PORT OF OAKLAND

April 20, 2012

Mr. Keith Nowell, PG, CHG
Hazardous Materials Specialist
Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda, CA 94502-6540

Subject: **Former Underground Storage Tank Site**
2700 Seventh Street, Oakland, CA
Fuel Leak Case No. RO0000059

Dear Mr. Nowell:

The Port of Oakland ("Port") acknowledges receipt of a letter from Alameda County Environmental Health ("ACEH") dated September 30, 2010, requesting the collection of soil and groundwater samples and analyses for methyl tertiary butyl ether ("MTBE") at the former underground storage tank ("UST") site ("Site") known to the Port as CF-31 at 2700 Seventh Street, Oakland, California. ACEH requested the additional analyses for MTBE as an additional step in preparation for regulatorly closing the UST Site.

The Port contacted ACEH by letter dated December 5, 2011, wherein the Port requested a meeting with ACEH prior to submitting a workplan. The outcome of a telephone call between the Port's consultant, AECOM Technical Services ("AECOM") and ACEH on December 15, 2011 concluded by the ACEH stating that a meeting was not necessary. Therefore, the Port, through its consultant, AECOM, herein submits to ACEH a "Limited Soil and Groundwater Investigation Work Plan, Underground Storage Tank Site at the Former Carnation Terminal, Berth 30, 2700 Seventh Street, Oakland, California" and dated January 27, 2012. This work plan was prepared by AECOM based on prior information collected by the Port and previously submitted to GeoTracker on November 22, 2010. The Port is prepared to conduct the proposed investigation following approval of this work plan by the County.

Should you have any questions or comments about the work plan, please do not hesitate to contact me at (510) 627-1373 or by email at jprall@portoakland.com

Sincerely,

John Prall PG, Port Associate Environmental Scientist
Port of Oakland Environmental Programs & Planning Division

I declare under penalty of perjury that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge.

CC: Luis Fraticelli, AECOM Technical Services
Anne Whittington, Port of Oakland
Michele Heffes, Port of Oakland
Deborah Ballati, Farella Braun + Martel

AECOM Environment

Prepared for:
Port of Oakland
530 Water Street
Oakland, California 94607

Prepared by:
AECOM
2101 Webster Street, Suite 1900
Oakland, CA 94612
January 2012
Project No.60236530

Limited Soil and Groundwater Investigation Work Plan

Underground Storage Tank Site at the Former Carnation Terminal, Berth 30 2700 7th Street, Oakland, California

AECOM
2101 Webster Street, Suite 1900
Oakland, California 94612

[Phone] 510.622.6600
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January 27, 2012
AECOM Project Number: 60236530

Mr. Paresh Khatri
Hazardous Material Specialist
Environmental Health Services Environmental Protection
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

Subject: **Limited Soil and Groundwater Investigation Work Plan**
Underground Storage Tank Site
Former Carnation Terminal, Berth 30
2700 7th Street, Oakland, California
Fuel Leak Case No. RO0000059

Dear Mr. Khatri,

On behalf of Port of Oakland (Port), AECOM Technical Services, Inc. (AECOM) is pleased to submit the enclosed Limited Soil and Groundwater Investigation Work Plan (Work Plan) to Alameda County Health Care Services Agency (ACEH) for approval. This Work Plan was prepared in response to the request by ACEH in their letter to the Port dated September 30, 2010.

If you have any questions or comments regarding this work plan, please do not hesitate to call Luis Fraticelli at (510) 879-4531.

Yours sincerely,

Luis A. Fraticelli, PG
Project Manager

Enclosure

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1.0 Introduction

This Limited Soil and Groundwater Investigation Work Plan (Work Plan) describes the scope of work proposed at the former Underground Storage Tank ("UST") Site in the former Carnation Terminal, Berth 30, located at 2700 7th Street, Oakland, California (the Site), for assessment of methyl tertiary butyl ether ("MTBE"). The UST was identified by the Port as CF-31. The Work Plan was prepared in response to the request by Alameda County Health Care Services Agency ("ACEH") in their letter to the Port of Oakland dated September 30, 2010 requesting MTBE analysis for soil and groundwater at the UST site. The objective of the investigation is to obtain case closure from ACEH. The Work Plan includes a Health and Safety Plan ("HASP") to be used during the implementation of the planned field work.

1.1 LOCATION AND BACKGROUND

The UST Site is located in the northwestern portion of the City of Oakland immediately adjacent to the Oakland Outer Harbor (Figure 1). Historical and current land use in the vicinity of the Site is exclusively commercial and industrial. Port of Oakland Maritime shipping terminals are located along the adjacent waterfront to the north, west, and south.

On November 28, 1988, a 15,000-gallon underground tank was removed by Aqua Science Engineering (ASE) as part of demolition activities of the former Carnation Terminal. Two of four soil samples and a groundwater sample collected during removal of the UST were reported to contain petroleum hydrocarbons. The highest reported concentration was 3,800 milligrams per kilogram (mg/kg) total petroleum hydrocarbon (TPH) as gasoline (TPH-g), and 2,600 mg/kg unspecified petroleum hydrocarbon in soil sample TA-1 from the southern end of the former tank cavity. The results of the tank removal were documented in the *Project Report, Underground Storage Tank Removal Assessment*, by ASE, dated December 20, 1988.

Baseline Environmental Consulting (Baseline) was retained by the Port of Oakland to direct remediation activities at the Site. Approximately 35 cubic yards of soil were excavated from the southern end of the former tank cavity in the area where soil sample TA-1 was collected. A confirmation soil sample collected following excavation was reported to contain 220 mg/kg of unspecified petroleum hydrocarbons. The excavation activities were documented in the *Report on Underground Tank Removal and Remedial Activities*, by Baseline, dated March 1989.

Subsequence to removal of the UST, the UST Site and Carnation Terminal area were redeveloped in 1992 through 1993. The former UST excavation pit is now located within the TransPacific Container Service Corporation Terminal ("TRAPAC").

Due to the wholesale redevelopment in the 1992 to 1993 time frame, the exact location the former UST is not known. A geophysical investigation was performed by Innovative Technical Solution Inc. ("ITSI") in September 1996 to attempt to locate and delineate the former UST excavation pit. The results of this geophysical investigation were inconclusive (ITSI, 1996). In 1997, ITSI made a revision on the approximately location of the former tank excavation, determined through historical aerial photographs (Figure 2).

On September 30, 2010, in a letter to Port of Oakland, ACHCS requested the Site be tested for MTBE for an adequate Site closure evaluation.

1.2 INVESTIGATION PURPOSE AND OBJECTIVES

The purpose of this investigation is to complete the data gap for evaluating case closure by collecting MTBE data on the soil and groundwater in the vicinity of the former UST excavation. The overall objective is to obtain case closure for ACEH Fuel Leak Case No. RO0000059.

Concentrations of MTBE derived from samples collected at the UST Site will be compared to RWQCB San Francisco Bay Region, May 2008 risk-based Environmental Screening Levels (ESLs), Table F-2b *Surface Water Screening Levels-Marine Habitats*.

2.0 Soil and Groundwater Investigation

Two soil borings will be advanced at the southern end of the former UST excavation pit and soil samples will be collected for MTBE analysis. A third boring will be advanced in the approximate center of the excavation pit and a groundwater sample will be collected for MTBE analysis. The proposed locations of the three soil borings are shown on Figure 2.

2.1 PRE-FIELD ACTIVITIES

2.1.1 Health and Safety Requirements

A Health and Safety Plan (HASP) has been prepared and will be followed by project personnel during the investigation activities (Appendix A). The HASP has been prepared in accordance with OSHA 29 CFR 1910.120 and Cal OSHA Title 8 Section 5192(e). The HASP addresses hazards associated with anticipated activities during the project.

2.1.2 Permitting

Prior to site investigation, a drilling permit will be obtained from the Alameda County Water District (ACWD).

2.2 SUBSURFACE INVESTIGATION FIELD ACTIVITIES

The field activities to be performed at the site include the following primary tasks:

- Conduct a subsurface utility survey at the locations of proposed soil borings;
- Advance three soil borings using direct push technology, collect soil and groundwater samples;

2.2.1 Subsurface Survey

AECOM will employ the service of a private underground utility locator (UUL) to conduct underground subsurface utility survey in the vicinity of the proposed soil boring locations. The survey is required to safely conduct the drilling work. Underground Service Alert (USA) will also be notified, as required by law.

2.2.2 Soil Borings

AECOM will employ a C-57 licensed drilling contractor to advance three soil borings, using direct push technology. The proposed locations are shown on Figure 2. Exact locations will be determined in the field.

The two borings located at the southern end of the former UST excavation pit will be drilled to first encountered groundwater which is expected at approximately 8 to 10 feet below ground surface (bgs). Soil samples will be collected at four to five feet bgs and at the soil/water interface, approximately 8 to 10 feet bgs. The third boring, located in the center of the former excavation, will be drilled to groundwater and a groundwater grab sample will be collected.

Soil and grab groundwater samples will be collected using the procedures established in the United States Environmental Protection Agency (U.S. EPA) Manual SW-846. After sample collection, the borings will be backfilled to the native soil surface level with cement and bentonite mixture. The cored pavement will be patched to match existing pavement.

All drilling activities will be directed by an AECOM geologist who is, who will be under the supervision of, a State of California Registered Professional Geologist. A detailed log of the field activities and observances will be maintained by the site geologist.

Subsurface soils will be examined for lithologic identification. The soils will be logged using the Unified Soil Classification System (ASTM D-2487). Subsurface soil will also be screened for organic vapors, as drilling progresses, by use of an organic vapor meter (OVM). The soils sampled from discrete depths will be placed in a Ziplock® bag and exposed to direct sunlight for approximately 10 minutes. The bag then will be pierced with the OVM probe in order to record the organic vapor levels present, if any, in the headspace.

Collected soil and/or groundwater samples will be marked with an identification number, and immediately placed in an insulated container cooled with ice. Duplicate field samples will be collected for quality control purpose. A travel blank will be prepared by the chosen analytical laboratory and will remain with the collected samples at all times.

2.3 LABORATORY ANALYSES

AECOM will maintain all collected samples in insulated containers cooled with ice, accompanied by the required chain-of-custody documentation. Soil and groundwater samples will be submitted to Curtis & Tompkins Laboratories, a State-certified analytical laboratory located in Berkeley, California, for analyses of MTBE by EPA Method 8060B. All analyses will be performed on a standard laboratory turnaround time.

2.4 QUALITY ASSURANCE / QUALITY CONTROL

To verify the appropriateness of the quality assurance and quality control (QA/QC) procedures during the field program, the QA/QC plan includes the collection and analysis of:

- One trip blank to accompany each cooler containing the samples for VOC analysis.

Trip blank samples are samples that will be collected to check for potential cross-contamination during sample collection, shipping, or laboratory handling.

All samples will be delivered under chain of custody for analysis by a state-certified analytical laboratory.

2.4.1 Laboratory Quality Control Samples

Laboratory QC samples will be analyzed to monitor the precision and accuracy of the laboratory results. The laboratory QC samples will consist of method blanks and laboratory control samples. In addition, surrogate spikes and internal standards will be added to samples and evaluated, as applicable for each method.

2.4.2 Data Review and Validation

The analytical data will be reported as U.S. EPA Level II data that will consist of the following:

- A copy of the signed COC and sample receiving records indicating the date and time of sample receipt in laboratory.

- Adequate information to cross-reference field sample numbers to laboratory sample numbers and to identify applicable laboratory QC samples with the field samples.
- Summary forms which include the analytical method used, date of extraction (if applicable), date of analysis, sample results, detection limits or reporting limits, and surrogate recoveries (where applicable).
- QA/QC summary reports providing data on method blanks, MS/MSD recoveries and laboratory duplicates (as applicable), LCS recoveries, and other QC required in the referenced analytical method.
- For all methods, each analysis will be performed at and each analyte reported from the lowest possible dilution free of interference.

U.S. EPA Level II data is generally reviewed for method compliance and summary review of QC outliers, but are not required to be validated.

2.5 INVESTIGATION DERIVED WASTE MANAGEMENT

Drilling and sampling equipment will be thoroughly cleaned with soap and clean water solution or with steam before and after each use. Investigation derived waste (IDW) generated from the sampling activities will include soil and equipment decontamination rinseate water. The soil and water will be containerized, separately, in Department of Transportation-approved drums, and will remain on-site pending a determination of the appropriate method of disposal based on analytical results. The drums will be labeled with date, contents, generator, and contact information and will be placed at a location acceptable with the Terminal. After receipt of the analytical results, AECOM will notify the Port of the results and the Port will be responsible for disposing of the IDW.

2.6 REPORTING

AECOM will prepare an investigation report, based on its field observations and laboratory data, which documents and summarizes the work performed, and discusses its findings and conclusions. This report will include descriptions of field procedures and sampling techniques, a site map showing relevant features and sample locations, tabulations of collected data, quality assurance/quality control discussions, laboratory chain-of-custody documentation, laboratory reports, and conclusions and recommendations based on the findings of the investigation.

3.0 References

Aqua Science Engineering, 1988. *Project Report Underground Storage Tank Removal Assessment at 2700 7th Street, Oakland, CA.* December.

Baseline Environmental Consulting, 1989. *Report on Underground Tank Removal and Remedial Activities, 2700 7th Street, Oakland, CA.* March.

