leave work: Yes ☐ No ☐ When:	
Has employee returned to work: Yes ☐ No ☐ When: Note: Employee must present a return to work release from examining physician before return to work	
Did employee have a work activity restriction: Yes ☐ No ☐ Describe:	Dates restricted:
Did employee miss a regularly scheduled work shift: Yes☐ No☐	Dates missed:
Injury Incident Description:	
What actions have been taken to prevent recurrence:	
What was the employee doing just before the incident occurred?	
Witness Name:	Telephone:
Address:	Statement Attached: Yes ☐ No ☐
INVESTIGATION AND REVIEW (Report to CHSM within 2 hours of injury)	
Completed by Name (print) / Signature / Date:	
Title / Phone:	
Site Supervisor Name (print) / Signature / Date:	
Project Manager Name (print) / Signature / Date:	
CHSM Name (print) / Signature / Date:	
Attached to this report: ☐ Incident Statement by Employee ☐ Incident Report by Supervisor ☐ Incident Statement by Witness ☐ Photographs ☐ Maps/Sketches ☐ Other _____	
(Section to be completed by a CAPE Safety Team Representative) Cape Case #: D/D:	

INSPECTION CHECKLIST: BOAT PRE-DEPARTURE INSPECTION

INSPECTION CHECKLIST: BOAT PRE-DEPARTURE INSPECTION	YES	NO	NA
PERSONAL FLOTATION DEVICES (PFDs)			
Have at least 1 USCG-approved PFD per passenger and a minimum of 2 on board			
Have an additional throwable device if the vessel is more than 16 feet long			
Reviewed location and use of PFDs to crew/passengers new to the vessel			
LIGHTS AND SHAPES			
All navigation lights are present and operational			
Instrument lights are working			
Have the required shapes (if engaging in an activity that requires a day shape)			
Flashlight is on board			
SOUND PRODUCING DEVICES, DISTRESS SIGNALS, AND SAFETY EQUIPMENT			
Have a horn capable of producing a four-second blast audible for at least 1/2 mile			
Have a spare can of air or an alternate device available (if portable air horn)			
Accessible flares, day signals, etc., are stored in a dry location			
Carrying distress signals at all times even if not required by the Coast Guard			
Informed the crew and passengers of the location and use of distress signals			
TOOLS AND SPARES			
Basic tool box is on board			
Box of spares on board (fuel filter, light bulbs, head parts, through hull plugs, etc)			
FIRE EXTINGUISHERS			
Fire extinguisher is accessible. Do you have at least those required by the USCG?			
Checked to be sure mounts are secure and functional before departure			
Reviewed location and use of fire extinguishers with crew/passengers			
FUEL AND OIL			
Tanks topped-off and have enough fuel for a reasonable margin of safety for return			
Checked the engine oil and coolant level			
BATTERY CARE			
The selector switch is in the proper position for dual charging systems			
The power is on to the entire vessel			
Spare batteries on board (handheld radio, flashlight, portable navigational aid, etc)			
Rechargeable items are charged			
VENTILATION			
Checked all interior spaces to make sure they are well-ventilated before departure			
If fuel odor before ventilating, run blowers /check before starting			
If odor persists, stop and look for the source of the leak			
BILGES			
Checked that bilges are reasonably dry and pumps are not running excessively			
Cleaned up any spilled oil or waste in bilges so as to prevent overboard discharge			
WEATHER FORECAST			
Checked the weather forecast?			
Radio is on board to receive weather updates			
DOCKING AND ANCHORING			
Have at least one anchor set up and bent-on to the anchor line			
Have two or three extra dock lines in case of unusual conditions dockside			
Visually inspected the lines for chafe or wear			
Have at least two fenders on board for docking or towing if required			
DOCUMENTATION			
Have the ship's papers, radio license, fishing permit, etc. on board			
Have the charts for the boating area regardless of level of local knowledge			

INSPECTION FORM: FORKLIFT

Date / Day:	
Project Name:	
Project Location:	
Equipment Type:	
Mfr / Model:	

Item	Mon _____	Tues _____	Wed _____	Thurs _____	Fri _____	Sat _____	Sun _____
Check radiator and battery							
Check engine oil and transmission fluid							
Check hydraulic oil and hydraulic system							
Check for hose crimp leaks including LPG tank/hose connections							
Check tires							
Check overhead guard							
Check mast and hydraulic cylinders							
Check lift chains/rollers							
Check engine operation							
Check brakes both service and parking							
Check lights, horn, fire extinguisher, and seatbelts							
Check steering							
Check back-up alarm signal							
Test operating controls							

Comments:

I have inspected this equipment and it is in good working condition except as noted.	
Inspected By / Signature / Date:	

PROPERTY DAMAGE, LOSS AND GENERAL LIABILITY REPORT

Project Name / Project No.:
Project Location:
Project Manager / Supervisor:
Date / Time of Damage or Loss:
Description / Identification of damaged or lost property:
Location of damaged or lost property (before loss):
Detailed description of how the damage or loss occurred:
Cause and corrective action recommended to prevent recurrence:
OWNER
Owner of damaged or lost property Name / Telephone:
Address:
Employer Name and Address:
WITNESS
Witness Name / Telephone:
Witness Address:
Employer Name and Address:
WITNESS
Witness Name / Telephone:
Witness Address:
Employer Name and Address:
REPAIR COST
Repair or Replacement Cost:
Attachments: [ ] Photographs [ ] Police Report [ ] Incident Statement by Witness [ ] Incident Report by Supervisor [ ] Incident Statement by Employee [ ] Injury Report
Supervisor Name (print):
Signature:
Date:

SAFETY INSPECTION REPORT

Date / Day:	
Project Name:	
Project Location:	
Work Description:	
Comments:	

OBSERVATIONS

Safety Conditions Requiring Corrective Action	Corrective Action, Assignment, and Completion Date

Project Manager:	
Safety Inspector:	
Distribution:	

SITE CONTROL LOG

Date / Day / Time:	
Project Name:	
Project Location:	

Time		**Name**	**Organization**
In	**Out**		

TAILGATE SAFETY MEETING RECORD

Date / Day:	**Time:**
Project Name:	**Project No.:**
Client:	**Location:**
Specific Location:	
Work Description:	
Comments:	
SAFETY TOPICS PRESENTED	
Protective Clothing / Equipment:	
Chemical Hazards:	
Physical Hazards:	
Emergency Procedures:	
Emergency Hospital:	
Hospital Telephone:	
Hospital Directions:	
Special Equipment:	
Other:	
SAFETY MEETING ATTENDEES	
Name Printed / Initial	**Name Printed / Initial**
1.	**6.**
2.	**7.**
3.	**8.**
4.	**9.**
5.	**10.**
Meeting conducted by (print name / signature):	

TRAINING ATTENDANCE ROSTER

Project Name:	
Project Location:	
Date:	
Topic	

Date	Name	Signature	Company

Instructor Name:	
Signature:	
Date:	

VEHICLE ACCIDENT REPORT

CAPE VEHICLE	
Date / Time:	Location:
Driver Name:	Accident Date:
Drivers License #:	State:
Driver Address:	Project Location:
Vehicle Year/Make /Model:	
License Plate #:	State:
Vehicle Owner (Circle): Owned / Leased / Rented / Private	
Vehicle Owner Name:	Telephone:
Vehicle Owner Address:	
Vehicle Damage:	Est. Repair Cost:
OTHER VEHICLE	
Driver Name:	Telephone:
Drivers License #:	State
Drivers Address:	
Vehicle Owner Name:	Telephone:
Vehicle Owner Address:	
Insurance Company:	Telephone:
Address:	Policy No.:
Vehicle Year / Make / Model:	Agents Name:
License Plate No.:	State:
Vehicle Damage:	
Passengers (list on back): Yes / No	Injuries (list on back): Yes / No
ACCIDENT DESCRIPTION	
Sketch Attached: Yes / No	Photos Attached: Yes / No
Description:	
WITNESS INFORMATION	
Witness Name:	Telephone:
Address:	
Statement Attached: Yes / No	
POLICE REPORT	
Police Department:	Telephone:
Police Officer Name:	Police Report #:
Date / Time Reported:	
INVESTIGATION AND REVIEW	
Report Prepared By / Date:	
Supervisor Name / Signature / Date:	

APPENDIX B

EMERGENCY CONTACT LIST

APPENDIX B
EMERGENCY CONTACT LIST

Police – Emergency	9-1-1 or (315) 339-3311
Fire/Paramedics/Ambulance – Emergency	9-1-1 or (315) 336-1234
Emergency Hospital: Rome Memorial Hospital 1500 N. James Street, Rome, New York	(315) 338-7000
National Response Center	(800) 424-8802
NYSDEC (Chemical Spills)	(800) 457-7362
Rome Fire Department (HAZMAT Team)	(315) 339-5600
AFCEC CO: Leticia Walton, 772 ESS/PKJ	Office: (210) 395-8196 Email: leticia.walton@us.af.mil
AFCEC COR & Former Griffiss AFB POC: Michael McDermott, AFCEC/CZRB	Office: (315) 356-0810 ext. 202 Email: michael.mcdermott.1@us.af.mil
CAPE (Corporate - Norcross, GA) 500 Pinnacle Court, Ste 100, Norcross, GA 30071	Office: (770) 908-7200 FAX: (770) 908-7219
CAPE (Project Office – Overland Park, KS) 10901 Lowell Ave, Ste 271, Overland Park, KS 66210	Office: (913) 327-8300 FAX: (913) 327-8305
CAPE Project Manager Philip Dula, PG, CHMM	Office: (913) 327-8300 ext. 104 Mobile: (913) 302-4962 Email: pdula@cape-inc.com
FPM Task Manager: Gaby Atik, PE	Office: (315) 336-7721 Mobile: Email:g.atik@fpm-remediations.com
FPM Senior Environmental Scientist: Dan Baldyga, CE	Office:(315) 336-7721 Mobile: Email: d.baldyga@fpm-remediations.com
AECOM Task Manager: Mike Niederreither, PG	Office:(717) 790-3404 Mobile: Email:Mike.neiderreither@aecom.com
AECOM Senior Engineer: Dan Servetas	Office: (518) 951-2371 Mobile: (518) 522-4761 Email: daniel.servetas@aecom.com
CAPE Site Safety and Health Officer Steven Usnick, PE	Office: (913) 327-8300 ext. 103 Mobile: (816) 721-5547 Email: susnick@cape-inc.com
CAPE Safety and Health Manager and CHSM (Glen Mayekawa, CIH)	Office: (949) 236-3000 Mobile: (714) 920-7483
CAPE Risk Manager (Chris Caviness, PE, JD)	Office: (678) 287-1340 FAX: (770) 908-7219
CAPE Corporate Human Resources Manager (Elena Linnar)	Office: (949) 236-3000 FAX: (949) 231-1346
Griffiss Utilities Service Corporation	(315) 838-4872

APPENDIX C

ACTIVITY HAZARD ANALYSES

ACTIVITY HAZARD ANALYSIS

ACTIVITY: MOBILIZATION AND SITE PREPARATION

Accepted By:

Risk Assessment Code (RAC): **L**

Date Prepared: 3/5/11
Prepared By: Glen Mayekawa, CIH
Reviewed By: Steve Usnick, PE

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Recommended Protective Clothing and Equipment: Use Level D protection for site preparation tasks.
Level D protection consists of: Hardhat, steel-toed boots, work gloves, safety glasses, high-visibility safety vest (if vehicle or equipment traffic), earplugs (if noise present.)

		PROBABILITY				
		Frequent	Likely	Occasional	Seldom	Unlikely
SEVERITY	Catastrophic	**E**	**E**	**H**	**H**	**M**
	Critical	**E**	**H**	**H**	**M**	**L**
	Marginal	**H**	**M**	**M**	**L**	**L**
	Negligible	**M**	**L**	**L**	**L**	**L**

RISK ASSESSMENT DEFINITIONS:

SEVERITY	
Catastrophic:	Mission failure; death or permanent disabling injury; damage to property >$200K.
Critical:	Major mission degradation; severe injury; occupational illness; or major system damage.
Marginal:	Minor mission degradation; injury; minor occupational illness; or minor system damage.
Negligible:	Less than minor mission degradation; injury; occupational illness; or minor system damage.
PROBABILITY	
Frequent:	Occurs often in the life of a system. Continuously experienced.
Likely:	Occurs often in the life of a system. Continuously experienced.
Occasional:	Will occur in the life of the system. Occurs sporadically.
Seldom:	Unlikely but can expect to occur in the life of the system. Occurs seldom.
Unlikely:	Unlikely but could occur in the life of a system. Occurs very rarely.

LIST OF COMPETENT PERSONS FOR THIS AHA:
-General S&H Competent Person: SSHO (TBD).

ACTIVITY HAZARD ANALYSIS

WORK TASK	POTENTIAL HAZARDS
Mobilization and Site Preparation: -Mobilize personnel and equipment -Conduct safety orientation briefing/HSP/AHA review -Review utility clearance (as applicable) -Delineate work zones -Complete site preparation tasks.	**Chemical Hazards**: No anticipated exposure to chemical hazards during mobilization and site preparation. **Biological Hazards**: Potential exposure to poisonous plants, snakes, spiders, rodents, ants, bees, and mosquitoes. **Physical Hazards**: Potential exposure to physical hazards: Fire protection; material handling; hand tool use; power tool use; electrical equipment; lockout/tagout; noise exposure; heat stress; cold stress; inclement weather and adverse environmental conditions; miscellaneous physical hazards. **SEE RECOMMENDED HAZARD CONTROLS BELOW**.

RECOMMENDED HAZARD CONTROLS
Chemical Hazards: No expected exposure to chemical hazards during mobilization and site preparation. Observe for any chemical hazards. Advise the SSHO if chemical hazards are observed and the potential for contact exists.
Biological Hazards: Biological hazards may be present. Watch for, and avoid contact with, poisonous plants, snakes, spiders, rodents, ants, bees and mosquitoes. Apply repellant containing 20% - 30% DEET if needed.
Fire Protection: Gasoline and diesel fuel will be used for vehicle and equipment operation. No hot work is expected. Require fire extinguishers for each location. Allow smoking only in designated areas.
Material Handling: Material handling involving lifting, and carrying will occur. Wear work gloves when handling materials. Watch for items that can cut, puncture, pinch, or crush. Use proper lifting technique: size up load, get help for heavy or awkward items, get good grasp on object to be lifted, keep load close to body, keep back straight, lift with legs not with back, and do not twist when lifting. Review material handling procedures during safety meetings.
Hand Tool Use: Hand tools may be used. A post driver will be used to install safety fence. Sledge hammer will be used to install silt fence. Use the proper tool for the job. Use safety glasses. Do not use damaged tools. Properly secure materials when working on them. Make sure area is adequately clear. Keep body out of line-of-fire area.
Power Tool Use: Power tools may be used. Use the proper tool for the job. Use safety glasses. Do not use damaged tools. Properly secure materials when working on them. Make sure area is clear when using equipment. Inspect electrical cords. Use GFCIs for power tool operation. Do not lift or lower power tools by their power cord.
Electrical Equipment: Fuel-powered generators may be used to provide electrical power on site. Utilities will be installed for job trailer. Use trained and licensed electrician for job trailer electrical installation and disconnection. Use GFCIs for portable electrical equipment. Electrical cords must be rated for outdoor construction use. Inspect electrical extension cords for damage and ground plugs. Electrical cords must be properly positioned and protected from being run over by vehicles or equipment. Keep electrical equipment/cords away from water and fuel materials. Electrical cords may not be used for raising or lowering the equipment.
Noise Exposure: Noise exposure above 85 dBA is expected when working near or operating machinery and equipment. Wear earplugs for protection.
Heat Stress: Heat stress may occur when elevated ambient temperatures, moderate to heavy workloads, and/or use of impermeable protective clothing occur. Adjust work-rest schedules as needed. Work at a steady pace. Drink plenty of fluids. Take rest breaks and use shaded rest area. Know signs/symptoms of heat exposure and emergency treatment.
Cold Stress: Cold stress may occur during the fall/winter/spring months when decreased ambient temperatures are present. For cold stress prevention, minimize exposure to temperatures below 45˚F. Wear insulated clothing for cold temperature work. Know the signs/symptoms of cold exposure and emergency treatment. Drink adequate fluids.
Inclement Weather and Adverse Environmental Conditions: Inclement weather conditions such as strong winds, heavy rain or lightning, and snow may occur during outdoor operations. Establish designated take cover area. Suspend outdoor operations during inclement weather or when other adverse environmental conditions exist. In case of work stoppage due to lightning, stay under shelter 30 minutes after last show of lightning or sound of thunder clap. Work will not resume until an all-clear signal has been communicated by the SSHO to affected personnel.

Miscellaneous Physical Hazards: General safety hazards will be present during site tasks. Use PPE for head, eye, hand, foot, and body protection. Follow safe work practices. Watch for slip, trip, and fall hazards from uneven, wet, slippery ground surfaces. Keep ground areas clear of tripping hazards such as hoses, cords, boxes, and debris. Maintain good housekeeping. Look where walking. Maintain balance. Maintain three-point contact when stepping off equipment. Use short steps when walking on slippery surfaces. Communicate general safety information during safety meetings.
PPE: Use prescribed levels of protection described in the PPE section of the HSP for the applicable work task. Standard PPE consists of: Sleeved shirt, long work pants or coveralls, hardhat, steel-toed boots, work gloves, and safety glasses. Use face shield (grinding, cutting, and pressure washing); high-visibility safety vest (if vehicle or equipment traffic), and earplugs (if noise present), as applicable. Use personal fall arrest systems (full-body harness, shock-absorbing lanyard, anchorage point) for activities at elevated work locations with a fall hazard of six-feet or more. Use leather gloves and a welding hood or goggles with filtered lenses for torch cutting. Use a welding jacket (and chaps if leg exposure hazard) where there is a hazard of flying sparks and slag.
Site Emergencies: Preparation for site emergencies is always a requirement for site work. Set-up emergency communications. Prepare emergency supplies. Post emergency contact and hospital route information. Maintain emergency phone list/hospital location/route map on site. Have first-aid kit, fire extinguisher, and safety supplies available. Have cell phones available. Designate evacuation location and emergency signals. See the "Emergency Response Plan" section of HSP.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Hand tools; Power tools; Generator; Caution tape; Fire extinguisher; Spill kit; Safety tote; First-aid kit; Eyewash bottles; PPE.	Safety inspection; Tool inspection.	Site orientation briefing and HSP/AHA review; Daily safety meetings (site personnel); HazWOPER training (site personnel); First-aid/CPR training (minimum two persons on site).

ACTIVITY HAZARD ANALYSIS

ACTIVITY: SAMPLING

Accepted By:

Risk Assessment Code (RAC): **M**

Date Prepared: 3/5/11
Prepared By: Glen Mayekawa, CIH
Reviewed By: Steve Usnick, PE

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Recommended Protective Clothing and Equipment: Use Level D protection for set-up. Use Modified Level D protection for water sampling.
Level D protection consists of: Hardhat, steel-toed boots, work gloves, safety glasses, high-visibility safety vest (if vehicle or equipment traffic), earplugs (if noise present).
Modified Level D protection consists of: Level D protection plus chemical protective clothing (disposable coveralls, PVC or nitrile gloves, PVC boots or boot covers).

		PROBABILITY				
		Frequent	Likely	Occasional	Seldom	Unlikely
SEVERITY	Catastrophic	**E**	**E**	**H**	**H**	**M**
	Critical	**E**	**H**	**H**	**M**	**L**
	Marginal	**H**	**M**	**M**	**L**	**L**
	Negligible	**M**	**L**	**L**	**L**	**L**

RISK ASSESSMENT DEFINITIONS:

SEVERITY	
Catastrophic:	Mission failure; death or permanent disabling injury; damage to property >$200K.
Critical:	Major mission degradation; severe injury; occupational illness; or major system damage.
Marginal:	Minor mission degradation; injury; minor occupational illness; or minor system damage.
Negligible:	Less than minor mission degradation; injury; occupational illness; or minor system damage.
PROBABILITY	
Frequent:	Occurs often in the life of a system. Continuously experienced.
Likely:	Occurs often in the life of a system. Continuously experienced.
Occasional:	Will occur in the life of the system. Occurs sporadically.
Seldom:	Unlikely but can expect to occur in the life of the system. Occurs seldom.
Unlikely:	Unlikely but could occur in the life of a system. Occurs very rarely.

LIST OF COMPETENT PERSONS FOR THIS AHA:
-General S&H Competent Person: SSHO (TBD).

ACTIVITY HAZARD ANALYSIS

WORK TASK	POTENTIAL HAZARDS
Sampling: -Perform landfill gas monitoring -Perform SVI indoor air, outdoor, & sub-slab monitoring -Perform soil sampling -Conduct Basewide surface water sampling -Conduct Basewide monitoring well sampling -Conduct Basewide leachate sampling -Conduct Basewide sediment sampling -Perform sample preparation and shipment.	**Chemical Hazards**: Potential exposure to VOCs during landfill gas monitoring and monitoring well sampling. Potential contact with sample preservatives during sample collection/preparation. **Biological Hazards**: Potential exposure to poisonous plants, snakes, spiders, rodents, ants, bees, and mosquitoes. **Physical Hazards**: Potential exposure to physical hazards: Fire protection; material handling; tools, machinery, and equipment use; electrical equipment; noise exposure; heat stress; cold stress; inclement weather and adverse environmental conditions; miscellaneous physical hazards. **SEE RECOMMENDED HAZARD CONTROLS BELOW**.

RECOMMENDED HAZARD CONTROLS

Chemical Hazards: Minor potential for exposure to site contaminants during sampling Potential exposure to VOCs during landfill gas monitoring and monitoring well sampling. Potential contact with sample preservatives during sample collection/preparation. Perform VOC monitoring in the worker breathing zone and compare to HSP exposure monitoring action levels. Use prescribed levels of protection described in the PPE section of the HSP. Properly don and doff protective clothing. Avoid contact with contaminated surfaces when possible. Use prescribed decontamination measures.

Biological Hazards: Biological hazards may be present. Watch for, and avoid contact with, poisonous plants, snakes, spiders, rodents, ants, bees and mosquitoes. Apply repellant containing 20% - 30% DEET if needed.

Fire Protection: Gasoline and/or diesel fuel will be used for vehicle operation. No hot work is expected. Require fire extinguishers for each site location. Allow smoking only in designated areas.

Material Handling: Material handling involving lifting and carrying will occur. Wear work gloves when handling materials. Watch for items that can cut, puncture, pinch, or crush. Use proper lifting technique: size up load, get help for heavy or awkward items, get good grasp on object to be lifted, keep load close to body, keep back straight, lift with legs not with back, and do not twist when lifting. Review material handling procedures during safety meetings.