Innovative Technical Solutions, Inc. (ITSI), 1996a. *WorkPlan for Soil and Water Investigation at Former Carnation Terminal Site, Berth 30, 2700 7th Street, Oakland, CA.* June.

_____, 1996b. *Geophysical Investigation at Berth 30 Port of Oakland, Oakland, California.* September.

_____, 1997. *Revised Soil and Groundater Sample Locations, Former Carnation Terminal Site, Berth 30, 2700 7th Street, Oakland, CA*. February.

FIGURES

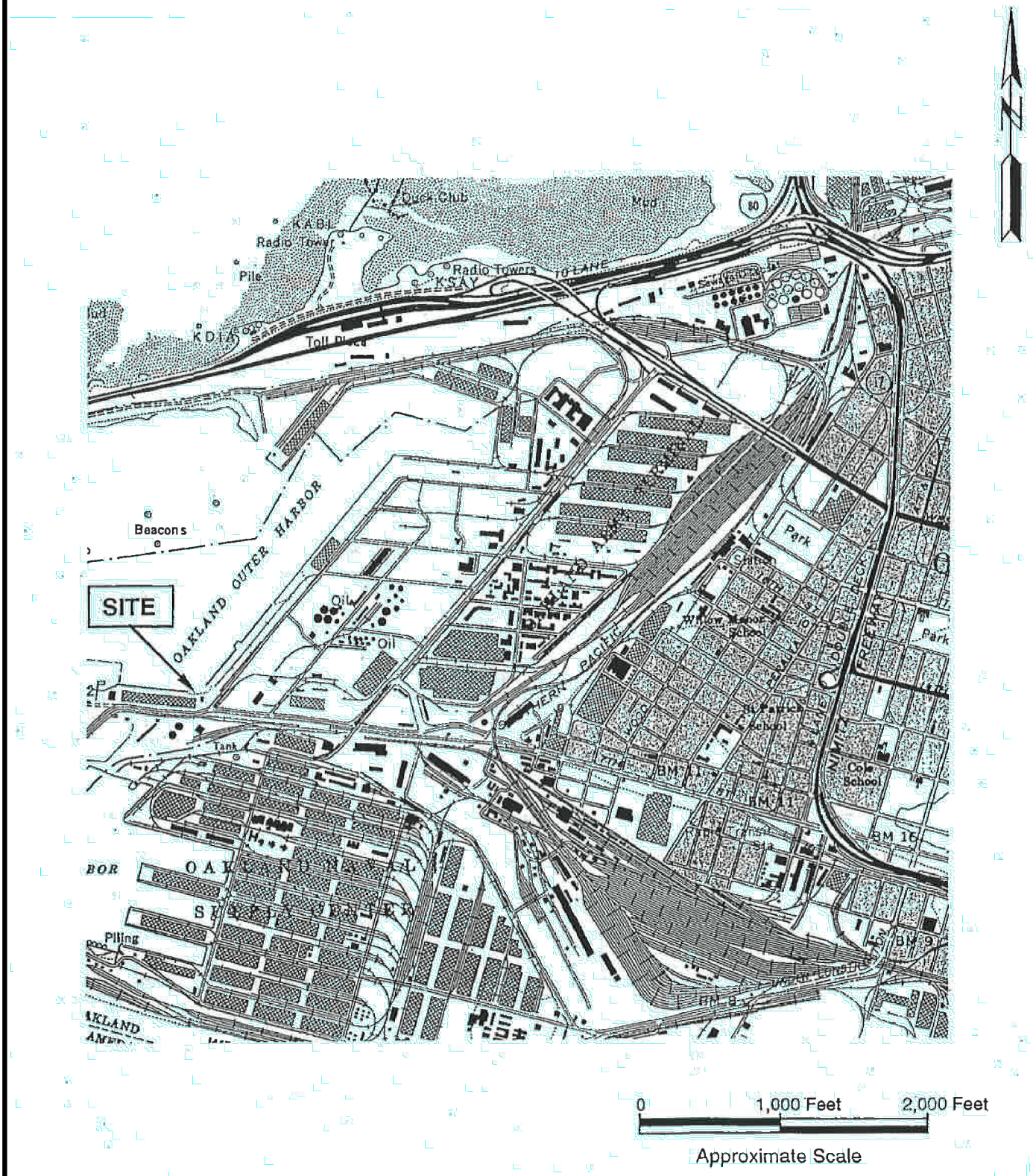


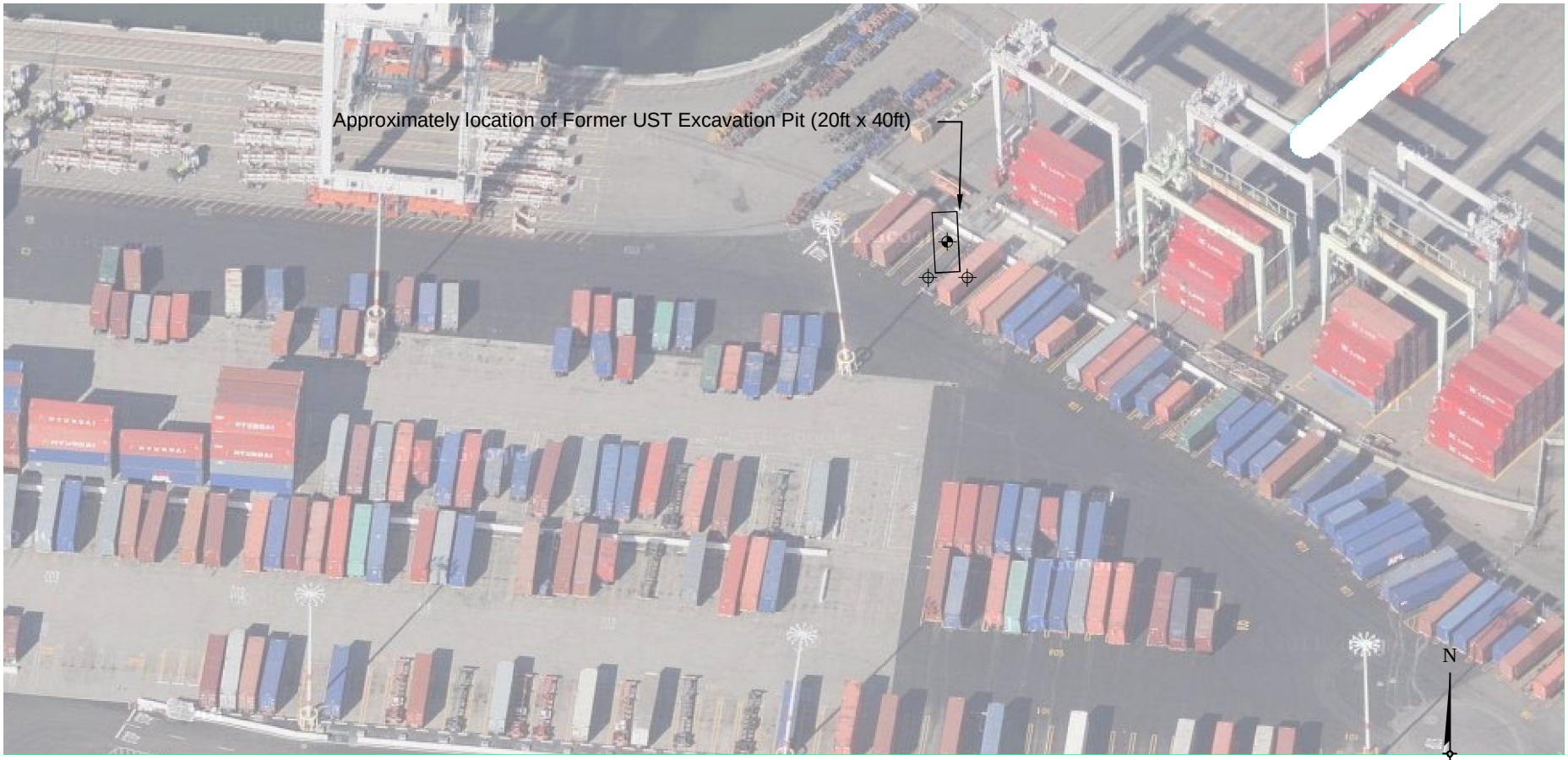
Figure 1

Site Location

Former Carnation Terminal Site ▪ 2700 7th St, Oakland, CA

January 2012 60236530

C:\Documents and Settings\difuntoruml\Works\60236530 7th St Port of Oakland\Figure 1 Site Location.dwg – 12 Jan 2012



Proposed Boring Location (Groundwater Only)

Proposed Boring Location (Soil Only)

AECOM

Figure 2

Proposed Soil and Groundwater Sampling Locations

Former Carnation Terminal Site ▪ 2700 7th St, Oakland, CA

January 2012 60236530

P:\Port of Oakland\05485 Port of Oakland\60236530 Soil Sampling\Work Plan\CADD\Figure 2 Soil & GW Sampling Locations.dwg – 16 Jan 2012

APPENDIX A

AECOM Environment

Health and Safety Plan

for Soil and Groundwater Investigation

Former Carnation Terminal Site, Berth 30
2700 7th Street, Oakland, California

Prepared for:
Port of Oakland
Oakland, California

Prepared by:
AECOM Technical Services, Inc.
2101 Webster Street, Suite 1900
Oakland, CA 94612

January 2012

Project No. 60236530

HEALTH AND SAFETY PLAN APPROVAL

This site-specific Health and Safety Plan (HASP) was prepared for employees performing a specific, limited scope of work. It was based on the best available information regarding the physical and chemical hazards known or suspected to be present on the project site. While it is not possible to discover, evaluate, and protect in advance against all possible hazards, which may be encountered during the completion of this project, adherence to the requirements of the HASP will significantly reduce the potential for occupational injury.

By signing below, I acknowledge that I have reviewed and hereby approve the HASP for Soil and Groundwater Investigation activities at the Former Carnation Terminal Site, Berth 30, located at 2700 7th Oakland, Oakland, California. This HASP has been written for the exclusive use of AECOM Technical Services, Inc., its employees, and subcontractors. It is intended for specified site conditions, dates, and personnel, and must be amended if these conditions change.

Written by:

Yurong Han

1/26/12

Yurong Han, PE
Engineer

Date

Approved by:

Cowburn, Art

Digitally signed by Cowburn, Art
DN: dc=com, dc=aecomnet, dc=na, ou=West Region, ou=USRED1, ou=Migrate, cn=Cowburn, Art
Date: 2011.12.21 11:49:55 -08'00'

Art Cowburn for/ Roman Worobel, CIH
District Safety Professional

Date

Luis Fraticelli

1/26/2012

Luis Fraticelli, PG
Project Manager

Date

Personnel Acknowledgement

By signing below, the undersigned acknowledges that he/she has read and reviewed the AECOM Health and Safety Plan for the Former Carnation Terminal Site, Berth 30 in Oakland, California. The undersigned also acknowledges that he/she has been instructed in the contents of this document and understands the information pertaining to the specified work, and will comply with the provisions contained therein.

PRINT NAME	SIGNATURE	ORGANIZATION	DATE

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ATTACHMENTS

FIGURES

TABLES

1.0 INTRODUCTION

1.1 GENERAL

This Health and Safety Plan (HASP) presents the applicable elements of AECOM's Health and Safety Program and has been developed to support the activities associated with the soil and groundwater investigation to be performed at the former Carnation Terminal Site, Berth 30, located at 2700 7th Street, Oakland, California (the site).

Operational changes to this HASP that could affect the health or safety of personnel, the community, or the environment will not be made without prior approval of the AECOM District Safety Professional.

In the event of a conflict between this HASP and federal, state, or local regulations, the most stringent will apply.

1.2 POLICY STATEMENT

It is the policy of AECOM to provide a safe and healthful work environment for all of its employees. AECOM considers no phase of operations or administration is of greater importance than injury and illness prevention. Safety takes precedence over expediency or shortcuts. At AECOM, we believe every accident and every injury is avoidable. We will take every reasonable step to reduce the possibility of injury, illness, or accident.

This HASP presents procedures to be employed during all on site work activities. The practices and procedures presented in this HASP are mandatory for all AECOM employees (and its subcontractors) while engaged in work operations at the site. AECOM also requires that all visitors to areas under its control abide by these procedures.

1.3 REFERENCES

This HASP complies with requirements specified in applicable regulations administered by the California Department of Industrial Relations, Division of Occupational Safety and Health (Cal-OSHA) and the U.S. Environmental Protection Agency (EPA) regulations. This HASP follows the guidelines established by the regulatory agencies in the following documents:

- California Code of Regulations, Title 8, General Industry Safety Orders (8 CCR, Subchapter 7, Sections 3200-6184)
- Cal-OSHA Construction Safety Orders (8 CCR, Subchapter 4, Sections 1500-1938)
- Standard Operating Safety Guides, U.S. EPA, June 1992

The following documents provide technical information to aid in the protection from chemical substances:

- Threshold Limits Values for Chemical Substances and Physical Agents and Biological Exposure Indices published by the American Conference of Governmental Industrial Hygienists in 2010.

2.0 SITE INFORMATION AND SCOPE OF WORK

AECOM will conduct soil and groundwater investigation at the Site. Additional scope of work in future will require that a District Safety Professional review changes made to this HASP to ensure adequate protection of personnel and other property.

The following is a summary of relevant data concerning the site, and the work procedures to be performed. The Work Plan (to be prepared by AECOM) will be a companion document to this HASP and provides significantly greater details concerning both site history and planned work operations.