Tools, Machinery and Equipment Use: Hand and power tools may be used. Use the proper tool for the job. Use safety glasses. Do not use damaged tools. Keep body out of line-of-fire area. Use the proper tool for the job. Use GFCIs for power tool operation. Properly secure materials when working on them. Make sure area is adequately clear when using equipment. Inspect electrical cords. Use GFCIs for power tool operation. Do not lift or lower power tools by their power cord.

Electrical Equipment: Generators or batteries may be used to provide electrical power. Use GFCIs for portable electrical equipment. Electrical cords must be rated for outdoor construction use. Inspect electrical extension cords for damage and ground plugs. Electrical cords must be properly positioned and protected from being run over by vehicles or equipment. Keep electrical equipment/cords away from water and fuel materials. Electrical cords may not be used for raising or lowering the equipment.

Noise Exposure: Noise exposure above 85 dBA is expected when working near or operating machinery and equipment. Wear earplugs for protection.

Heat Stress: Heat stress may occur when elevated ambient temperatures, moderate to heavy workloads, and/or use of impermeable protective clothing occur. Adjust work-rest schedules as needed. Work at a steady pace. Drink plenty of fluids. Take rest breaks and use shaded rest area. Know signs/symptoms of heat exposure and emergency treatment.

Cold Stress: Cold stress may occur during the fall/winter/spring months when decreased ambient temperatures are present. For cold stress prevention, minimize exposure to temperatures below 45˚F. Wear insulated clothing for cold temperature work. Know the signs/symptoms of cold exposure and emergency treatment. Drink adequate fluids.

Inclement Weather and Adverse Environmental Conditions: Inclement weather conditions such as strong winds, heavy rain or lightning, and snow may occur during outdoor operations. Establish designated take cover area. Suspend outdoor operations during inclement weather or when other adverse environmental conditions exist. In case of work stoppage due to lightning, stay under shelter 30 minutes after last show of lightning or sound of thunder clap. Work will not resume until an all-clear signal has been communicated by the SSHO to affected personnel.

ACTIVITY HAZARD ANALYSIS

Miscellaneous Physical Hazards: General safety hazards will be present during all site tasks. Use PPE for head, eye, hand, foot, and body protection. Follow safe work practices. Watch for slip, trip, and fall hazards from uneven, wet, slippery ground surfaces. Keep ground areas clear of tripping hazards such as hoses, cords, boxes, and debris. Maintain good housekeeping. Look where walking. Maintain balance. Maintain three-point contact when stepping off equipment. Use short steps when walking on slippery surfaces. Communicate general safety information during safety meetings.
PPE: Use prescribed levels of protection described in the PPE section of the HSP for the applicable work task. Standard PPE consists of: Sleeved shirt, long work pants or coveralls, hardhat, steel-toed boots, work gloves, and safety glasses. Use face shield (grinding, cutting, and pressure washing); high-visibility safety vest (if vehicle or equipment traffic), and earplugs (if noise present), as applicable. Use personal fall arrest systems (full-body harness, shock-absorbing lanyard, anchorage point) for activities at elevated work locations with a fall hazard of six-feet or more. Use leather gloves and a welding hood or goggles with filtered lenses for torch cutting. Use a welding jacket (and chaps if leg exposure hazard) where there is a hazard of flying sparks and slag.
Site Emergencies: Preparation for site emergencies is always a requirement for site work. Set-up emergency communications. Prepare emergency supplies. Post emergency contact and hospital route information. Maintain emergency phone list/hospital location/route map on site. Have first-aid kit, fire extinguisher, and safety supplies available. Have cell phones available. Designate evacuation location and emergency signals. See the "Emergency Response Plan" section of HSP.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Hand tools; Power tools; Generator; Compressor; Batteries; Electronic control boxes; Sampling equipment; Sample containers; Decon solutions (detergent, nitric acid, deionized water); Hand sprayer; 5-gallon buckets;; Coolers; Sheet poly; PID; Caution tape; Fire extinguisher; Spill kit; Safety tote; first-aid kit; eyewash bottles; PPE.	Safety inspection; Tool inspection.	Site orientation briefing and HSP/AHA review; Daily safety meetings (site personnel) HazWOPER training (site personnel); First-aid/CPR training (minimum two persons on site).

ACTIVITY HAZARD ANALYSIS

ACTIVITY: FISH TISSUE SAMPLING

Accepted By:

Risk Assessment Code (RAC): **H**

Date Prepared: 3/5/11
Prepared By: Glen Mayekawa, CIH
Reviewed By: Steve Usnick, PE

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Recommended Protective Clothing and Equipment	SEVERITY		PROBABILITY				
			Frequent	Likely	Occasional	Seldom	Unlikely
Recommended Protective Clothing and Equipment: Use Level D protection for set-up. Use Modified Level D protection for excavation where VOC exposure is below action levels. Use Level C protection for contaminated soil excavation/loading if VOCs are above action levels. Level D protection consists of: Hardhat, steel-toed boots, work gloves, safety glasses, high-visibility safety vest (if vehicle or equipment traffic), earplugs (if noise present). Modified Level D protection consists of: Level D protection plus chemical protective clothing (disposable coveralls, PVC or nitrile gloves, PVC boots or boot covers). Use PFD for work near, on, or over water.		Catastrophic	**E**	**E**	**H**	**H**	**M**
		Critical	**E**	**H**	**H**	**M**	**L**
		Marginal	**H**	**M**	**M**	**L**	**L**
		Negligible	**M**	**L**	**L**	**L**	**L**

RISK ASSESSMENT DEFINITIONS:

SEVERITY	
Catastrophic:	Mission failure; death or permanent disabling injury; damage to property >$200K.
Critical:	Major mission degradation; severe injury; occupational illness; or major system damage.
Marginal:	Minor mission degradation; injury; minor occupational illness; or minor system damage.
Negligible:	Less than minor mission degradation; injury; occupational illness; or minor system damage.
PROBABILITY	
Frequent:	Occurs often in the life of a system. Continuously experienced.
Likely:	Occurs often in the life of a system. Continuously experienced.
Occasional:	Will occur in the life of the system. Occurs sporadically.
Seldom:	Unlikely but can expect to occur in the life of the system. Occurs seldom.
Unlikely:	Unlikely but could occur in the life of a system. Occurs very rarely.

LIST OF COMPETENT PERSONS FOR THIS AHA:
-General S&H Competent Person: SSHO (TBD).
-Water Safety Competent Person: SSHO (TBD).
-Electrofishing Competent Person: SSHO (TBD).

ACTIVITY HAZARD ANALYSIS

WORK TASK	POTENTIAL HAZARDS
Fish Tissue Sampling: -Perform fish tissue collection using electrofishing techniques.	**Chemical Hazards**: Potential exposure to preservative chemicals during this activity. **Biological Hazards**: Potential exposure to poisonous plants, snakes, spiders, rodents, ants, bees, and mosquitoes. **Physical Hazards**: Potential exposure to physical hazards: Fire protection; material handling; tools, machinery, and equipment use; electrical equipment; electrofishing safety; noise exposure; heat stress; cold stress; water safety; inclement weather and adverse environmental conditions; miscellaneous physical hazards. **SEE RECOMMENDED HAZARD CONTROLS BELOW**.

RECOMMENDED HAZARD CONTROLS
Chemical Hazards: Preservative chemicals for samples may be present for the electrofishing activity. Use prescribed levels of protection described in the PPE section of the HSP for the applicable work task anticipated to be encountered. Use prescribed levels of protection described in the PPE section of the HSP. Properly don and doff protective clothing. Avoid contact with contaminated surfaces when possible. Use prescribed decontamination measures.
Biological Hazards: Biological hazards may be present. Watch for, and avoid contact with, poisonous plants, snakes, spiders, rodents, ants, bees and mosquitoes. Apply repellant containing 20% - 30% DEET if needed.
Fire Protection: Gasoline and diesel fuel will be used for boat and equipment operation. No hot work is expected. Require fire extinguishers for each site location. Allow smoking only in designated areas.
Material Handling: Material handling involving lifting/carrying and carrying materials by backpack will occur. Wear work gloves when handling materials. Watch for items that can cut, puncture, pinch, or crush. Use proper lifting technique: size up load, get help for heavy or awkward items, get good grasp on object to be lifted, keep load close to body, keep back straight, lift with legs not with back, and do not twist when lifting. Review material handling procedures during safety meetings.
Tools, Machinery and Equipment Use: Hand and power tools may be used. Use the proper tool for the job. Use safety glasses. Do not use damaged tools. Keep body out of line-of-fire area. Use the proper tool for the job. Use GFCIs for power tool operation. Properly secure materials when working on them. Make sure area is adequately clear when using equipment. Inspect electrical cords. Use GFCIs for power tool operation. Do not lift or lower power tools by their power cord.
Electrical Equipment: Generators may be used to provide electrical power. Use GFCIs for portable electrical equipment. Electrical cords must be rated for outdoor construction use. Inspect electrical extension cords for damage and ground plugs. Electrical cords must be properly positioned and protected from being run over by vehicles or equipment. Keep electrical equipment/cords away from water and fuel materials. Electrical cords may not be used for raising or lowering the equipment.
Electrofishing Safety: Electrical safety procedures are required for electrofishing operations. AC voltage from the generator will be isolated from the ground either by removing the ground strap from the generator case or by adding and isolation transformer. Rated voltages of insulation of conductors used to deliver output current from the pulsator to the electrodes must exceed the maximum potential voltage of the pulsator or generator by the next higher rating. Net handles will be constructed of a nonconductive material and will be sufficient length to avoid hand contact with the water. Personnel using the electroshocker will wear rubber footwear which will insulate the wearer from electrical shock. All footwear will be equipped with non-slip soles. Rubber linesman gloves, rated above the voltage being used in the electrofishing operation will be worn.
Noise Exposure: Noise exposure above 85 dBA is expected when working near or operating machinery and equipment. Wear earplugs for protection.
Heat Stress: Heat stress may occur when elevated ambient temperatures, moderate to heavy workloads, and/or use of impermeable protective clothing occur. Adjust work-rest schedules as needed. Work at a steady pace. Drink plenty of fluids. Take rest breaks and use shaded rest area. Know the signs and symptoms of heat exposure and emergency treatment.
Cold Stress: Cold stress may occur during the fall/winter/spring months when decreased ambient temperatures are present. For cold stress prevention, minimize exposure to temperatures below 45˚F. Wear insulated clothing for cold temperature work. Know the signs and symptoms of cold exposure and emergency treatment. Drink adequate fluids.

ACTIVITY HAZARD ANALYSIS

Water Safety: Fish sampling will occur on water. Sampling will not be conducted when there are strong winds, rain or other adverse weather conditions. Work on, over or within six feet of the edge of the water requires use of personal flotation devices by personnel. Boat operators must be trained and conduct boat inspections. Hands must be kept away from the outside of the boat where it could impact stationary objects. Care must be taken when boarding due to boat movement and wet and slippery surfaces. Use caution and safe operating procedures when using a boat for electrofishing.

Inclement Weather and Adverse Environmental Conditions: Inclement weather conditions such as strong winds, heavy rain or lightning, and snow may occur during outdoor operations. Establish designated take cover area. Suspend outdoor operations during inclement weather or when other adverse environmental conditions exist. In case of work stoppage due to lightning, stay under shelter 30 minutes after last show of lightning or sound of thunder clap. Work will not resume until an all-clear signal has been communicated by the SSHO to affected personnel.

Miscellaneous Physical Hazards: General safety hazards will be present during all site tasks. Use PPE for head, eye, hand, foot, and body protection. Follow safe work practices. Watch for slip, trip, and fall hazards from uneven, wet, slippery ground surfaces. Keep ground areas clear of tripping hazards such as hoses, cords, boxes, and debris. Maintain good housekeeping. Look where walking. Maintain balance. Maintain three-point contact when stepping off equipment. Use short steps when walking on slippery surfaces. Communicate general safety information during safety meetings.

PPE: Use prescribed levels of protection described in the PPE section of the HSP for the applicable work task. Standard PPE consists of: Sleeved shirt, long work pants or coveralls, hardhat, steel-toed boots, work gloves, and safety glasses. Use face shield (grinding, cutting, and pressure washing); high-visibility safety vest (if vehicle or equipment traffic), and earplugs (if noise present), as applicable. Use personal fall arrest systems (full-body harness, shock-absorbing lanyard, anchorage point) for activities at elevated work locations with a fall hazard of six-feet or more. Use leather gloves and a welding hood or goggles with filtered lenses for torch cutting. Use a welding jacket (and chaps if leg exposure hazard) where there is a hazard of flying sparks and slag.

Site Emergencies: Preparation for site emergencies is always a requirement for site work. Set-up emergency communications. Prepare emergency supplies. Post emergency contact and hospital route information. Maintain emergency phone list/hospital location/route map on site. Have first-aid kit, fire extinguisher, and safety supplies available. Have cell phones available. Designate evacuation location and emergency signals. See the "Emergency Response Plan" section of HSP.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Hand tools; Generator; Boat; Electrofishing equipment; Sample collection equipment; Sheet poly; Decon solutions (detergent, nitric acid, deionized water); Hand sprayer; 5-gallon buckets; Sample containers; Coolers; PFDs; Fire extinguisher; Spill kit; Safety tote; First-aid kit; Eyewash bottles; PPE.	Safety inspection; Tool inspection; Boat inspection.	Site orientation briefing and HSP/AHA review; Daily safety meetings (site personnel); HazWOPER training (site personnel); First-aid/CPR training (minimum two persons on site); Boat operator training (operator); Electrofishing training (operator).

ACTIVITY HAZARD ANALYSIS

ACTIVITY: OPERATIONS AND MAINTENANCE

Accepted By:

Risk Assessment Code (RAC): **M**

Date Prepared: 3/5/11
Prepared By: Glen Mayekawa, CIH
Reviewed By: Steve Usnick, PE

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Recommended Protective Clothing and Equipment: Use Level D protection for LTM activities.
Level D protection consists of: Hardhat, steel-toed boots, work gloves, safety glasses, high-visibility safety vest (if vehicle or equipment traffic), earplugs (if noise present).

		PROBABILITY				
		Frequent	Likely	Occasional	Seldom	Unlikely
SEVERITY	Catastrophic	**E**	**E**	**H**	**H**	**M**
	Critical	**E**	**H**	**H**	**M**	**L**
	Marginal	**H**	**M**	**M**	**L**	**L**
	Negligible	**M**	**L**	**L**	**L**	**L**

RISK ASSESSMENT DEFINITIONS:

SEVERITY	
Catastrophic:	Mission failure; death or permanent disabling injury; damage to property >$200K.
Critical:	Major mission degradation; severe injury; occupational illness; or major system damage.
Marginal:	Minor mission degradation; injury; minor occupational illness; or minor system damage.
Negligible:	Less than minor mission degradation; injury; occupational illness; or minor system damage.
PROBABILITY	
Frequent:	Occurs often in the life of a system. Continuously experienced.
Likely:	Occurs often in the life of a system. Continuously experienced.
Occasional:	Will occur in the life of the system. Occurs sporadically.
Seldom:	Unlikely but can expect to occur in the life of the system. Occurs seldom.
Unlikely:	Unlikely but could occur in the life of a system. Occurs very rarely.

LIST OF COMPETENT PERSONS FOR THIS AHA:
-General S&H Competent Person: SSHO (TBD).

ACTIVITY HAZARD ANALYSIS

WORK TASK	POTENTIAL HAZARDS
O&M: -Landfill cover maintenance (landfill cap mowing) -Monitoring well maintenance -O&M for treatment system equipment -LUC/IC annual inspections.	**Chemical Hazards**: Potential exposure to site contaminants during O&M activities. **Biological Hazards**: Potential exposure to poisonous plants, snakes, spiders, rodents, ants, bees, and mosquitoes. **Physical Hazards**: Potential exposure to physical hazards: Fire protection; vehicle and equipment traffic; material handling; tools, machinery, and equipment use; electrical equipment; noise exposure; heat stress; cold stress; inclement weather and adverse environmental conditions; miscellaneous physical hazards. **SEE RECOMMENDED HAZARD CONTROLS BELOW**.

RECOMMENDED HAZARD CONTROLS
Chemical Hazards: Minor potential for exposure to site contaminants during O&M activities. Use prescribed levels of protection described in the PPE section of the HSP. Properly don and doff protective clothing. Avoid contact with contaminated surfaces when possible. Use prescribed decontamination measures.
Biological Hazards: Biological hazards may be present. Watch for, and avoid contact with, poisonous plants, snakes, spiders, rodents, ants, bees and mosquitoes. Apply repellant containing 20% - 30% DEET if needed.
Fire Protection: Gasoline and diesel fuel will be used for equipment operation. No hot work is expected. Require fire extinguishers for each site location. Allow smoking only in designated areas.
Vehicle and Equipment Traffic: Concurrent use of mobile equipment, vehicles, and ground personnel will occur. Establish traffic control procedures when there is vehicle, heavy equipment, and/or pedestrian traffic present. Have workers wear high-visibility safety vests with reflective striping when working near traffic areas. Advise workers to look carefully where they walk to avoid vehicles and moving equipment and to maintain eye contact with heavy equipment operators. Use traffic control devices as needed. Use spotters if needed for backing of equipment and vehicles into tight work areas. For driver safety: Wear seat belts. Observe posted speeds and traffic signs. Keep load secure. Wear required PPE. Check overhead clearance from utilities. Set brakes and use chocks on an incline.
Material Handling: Material handling involving lifting and carrying will occur. Wear work gloves when handling materials. Watch for items that can cut, puncture, pinch, or crush. Use proper lifting technique: size up load, get help for heavy or awkward items, get good grasp on object to be lifted, keep load close to body, keep back straight, lift with legs not with back, and do not twist when lifting. Review material handling procedures during safety meetings.
Tools, Machinery and Equipment Use: Hand and power tools may be used. Use the proper tool for the job. Use safety glasses. Do not use damaged tools. Keep body out of line-of-fire area. Use the proper tool for the job. Use GFCIs for power tool operation. Properly secure materials when working on them. Make sure area is adequately clear when using equipment. Inspect electrical cords. Use GFCIs for power tool operation. Do not lift or lower power tools by their power cord.
Electrical Equipment: Generators may be used to provide electrical power. Use GFCIs for portable electrical equipment. Electrical cords must be rated for outdoor construction use. Inspect electrical extension cords for damage and ground plugs. Electrical cords must be properly positioned and protected from being run over by vehicles or equipment. Keep electrical equipment/cords away from water and fuel materials. Electrical cords may not be used for raising or lowering the equipment.
Noise Exposure: Noise exposure above 85 dBA is expected when working near or operating machinery and equipment. Wear earplugs for protection.
Heat Stress: Heat stress may occur when elevated ambient temperatures, moderate to heavy workloads, and/or use of impermeable protective clothing occur. Adjust work-rest schedules as needed. Work at a steady pace. Drink plenty of fluids. Take rest breaks and use shaded rest area. Know signs/symptoms of heat exposure and emergency treatment.
Cold Stress: Cold stress may occur during the fall/winter/spring months when decreased ambient temperatures are present. For cold stress prevention, minimize exposure to temperatures below 45˚F. Wear insulated clothing for cold temperature work. Know the signs/symptoms of cold exposure and emergency treatment. Drink adequate fluids.
Inclement Weather and Adverse Environmental Conditions: Inclement weather conditions such as strong winds, heavy rain or lightning, and snow may occur during outdoor operations. Establish designated take cover area. Suspend outdoor operations during inclement weather or when other adverse environmental conditions exist. In case of work stoppage due to lightning, stay under shelter 30 minutes after last show of lightning or sound of thunder clap. Work will not resume until an all-clear signal has been communicated by the SSHO to affected personnel.

ACTIVITY HAZARD ANALYSIS

Miscellaneous Physical Hazards: General safety hazards will be present during all site tasks. Use PPE for head, eye, hand, foot, and body protection. Follow safe work practices. Watch for slip, trip, and fall hazards from uneven, wet, slippery ground surfaces. Keep ground areas clear of tripping hazards such as hoses, cords, boxes, and debris. Maintain good housekeeping. Look where walking. Maintain balance. Maintain three-point contact when stepping off equipment. Use short steps when walking on slippery surfaces. Communicate general safety information during safety meetings.
PPE: Use prescribed levels of protection described in the PPE section of the HSP for the applicable work task. Standard PPE consists of: Sleeved shirt, long work pants or coveralls, hardhat, steel-toed boots, work gloves, and safety glasses. Use face shield (grinding, cutting, and pressure washing); high-visibility safety vest (if vehicle or equipment traffic), and earplugs (if noise present), as applicable. Use personal fall arrest systems (full-body harness, shock-absorbing lanyard, anchorage point) for activities at elevated work locations with a fall hazard of six-feet or more. Use leather gloves and a welding hood or goggles with filtered lenses for torch cutting. Use a welding jacket (and chaps if leg exposure hazard) where there is a hazard of flying sparks and slag.
Site Emergencies: Preparation for site emergencies is always a requirement for site work. Set-up emergency communications. Prepare emergency supplies. Post emergency contact and hospital route information. Maintain emergency phone list/hospital location/route map on site. Have first-aid kit, fire extinguisher, and safety supplies available. Have cell phones available. Designate evacuation location and emergency signals. See the "Emergency Response Plan" section of HSP.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Hand tools; Power tools; Mowing equipment; PID; Fire extinguisher; Spill kit; Safety tote; First-aid kit; Eyewash bottles; PPE.	Safety inspection; Tool inspection.	Site orientation briefing and HSP/AHA review; Daily safety meetings (site personnel); HazWOPER training (site personnel); First-aid/CPR training (minimum two persons on site).

ACTIVITY HAZARD ANALYSIS

ACTIVITY: MONITORING WELL INSTALLATION

Accepted By:

Risk Assessment Code (RAC): **M**

Date Prepared: 3/5/11
Prepared By: Glen Mayekawa, CIH
Reviewed By: Steve Usnick, PE

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Recommended Protective Clothing and Equipment: Use Level D and Modified Level D protection for monitoring well installation.
Level D protection consists of: Hardhat, steel-toed boots, work gloves, safety glasses, high-visibility safety vest (if vehicle or equipment traffic), earplugs (if noise present).
Modified Level D protection consists of: Level D protection plus chemical protective clothing (disposable coveralls, PVC or nitrile gloves, PVC boots or boot covers).

		PROBABILITY				
		Frequent	Likely	Occasional	Seldom	Unlikely
SEVERITY	Catastrophic	**E**	**E**	**H**	**H**	**M**
	Critical	**E**	**H**	**H**	**M**	**L**
	Marginal	**H**	**M**	**M**	**L**	**L**
	Negligible	**M**	**L**	**L**	**L**	**L**

RISK ASSESSMENT DEFINITIONS:

SEVERITY	
Catastrophic:	Mission failure; death or permanent disabling injury; damage to property >$200K.
Critical:	Major mission degradation; severe injury; occupational illness; or major system damage.
Marginal:	Minor mission degradation; injury; minor occupational illness; or minor system damage.
Negligible:	Less than minor mission degradation; injury; occupational illness; or minor system damage.
PROBABILITY	
Frequent:	Occurs often in the life of a system. Continuously experienced.
Likely:	Occurs often in the life of a system. Continuously experienced.
Occasional:	Will occur in the life of the system. Occurs sporadically.
Seldom:	Unlikely but can expect to occur in the life of the system. Occurs seldom.
Unlikely:	Unlikely but could occur in the life of a system. Occurs very rarely.