2.1 SITE INFORMATION

This section provides a general description and historical information associated with the site.

2.1.1 General Description

The work is to collect soil and groundwater samples from the vicinity of former UST excavation pit to evaluate the MTBE concentrations at the Site.

2.1.2 Site Location and Previous Investigation

The Site is located in the northwestern portion of the City of Oakland immediately adjacent to the Oakland Outer Harbor. Historical and current land use in the vicinity of the Site is exclusively commercial and industrial. Port of Oakland shipping terminals are located along the adjacent waterfront to the north, west, and south.

On November 28, 1988, a 15,000-gallon underground tank was removed as part of demolition activities at the Site, by Aqua Science Engineering (ASE). Two of four soil samples and a groundwater sample collected during removal of the UST were reported to contain petroleum hydrocarbons. The highest reported concentration was 3,800 milligrams per kilogram (mg/kg) total petroleum hydrocarbon (TPH) as gasoline (TPH-g), and 2,600 mg/kg unspecified petroleum hydrocarbon in soil sample TA-1 from the southern end of the former tank cavity.

Baseline Environmental Consulting (Baseline) was retained by the Port of Oakland to direct remediation activities at the Site. Approximately 35 cubic yards of soil were excavated from the southern end of the former tank cavity in the area where soil sample TA-1 was collected. A confirmation soil sample collected following excavation was reported to contain 220 mg/kg of unspecified petroleum hydrocarbons.

On September 30, 2010, in a letter to Port of Oakland, ACHCS requested the Site be tested for MTBE for an adequate Site closure evaluation.

2.2 SCOPE OF WORK

AECOM will provide environmental services to the Site. Anticipated tasks for AECOM employees and subcontractors will include:

- Site reconnaissance / underground utility survey
- Drilling and collect soil and groundwater samples.
- Decontamination
- Investigation-Derived Waste (IDW) management

2.2.1 Site Reconnaissance/ Underground Utility Survey

Site reconnaissance will include identifying former UST excavation pit and soil boring locations. As with non-intrusive activities, the primary hazards associated with this work are the potential for slip/fall hazards due to uneven surfaces and/or physical obstructions in the sampling areas, and interior issues such as overhead electrical lines and falling hazards.

AECOM will employ the services of a professional underground utility locator (UUL) to conduct an underground survey to investigate the existence and location of underground utilities or obstructions in the vicinity of the proposed vapor well and groundwater locations. Underground Service Alert will also be notified.

2.2.2 Drilling and collect soil and groundwater samples

AECOM will employ a C-57 licensed drilling contractor to advance three soil borings, using direct push technology. The two borings located outside the southern end of the former UST excavation pit will be drilled to first encountered groundwater which is expected at approximately eight to 10 feet below the groundwater surface (bgs), which soil samples collected at four to five feet bgs and at the soil/water interface of eight to 10 feet bgs. The third boring, located in the center of the former excavation, will be drilled to groundwater and a groundwater grab sample will be collected.

2.2.9 Equipment Decontamination

AECOM employees and Subcontractor personnel will perform primary decontamination of vehicles and equipment at the worksite to prevent cross-contamination between the different investigation locations. All decontamination water and debris will be collected and contained in 55-gallon DOT approved drums.

2.2.10 Investigation Derived Waste Management

AECOM will store accumulated IDW in approved and labeled drums located in designated areas. Potentially hazardous IDW (decontamination fluids, etc.) will be tested, segregated, and disposed of within 90 calendar days of completing the field activities if found to be hazardous. Non-hazardous IDW will be disposed of in a timely fashion following fieldwork.

3.0 PROJECT HEALTH AND SAFETY ORGANIZATION

3.1 PROJECT MANAGER

AECOM's Project Manager (PM) is Mr. Luis Fraticelli and he is responsible for ensuring that field personnel are provided with adequate programmatic guidance, resources and support to enable safe planning and performance of on-site operations. He is ultimately responsible for the health and safety of employees and contractors participating in this project. Specific safety-related duties include:

- Ensuring that an approved HASP is prepared that addresses all aspects of the work to be performed
- Ensuring that all personnel assigned to perform on-site activities meet the required qualifications
- Providing adequate resources and supplies to fulfill all work safety requirements
- Assigning the Field Manager and Site Safety Officer, to provide on-site management of work activities
- Contacting the District Safety Professional for guidance regarding any health and safety related matters.

3.2 DISTRICT SAFETY PROFESSIONAL

The District Safety Professional is Mr. Roman Worobel and he is a member of the AECOM Safety, Health and Environmental Department assigned to review this HASP and provide any needed technical support. The District Safety Professional will be the first point-of-contact for all of the project's health and safety matters. Duties include the following:

- Review and approve the HASP.
- Provide technical guidance related to health and safety.
- Approve any required changes to this HASP.
- Approving of the designated site safety officer.
- Investigating any reported unsafe acts or conditions.

3.3 FIELD MANAGER

The designated Field Manager (FM) is to be determined. FM is responsible for field implementation of the specified SH&E requirements, including communicating site requirements to all personnel, observing that field supervisors and subcontractors enforce all provisions of the HASP/other SH&E documentation, working with the Site Safety Officer to implement all SH&E performance elements, and consulting with the SH&E regarding any necessary changes to SH&E requirements. Other responsibilities include:

- Reading and becoming familiar with the HASP
- Enforcing the HASP and other safety regulations
- Ensuring that no work is performed which is not properly addressed in this HASP (or approved supplemental guidance)
- Maintaining the presence of at least one qualified first-aid and cardiopulmonary resuscitation (CPR)-trained provider on site at all times
- Contacting the DSP for guidance regarding any health and safety related matters.

Any designated Field Manager is required to have completed the annual 8-hour refresher training course for hazardous waste operations and emergency response (HAZWOPER) and the 8-hour HAZWOPER supervisor training course in accordance with 8 CCR §5192 (e)(8).

3.4 SITE SAFETY OFFICER

The FM or designated alternate will serve as the Site Safety Officer (SSO) during on-site work operations, and will be responsible for the execution of the routine on-site duties for health and safety, with assistance and direction from the designated SH&E. The responsibilities of the SSO include:

- Conducting periodic safety reviews of the project site and project documentation
- Performing regular and frequent site inspections to identify hazards and observe employees at work
- Stopping work, as required, to maintain personal and environmental health and safety
- Perform air monitoring for contaminants of concern during work activities
- Determining emergency evacuation routes, establishing and posting local emergency telephone numbers, and arranging emergency transportation
- Ensuring that all site personnel and visitors have received the proper training and medical clearance prior to entering the site
- Establishing any necessary controlled work areas (as designated in this HASP)
- Presenting tailgate safety meetings and maintaining attendance logs and records
- Discussing potential health and safety hazards with the FM, SH&E and the Project Manager
- Implementing the field elements of the AECOM Respiratory Protection Program
- Maintaining decontamination procedures, which meet established criteria.

The SSO is required to have completed the annual 8-hour HAZWOPER refresher training course and the supervisor training course in accordance with 8 CCR §5192 (e)(8).

3.5 SUBCONTRACTORS

Each AECOM subcontractor is responsible for assigning specific work tasks to their employees. The subcontractor's management will provide qualified employees and allocate sufficient time, materials, and equipment to safely complete assigned tasks. In particular, each subcontractor is responsible for equipping its personnel with any required personnel protective equipment (PPE).

AECOM considers each subcontractor to be an expert in all aspects of the work operations for which they are tasked to provide, and each subcontractor is responsible for compliance with the regulatory requirements that pertain to those services. Each subcontractor is expected to perform its operations in accordance with its own unique safety policies and procedures, in order to ensure that hazards associated with the performance of the work activities are properly controlled. Copies of any required safety documentation for a subcontractor's work activities will be provided to AECOM for review prior to the start of onsite activities, if required.

Hazards not listed in this HASP but known to any subcontractor, or known to be associated with a subcontractor's services, must be identified and addressed to the AECOM PM or the Site FM and documented in a Task Hazard Analysis prior to beginning work operations. The Site Supervisor or authorized representative has the authority to halt any subcontractor operations, and to remove any subcontractor or subcontractor employee from the site for failure to comply with established health and safety procedures or for operating in an unsafe manner.

3.6 ON-SITE PERSONNEL AND VISITORS

Each person (AECOM or subcontractor employee) is responsible for his/her own health and safety, for completing assigned tasks in a safe manner, and for reporting any unsafe acts or conditions to his/her supervisor and/or the FM/SSO. All personnel are responsible for continuous adherence to the specified health and safety procedures during the performance of their work. No person may work in a manner that conflicts with the letter or intent of safety and environmental precautions expressed in these procedures. After due warnings, AECOM will dismiss from the work site any person who violates safety procedures. AECOM employees are subject to progressive discipline and may be terminated for blatant or continued violations.

All personnel working for AECOM and its subcontractors are required to read and acknowledge their understanding of the HASP and any other applicable SH&E documentation. All visitors to controlled work areas of any project site must likewise read and acknowledge their understanding of the applicable H&S requirements. All personnel are expected to abide by all written SH&E requirements and any supplementary instructions communicated by the FM/SSO, and cooperate with supervisory personnel to ensure a safe and healthful work site. Site personnel are required to report immediately any of the following to the FM:

- Accidents and injuries, no matter how minor

- Unexpected or uncontrolled releases of any hazardous substances
- Any symptoms of exposure to a hazardous substance
- Any unsafe or malfunctioning equipment
- Any changes in site conditions which may affect the health or safety of project personnel.

Unauthorized visitors, and visitors not meeting the specified qualifications, will not be permitted within established controlled work areas.

4.0 SAFETY PROGRAMS

4.1 HAZWOPER QUALIFICATIONS

Personnel performing work at the job site must be certified as HAZWOPER workers (unless otherwise noted in specific THAs or by the SSO), and must meet the medical monitoring and training requirements specified in the following safety procedures:

- SH&E SOP S3NA – 001-PR, *Safe Work Standards and Rules*
- SH&E SOP S3NA – 002-PR, *Stop Work Authority for Unsafe Work*
- SH&E SOP S3NA – 004-PR, *Incident Reporting*
- SH&E SOP S3NA – 005-PR, *Vehicle and Driver Safety Program*
- SH&E SOP S3NA – 208-PR, *Personal Protective Equipment Program*
- SH&E SOP S3NA – 210-PR, *Project Safety Meetings*
- SH&E SOP S3NA-605, *Medical Surveillance Program*
- SH&E SOP S3NA-509-PR, *Hazardous Waste Operations and Emergency Response*

Personnel must have successfully completed training meeting the provisions established in 8 CCR §5192 (e)(2) [40-hour initial training]. As appropriate, personnel must also have completed annual refresher training in accordance with 8 CCR §5192 (e)(8); each person's most recent training course must have been completed within the previous 365 days. Personnel must also have completed a physical exam in accordance with the requirements of 8 CCR §5192 (f), where the medical evaluation includes a judgment of the employee's ability to use respiratory protective equipment and to participate in hazardous waste site activities.

4.2 SITE-SPECIFIC SAFETY TRAINING

All personnel performing field activities at the site will be trained in accordance with SH&E SOP S3NA-509-PR, *Hazardous Waste Operations and Emergency Response*.

In addition to the general health and safety training programs, personnel will be:

- Instructed on the contents of applicable portions of this HASP and any supplemental health and safety information developed for the tasks to be performed.
- Informed about the potential routes of exposure, protective clothing, precautionary measures, and symptoms or signs of chemical exposure and heat stress.
- Made aware of task-specific physical hazards and other hazards that may be encountered during site work. This includes any client-specific required training for health and safety.
- Made aware of fire prevention measures, fire extinguishing methods, and evacuation procedures.

The site-specific training will be performed prior to the worker performing the subject task or handling the impacted materials and on an as-needed basis thereafter. Training will be conducted by the SSO (or his/her designee) and will be documented on the form attached to SH&E SOP S3NA – 210-PR, *Project Safety Meetings*.

4.3 HAZARD COMMUNICATION

Section 5.2 provides information concerning the materials that may be encountered as environmental contaminants during the work activities. In addition, any organization wishing to bring any hazardous material onto any AECOM-controlled work site must first provide a copy of the item's Material Safety Data Sheet (MSDS) to the SSO for approval and filing (the SSO will maintain copies of all MSDSs on site). MSDSs may not be available for locally-obtained products, in which case some alternate form of product hazard documentation will be acceptable. In accordance with the requirements of SH&E SOP S3NA-509-PR, *Hazardous Waste*

Operations and Emergency Response, all personnel shall be briefed on the hazards of any chemical product they use, and shall be aware of and have access to all MSDSs.

All containers on site shall be properly labeled to indicate their contents. Labeling on any containers not intended for single-day, individual use shall contain additional information indicating potential health and safety hazards (flammability, reactivity, etc.).

4.4 HAZARDOUS, SOLID, OR MUNICIPAL WASTE

If hazardous, solid and/or municipal wastes are generated during any phase of the project, the waste shall be accumulated, labeled, and disposed of in accordance with applicable Federal, State, and/or local regulations.

4.5 GENERAL SAFETY RULES

4.5.1 Housekeeping

During site activities, work areas will be continuously observed for identification of excess trash and unnecessary debris. Excess debris and trash will be collected and stored in an appropriate container (e.g., plastic trash bags, garbage can, roll-off bin) prior to disposal. At no time will debris or trash be intermingled with waste PPE or contaminated materials.