LIST OF COMPETENT PERSONS FOR THIS AHA:
-General S&H Competent Person: SSHO (TBD).

ACTIVITY HAZARD ANALYSIS

WORK TASK	POTENTIAL HAZARDS
Monitoring Well Installation: -Install monitoring wells.	**Chemical Hazards**: Potential for exposure to VOCs during monitoring well installation. **Biological Hazards**: Potential exposure to poisonous plants, snakes, spiders, rodents, ants, bees, and mosquitoes. **Physical Hazards**: Potential exposure to physical hazards: Fire protection; underground utilities; overhead utilities; heavy equipment operation; vehicle and equipment traffic; material handling; tools, machinery, and equipment use; electrical equipment; noise exposure; heat stress; cold stress; drill rig safety; forklift operation; inclement weather and adverse environmental conditions; miscellaneous physical hazards. **SEE RECOMMENDED HAZARD CONTROLS BELOW**.

RECOMMENDED HAZARD CONTROLS
Chemical Hazards: Potential for exposure to VOCs during monitoring well installation. Perform VOC monitoring in the worker breathing zone and compare to HSP exposure monitoring action levels. Use prescribed levels of protection described in the PPE section of the HSP. Properly don and doff protective clothing. Avoid contact with contaminated surfaces when possible. Use prescribed decontamination measures.
Biological Hazards: Biological hazards may be present. Watch for, and avoid contact with, poisonous plants, snakes, spiders, rodents, ants, bees and mosquitoes. Apply repellant containing 20% - 30% DEET if needed.
Fire Protection: Gasoline and diesel fuel will be used for equipment operation. No hot work is expected. Require fire extinguishers for each site location. Allow smoking only in designated areas.
Overhead Utilities: Overhead utilities may be present. Make sure heavy equipment is kept clear of overhead lines. Survey for overhead utilities before bringing equipment with high extensions (i.e., heavy equipment, dump truck, roll-off bin truck) into a work area. Do not operate equipment within 10-feet of overhead lines. Determine and comply with the required distance from energized overhead electric lines per EM 385-1-1 11F and Tables 11-1 and 11-3.
Underground Utilities: Underground utility lines may be present. Obtain a dig permit before any ground disturbance. Obtain and review base utility map. Marked locations of existing utilities will be approximate. Contact a utility locator to mark-out underground utilities in the work area. Review and inspect utility mark-outs before excavating. If utilities are indicated in the area to be excavated, hand dig (or pot hole by air knife or water injection) two feet on either side of a marked utility to locate it. Immediately contact the Contracting Officer should damage to underground utilities or subsurface construction occur.
Heavy Equipment Operation: Heavy equipment will be used for grading. Survey area for overhead utilities. Use a spotter to assist during unloading of heavy equipment off of delivery trailers. Inspect heavy equipment daily and document. Check operation of backup alarms. Have ground personnel wear high-visibility safety vests with reflective striping. Maintain positive contact between operator and ground personnel at all times. Use hand signals. Do not cross path of moving equipment or cross behind equipment. Position ground personnel out of heavy equipment operating area when possible. Require operators to look before backing.
Vehicle and Equipment Traffic: Concurrent use of mobile equipment, vehicles, and ground personnel will occur. Establish traffic control procedures when there is vehicle, heavy equipment, and/or pedestrian traffic present. Have workers wear high-visibility safety vests with reflective striping when working near traffic areas. Advise workers to look carefully where they walk to avoid vehicles and moving equipment and to maintain eye contact with heavy equipment operators. Use traffic control devices as needed. Use spotters if needed for backing of equipment and vehicles into tight work areas. For driver safety: Wear seat belts. Observe posted speeds and traffic signs. Keep load secure. Wear required PPE. Check overhead clearance from utilities. Set brakes and use chocks on an incline.
Material Handling: Material handling involving lifting and carrying will occur. Wear work gloves when handling materials. Watch for items that can cut, puncture, pinch, or crush. Use proper lifting technique: size up load, get help for heavy or awkward items, get good grasp on object to be lifted, keep load close to body, keep back straight, lift with legs not with back, and do not twist when lifting. Review material handling procedures during safety meetings.
Tools, Machinery and Equipment Use: Hand and power tools may be used. Use the proper tool for the job. Use safety glasses. Do not use damaged tools. Keep body out of line-of-fire area. Use the proper tool for the job. Use GFCIs for power tool operation. Properly secure materials when working on them. Make sure area is adequately clear when using equipment. Inspect electrical cords. Use GFCIs for power tool operation. Do not lift or lower power tools by their power cord.

ACTIVITY HAZARD ANALYSIS

Electrical Equipment: Generators may be used to provide electrical power. Use GFCIs for portable electrical equipment. Electrical cords must be rated for outdoor construction use. Inspect electrical extension cords for damage and ground plugs. Electrical cords must be properly positioned and protected from being run over by vehicles or equipment. Keep electrical equipment/cords away from water and fuel materials. Electrical cords may not be used for raising or lowering the equipment.
Noise Exposure: Noise exposure above 85 dBA is expected when working near or operating machinery and equipment. Wear earplugs for protection.
Heat Stress: Heat stress may occur when elevated ambient temperatures, moderate to heavy workloads, and/or use of impermeable protective clothing occur. Adjust work-rest schedules as needed. Work at a steady pace. Drink plenty of fluids. Take rest breaks and use shaded rest area. Know signs/symptoms of heat exposure and emergency treatment.
Cold Stress: Cold stress may occur during the fall/winter/spring months when decreased ambient temperatures are present. For cold stress prevention, minimize exposure to temperatures below 45˚F. Wear insulated clothing for cold temperature work. Know the signs/symptoms of cold exposure and emergency treatment. Drink adequate fluids.
Drill Rig Safety: Drill rig equipment will be used for monitoring well installation. Check for above and below ground utilities before drilling. Do not operate drill rig within 10 feet of overhead lines (additional distance required if >50kV). Inspect drilling equipment and test drill rig kill switch. Establish communication system between driller, helper, and others. Use proper handling and lifting techniques for material handling. For horizontal boring operations, watch for slippery and muddy walking surfaces, use splash protection, follow safety requirements for working inside of drill pits, watch for pinch and crush points, and use caution during equipment operation.
Forklift Operation: A forklift will be used to load and off load materials. Inspect forklifts daily. Check for operational backup alarm. Use trained and experienced operator. Travel at safe speeds and look for ground personnel. Forklift operators will look in the direction of travel and must not move the forklift until all persons are clear. Maintain eye contact with operator. Do not cross the path of an operating forklift.
Inclement Weather and Adverse Environmental Conditions: Inclement weather conditions such as strong winds, heavy rain or lightning, and snow may occur during outdoor operations. Establish designated take cover area. Suspend outdoor operations during inclement weather or when other adverse environmental conditions exist. In case of work stoppage due to lightning, stay under shelter 30 minutes after last show of lightning or sound of thunder clap. Work will not resume until an all-clear signal has been communicated by the SSHO to affected personnel.
Miscellaneous Physical Hazards: General safety hazards will be present during all site tasks. Use PPE for head, eye, hand, foot, and body protection. Follow safe work practices. Watch for slip, trip, and fall hazards from uneven, wet, slippery ground surfaces. Keep ground areas clear of tripping hazards such as hoses, cords, boxes, and debris. Maintain good housekeeping. Look where walking. Maintain balance. Maintain three-point contact when stepping off equipment. Use short steps when walking on slippery surfaces. Communicate general safety information during safety meetings.
PPE: Use prescribed levels of protection described in the PPE section of the HSP for the applicable work task. Standard PPE consists of: Sleeved shirt, long work pants or coveralls, hardhat, steel-toed boots, work gloves, and safety glasses. Use face shield (grinding, cutting, and pressure washing); high-visibility safety vest (if vehicle or equipment traffic), and earplugs (if noise present), as applicable. Use personal fall arrest systems (full-body harness, shock-absorbing lanyard, anchorage point) for activities at elevated work locations with a fall hazard of six-feet or more. Use leather gloves and a welding hood or goggles with filtered lenses for torch cutting. Use a welding jacket (and chaps if leg exposure hazard) where there is a hazard of flying sparks and slag.
Site Emergencies: Preparation for site emergencies is always a requirement for site work. Set-up emergency communications. Prepare emergency supplies. Post emergency contact and hospital route information. Maintain emergency phone list/hospital location/route map on site. Have first-aid kit, fire extinguisher, and safety supplies available. Have cell phones available. Designate evacuation location and emergency signals. See the "Emergency Response Plan" section of HSP.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS

Hand tools; Generator; Drill rig; Drilling equipment; Sampling Heavy equipment; Water truck; Forklift; PID; Fire extinguisher; Spill kit; Safety tote; First-aid kit; Eyewash bottles; PPE.	Dig permit; Safety inspection; Tool inspection; Drill rig inspection; Heavy equipment inspection; Forklift inspection.	Site orientation briefing and HSP/AHA review; Daily safety meetings (site personnel); HazWOPER training (site personnel); First-aid/CPR training (minimum two persons on site); Forklift operator training (operator).

ACTIVITY HAZARD ANALYSIS

ACTIVITY: MONITORING WELL DECOMMISSIONING

Accepted By:

Risk Assessment Code (RAC): **M**

Date Prepared: 3/5/11
Prepared By: Glen Mayekawa, CIH
Reviewed By: Steve Usnick, PE

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Recommended Protective Clothing and Equipment: Use Level D and Modified Level D protection for monitoring well plugging and abandonment.
Level D protection consists of: Hardhat, steel-toed boots, work gloves, safety glasses, high-visibility safety vest (if vehicle or equipment traffic), earplugs (if noise present).
Modified Level D protection consists of: Level D protection plus chemical protective clothing (disposable coveralls, PVC or nitrile gloves, PVC boots or boot covers).

		PROBABILITY				
		Frequent	Likely	Occasional	Seldom	Unlikely
SEVERITY	Catastrophic	**E**	**E**	**H**	**H**	**M**
	Critical	**E**	**H**	**H**	**M**	**L**
	Marginal	**H**	**M**	**M**	**L**	**L**
	Negligible	**M**	**L**	**L**	**L**	**L**

RISK ASSESSMENT DEFINITIONS:

SEVERITY	
Catastrophic:	Mission failure; death or permanent disabling injury; damage to property >$200K.
Critical:	Major mission degradation; severe injury; occupational illness; or major system damage.
Marginal:	Minor mission degradation; injury; minor occupational illness; or minor system damage.
Negligible:	Less than minor mission degradation; injury; occupational illness; or minor system damage.
PROBABILITY	
Frequent:	Occurs often in the life of a system. Continuously experienced.
Likely:	Occurs often in the life of a system. Continuously experienced.
Occasional:	Will occur in the life of the system. Occurs sporadically.
Seldom:	Unlikely but can expect to occur in the life of the system. Occurs seldom.
Unlikely:	Unlikely but could occur in the life of a system. Occurs very rarely.

LIST OF COMPETENT PERSONS FOR THIS AHA:
-General S&H Competent Person: SSHO (TBD).

ACTIVITY HAZARD ANALYSIS

WORK TASK	POTENTIAL HAZARDS
Monitoring Well Decommissioning: -Plug and abandon monitoring wells -Grade area around monitoring wells -Apply seeding to disturbed areas.	**Chemical Hazards**: Potential for exposure to grout during monitoring well decommissioning. **Biological Hazards**: Potential exposure to poisonous plants, snakes, spiders, rodents, ants, bees, and mosquitoes. **Physical Hazards**: Potential exposure to physical hazards: Fire protection; overhead utilities; heavy equipment operation; vehicle and equipment traffic; material handling; tools, machinery, and equipment use; electrical equipment; noise exposure; heat stress; cold stress; forklift operation; inclement weather and adverse environmental conditions; miscellaneous physical hazards. **SEE RECOMMENDED HAZARD CONTROLS BELOW**.

RECOMMENDED HAZARD CONTROLS
Chemical Hazards: Potential for exposure to grout during monitoring well decommissioning. Perform VOC monitoring in the worker breathing zone and compare to HSP exposure monitoring action levels. Use prescribed levels of protection described in the PPE section of the HSP. Properly don and doff protective clothing. Avoid contact with contaminated surfaces when possible. Use prescribed decontamination measures.
Biological Hazards: Biological hazards may be present. Watch for, and avoid contact with, poisonous plants, snakes, spiders, rodents, ants, bees and mosquitoes. Apply repellant containing 20% - 30% DEET if needed.
Fire Protection: Gasoline and diesel fuel will be used for equipment operation. No hot work is expected. Require fire extinguishers for each site location. Allow smoking only in designated areas.
Overhead Utilities: Overhead utilities may be present. Make sure heavy equipment is kept clear of overhead lines. Survey for overhead utilities before bringing equipment with high extensions (i.e., heavy equipment, dump truck, roll-off bin truck) into a work area. Do not operate equipment within 10-feet of overhead lines. Determine and comply with the required distance from energized overhead electric lines per EM 385-1-1 11F and Tables 11-1 and 11-3.
Heavy Equipment Operation: Heavy equipment will be used for grading. Survey area for overhead utilities. Use a spotter to assist during unloading of heavy equipment off of delivery trailers. Inspect heavy equipment daily and document. Check operation of backup alarms. Have ground personnel wear high-visibility safety vests with reflective striping. Maintain positive contact between operator and ground personnel at all times. Use hand signals. Do not cross path of moving equipment or cross behind equipment. Position ground personnel out of heavy equipment operating area when possible. Require operators to look before backing.
Vehicle and Equipment Traffic: Concurrent use of mobile equipment, vehicles, and ground personnel will occur. Establish traffic control procedures when there is vehicle, heavy equipment, and/or pedestrian traffic present. Have workers wear high-visibility safety vests with reflective striping when working near traffic areas. Advise workers to look carefully where they walk to avoid vehicles and moving equipment and to maintain eye contact with heavy equipment operators. Use traffic control devices as needed. Use spotters if needed for backing of equipment and vehicles into tight work areas. For driver safety: Wear seat belts. Observe posted speeds and traffic signs. Keep load secure. Wear required PPE. Check overhead clearance from utilities. Set brakes and use chocks on an incline.
Material Handling: Material handling involving lifting and carrying will occur. Wear work gloves when handling materials. Watch for items that can cut, puncture, pinch, or crush. Use proper lifting technique: size up load, get help for heavy or awkward items, get good grasp on object to be lifted, keep load close to body, keep back straight, lift with legs not with back, and do not twist when lifting. Review material handling procedures during safety meetings.
Tools, Machinery and Equipment Use: Hand and power tools may be used. Use the proper tool for the job. Use safety glasses. Do not use damaged tools. Keep body out of line-of-fire area. Use the proper tool for the job. Use GFCIs for power tool operation. Properly secure materials when working on them. Make sure area is adequately clear when using equipment. Inspect electrical cords. Use GFCIs for power tool operation. Do not lift or lower power tools by their power cord.
Electrical Equipment: Generators may be used to provide electrical power. Use GFCIs for portable electrical equipment. Electrical cords must be rated for outdoor construction use. Inspect electrical extension cords for damage and ground plugs. Electrical cords must be properly positioned and protected from being run over by vehicles or equipment. Keep electrical equipment/cords away from water and fuel materials. Electrical cords may not be used for raising or lowering the equipment.

ACTIVITY HAZARD ANALYSIS

Noise Exposure: Noise exposure above 85 dBA is expected when working near or operating machinery and equipment. Wear earplugs for protection.
Heat Stress: Heat stress may occur when elevated ambient temperatures, moderate to heavy workloads, and/or use of impermeable protective clothing occur. Adjust work-rest schedules as needed. Work at a steady pace. Drink plenty of fluids. Take rest breaks and use shaded rest area. Know signs/symptoms of heat exposure and emergency treatment.
Cold Stress: Cold stress may occur during the fall/winter/spring months when decreased ambient temperatures are present. For cold stress prevention, minimize exposure to temperatures below 45˚F. Wear insulated clothing for cold temperature work. Know the signs/symptoms of cold exposure and emergency treatment. Drink adequate fluids.
Forklift Operation: A forklift will be used to load and off load materials. Inspect forklifts daily. Check for operational backup alarm. Use trained and experienced operator. Travel at safe speeds and look for ground personnel. Forklift operators will look in the direction of travel and must not move the forklift until all persons are clear. Maintain eye contact with operator. Do not cross the path of an operating forklift.
Inclement Weather and Adverse Environmental Conditions: Inclement weather conditions such as strong winds, heavy rain or lightning, and snow may occur during outdoor operations. Establish designated take cover area. Suspend outdoor operations during inclement weather or when other adverse environmental conditions exist. In case of work stoppage due to lightning, stay under shelter 30 minutes after last show of lightning or sound of thunder clap. Work will not resume until an all-clear signal has been communicated by the SSHO to affected personnel.
Miscellaneous Physical Hazards: General safety hazards will be present during all site tasks. Use PPE for head, eye, hand, foot, and body protection. Follow safe work practices. Watch for slip, trip, and fall hazards from uneven, wet, slippery ground surfaces. Keep ground areas clear of tripping hazards such as hoses, cords, boxes, and debris. Maintain good housekeeping. Look where walking. Maintain balance. Maintain three-point contact when stepping off equipment. Use short steps when walking on slippery surfaces. Communicate general safety information during safety meetings.
PPE: Use prescribed levels of protection described in the PPE section of the HSP for the applicable work task. Standard PPE consists of: Sleeved shirt, long work pants or coveralls, hardhat, steel-toed boots, work gloves, and safety glasses. Use face shield (grinding, cutting, and pressure washing); high-visibility safety vest (if vehicle or equipment traffic), and earplugs (if noise present), as applicable. Use personal fall arrest systems (full-body harness, shock-absorbing lanyard, anchorage point) for activities at elevated work locations with a fall hazard of six-feet or more. Use leather gloves and a welding hood or goggles with filtered lenses for torch cutting. Use a welding jacket (and chaps if leg exposure hazard) where there is a hazard of flying sparks and slag.
Site Emergencies: Preparation for site emergencies is always a requirement for site work. Set-up emergency communications. Prepare emergency supplies. Post emergency contact and hospital route information. Maintain emergency phone list/hospital location/route map on site. Have first-aid kit, fire extinguisher, and safety supplies available. Have cell phones available. Designate evacuation location and emergency signals. See the "Emergency Response Plan" section of HSP.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Hand tools; Generator; Heavy equipment; Water truck; Fire extinguisher; Spill kit; Safety tote; First-aid kit; Eyewash bottles; PPE.	Safety inspection; Tool inspection; Heavy equipment inspection.	Site orientation briefing and HSP/AHA review; Daily safety meetings (site personnel); HazWOPER training (site personnel); First-aid/CPR training (minimum two persons on site).

ACTIVITY HAZARD ANALYSIS

ACTIVITY: FREE PRODUCT RECOVERY

Accepted By:

Risk Assessment Code (RAC): **M**

Date Prepared: 3/5/11
Prepared By: Glen Mayekawa, CIH
Reviewed By: Steve Usnick, PE

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Recommended Protective Clothing and Equipment: Use Level D protection for landfarm closure.
Level D protection consists of: Hardhat, steel-toed boots, work gloves, safety glasses, high-visibility safety vest (if vehicle or equipment traffic), earplugs (if noise present).

		PROBABILITY				
		Frequent	Likely	Occasional	Seldom	Unlikely
SEVERITY	Catastrophic	**E**	**E**	**H**	**H**	**M**
	Critical	**E**	**H**	**H**	**M**	**L**
	Marginal	**H**	**M**	**M**	**L**	**L**
	Negligible	**M**	**L**	**L**	**L**	**L**

RISK ASSESSMENT DEFINITIONS:

SEVERITY	
Catastrophic:	Mission failure; death or permanent disabling injury; damage to property >$200K.
Critical:	Major mission degradation; severe injury; occupational illness; or major system damage.
Marginal:	Minor mission degradation; injury; minor occupational illness; or minor system damage.
Negligible:	Less than minor mission degradation; injury; occupational illness; or minor system damage.
PROBABILITY	
Frequent:	Occurs often in the life of a system. Continuously experienced.
Likely:	Occurs often in the life of a system. Continuously experienced.
Occasional:	Will occur in the life of the system. Occurs sporadically.
Seldom:	Unlikely but can expect to occur in the life of the system. Occurs seldom.
Unlikely:	Unlikely but could occur in the life of a system. Occurs very rarely.

LIST OF COMPETENT PERSONS FOR THIS AHA:
-General S&H Competent Person: SSHO (TBD).

ACTIVITY HAZARD ANALYSIS

WORK TASK	POTENTIAL HAZARDS
Free Product Recovery: -Perform free product recovery activities.	**Chemical Hazards**: Possible exposure to VOCs during this activity. **Biological Hazards**: Potential exposure to poisonous plants, snakes, spiders, rodents, ants, bees, and mosquitoes. **Physical Hazards**: Potential exposure to physical hazards: Fire protection; material handling; tools, machinery, and equipment use; electrical equipment; noise exposure; heat stress; cold stress; inclement weather and adverse environmental conditions; miscellaneous physical hazards. **SEE RECOMMENDED HAZARD CONTROLS BELOW**.