4.5.2 Smoking, Eating, or Drinking

Smoking, eating and drinking will not be permitted inside any controlled work area at any time. Field workers will first wash hands and face immediately after leaving controlled work areas (and always prior to eating or drinking). Consumption of alcoholic beverages is prohibited at any AECOM site.

4.5.3 Personal Hygiene

The following personal hygiene requirements will be observed:

Water Supply: A water supply meeting the following requirements will be utilized:

- *Potable Water* - An adequate supply of potable water will be available for field personnel consumption. Potable water can be provided in the form of water bottles, canteens, water coolers, or drinking fountains. Where drinking fountains are not available, individual-use cups will be provided as well as adequate disposal containers. Potable water containers will be properly identified in order to distinguish them from non-potable water sources.
- *Non-Potable Water* - Non-potable water may not be used for drinking purposes, hand washing and cleaning activities. All containers of non-potable water will be marked with a label stating:

Non-Potable Water
Not Intended for Drinking Water Consumption

Toilet Facilities: A minimum of one toilet will be provided for every 20 personnel on site, with separate toilets maintained for each sex except where there are less than 5 total personnel on site. For mobile crews where work activities and locations permit transportation to nearby toilet facilities on-site facilities are not required.

Washing Facilities: Employees will be provided washing facilities (e.g., buckets with water and Alconox) at each work location. The use of water and hand soap (or similar substance) will required by all employees following exit from the Exclusion Zone, prior to breaks, and at the end of daily work activities.

4.5.4 Buddy System

All field personnel will use the buddy system when working within any controlled work area. Personnel belonging to another organization on site can serve as "buddies" for AECOM personnel. Under no circumstances will any employee be present alone in a controlled work area.

4.5.5 Heat and Cold Stress

Heat and cold stress may vary based upon work activities, PPE/clothing selection, geographical locations, and weather conditions. To reduce the potential of developing heat/cold stress, be aware of the signs and symptoms of heat/cold stress and watch fellow employees for signs of heat/cold stress. For additional requirements, refer

to SH&E SOP S3NA – 505-PR, Cold Stress Prevention, and SH&E SOP S3NA – 511-PR, Heat Stress Prevention.

4.5.5.1 Responding to Heat-Related Illness

Heat stress can be a significant field site hazard, particularly for non-acclimated personnel working in hot environments. Site personnel must be instructed in the identification of heat stress symptoms, first-aid procedures for severe heat stress, and prevention of associated injuries. Workers must be encouraged to immediately report any heat stress experienced personally or by fellow workers.

A work-rest schedule must be implemented to prevent heat stress. Work breaks should take place in a shaded area. This area should be equipped to allow workers to loosen or remove protective clothing, and provide sufficient seating for personnel. During breaks, workers must be encouraged to drink plenty of water or other proper liquids to replace lost fluids and promote cooling. This must be completed even if the worker is not thirsty. Cool water should be available at all times in the break area.

Personnel who exhibit any signs of a heat-related illness should be relieved of all duties at once. This person should be to the rest area and provided cool water. Anyone exhibiting signs of heat exhaustion or stroke must be taken immediately to the nearest medical facility.

The guidance below will be used in identifying and treating heat-related illness.

Table 4-1: Identification and Treatment of Heat-Related Illness

Type of Heat-Related Illness	Description	First Aid
Mild Heat Strain	The mildest form of heat-related illness. Victims exhibit irritability, lethargy, and significant sweating. The victim may complain of headache or nausea. This is the initial stage of overheating, and prompt action at this point may prevent more severe heat-related illness from occurring.	▪ Provide the victim with a work break during which he/she may relax, remove any excess protective clothing, and drink cool fluids. ▪ If an air-conditioned spot is available, this is an ideal break location. ▪ Once the victim shows improvement, he/she may resume working; however, the work pace should be moderated to prevent recurrence of the symptoms.
Heat Exhaustion	Usually begins with muscular weakness and cramping, dizziness, staggering gait, and nausea. The victim will have pale, clammy moist skin and may perspire profusely. The pulse is weak and fast and the victim may faint unless they lie down. The bowels may move involuntarily.	▪ Immediately remove the victim from the work area to a shady or cool area with good air circulation (avoid drafts or sudden chilling). ▪ Remove all protective outerwear. ▪ Call a physician. ▪ Treat the victim for shock. (Make the victim lie down, raise his or her feet 6–12 inches, and keep him or her cool by loosening all clothing). ▪ If the victim is conscious, it may be helpful to give him or her sips of water. ▪ Transport victim to a medical facility as soon as possible.

Type of Heat-Related Illness	Description	First Aid
Heat Stroke	The most serious of heat illness, heat stroke represents the collapse of the body's cooling mechanisms. As a result, body temperature may rise to 104 degrees Fahrenheit or higher. As the victim progresses toward heat stroke, symptoms such as headache, dizziness, and nausea can be noted, and the skin is observed to be dry, red, and hot. Sudden collapse and loss of consciousness follows quickly and death is imminent if exposure continues. Heat stroke can occur suddenly.	▪ Immediately evacuate the victim to a cool and shady area. ▪ Remove all protective outerwear and as much personal clothing as decency permits. ▪ Lay the victim on his or her back with the feet slightly elevated. ▪ Apply cold wet towels or ice bags to the head, armpits, and thighs. ▪ Sponge off the bare skin with cool water or rubbing alcohol, if available. ▪ The main objective is to cool without chilling the victim. ▪ Give no stimulants or hot drinks. ▪ Since heat stroke is a severe medical condition requiring professional medical attention, emergency medical help should be summoned immediately to provide onsite treatment of the victim and proper transport to a medical facility.

4.5.5.2 Work-Rest Schedule

The prevention of heat stress is best performed through observation of employees and routine heat stress awareness training activities. However, it is also necessary to implement a work routine that incorporates adequate rest periods to allow workers to remove protective clothing, drink fluids, rest and recover. The frequency and length of the work breaks must be determined by the SSO and following guidelines can be used:

- Wet Bulb Globe Thermometer Method – it is the preferred method, or
- Adjusted Temperature Method – provided in SH&E SOP S3NA – 511-PR, Heat Stress Prevention.

4.5.5.3 Solar Protection

To protect against exposure to solar radiation, workers will observe the following requirements:

1. All workers will wear sunglass-type safety glasses at all times when working outdoors during daylight hours.
2. Workers will utilize a commercial sun block with a minimum solar protection factor (SPF) of 30.

4.5.6 Illumination

All work will be conducted during daylight hours. Areas accessible to employees shall be illuminated to not less than the minimum illumination intensity requirements specified in 8 CCR, §5192(m), while any work is in progress. For general work areas, the minimum illumination intensity shall consist of 5 foot candles.

4.6 CLIENT SPECIFIC SAFETY REQUIREMENTS

All work shall follow the Port's "Terminal Safety Guidelines" (Attachment C).

4.7 STOP WORK AUTHORITY

All employees have the right and duty to stop work when conditions are unsafe, and to assist in correcting these conditions. Whenever the SSO determines that workplace conditions present an uncontrolled risk of injury or illness to employees, immediate resolution with the appropriate supervisor shall be sought. Should the supervisor be unable or unwilling to correct the unsafe conditions, the SSO is authorized and required to stop work, which shall be immediately binding on all affected AECOM employees and subcontractors.

Upon issuing the stop work order, the SSO shall implement corrective actions so that operations may be safely resumed. Resumption of safe operations is the primary objective; however, operations shall not resume until the Safety Professional has concurred that workplace conditions meet acceptable safety standards.

4.8 INJURY REPORTING

All accidents and incidents that occur on-site during any field activity will be promptly reported to the SSO and the immediate supervisor.

If any AECOM employee is injured and/or requires medical treatment including First Aid, the Site Supervisor will report the incident in accordance with AECOM's incident reporting procedures to include contacting the AECOM Incident Reporting Line at 1-800-348-5046. A copy of the final Supervisor's Report of Incident (SRI) will be provided to the SH&E Professional before the end of the following shift.

If any employee of a subcontractor is injured, documentation of the incident will be accomplished in accordance with the subcontractor's procedures; however, copies of all documentation (which at a minimum must include the OSHA Form 301 or equivalent) must be provided to the SH&E Progressoinal within 24 hours after the incident has occurred.

5.0 HAZARD ASSESSMENT

5.1 TASK HAZARD ANALYSIS

Task hazard analysis (THA) is a technique used to identify hazards and hazard controls associated with a specific job function. THAs focus on the relationship between the workers, task, resources required to complete the task, and work environment. These variables must be evaluated to identify the potential hazards associated with the task. Once identified, steps can be taken to eliminate, reduce, or control the hazards to an acceptable risk level.

Section 2.2 describes the work activities anticipated to be performed during this project. Individual THAs for the tasks associated with this work can be found in Attachment A and the Safety, Health and Environmental Standard Operating Procedures are located in Attachment B.

5.1.1 Unanticipated Work Activities/Conditions

Where work activities are identified which are not addressed in this HASP, appropriate safety documentation and procedures will be implemented. Prior to initiation of work activities any subcontractor organization tasked with performance of such work will submit a work procedure document, which presents appropriate safety procedures applicable to the specific work activities to be undertaken. Submitted safety procedures will be reviewed by the SH&E for adequacy and compliance with applicable regulatory requirements and the requirements presented in this HASP. Work will not be initiated until this review is completed and any identified deficiencies corrected to the satisfaction of the SH&E.

5.2 SUSPECTED ENVIRONMENTAL CONTAMINANT EXPOSURE HAZARDS

The following is a discussion of the potential chemical hazards that could impact workers during this project. Hazards associated with chemical products brought to the site during work operations are addressed separately, under the Hazard Communication Program described in Section 4.3.

5.2.1 Lead

Lead may are present in the soil. As a group, heavy metals are toxic to a number of organs and organ systems in the body, including the liver, kidneys, blood-forming organs (primarily located in the bones), and the CNS (especially lead). Acute exposure to metals can produce symptoms, such as stomach distress and vomiting, mental confusion and sluggishness, heart palpitations, breathing difficulties, and renal (kidney) failure. Chronic exposure can be characterized by CNS degradation and deterioration of liver and kidney function. The Cal-OSHA PEL and ACGIH TLV-TWA for the lead is 0.05 milligrams per cubic meter (mg/m^3) of air.

5.2.2 Petroleum Hydrocarbon Compounds (TPH)

Petroleum hydrocarbon fuels (i.e., gasoline and diesel fuel) are produced by refining various crude oil fractions. Because refining is primarily a distillation process, all petroleum fuels contain a mixture of hydrocarbon compounds (primarily in the aliphatic and aromatic families), additives, and agents introduced in final blending to improve performance, clean and lubricate engine components, and reduce emissions.

Petroleum hydrocarbon fuels are complex mixtures of hydrocarbons and additives, used primarily as a motor fuel. Gasoline, which possesses a moderate to high vapor pressure and a lower explosive limit of 1.1 percent concentration in air, can present a significant and fire/explosion hazard in enclosed spaces (where airborne concentrations may accumulate). Diesel fuel possesses a much lower vapor pressure than gasoline, and does not produce an explosive mixture in air unless heated.

Chronic exposures or exposures to a high concentration of petroleum fuel vapor (gasoline) may cause unconsciousness, coma, and possible death from respiratory failure. Exposure to low concentrations may produce flushing of the face, slurred speech, and mental confusion. Fuels are also irritating to the skin, and may cause drying and dermatitis as a result of prolonged contact.

Both the Cal-OSHA[1] permissible exposure limit (PEL) and the threshold limit value-time-weighted average concentration (TLV-TWA) established by the American Conference of Governmental Industrial Hygienists (ACGIH) for gasoline are 300 parts per million (ppm). The TLV-TWA for diesel fuel vapors established by the ACGIH is 15 ppm. . Control of inhalation exposure to fuels (and their various constituents and additives) can be accomplished through the use of engineering controls and air purifying respirators equipped with organic vapor cartridges. The use of skin protection (chemically-protective gloves, etc.) is required when handling fuel-contaminated materials.

Motor oils are composed of higher molecular weight carbon chain molecules, and present properties (e.g., low vapor pressure) similar to hydraulic fluids. As with hydraulic fluids, waste oils possess no significant vapor hazard; exposure hazards are limited to skin contact. Irritation of the skin can be prevented through the use of chemically protective clothing and gloves. Waste oils, primarily waste motor oils, may also be contaminated by a variety of heavy metals as a result of use.

5.2.3 Assessment of Hazards

There is the potential for occupational exposure to occur through one direct route (skin contact) and two indirect routes (ingestion and inhalation).

Inhalation - The method of direct push drilling produces very little potential for exposure to volatile chemicals in soil because of the limited drill cuttings produced. Inhalation is considered to be a potential route of exposure to site contaminants.

Skin Contact - Contact with contaminated materials is most likely during drilling and handling/collecting environmental samples. However, protection against skin contact can be accomplished through the use of proper PPE such as protective gloves/clothing (see SH&E SOP S3NA-208-PR, Personal Protective Program).

Ingestion - Contact with contaminated materials is possible during drilling and handling/collecting environmental samples. However, protection against exposure via ingestion can be accomplished by proper hygiene and performance of proper decontamination procedures when exiting contaminated work areas.

5.3 VAPOR AND DUST SUPPRESSION

In the event work activities create excessive vapor or dust levels (based on monitoring program action levels or worker comfort), the SSO will implement appropriate mitigation measures. If mitigation measures are found to be inadequate, the SSO will stop on-site operations until effective control can be achieved. The action level will be based on visual acuity and therefore, work will cease in the event that airborne dust is observed to be present within a distance of five (5) feet from the employee.