RECOMMENDED HAZARD CONTROLS
Chemical Hazards: Possible exposure to gasoline/jet fuel-related VOCs during this activity. Observe for any chemical hazards. Advise the SSHO if chemical hazards are observed and the potential for contact exists.
Biological Hazards: Biological hazards may be present. Watch for, and avoid contact with, poisonous plants, snakes, spiders, rodents, ants, bees and mosquitoes. Apply repellant containing 20% - 30% DEET if needed.
Fire Protection: Gasoline and diesel fuel will be used for equipment operation. No hot work is expected. Require fire extinguishers for each site location. Allow smoking only in designated areas.
Material Handling: Material handling involving lifting and carrying will occur. Wear work gloves when handling materials. Watch for items that can cut, puncture, pinch, or crush. Use proper lifting technique: size up load, get help for heavy or awkward items, get good grasp on object to be lifted, keep load close to body, keep back straight, lift with legs not with back, and do not twist when lifting. Review material handling procedures during safety meetings.
Tools, Machinery and Equipment Use: Hand and power tools may be used. Use the proper tool for the job. Use safety glasses. Do not use damaged tools. Keep body out of line-of-fire area. Use the proper tool for the job. Use GFCIs for power tool operation. Properly secure materials when working on them. Make sure area is adequately clear when using equipment. Inspect electrical cords. Use GFCIs for power tool operation. Do not lift or lower power tools by their power cord.
Electrical Equipment: Generators may be used to provide electrical power. Use GFCIs for portable electrical equipment. Electrical cords must be rated for outdoor construction use. Inspect electrical extension cords for damage and ground plugs. Electrical cords must be properly positioned and protected from being run over by vehicles or equipment. Keep electrical equipment/cords away from water and fuel materials. Electrical cords may not be used for raising or lowering the equipment.
Noise Exposure: Noise exposure above 85 dBA is expected when working near or operating machinery and equipment. Wear earplugs for protection.
Heat Stress: Heat stress may occur when elevated ambient temperatures, moderate to heavy workloads, and/or use of impermeable protective clothing occur. Adjust work-rest schedules as needed. Work at a steady pace. Drink plenty of fluids. Take rest breaks and use shaded rest area. Know signs/symptoms of heat exposure and emergency treatment.
Cold Stress: Cold stress may occur during the fall/winter/spring months when decreased ambient temperatures are present. For cold stress prevention, minimize exposure to temperatures below 45˚F. Wear insulated clothing for cold temperature work. Know the signs/symptoms of cold exposure and emergency treatment. Drink adequate fluids.
Inclement Weather and Adverse Environmental Conditions: Inclement weather conditions such as strong winds, heavy rain or lightning, and snow may occur during outdoor operations. Establish designated take cover area. Suspend outdoor operations during inclement weather or when other adverse environmental conditions exist. In case of work stoppage due to lightning, stay under shelter 30 minutes after last show of lightning or sound of thunder clap. Work will not resume until an all-clear signal has been communicated by the SSHO to affected personnel.
Miscellaneous Physical Hazards: General safety hazards will be present during all site tasks. Use PPE for head, eye, hand, foot, and body protection. Follow safe work practices. Watch for slip, trip, and fall hazards from uneven, wet, slippery ground surfaces. Keep ground areas clear of tripping hazards such as hoses, cords, boxes, and debris. Maintain good housekeeping. Look where walking. Maintain balance. Maintain three-point contact when stepping off equipment. Use short steps when walking on slippery surfaces. Communicate general safety information during safety meetings.

ACTIVITY HAZARD ANALYSIS

PPE: Use prescribed levels of protection described in the PPE section of the HSP for the applicable work task. Standard PPE consists of: Sleeved shirt, long work pants or coveralls, hardhat, steel-toed boots, work gloves, and safety glasses. Use face shield (grinding, cutting, and pressure washing); high-visibility safety vest (if vehicle or equipment traffic), and earplugs (if noise present), as applicable. Use personal fall arrest systems (full-body harness, shock-absorbing lanyard, anchorage point) for activities at elevated work locations with a fall hazard of six-feet or more. Use leather gloves and a welding hood or goggles with filtered lenses for torch cutting. Use a welding jacket (and chaps if leg exposure hazard) where there is a hazard of flying sparks and slag.
Site Emergencies: Preparation for site emergencies is always a requirement for site work. Set-up emergency communications. Prepare emergency supplies. Post emergency contact and hospital route information. Maintain emergency phone list/hospital location/route map on site. Have first-aid kit, fire extinguisher, and safety supplies available. Have cell phones available. Designate evacuation location and emergency signals. See the "Emergency Response Plan" section of HSP.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Hand tools; Generator; Compressor; Pumping equipment; Drums; Portable tank; Vacuum truck; Fire extinguisher; Spill kit; Safety tote; First-aid kit; Eyewash bottles; PPE.	Safety inspection; Tool inspection; Heavy equipment inspection.	Site orientation briefing and HSP/AHA review; Daily safety meetings (site personnel); HazWOPER training (site personnel); First-aid/CPR training (minimum two persons on site).

ACTIVITY HAZARD ANALYSIS

ACTIVITY: SITE CLEANUP AND DEMOBILIZATION

Accepted By:

Risk Assessment Code (RAC): **M**

Date Prepared: 3/5/11
Prepared By: Glen Mayekawa, CIH
Reviewed By: Steve Usnick, PE

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Recommended Protective Clothing and Equipment: Use Level D protection for site cleanup and demobilization. Use Modified Level D protection for equipment decontamination.
Level D protection consists of: Hardhat, steel-toed boots, work gloves, safety glasses, high-visibility safety vest (if vehicle or equipment traffic), earplugs (if noise present).
Modified Level D protection consists of: Level D protection plus chemical protective clothing (disposable coveralls, PVC or nitrile gloves, PVC boots or boot covers).

		PROBABILITY				
		Frequent	Likely	Occasional	Seldom	Unlikely
SEVERITY	Catastrophic	**E**	**E**	**H**	**H**	**M**
	Critical	**E**	**H**	**H**	**M**	**L**
	Marginal	**H**	**M**	**M**	**L**	**L**
	Negligible	**M**	**L**	**L**	**L**	**L**

RISK ASSESSMENT DEFINITIONS:

SEVERITY	
Catastrophic:	Mission failure; death or permanent disabling injury; damage to property >$200K.
Critical:	Major mission degradation; severe injury; occupational illness; or major system damage.
Marginal:	Minor mission degradation; injury; minor occupational illness; or minor system damage.
Negligible:	Less than minor mission degradation; injury; occupational illness; or minor system damage.
PROBABILITY	
Frequent:	Occurs often in the life of a system. Continuously experienced.
Likely:	Occurs often in the life of a system. Continuously experienced.
Occasional:	Will occur in the life of the system. Occurs sporadically.
Seldom:	Unlikely but can expect to occur in the life of the system. Occurs seldom.
Unlikely:	Unlikely but could occur in the life of a system. Occurs very rarely.

LIST OF COMPETENT PERSONS FOR THIS AHA:
-General S&H Competent Person: SSHO (TBD).

ACTIVITY HAZARD ANALYSIS

WORK TASK	POTENTIAL HAZARDS
Site Cleanup and Demobilization: -Perform site cleanup -Decontaminate equipment -Demobilize personnel and equipment.	**Chemical Hazards**: No anticipated exposure to site contaminants during site cleanup; however potential for exposure during equipment decontamination. **Biological Hazards**: Potential exposure to poisonous plants, snakes, spiders, rodents, ants, bees, and mosquitoes. **Physical Hazards**: Potential exposure to physical hazards: Fire protection; material handling; tools, machinery, and equipment use; electrical equipment; noise exposure; heat stress; cold stress; pressure washer operation; inclement weather and adverse environmental conditions; miscellaneous physical hazards. **SEE RECOMMENDED HAZARD CONTROLS BELOW**.

RECOMMENDED HAZARD CONTROLS
Chemical Hazards: Possible exposure to site contaminants during equipment decontamination. Use prescribed levels of protection described in the PPE section of the SSHP. Properly don and doff protective clothing. Avoid contact with contaminated surfaces when possible. Use prescribed decontamination measures.
Biological Hazards: Biological hazards may be present. Watch for, and avoid contact with, poisonous plants, snakes, spiders, rodents, ants, bees and mosquitoes. Apply repellant containing 20% - 30% DEET if needed.
Fire Protection: Gasoline and diesel fuel will be used for equipment operation. No hot work is expected. Require fire extinguishers for each site location. Allow smoking only in designated areas.
Material Handling: Material handling involving lifting and carrying will occur. Wear work gloves when handling materials. Watch for items that can cut, puncture, pinch, or crush. Use proper lifting technique: size up load, get help for heavy or awkward items, get good grasp on object to be lifted, keep load close to body, keep back straight, lift with legs not with back, and do not twist when lifting. Review material handling procedures during safety meetings.
Tools, Machinery and Equipment Use: Hand and power tools may be used. Use the proper tool for the job. Use safety glasses. Do not use damaged tools. Keep body out of line-of-fire area. Use the proper tool for the job. Use GFCIs for power tool operation. Properly secure materials when working on them. Make sure area is adequately clear when using equipment. Inspect electrical cords. Use GFCIs for power tool operation. Do not lift or lower power tools by their power cord.
Electrical Equipment: Generators may be used to provide electrical power. Use GFCIs for portable electrical equipment. Electrical cords must be rated for outdoor construction use. Inspect electrical extension cords for damage and ground plugs. Electrical cords must be properly positioned and protected from being run over by vehicles or equipment. Keep electrical equipment/cords away from water and fuel materials. Electrical cords may not be used for raising or lowering the equipment.
Noise Exposure: Noise exposure above 85 dBA is expected when working near or operating machinery and equipment. Wear earplugs for protection.
Heat Stress: Heat stress may occur when elevated ambient temperatures, moderate to heavy workloads, and/or use of impermeable protective clothing occur. Adjust work-rest schedules as needed. Work at a steady pace. Drink plenty of fluids. Take rest breaks and use shaded rest area. Know signs/symptoms of heat exposure and emergency treatment.
Cold Stress: Cold stress may occur during the fall/winter/spring months when decreased ambient temperatures are present. For cold stress prevention, minimize exposure to temperatures below 45˚F. Wear insulated clothing for cold temperature work. Know the signs/symptoms of cold exposure and emergency treatment. Drink adequate fluids.
Pressure Washer Operation: Pressure washer equipment may be used for cleaning. Use gloves, face, foot, and eye protection and wear splash resistant clothing during pressure washer operation. Keep area clear when washing. Do not clean boots with pressure washer. Watch for slippery surfaces and handling of slippery materials. Have fire extinguisher and emergency eyewash supplies immediately available.
Inclement Weather and Adverse Environmental Conditions: Inclement weather conditions such as strong winds, heavy rain or lightning, and snow may occur during outdoor operations. Establish designated take cover area. Suspend outdoor operations during inclement weather or when other adverse environmental conditions exist. In case of work stoppage due to lightning, stay under shelter 30 minutes after last show of lightning or sound of thunder clap. Work will not resume until an all-clear signal has been communicated by the SSHO to affected personnel.

ACTIVITY HAZARD ANALYSIS

Miscellaneous Physical Hazards: General safety hazards will be present during all site tasks. Use PPE for head, eye, hand, foot, and body protection. Follow safe work practices. Watch for slip, trip, and fall hazards from uneven, wet, slippery ground surfaces. Keep ground areas clear of tripping hazards such as hoses, cords, boxes, and debris. Maintain good housekeeping. Look where walking. Maintain balance. Maintain three-point contact when stepping off equipment. Use short steps when walking on slippery surfaces. Communicate general safety information during safety meetings.

PPE: Use prescribed levels of protection described in the PPE section of the HSP for the applicable work task. Standard PPE consists of: Sleeved shirt, long work pants or coveralls, hardhat, steel-toed boots, work gloves, and safety glasses. Use face shield (grinding, cutting, and pressure washing); high-visibility safety vest (if vehicle or equipment traffic), and earplugs (if noise present), as applicable. Use personal fall arrest systems (full-body harness, shock-absorbing lanyard, anchorage point) for activities at elevated work locations with a fall hazard of six-feet or more. Use leather gloves and a welding hood or goggles with filtered lenses for torch cutting. Use a welding jacket (and chaps if leg exposure hazard) where there is a hazard of flying sparks and slag.

Site Emergencies: Preparation for site emergencies is always a requirement for site work. Set-up emergency communications. Prepare emergency supplies. Post emergency contact and hospital route information. Maintain emergency phone list/hospital location/route map on site. Have first-aid kit, fire extinguisher, and safety supplies available. Have cell phones available. Designate evacuation location and emergency signals. See the "Emergency Response Plan" section of HSP.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Hand tools; Power tools; Generator; Pressure washer; Fire extinguisher; Spill kit; Safety tote; First-aid kit; Eyewash bottles; PPE.	Safety inspection; Tool inspection; Equipment decontamination release authorization.	Site orientation briefing and HSP/AHA review; Daily safety meetings (site personnel); HazWOPER training (site personnel); First-aid/CPR training (minimum of two persons on site).