5.4 EXPLOSIVE HAZARDS

Some investigation activities increase the potential release of elevated concentrations of volatile organic compounds. Explosive concentrations of these constituents could develop. To the extent practicable, intrinsically-safe or spark-resistant equipment will be used; and appropriate air monitoring for flammable environments will be permformed.

[1] Cal-OSHA refers to the California Department of Industrial Relations, Division of Occupational Safety and Health

6.0 ACTIVITY SPECIFIC REQUIREMENTS

6.1 SUPPLEMENTAL SAFETY PROCEDURES

As discussed in Section 5.0, personnel may be exposed to a variety of chemical, physical, radiological and biological hazards. The requirements for the control of many of these hazards these hazards are discussed in Standard Operating Procedures found in the SH&E Manual.

Specific procedures applicable to this project include:

- SH&E SOP S3NA – 302-PR —*Electrical General*
- SH&E SOP S3NA – 305-PR —*Hand and Power Tools*
- SH&E SOP S3NA - 308-PR, - *Manual Lifting, Field*
- SH&E SOP S3NA – 309-PR --*Mobile or Heavy Equipment*
- SH&E SOP S3NA – 313-PR —*Wildlife Plants and Insects*
- SH&E SOP S3NA – 405-PR —*Drilling, Boring and Direct Push Probing*
- SH&E SOP S3NA – 417-PR —*Utilities Underground*
- SH&E SOP S3NA – 511-PR —*Heat Stress Prevention*

In addition, the following supplemental procedures highlight specific hazards for the work to be performed during the project. SH&E and supplemental procedures are specified on a task-specific basis in the individual THAs found in Attachment A.

6.1.1 Slips, Trips, Falls and Protruding Objects

A variety of conditions may exist that may result in injury from slips, trips, falls, and protruding objects. Slips and trips may occur as a result of wet, slippery, or uneven walking surfaces. To prevent injuries from slips and trips, always keep work areas clean; keep walkways free of objects and debris; and report/clean up liquid spills. Serious injuries may occur as a result of falls from elevated heights. Always wear fall protection while working at heights of 6 feet or greater above the next lower level. Protruding objects are any object that extends into the path of travel or working area that may cause injury when contacted by personnel. Always be aware of protruding objects and when feasible remove or label the protruding object with an appropriate warning.

6.1.2 Hazardous Noise Environments

Working around drill rigs and other heavy equipment often creates excessive noise. The effects of noise can include physical damage to the ear, pain, and temporary and/or permanent hearing loss. Workers can also be startled, annoyed, or distracted by noise during critical activities.

AECOM has compiled noise monitoring data that indicates that work locations within 25 feet of operating heavy equipment (e.g., drill rigs, earthworking equipment) can result in exposure to hazardous levels of noise (levels greater than 90 dBA). Accordingly, all personnel are required to use hearing protection (earplugs or earmuffs) within 25 feet of any operating piece of heavy equipment.

The District Safety Professional may also monitor employee exposure to hazardous noise levels to determine compliance with AECOM Safety Procedure SH&E S3NA – 510-PR, *Hearing Conservation Program*.

6.1.3 Manual Lifting Guidelines

Most materials associated with investigation and remedial activities are moved by hand. The human body is subject to severe damage in the forms of back injury, muscle strains, and hernia if caution is not observed in the handling process. Whenever possible, use at least two people to lift, or roll/lift with your arms as close to the body as possible. Additional safe work procedures are contained in SH&E SOP S3NA-308-PR, *Manual Lifting, Field*

6.1.4 Drilling and Boring

Heavy equipment operations using drill rigs produce hazardous noise. Protection will be provided through the use of hearing protection such as ear plugs or ear muffs or a combination of the two. In addition to noise exposure, the operations of drill rigs present physical hazards if the equipment is not in good working order. Therefore, a *Machinery and Mechanized Equipment Certification Form* will be completed prior to the start of work. The driller will identify the emergency shut off for the drill rig to all personnel on site during the daily tailgate meeting. The driller/operator personnel will inspect each drill rig on a daily basis to ensure that it is working properly and safely and a Drill Rig Inspection Form will be completed daily. AECOM personnel should ensure that this was done daily and recorded. To maintain visibility, all personnel at the site will wear traffic safety vests. Drilling and boring activities (including concrete saw) will be conducted by proper hand or powered tools and in accordance with procedures specified in SH&E SOP S3NA – 405-PR – *Drilling, Boring, and Direct Push Probing*.

6.1.5 Biological Hazards

The site is close to Oakland outer Harbor. All personnel will conduct field activities in accordance with SH&E SOP S3NA – 313-PR, *Wildlife Plants and Insects* included in Attachment B.

6.1.5.1 Bees

Bees are found throughout the world except at the highest altitudes, in polar regions, and on some small oceanic islands. Bees range in size from tiny species only 2 millimeters (0.08 inch) in length to rather large insects up to 4 centimeters (1.6 inches) long. Many bees are black or gray, but others are bright yellow, red, or metallic green or blue. Specifically, in the United States the European Honey Bee, the Bumble Bee, and the Africanized Honey Bee are endemic. Bee venom is a water-clear liquid with a sharp, bitter taste and a distinct acid reaction. The three toxic effects of bee venom are: neurotoxic (paralysis of the nervous system), hemorrhagic (increase in the permeability of the blood capillaries), and hemolytic (destruction of red blood cells). Typical systemic symptoms include difficulty in swallowing and breathing, variable heart rate and pulse, flushing of the skin or hives, abdominal cramps and nausea, sense of panic and doom, collapse, and unconsciousness. However, a small number of highly allergic individuals are susceptible to a life-threatening allergic reaction known as *anaphylaxis*. Symptoms include: a tingling or burning sensation on the skin, particularly extremities like fingers, hives over large areas of the body, breathing difficulties and swelling of the throat, severe drop in blood pressure, and lethargic motor skills. Currently, the only effective treatment for *anaphylaxis* is an intramuscular injection of epinephrine, a hormone the body produces naturally in the adrenal glands. Epinephrine counteracts the symptoms of *anaphylaxis* by constricting the blood vessels and opening the airways. In general, bees are not as aggressive as wasps and hornets, and will usually only attack if their nests are seen to be under threat.

6.1.5.2 Wasps

Wasps are members of the order *Hymenoptera* (skin wings) and come in many types and sizes. Common wasps belong to the families *Vespidae* and *Sphecidae*. The family *Vespidae* has seven subfamilies in North America, containing many common wasp species like yellow jackets and hornets. All female stinging wasps can defend themselves and their nests by using their ovipositor to inject venom. Males do not have a stinger. No species will attack a human except in defense. If the colonies of some yellow jacket and hornet species are disturbed, they may respond by releasing more than 100 defending wasps, each capable of delivering several stings. The nests of these species should be left alone or removed professionally, if they are considered a nuisance. Wasp venom contains factors that release histamine, which dissolves red blood cells. Most people can survive many stings, responding with only temporary pain and swelling, but to hyperallergic individuals (about 1 percent of the population) a wasp sting can be fatal.

6.1.5.3 Spiders

Spiders in the United States are generally harmless, with two notable exceptions: the Black Widow spider and the Brown Recluse or Violin Spider. The symptoms of a spider bite include slight local reaction or severe pain produced by nerve toxin, profuse sweating, nausea, and painful cramps in the abdominal muscles.

Field personnel should use extreme caution when lifting manhole covers, investigating sumps, or inspecting or collecting samples from groundwater monitoring wells because spiders are typically found in dark areas. If bitten by a spider, provide first aid and notify the SSO.

If the victim has a history of allergic reactions to insect bites or is subject to attacks of hay fever or asthma, or if he/she is not promptly relieved of symptoms, get help or take the victim immediately to the nearest location where medical treatment is available. In a highly sensitive person, do not wait for symptoms to appear since delay may be fatal.

Personnel are encouraged to wear heavy work gloves (i.e., leather gloves), and to use a stick and an explosion proof flashlight to look into areas where visibility is low (i.e., monitoring well or confined space) prior to personnel reaching or bodily entering into these dim or dark areas.

7.0 CHEMICAL EXPOSURE MONITORING

Workplace monitoring must be sufficient to properly characterize employee exposures and provide knowledge of work site conditions in enough detail to determine PPE requirements as work progresses. Air monitoring instrumentation is presented in Table 7-1. Required monitoring procedures, frequency, and locations are specified in Table 7-2, along with response actions based upon monitoring results. In addition, this exposure monitoring is described in each THA presented in Attachment A.

7.1 WORK AREA MONITORING

The SSO will ensure that the work area is routinely evaluated in order to verify that anticipated site contaminants are not encountered at shallow soil depths. Should site conditions change or personnel observe any unusual odors, the SSO will immediately implement the requirements of this section and other applicable requirements.

In general, monitoring will be used to detect emissions of airborne contaminants as close to the source as practical to give maximum warning of an exposure. Monitoring worker breathing zone concentrations of site contaminants will be conducted to document exposures. The specified respiratory protection will be based on required response actions outlined in Table 7-2.

Table 7-1: Air Contaminant Monitoring Instrumentation

Instrument	Manufacturer/Model	Substances Detected
Photoionization Detector (PID) (Required)	RAE Systems Mini-RAE PID/or Multi-RAE (use of Multi-RAE will also satisfy requirement for a multi-gas detector)	Combustible and easily ionizable vapors and gases, such as compounds containing double bonds and aromatic compounds Used in conjunction with Dräeger tubes to monitor for benzene.
Multi-gas Detector (Required)	ISC TMX-410 *or* GasTech GX-91 *or* Multi-RAE (use of a Multi-RAE will also satisfy requirement for PID)	Oxygen, %LEL (combustible and flammable vapors and gases), hydrogen sulfide, and methane

Notes:

% = percent
LEL = lower explosive limit

Table 7-2: Monitoring Program Action Levels

Parameter	Location and Interval	Response Level (Above Background)	Response
VOCs (Total by PID)	**Breathing Zone, every 15 minutes during intrusive activities**	< 5 ppmv	Continue work in required PPE and continue monitoring. Monitor for benzene.
		5 – 15 ppmv (Sustained for more than 5 minutes)	Continue work in required PPE and continue monitoring.
		15 – 50 ppmv (Sustained for more than 5 minutes)	Contact the SSO, implement mitigation measures, and upgrade PPE to Level C (organic vapor cartridge) and and continue monitoring.
		> 50 ppmv (Sustained for more than 5 minutes)	Cease work, exit, and contact the SSO.

Notes:

> = greater than
< = less than
PID = photoionization detector
PPE = personal protective equipment
SSO = site safety officer
VOC = volatile organic compound

7.1.2 Personal Sampling

Measurement of employee exposure to chemical contaminants will be performed at the discretion of the SSO and under the guidance of the District Safety Professional. Monitoring techniques will also be determined by the District Safety Professional, and, whenever possible, will conform with applicable OSHA and NIOSH sampling methods. Samples will be collected by, or under the direction of, the District Safety Professional. .

8.0 PERSONAL PROTECTIVE EQUIPMENT

Proper selection of PPE depends upon a number of factors. The tasks to be performed and the probability of exposure to the substance must also be considered when specifying protective clothing. Once the specific hazard has been identified, appropriate clothing can be selected. The protection level assigned at this site must match the hazard confronted. Protective clothing ranges from safety glasses, hard hats, and safety shoes, to respiratory protection.

This section describes the required types and uses of PPE associated with the performance of the anticipated site activities. The specific PPE to be donned per the required task is described in the individual task hazard analysis contained in Attachment A.

8.1 SUPPLEMENTAL PPE

Depending on the specific work task, additional use of supplemental forms of PPE may be warranted. It will be the responsibility of each organization performing work activities at the site to provide the above described PPE to its employees prior to the start of work activities. Unless specific contractual obligations are required, AECOM will not provide PPE to non-AECOM employees at any time.

8.2 MINIMUM PPE DESIGN REQUIREMENTS

This section presents the minimum performance and construction specifications for the various types of PPE required by this document. The Task Hazard Analyses contain the specific PPE requirements by task. Where possible, references to specific standards or regulations have been made; however, AECOM reserves the right to approve/disapprove any form or type of PPE used at AECOM controlled work areas/projects. AECOM also reserves the right to request that any form of PPE used at the project site be replaced if AECOM determines that the particular piece of PPE is not designed or operable in a manner consistent with AECOM policies: SH&E SOP S3NA-208-PR, *Personal Protective Equipment Program.*

8.3 HEAD PROTECTION

Hard hats are mandatory when working on the project site to provide head protection. Hard hats will meet the requirements of American National Standards Institute (ANSI) Z87.1-1981 as indicated by the manufacturer's label. Ear protection and face shields may be attached to hard hats.

8.3.1 Eye Protection

Eye protection will be worn inside the work zones at all times. Subcontractor employees who do not have suitable eye protection will have an appropriate type of eye protection provided to them by their respective employer(s).

Eye protection will meet the requirements of ANSI Z87.1-1989 (as indicated by the manufacturer's mark on the lens) and the following minimum requirements:

- Provide adequate protection against the particular hazards for which they are designed
- Be reasonably comfortable when worn under the designated conditions
- Fit snugly and not unduly interfere with the wearer's movements
- Be durable
- Be easily cleaned and sanitized

Contact lenses do not provide adequate eye protection. Contact lens wearers must use the same additional eye protection as non-lens wearers. Contact lenses may be worn under full-face respirators, but are generally not acceptable with half-mask respirators.

Persons whose vision requires correction and are required to wear eye protection may wear goggles or spectacles of one of the following types:

- Spectacles whose protective lenses provide optical correction

- Goggles that can be worn over corrective spectacles without disturbing the adjustment of the spectacles
- Goggles that incorporate corrective lenses mounted behind the protective lenses

Where there is no potential for high velocity impact hazards associated with the activities, the use of sunglasses is permitted at the work sites. Sunglasses are appropriate for such activities as site reconnaissance, surveying, etc., when no other activities nearby create eye hazards.

8.3.2 Ear Protection

Appropriate hearing protection, including ear plugs, canal caps, and ear muffs, will be used at all times where diesel or gasoline powered equipment is operated and when treatment system equipment is operating. Hearing protection devices shall contain a minimum noise reduction rating of 25 decibels (A-weighting).

8.3.3 Foot Protection

Site workers will wear appropriate foot protection while working on site, which will consist of leather or water- and chemical-resistant boots with safety toes. Footwear worn during the project shall meet the following criteria:

(a) Footwear which is defective or inappropriate to the extent that its ordinary use creates the possibility of foot injuries shall not be worn.
(b) 1) Protective footwear for employees purchased after January 26, 2007 shall meet the requirements and specifications in American Society for Testing and Materials (ASTM) F 2412-05, Standard Test Methods for Foot Protection and ASTM F 2413-05, Standard Specification for Performance Requirements for Foot Protection which are hereby incorporated by reference.
2) Protective footwear purchased on or before January 26, 2007 shall meet the requirements of either the American National Standard for Personal Protection -Protective Footwear, American National Standards Institute (ANSI) Z41-1999, or the American Society for Testing and Materials (ASTM) F2412-05, Standard Test Methods for Foot Protection and ASTM F 2413-05, Standard Specification for Performance Requirements for Foot Protection which are hereby incorporated by reference.

8.3.4 Hand Protection

Site workers will use appropriate hand protection when exposed to hazards that could cause injury to the hands.

8.3.5 Body Protection

Protective clothing and body protection is selected on the basis of the tasks to be performed and the hazards, both chemical and physical, to which the worker may be exposed. For all work areas, including the "clean" support and administrative areas, appropriate work clothing will be worn that at least covers from the knees to shoulders. Tank and halter tops are not appropriate. Bathing suits, shorts, and cut-off pants are not appropriate.

8.4 HAZARDOUS WASTE SITE ACTIVITY PPE

In response to the challenges presented by site contaminants, specific PPE ensembles have been developed. The designated levels of protection are, in increasing complexity: Level D, Modified Level D, Level C, Level B, and Level A. These ensembles provide increasing levels of protection against chemical hazards, as defined primarily by the level of respiratory protection provided and secondarily by the level of skin protection. General specifications for each ensemble are listed below, but specific equipment may vary depending on specific conditions and/or manufacturers' brands available.

8.4.1 Level D PPE

The Level D ensemble provides minimal levels of skin protection (primarily against physical rather than chemical hazards), and no respiratory protection. Level D PPE will be considered to be the minimum work uniform at all times during the performance of site activities that may involve potential exposures to site contaminants or entrance into controlled work areas.

8.4.1.1 Level D Equipment List

Level D Equipment List includes:

- Hard hat

- Safety glasses/faceshield
- Safety-toe work boots
- Hearing protection (as required)
- Appropriate reflective traffic safety vest
- Full-face air purifying respirator (available for emergency use)

8.4.2 Level C PPE

The Level C ensemble provides considerable skin protection against chemical contact, and moderate respiratory protection.

8.4.2.1 Level C Equipment List

Level C Equipment List includes:

- Full-face air-purifying respirator equipped with organic vapor/acid gas/high-efficiency particulate air cartridges
- Chemical-resistant disposable outer coveralls (e.g., Tyvek® or polyethylene-coated Tyvek® coveralls)
- Chemical-resistant (e.g., nitrile or Silver Shield®) outer glove (taped to outer coveralls)
- Chemical-resistant (e.g., nitrile) inner gloves
- Butyl apron (optional, for use where splash potential is high)
- Hard hat
- Chemical resistant safety-toe boots (taped to coveralls)
- Hearing protection (as required)
- Self-contained breathing apparatus (available for emergency use)

8.4.3 Level B PPE

The need for the use of Level B protective equipment during site activities is considered to be highly unlikely. Should on-site monitoring indicate that Level B PPE is inadequate; the District Safety Professional will be contacted for further guidance. All work will be halted until the District Safety Professional has prepared supplemental Health and Safety requirements for increased engineering or contaminant exposure controls.

8.4.4 Level A PPE

Level A PPE will not be used during the course of site activities and is therefore not specified in this document.

8.5 DECONTAMINATION ACTIVITIES

The following decontamination procedures outline the physical removal and/or neutralization of contaminants that adhere to equipment and personnel. These procedures are designed to prevent cross-contamination of samples and contaminant migration to clean areas. All possible and necessary steps shall be taken to reduce or minimize contact with chemicals and contaminated/impacted materials while performing field activities (e.g., avoid sitting or leaning on, walking through, dragging equipment over, tracking, or splashing potential or known contaminated/impacted materials, etc).

Before entering the site with equipment, decontamination station(s) will be setup in the CRZ and all equipment will be cleaned to remove grease, oil, encrusted dirt, or other potential contaminants. All personnel performing decontamination will wear appropriate PPE for the potential chemicals of concern for the individual site locations. All personal decontamination activities shall be performed with an attendant (buddy) to provide assistance to personnel that are performing decontamination activities. All persons and equipment exiting the EZ shall be considered contaminated, and thus, must be properly decontaminated prior to entering the Support Zone. The location of the decontamination area should be selected based on the ability to control access to the area, the ability to control residual material removed from equipment, the need to store clean equipment, and the ability to restrict access to the area being investigated.

Decontamination procedures may vary based on site conditions and nature of the contaminant(s). Equipment to be decontaminated at the conclusion of field work includes tools, monitoring equipment, sampling equipment and containers, trucks and rigs, and the decontamination equipment. If chemicals or decontamination solutions are used, care should be taken to minimize reactions between the solutions and contaminated materials. In addition, personnel must assess the potential exposures created by the decontamination chemical(s) or solutions. The applicable MSDS must be reviewed, implemented, and filed by personnel contacting the chemicals/solutions.

All contaminated PPE and decontamination materials shall be contained, stored, and disposed of in accordance with site-specific requirements determined by site management.

9.0 EMERGENCY RESPONSE PLANNING

9.1 EMERGENCY ACTION PLAN

Although the potential for an emergency to occur is remote, contingency planning has been accomplished should such situations arise. S3NA-203-PR, *Emergency Response Planning, Field*, lists the general requirements. Types of emergencies, which could occur include:

- Medical Emergency (all injuries, including chemical exposure); and
- Fire, earthquake, etc.

9.2 RESPONSIBILITIES

9.2.1 Field Manager/Site Safety Officer

The FM/SSO will be the primary contact and coordinator of all emergency activities. The FM/SSO will be responsible for:

- Evaluating the severity of the emergency,
- Implementing the appropriate response action,
- Establish the emergency assembly areas,
- Summoning appropriate emergency services (e.g., fire department, police, or ambulance), and
- Notifying all site personnel, the DSP, and concerned authorities of the emergency situation.

9.2.2 Other Onsite Personnel

Field personnel are required to inform the SSO of all emergency situations and to abide by their issued response actions. Special medical problems of field personnel, such as allergies to insects, plants, or prescription medication, will be reported to the SSO.

9.3 EMERGENCY EQUIPMENT

Provisions will be made to have appropriate emergency equipment available and in proper working condition.

9.3.1 First Aid Kits

Each work site shall have a first-aid kit meeting the following requirements:

- First-aid kits in weather-proof containers, approved by AECOM's Occupational Physician and meeting all regulatory requirements, shall be present at all locations where AECOM employees will be working.
- Whenever a new first-aid kit is assembled, a new Inventory List/Physician's Authorization Certificate shall be placed in the first-aid kit as part of its inventory.
- First-aid kits shall be available at the job site at all times.
- Use of any item from the first-aid kit shall necessitate completion of an Accident/Injury Report. The report shall be submitted to the Health and Safety Department within 1 working day.
- For local field services work, first-aid kits shall be returned to the storeroom at the end of each workday.
- First-aid kits shall be inspected and restocked weekly. An inventory of first-aid supplies sufficient to restock kits on a weekly basis shall be maintained.
- For jobs outside the local area, the site supervisors shall replenish the kit from the nearest pharmaceutical source, with equivalent supplies to those used (until proper restocking by the storeroom can be accomplished), unless such supplies can economically be made available to the job from the storeroom.
- Personnel permitted to use first-aid kits shall possess a current first-aid card.

9.3.2 Eyewash Units

Eyewash units meeting the requirements of American National Standards Institute (ANSI) Standard Z358.1-1990 will be maintained at each work site. All units will also comply with the provisions of 8 CCR δ5162, and will be capable of supplying hands-free irrigation for both eyes for at least 15 minutes at a flow rate of at least 0.4 gallons per minute.

Subcontractors performing work at the site, and whose work activities will involve the handling of any potentially hazardous or irritating chemical product which may present a splash hazard, will maintain their own units for each work team which meet the above performance requirements.

9.3.3 Fire Extinguishers

Fire extinguishers carrying a minimum rating of 1-A,10-B,C will be available for use at each work location. Personnel will be readily aware of the location of the nearest fire extinguisher at all times in the event of an incident where a fire extinguisher may be utilized.

Each fire extinguisher will be inspected monthly to ensure that it is present, and in proper working order. Annually, each fire extinguisher will be provided with a complete function and maintenance check by an agency qualified to provide this service.

9.4 RESPONSE ACTIONS—MEDICAL EMERGENCIES

A medical emergency is a situation that presents a significant threat to the health of personnel onsite. Chemical exposure, heat stress, cold stress, and poisonous insect bites can cause medical emergencies. Proper care must be initiated immediately. Proper care may be in the form of first aid treatment or emergency hospitalization.

Response personnel will accompany victims to the medical facility, whenever possible, to advice on decontamination. Table 9-1 provides response instructions for various medical emergencies.

Table 9-1: How to Respond to Medical Emergencies

EMERGENCY	RESPONSE
Inhalation	1. Call for medical assistance. 2. Workers wearing proper respiratory protective equipment should remove the victim from the contaminated atmosphere. 3. Voluntary basis only: If the victim is not breathing, administer mouth-to-mouth resuscitation or CPR immediately.
Eye Contact	1. Do not rub eyes. 2. Flood eyes with emergency eyewash solution. Hold the eye open and flood so that all surfaces are thoroughly washed. 3. Continue washing for 15 minutes while calling for medical assistance.
Skin Exposure	1. Wash skin with soap and water for a minimum of 15 minutes. All contaminated areas on the body, including hair, should be thoroughly decontaminated. 2. If clothing is contaminated, it should be removed in a way to minimize further contact with the substance. 3. Seek medical assistance.
Heat Stress	1. Remove excess clothing. 2. Pour water on the victim. 3. If the victim is conscious, offer water. 4. Seek medical assistance.

9.4.1 Medical Assistance

The FM or SSO will keep on site the list of emergency telephone numbers and locations of the local fire department, hospitals, ambulance service, and other emergency services (see Table 9-2).