ACTIVITY HAZARD ANALYSIS

ACTIVITY: EXCAVATION, SOIL REMOVAL AND DISPOSAL

Accepted By:

Risk Assessment Code (RAC): **M**

Date Prepared: 4/3/13
Prepared By: Ken Beatty, CSP, CHST
Reviewed By: Phil Dula, PG, CHMM

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Recommended Protective Clothing and Equipment: Level D, Modified Level D (if contact with contaminated soil) and Level C protection (if elevated VOCs).
-Level D protection consists of: Hardhat, steel-toed boots, work gloves, safety glasses, high-visibility safety vest (if vehicle or equipment traffic), earplugs (if noise present).
-Modified Level D protection consists of: Level D protection plus chemical protective clothing (disposable coveralls, PVC or nitrile gloves, PVC boots).
-Level C protection consists of: Modified Level D protection plus APR w/OV/AG/P-100 HEPA filter cartridges.

		PROBABILITY				
		Frequent	Likely	Occasional	Seldom	Unlikely
SEVERITY	Catastrophic	**E**	**E**	**H**	**H**	**M**
	Critical	**E**	**H**	**H**	**M**	**L**
	Marginal	**H**	**M**	**M**	**L**	**L**
	Negligible	**M**	**L**	**L**	**L**	**L**

RISK ASSESSMENT DEFINITIONS:

SEVERITY	
Catastrophic:	Mission failure; death or permanent disabling injury; damage to property >$200K.
Critical:	Major mission degradation; severe injury; occupational illness; or major system damage.
Marginal:	Minor mission degradation; injury; minor occupational illness; or minor system damage.
Negligible:	Less than minor mission degradation; injury; occupational illness; or minor system damage.
PROBABILITY	
Frequent:	Occurs often in the life of a system. Continuously experienced.
Likely:	Occurs often in the life of a system. Continuously experienced.
Occasional:	Will occur in the life of the system. Occurs sporadically.
Seldom:	Unlikely but can expect to occur in the life of the system. Occurs seldom.
Unlikely:	Unlikely but could occur in the life of a system. Occurs very rarely.

LIST OF COMPETENT PERSONS FOR THIS AHA:
-General S&H Competent Person: SSHO (TBD)
-Excavation Competent Person: (TBD)

ACTIVITY HAZARD ANALYSIS

WORK TASK	POTENTIAL HAZARDS
Excavation, Soil Removal and Disposal: -Field screen soil for VOCs -Segregate soils based on VOC screening -Collect soil samples and analyze -Excavate soil and stockpile -Cover soil stockpiles with reinforced poly sheeting -Install construction fence around excavation areas -Load, transport, and dispose of soil -Backfill and compact soil -Perform site restoration tasks.	**Chemical Hazards**: Potential exposure to petroleum-impacted soils during this activity. **Biological Hazards**: Potential exposure to poisonous plants, snakes, spiders, rodents, ants, bees, and mosquitoes. **Physical Hazards**: Potential exposure to physical hazards: Fire protection; underground utilities; overhead utilities; heavy equipment operation; excavation and trench safety; vehicle and equipment traffic; material handling; tools, machinery, and equipment use; electrical equipment; noise exposure; heat stress; cold stress; forklift operation; inclement weather and adverse environmental conditions; miscellaneous physical hazards. **SEE RECOMMENDED HAZARD CONTROLS BELOW**.

RECOMMENDED HAZARD CONTROLS

Chemical Hazards: Potential for exposure to petroleum-related VOCs and SVOCs impacted soil. Conduct monitoring as described in the "Exposure Monitoring" section of the HSP. Use prescribed levels of protection described in the PPE section of the HSP for the applicable work task. Properly don and doff protective clothing. Avoid contact with contaminated surfaces whenever possible. Use prescribed decontamination measures. Immediately advise the SSHO if unusual odors or other conditions are observed.

Biological Hazards: Biological hazards may be present. Watch for, and avoid contact with, poisonous plants, snakes, spiders, rodents, ants, bees and mosquitoes. Apply repellant containing 20% - 30% DEET if needed.

Fire Protection: Gasoline and diesel fuel will be used for equipment operation. No hot work is expected. Require fire extinguishers for each site location. Allow smoking only in designated areas.

Overhead Utilities: Overhead utilities may be present. Survey for overhead utilities before bringing equipment with high extensions (heavy equipment, dump trucks) into a work area. Do not operate equipment within 10-feet of overhead lines. Determine/comply with the required distance from energized overhead electric lines per EM 385-1-1 11E and Tables 11-1 and 11-3.

Underground Utilities: Underground utilities may be present. Obtain dig permits and complete subsurface utility clearance of site before work. Check for underground utilities before excavation. Hand dig near identified utilities.

Heavy Equipment Operation: Heavy equipment will be used for earthwork and to load contaminated soil into dump trucks. Survey area for overhead utilities. Use a spotter to assist during unloading of heavy equipment off of delivery trailers. Inspect heavy equipment daily and document. Check operation of backup alarms. Have ground personnel wear high-visibility safety vests with reflective striping. Maintain positive contact between operator and ground personnel at all times. Use hand signals. Do not cross path of moving equipment or cross behind equipment. Position ground personnel out of heavy equipment operating area when possible. Require operators to look before backing.

Excavation and Trench Safety: Certain excavation operations may require personnel entry into trenches or excavations. Complete excavation entry operations according to OSHA requirements if entry into trenches 4 feet or more in depth or excavations 5 feet or more in depth. Check for underground utilities before excavation. Survey for overhead utilities before bringing equipment with high extensions (heavy equipment) into a work area. Do not operate equipment within 10 feet of overhead lines. For excavation entry operations, have a "Competent Person" supervise operations, conduct daily inspections, and implement protective systems for excavation operations (sloping, benching, shielding, and/or shoring).

Vehicle and Equipment Traffic: Concurrent use of mobile equipment, vehicles, and ground personnel will occur. Establish traffic control procedures when there is vehicle, heavy equipment, and/or pedestrian traffic present. Have workers wear high-visibility safety vests with reflective striping when working near traffic areas. Advise workers to look carefully where they walk to avoid vehicles and moving equipment and to maintain eye contact with heavy equipment operators. Use traffic control devices as needed. Use spotters if needed for backing of equipment and vehicles into tight work areas. For driver safety: Wear seat belts. Observe posted speeds and traffic signs. Keep load secure. Wear required PPE. Check overhead clearance from utilities. Set brakes and use chocks on an incline.
Material Handling: Material handling involving lifting and carrying will occur. Wear work gloves when handling materials. Watch for items that can cut, puncture, pinch, or crush. Use proper lifting technique: size up load, get help for heavy or awkward items, get good grasp on object to be lifted, keep load close to body, keep back straight, lift with legs not with back, and do not twist when lifting. Review material handling procedures during safety meetings.
Tools, Machinery and Equipment Use: Hand and power tools may be used. Use the proper tool for the job. Use safety glasses. Do not use damaged tools. Keep body out of line-of-fire area. Use the proper tool for the job. Use GFCIs for power tool operation. Properly secure materials when working on them. Make sure area is adequately clear when using equipment. Inspect electrical cords. Use GFCIs for power tool operation. Do not lift or lower power tools by their power cord.
Electrical Equipment: Generators may be used to provide electrical power. Use GFCIs for portable electrical equipment. Electrical cords must be rated for outdoor construction use. Inspect electrical extension cords for damage and ground plugs. Electrical cords must be properly positioned and protected from being run over by vehicles or equipment. Keep electrical equipment/cords away from water and fuel materials. Electrical cords may not be used for raising or lowering the equipment.
Noise Exposure: Noise exposure above 85 dBA is expected when working near or operating machinery and equipment. Wear earplugs for protection.
Heat Stress: Heat stress may occur when elevated ambient temperatures, moderate to heavy workloads, and/or use of impermeable protective clothing occur. Adjust work-rest schedules as needed. Work at a steady pace. Drink plenty of fluids. Take rest breaks and use shaded rest area. Know signs/symptoms of heat exposure and emergency treatment.
Cold Stress: Cold stress may occur during the fall/winter/spring months when decreased ambient temperatures are present. For cold stress prevention, minimize exposure to temperatures below 45˚F. Wear insulated clothing for cold temperature work. Know the signs/symptoms of cold exposure and emergency treatment. Drink adequate fluids.
Forklift Operation: A forklift may be used to load and off load materials. Inspect forklifts daily. Check for operational backup alarm. Use trained and experienced operator. Travel at safe speeds and look for ground personnel. Forklift operators will look in the direction of travel and must not move the forklift until all persons are clear. Maintain eye contact with operator. Do not cross the path of an operating forklift.
Inclement Weather and Adverse Environmental Conditions: Inclement weather conditions such as strong winds, heavy rain or lightning, and snow may occur during outdoor operations. Establish designated take cover area. Suspend outdoor operations during inclement weather or when other adverse environmental conditions exist. In case of work stoppage due to lightning, stay under shelter 30 minutes after last show of lightning or sound of thunder clap. Work will not resume until an all-clear signal has been communicated by the SSHO to affected personnel.
Miscellaneous Physical Hazards: General safety hazards will be present during all site tasks. Use PPE for head, eye, hand, foot, and body protection. Follow safe work practices. Watch for slip, trip, and fall hazards from uneven, wet, slippery ground surfaces. Keep ground areas clear of tripping hazards such as hoses, cords, boxes, and debris. Maintain good housekeeping. Look where walking. Maintain balance. Maintain three-point contact when stepping off equipment. Use short steps when walking on slippery surfaces. Communicate general safety information during safety meetings.
PPE: Use prescribed levels of protection described in the PPE section of the HSP for the applicable work task. Level D protection consists of: Sleeved shirt, long work pants or coveralls, hardhat, steel-toed boots, work gloves, and safety glasses. Use face shield (grinding, cutting, and pressure washing); high-visibility safety vest (if vehicle or equipment traffic), and earplugs (if noise present), as applicable. Modified Level D protection consists of: Level D protection equipment plus chemical protective clothing (protective suit, gloves and boots or boot covers). Level C protection consists of: Modified Level D protection equipment plus an APR (w/organic vapor/acid gas/P100 cartridge). Use personal fall arrest systems (full-body harness, shock-absorbing lanyard, anchorage point) for activities at elevated work locations with a fall hazard of six-feet or more. Use leather gloves and a welding hood or goggles with filtered lenses for torch cutting. Use a welding jacket (and chaps if leg exposure hazard) where there is a hazard of flying sparks and slag.

ACTIVITY HAZARD ANALYSIS

Site Emergencies: Preparation for site emergencies is always a requirement for site work. Set-up emergency communications. Prepare emergency supplies. Post emergency contact and hospital route information. Maintain emergency phone list/hospital location/route map on site. Have first-aid kit, fire extinguisher, and safety supplies available. Have cell phones available. Designate evacuation location and emergency signals. See the "Emergency Response Plan" section of HSP.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Hand tools; Generator; Heavy equipment; Haul trucks; Water truck; Air monitoring equipment; Fire extinguisher; Spill kit; Safety tote; First-aid kit; Eyewash bottles; PPE.	Safety inspection; Dig permit; Tool inspection; Heavy equipment inspection Excavation safety inspection.	Site orientation briefing and HSP/AHA review; Daily safety meetings (site personnel); HazWOPER training (site personnel); First-aid/CPR training (minimum two persons on site) Excavation Competent Person training (CP).