In the event of severe injury, transport personnel to the designated hospital. The address and phone number of that hospital is:

Alameda Hospital
2070 Clinton Ave
Alameda, CA
(510) 522-3700

Hospital Route:

1. Head west on 7th Street toward Middle Harbor Road - 0.3 mi
2: Continue onto Middle Harbor Road – 2.2 mi
3: Continue onto Adeline Street – 0.2 mi
4: Turn right onto 7th Street – 1.0 mi
5: Turn right onto Webster Street – 223 feet
6. Keep right at the fork – 69 feet
7. Continue onto CA-260 S /Webster St Tube – 1.9 mi
8. Turn left onto Central Ave – 0.7 mi
9. Slight right onto Encinal Ave – 0.6 mi
10. Turn right onto Lafayette Street – 0.2 mi
11. Take the 2nd left onto Clinton Ave – 0.2mi

Will take approximately 17 minutes to get to hospital from the site (~7.3 miles)

Figure 9-1: Hospital Route/Detail Map

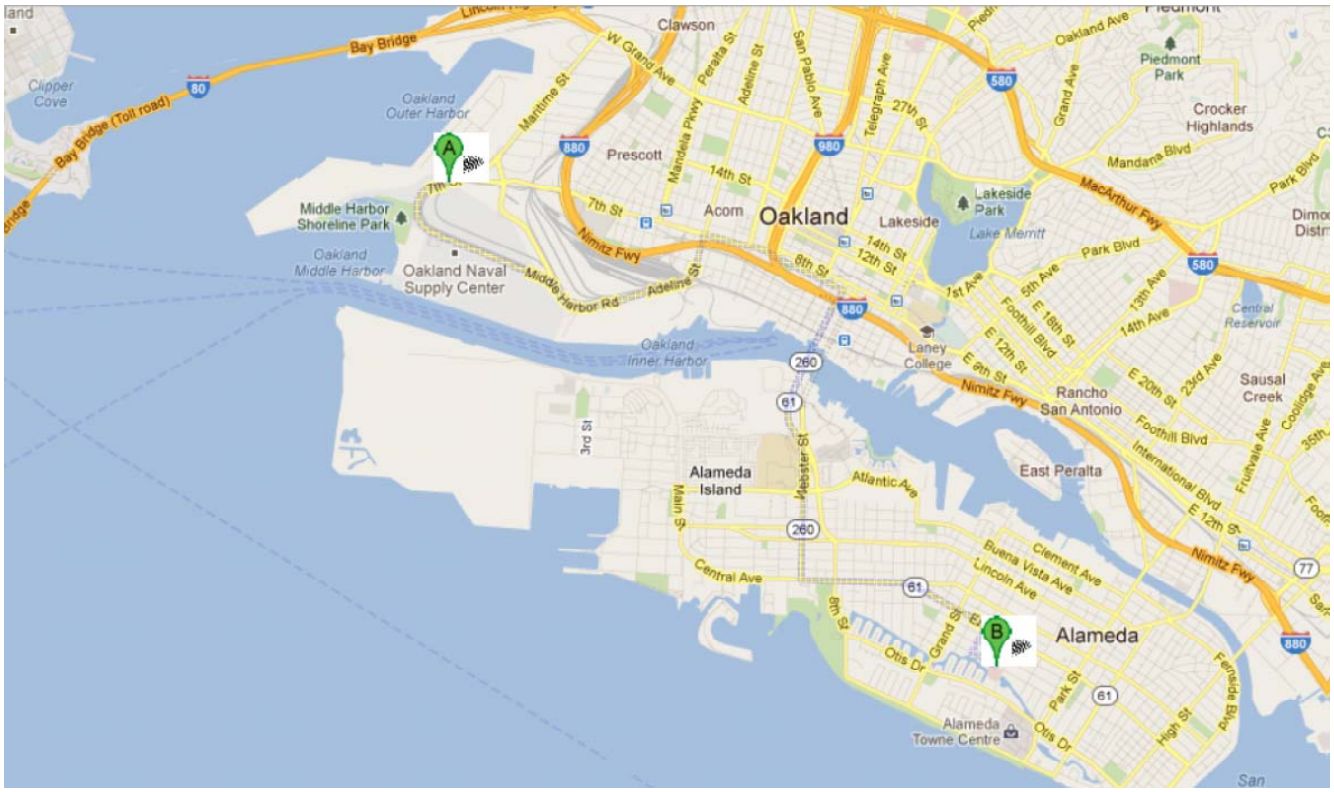

Table 9-2: Emergency Contacts

Fire Department:	
Local Fire Department	911
AECOM Incident Reporting line	**800-348-5046**
Medical Care:	
Alameda Hospital	(510) 522-3700
Ambulance	911
Police:	
Local Police	911
Information and Response Organizations:	
National Response Center (if spill over reportable quantity)	(800) 424-8802
Local Poison Control Center	(800) 222-1222
AECOM Personnel:	
Project Manager, Luis Fraticelli	(510) 879-4531
District Safety Professional, Roman Worobel	(916) 361-6429
Field Manager/Site Safety Officer	TBD

Attachment A

Task Hazard Analyses

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Soil and Groundwater Investigation	Project Number: 60236530	Client: Port of Oakland
	Supervisor: Luis Fraticelli	Project Manager: Luis Fraticelli	Location: 1700 7th Street, Oakland, CA
	THA Developed By: Yurong Han		Date: 12/16/11
TASK HAZARD ANALYSIS	Task Name: Mobilization/Demobilization	Regularity of Task: One-time ☐ Routine ☑	

	Job Event Sequence (List the major steps of the individual task)	Hazards (List primary hazards)	Hazard Classification (before controls) Severity	Likelihood	Risk Level	Hazard Classification	Controls (List controls that AECOM will implement)
1	Pre-trip Planning	Traffic delays, weather	2	2	4	Low	Plan your route, research construction delays, weather impacts
2	Comnplete Vehicle Inspection	Unserviceable vehicles	2	3	6	Medium	Inspect vehicle for deficiencies, report and correct prior to use
3	Safety Equipment	Unsecured driver or passenger	3	3	9	Medium	Always use seatbelts while vehicle is in motion, lock doors.
4	Backing	blind spots; unseen objects	4	3	12	Medium	Always use a spotter when backing, check mirrors and over shoulder
5	Driving	Rough road surface (potholes), blind spots,	4	3	12	Medium	Keep eyes moving, use mirrors, follow posted signs, avoid distractions
6		traffic, bicyclists, pedestrians, glare, severe			0		Aim high in steering, maintain 15 sec eye lead time
7		weather, snow and ice, flat tire, road rage,			0		Leave yourself an out, maintain cusion around vehicle
8		drowsy			0		Get the big picture; avoid being boxed in, adjust speed to traffic
9					0		Focus on driving, refrain from emotional discussions/NO CELL PHONE
10	Parking	Collision, injury to others	3	4	12	Medium	Park away from other cars, back into space when possible, set brake
11					0		
12	Driving larger trucks/vans	Blind spots; unseen objects; longer stopping	3	4	12	Medium	Driver should be familiar with the vehicle they are driving
13		distance; wider turning radius			0		set side view mirrors to reduce blind spots
14					0		Know the increased turning radius of the vehicle vs a small compact
15					0		
16					0		
17					0		

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix

Likelihood \ Severity	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

Risk Level
Low
Medium
High

Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Soil and Groundwater Investigation	Project Number: 60236530	Client: Port of Oakland
	Supervisor: Luis Fraticelli	Project Manager: Luis Fraticelli	Location: 1700 7th Street, Oakland, CA
	THA Developed By: Yurong Han		Date: 12/16/11

SUMMARY OF CONTROLS	Task Name: Mobilization/Demobilization	Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☐ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☐ CSA/ANSI Safety Glasses or Goggles
- ☐ CSA/ANSI-approved Hard Hat
- ☐ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Prescription Glasses as necessary
- ☑ Sunglasses as necessary
- ☐
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☐ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Defensive Driver Awareness			S3NA-005-PR Vehicle and Driver Safety Program
2 Must be licensed by DMV			S3NA-004-PR Incident Reporting
3 Must be AECOM employee			
4			
5			
6			

Project Manager / Supervisor (signature): Date:

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Soil and Groundwater Investigation	Project Number: 60236530	Client: Port of Oakland
	Supervisor: Luis Fraticelli	Project Manager: Luis Fraticelli	Location: 1700 7th Street, Oakland, CA
	THA Developed By: Yurong Han		Date: 12/16/11
EMERGENCY RESPONSE PLAN	Task Name: Mobilization/Demobilization	Regularity of Task: One-time ☐ Routine ☐	

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
	On-site First Aid Attendant		
	Project Manager		
	Site Supervisor		
	Regional SH&E Manager		
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
	Client Contact		

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
	Police		
	Fire		
	Ambulance		
	Nearest Hospital / Clinic		
	Poison Control Center		
	Pollution / Environmental		

Emergency Equipment & Supplies

- ☐ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☐ Fire Extinguishers Type:
- ☐ Communication Device
- ☐ Vehicle Safety Equipment
- ☐ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Soil and Groundwater Investigation	Project Number: 60236530	Client: Port of Oakland
	Supervisor: Luis Fraticelli	Project Manager: Luis Fraticelli	Location: 1700 7th Street, Oakland, CA
	THA Developed By: Yurong Han		Date: 12/16/11
TASK HAZARD ANALYSIS	Task Name: Site Reconnaissance; Surface Geophysical Surveys	Regularity of Task: One-time ☐	Routine ☑

	Job Event Sequence (List the major steps of the individual task)	Hazards (List primary hazards)	Hazard Classification (before controls) Severity	Likelihood	Risk Level	Hazard Classification	Controls (List controls that AECOM will implement)
1	Walking on level and uneven ground	Slip, Trip, Fall/Personal Injury	3	3	9	Medium	Concentrate on where you are walking; stop to write notes or take photos
2		Sunburn/Heat Stress	3	3	9	Medium	Wear a hat or hardhat with wide brim; use sunscreen with minimum SPF 30; stay hydrated
3			3	3	9	Medium	Wear layers of warm clothing; use windbreaker; stay hydrated
4		Biological (spiders, snakes, insects,	4	2	8	Medium	Be attentive to your surroundings; don't reach into places you cannot see; wear high-top b
5		feral animals)			0		
6		Severe weather	4	2	8	Medium	Be aware of forecasted weather; seek shelter during electrical storms
7	Staking well locations; conducting surveys	Hand and Power Tools	3	3	9	Medium	Wear thick leather gloves to protect hands
8		Manual Lifting	3	3	9	Medium	Seek assistance with heavy loads; use proper posture when toting instruments in
9					0		
10					0		
11					0		
12					0		
13					0		
14					0		
15					0		
16					0		
17					0		

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix

Likelihood \ Severity	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

Risk Level
Low
Medium
High

Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Soil and Groundwater Investigation	Project Number: 60236530	Client: Port of Oakland
	Supervisor: Luis Fraticelli	Project Manager: Luis Fraticelli	Location: 1700 7th Street, Oakland, CA
	THA Developed By: Yurong Han		Date: 12/16/11

SUMMARY OF CONTROLS	Task Name: Site Reconnaissance; Surface Geophysical Surveys	Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Thick Work Gloves when using tools
- ☑ Sunglasses as appropriate
- ☑ Long sleeved shirt and pants
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☐ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 HAZWOPER - 8 hour refresher training	S3NA-305-PR Hand and Power Tools		SOP S3NA-001-PR, Safe Work Standards and Rules
2	S3NA-308-PR Manual Lifting, Field		SOP S3NA-005-PR, Vehicle and Driver Safety Program
3	S3NA-505-PR Cold Stress Prevention		SOP S3NA-203-PR, Emergency Response Planning, Field
4	S3NA-511-PR Heat Stress Prevention		SOP S3NA-313-PR, Wildlife, Plants and Insects
5			S3NA-004-PR Incident Reporting
6			

Acknowledgement / Signatures

Project Manager / Supervisor (signature): Date:

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Soil and Groundwater Investigation	Project Number: 60236530	Client: Port of Oakland
	Supervisor: Luis Fraticelli	Project Manager: Luis Fraticelli	Location: 1700 7th Street, Oakland, CA
	THA Developed By: Yurong Han		Date: 12/16/11
EMERGENCY RESPONSE PLAN	Task Name: Site Reconnaissance; Surface Geophysical Surveys	Regularity of Task: One-time ☐	Routine ☐

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
	On-site First Aid Attendant		
	Project Manager		
	Site Supervisor		
	Regional SH&E Manager		
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
	Client Contact		

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
	Police		
	Fire		
	Ambulance		
	Nearest Hospital / Clinic		
	Poison Control Center		
	Pollution / Environmental		

Emergency Equipment & Supplies

- ☐ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☐ Fire Extinguishers Type:
- ☐ Communication Device
- ☐ Vehicle Safety Equipment
- ☐ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Soil and Groundwater Investigation	Project Number: 60236530	Client: Port of Oakland
	Supervisor: Luis Fraticelli	Project Manager: Luis Fraticelli	Location: 1700 7th Street, Oakland, CA
	THA Developed By: Yurong Han		Date: 12/16/2011
TASK HAZARD ANALYSIS	Task Name: Heavy Equipment and Tool Decontamination		Regularity of Task: One-time ☐ Routine ☑

	Job Event Sequence (List the major steps of the individual task)	Hazards (List primary hazards)	Hazard Classification (before controls) Severity	Likelihood	Risk Level	Hazard Classification	Controls (List controls that AECOM will implement)
1	Remove visible gross contamination in exclusion	contact with contaminants	2	3	6	Medium	wear safety boots, safety glasses, goggles, or faceshield, protective gloves;
2	zone				0		use proper tool for the job (brush, putty knife)
3	Transfer tools to decontamination trailer or pad	manual lifting; forklift	3	3	9	Medium	get assistance when lifting heavy tools (drilling pipe, large-diameter augers);
4					0		stay clear of heavy loads suspended overhead by cable; avoid pinch points;
5					0		use caution walking behind forklift; forklift operator should check behind before
6					0		backing up
7	Remove contaminants from equipment	contact with contaminants	3	3	9	Medium	wear rain gear, faceshield when using pressure washer
8		pressure washer	4	2	8	Medium	Avoid thin stream from small nozzle at close range
9					0		
10		Sunburn/Heat Stress	3	3	9	Medium	Wear a hardhat with wide brim; use sunscreen with minimum SPF 30; stay hydrated
11			3	3	9	Medium	Wear layers of warm clothing; use windbreaker; stay hydrated
12		Biological (spiders, snakes, insects)	4	2	8	Medium	Be attentive to your surroundings; don't reach into places you cannot see; wear high-top boots
13					0		
14					0		
15					0		
16					0		
17					0		

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix

Likelihood \ Severity	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

Risk Level
Low
Medium
High

Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Soil and Groundwater Investigation	Project Number: 60236530	Client: Port of Oakland
	Supervisor: Luis Fraticelli	Project Manager: Luis Fraticelli	Location: 1700 7th Street, Oakland, CA
	THA Developed By: Yurong Han		Date: 12/16/2011

SUMMARY OF CONTROLS

Task Name: Heavy Equipment and Tool Decontamination

Regularity of Task: One-time ☐ Routine ☐

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ gloves (nitrile +/- heavy protective)
- ☑ faceshield
- ☑ rain gear
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☐ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity

Required Training (associated with this THA)

1. HAZWOPER: 40 Hours and annual 8-hr refresher
2.
3.
4.
5.
6.

Key SOPs (associated with this THA)

S3NA-305-PR Hand and Power Tools	S3NA-508-PR Hazardous Materials Handling an
S3NA-307-PR Housekeeping, Worksite	S3NA-511-PR Heat Stress Prevention
S3NA-308-PR Manual Lifting, Field	
S3NA-409-PR Forklifts (operation of)	
S3NA-520-PR Spill Response, Incidental	

Client & Other Requirements

SH&E SOP 613 - Pressure Washers
S3NA-313-PR, Wildlife, Plants and Insects

Acknowledgement / Signatures

Project Manager / Supervisor (signature): Date:

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Soil and Groundwater Investigation	Project Number: 60236530	Client: Port of Oakland
	Supervisor: Luis Fraticelli	Project Manager: Luis Fraticelli	Location: 1700 7th Street, Oakland, CA
	THA Developed By: Yurong Han		Date: 12/16/2011
EMERGENCY RESPONSE PLAN	Task Name: Heavy Equipment and Tool Decontamination	Regularity of Task: One-time ☐ Routine ☐	

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
	On-site First Aid Attendant		
	Project Manager		
	Site Supervisor		
	Regional SH&E Manager		
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
	Client Contact		

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
	Police		
	Fire		
	Ambulance		
	Nearest Hospital / Clinic		
	Poison Control Center		
	Pollution / Environmental		

Emergency Equipment & Supplies

- ☐ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☐ Fire Extinguishers Type:
- ☐ Communication Device
- ☐ Vehicle Safety Equipment
- ☐ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Soil and Groundwater Investigation	Project Number: 60236530	Client: Port of Oakland
	Supervisor: Luis Fraticelli	Project Manager: Luis Fraticelli	Location: 2700 7th Street, Oakland, CA
	THA Developed By: Yurong Han		Date: 12/16/2011
TASK HAZARD ANALYSIS	Task Name: Drilling		Regularity of Task: One-time ☑ Routine ☐

	Job Event Sequence *(List the major steps of the individual task)*	Hazards *(List primary hazards)*	Hazard Classification *(before controls)* Severity	Likelihood	Risk Level	Hazard Classification	Controls *(List controls that AECOM will implement)*
1	Unload supplies	Forklift activities; unsecured loads	4	2	8	Medium	Always check behind forklift before backing up; wear high-visibility safety vest
2					0		when working around forklift; secure loads; always turn off engine and set
3					0		parking brake when done.
4	Drill rig setup	Overhead eletrical lines, heavy equipment,	4	2	8	Medium	Keep adequate distance from electrical lines; wear safety vest around forklift;
5		Forklift activities; unsecured loads			0		avoid walking beneath loads hanging by cable; use proper tools for job.
6	Drilling boreholes,	Noise, energized rotating parts, pinch points,	4	2	8	Medium	Wear ear plugs or muffs; monitor breathing zone for VOCs; wear nitrile inner
7		manual lifting, hand and power tools, dust,			0		and heavy outer gloves; keep distance from rotating parts; use air-powered
8		forklift activities, drum handling, contaminated			0		and hydraulic-powered tools as appropriate; be alert when forklift is in use;
9		soil and water, slips,trips, and falls			0		follow good housekeeping procedures; be alert when heavy loads are
10					0		suspended by cable; wear respirator equipped with cartirdges when pouring silica sa
11					0		cement grout.
12		Sunburn/Heat Stress	3	3	9	Medium	Wear a hat or hardhat with wide brim; use sunscreen with minimum SPF 30; stay hydrated
13			3	3	9	Medium	Wear layers of warm clothing; use windbreaker; stay hydrated
14		Biological (spiders, snakes, insects)	4	2	8	Medium	Be attentive to your surroundings; don't reach into places you cannot see; wear high-top boot
15	IDW management	Drum handling, forklift activities	4	2	8	Medium	Wear heavy gloves when securing drum lids; be alert around forklift; wear
16					0		high-visibility safety vest; set brake and turn forklift engine off when done.
17	Backing up Drill Rig and large support trucks	Blind spots	4	2	8	Medium	Use spotter when backing up

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix

Likelihood \ Severity	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

Risk Level
Low
Medium
High

Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Soil and Groundwater Investigation	Project Number: 60236530	Client: Port of Oakland
	Supervisor: Luis Fraticelli	Project Manager: Luis Fraticelli	Location: 2700 7th Street, Oakland, CA
	THA Developed By: Yurong Han		Date: 12/16/2011
SUMMARY OF CONTROLS	Task Name: Drilling		Regularity of Task: One-time ☑ Routine ☐

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Hearing Protection
- ☑ Nitrile inner gloves
- ☑ nitrile outer gloves
- ☑ respirator equipped with appropriate cartridges
- ☐ Long sleeved shirt and pants
- ☐

Air Monitoring (reference HASP monitoring plan)

☐ No air monitoring required ☑ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity
VOCs by PID	BZ, continuous	5 – 15 ppmv (Sustained for more than 5 minutes)	Continue work in required PPE and continue monitoring.
		15 – 50 ppmv (Sustained for more than 5 minutes)	Contact the SSO and DSP, implement mitigation measures, and upgrade PPE to Level C (organic vapor cartridge) and and continue monitoring.
		> 50 ppmv (Sustained for more than 5 minutes)	Cease work, exit, and contact the SSO and DSP.

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 HAZWOPER 40 Hours and annual 8-hr refresher			Monitor Methane at point of operation. When >10% LEL, cease work, exit the area, and contact the SSO and DSP. S3NA-313-PR, Wildlife, Plants and Insects
2	S3NA-305-PR Hand and Power Tools	S3NA-409-PR Forklifts (operation of)	
3	S3NA-307-PR Housekeeping, Worksite	S3NA-417-PR Utilities, Underground	
4	S3NA-308-PR Manual Lifting, Field	S3NA-511-PR Heat Stress Prevention	
5	S3NA-309-PR Mobile or Heavy Equipment	S3NA-509-PR Hazardous Waste Operations and	
6	S3NA-405-PR Drilling and Boring	S3NA-510-PR Hearing Conservation Program	

Acknowledgement / Signatures

Project Manager / Supervisor (signature): Date:

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Soil and Groundwater Investigation	Project Number: 60236530	Client: Port of Oakland
	Supervisor: Luis Fraticelli	Project Manager: Luis Fraticelli	Location: 2700 7th Street, Oakland, CA
	THA Developed By: Yurong Han		Date: 12/16/2011
EMERGENCY RESPONSE PLAN	Task Name: Drilling	Regularity of Task: One-time ☐ Routine ☐	

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
	On-site First Aid Attendant		
	Project Manager		
	Site Supervisor		
	Regional SH&E Manager		
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
	Client Contact		

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
	Police		
	Fire		
	Ambulance		
	Nearest Hospital / Clinic		
	Poison Control Center		
	Pollution / Environmental		

Emergency Equipment & Supplies

- ☐ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☐ Fire Extinguishers Type:
- ☐ Communication Device
- ☐ Vehicle Safety Equipment
- ☐ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Attachment B

AECOM SH&E

S3NA-001-PR Safe Work Standards and Rules

1.0 Purpose and Scope

1.1 Demonstrates AECOM's commitment to the establishment and maintenance of workplaces free from recognized hazards.

1.2 This procedure applies to all AECOM North America based employees and operations.

2.0 Terms and Definitions

2.1 **Safety Violation:** Not following verbal or written safety policies, rules and procedures (e.g., guidelines, rules, horse play, failure to wear selected PPE, abuse of selected PPE, etc.).

2.2 **Safe Work Practices:** The do's and don'ts about carrying out a task or use of equipment, informing the worker about the hazards present and providing direction on how to safeguard against the hazard. Safe Work Practices are generally guidelines only.

2.3 **Safe Job Procedures:** Written step-by-step set of instructions about completing a specific task safely including control measures and responding to emergency situations.

3.0 References

3.1 AECOM Employee Handbook

4.0 Procedure

4.1 Standard Operating Procedures (SOPs)

4.1.1 Safe Work Practices and Safe Job Procedures are embodied in the SH&E Standard Operating Procedures and are available on AECOM's NA SH&E website.

4.1.2 Specific Safe Work Practices and Safe Job Procedures have been developed in conjunction with employees and with particular input from those who have significant experience.

4.1.3 Standard Operating Procedures have been developed to provide clear instruction regarding the safety and reporting requirements of staff and operations.

4.2 Inspections and Audits

4.2.1 **Project Managers,** supervisors and **Office Managers** shall conduct project audits and office inspections to identify safe work practices and potential safety violations.

4.3 Roles and Responsibilities

4.3.1 All managers and mupervisors are responsible for compliance with all SOP's and governmental requirements, and will be held responsible to prevent or bring any violations to the attention of the appropriate level of Management for corrective actions as per AECOM HR policies.

4.3.2 **District, Office, and Project Managers** (Including field task managers, supervisors) have overall responsibility for implementation of, and compliance with, this procedure.

4.3.3 **Regional SH&E Managers** provide guidance as to safe work standards, rules, requirements and guidelines.

4.3.4 **Human Resource Managers** provide guidance and direction to managers and supervisors implementing the disciplinary process for safety violations (as defined in the Employee Handbook).

4.3.5 **Employees** are responsible for adhering to all AECOM safe work standards, rules, requirements and instructions and to provide input as appropriate.

4.4 Any employee who willfully disregards AECOM or client safety standards, rules or requirements is subject to disciplinary action.

5.0 Records

None.

6.0 Attachments

6.1 S3NA-001-ST Safety Rules

S3NA-002-PR Stop Work Authority for Unsafe Work

1.0 Purpose and Scope

1.1 This procedure establishes the requirements for AECOM personnel to stop work if they believe there is an imminent safety, health, or environmental risk as described below that will affect them, their co-workers, the public, or the environment.

1.2 This procedure applies to all AECOM North America-based employees and operations.

2.0 Terms and Definitions

2.1 **Discrepancy/Deficiency**: An omission or commission, a condition, or a situation that is in conflict with the procedures and requirements of AECOM's SH&E standards.

2.2 **Imminent Danger**: An impending or threatening situation that, if left uncorrected, is likely to result in serious injury, property damage, or environmental impairment.

2.3 **Potentially Dangerous**: Minor violations that present a low potential for serious injury, property damage, or environmental impairment.

2.4 **Stop Work Order**: A directive to cease AECOM-controlled work issued for failure to follow procedures, imminent danger situations/conditions, accumulation of safety violations, etc. The Stop Work Order will apply to AECOM and its direct subcontractors placed at risk by the situations or conditions.

3.0 References

None.

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 **Employees** are responsible for stopping all AECOM-directed work and for bringing it to the attention of the appropriate manager, Site Safety Officer, Project Manager, and/or Contractor representative any time an employee identifies a discrepancy, deficiency, or potentially dangerous condition or act that is likely to cause an unsafe or unhealthy situation or an imminent danger situation.

4.1.2 **Employees** may report unsafe working conditions anonymously, but they must provide sufficient detail and promptness to allow AECOM management and the SH&E staff to initiate corrective action.

4.1.3 **The Site Safety Officer** or **Local SH&E Representative** must initiate the development and implementation of corrective actions to eliminate the condition causing the Stop Work Order for AECOM employees and other personnel under AECOM's direct control affected by such condition. Report the details of the Stop Work Order and any corrective actions implemented to the **Project Manager** and the appropriate **Regional SH&E Manager**

4.1.4 **Project managers (field task managers, supervisors)**

- Verify that corrective actions taken appropriately address the conditions leading to the Stop Work Order.
- If AECOM has control over the circumstance that led to the condition, initiate additional corrective actions necessary to correct the conditions leading to the Stop Work Order. Otherwise, remain in communication with the persons or entities that are taking the corrective measures.
- Communicate such corrective actions and the effects of such corrective actions on the project/office to the client and/or Region Management.
- Ensure that documentation related to the Stop Work Order and corrective actions is placed in the project/office file.

4.1.5 **Regional Business line Managers (regional, district and office managers)**

- Provide support, in accordance with our contractual responsibilities for the project, for the implementation of corrective actions and communications with clients.
- Ensure that no reprimand or reprisal is associated with the initiation of a Stop Work Order.

4.1.6 **Regional SH&E Managers**

- Provide technical guidance for the development and implementation of corrective actions.
- Communicate with the SH&E group and assist with the development of Shared Learning and Safety Alert notices.

4.2 Commitment

4.2.1 It is AECOM's policy and firm commitment that employees are expected to stop their work to prevent unacceptable exposure to workplace hazards, including unsafe conditions or worker behaviors, without fear of reprimand or reprisal.

4.2.2 Cases involving reprisal, reprimand, or any attempt to discourage the initiation of Stop Work Orders or reporting of unsafe or unhealthy conditions or situations within AECOM should be immediately reported to the employee's **Manager, Human Resources Representative**, and **Regional SH&E Manager**.

4.3 Authority

4.3.1 AECOM's stop work authority applies to all work controlled by AECOM, its employees, and AECOM-controlled subcontractor work activities. All AECOM personnel are authorized to stop work in the event of an identified unsafe condition. If the responsible organization fails to provide resolution, or if at any time their acts or failure to act cause substantial harm or imminent danger to the health and safety of project employees, the public, or the environment, AECOM may issue an order stopping work in whole or in part. In the event that AECOM issues a Stop Work Order, an order issued by AECOM authorizing the resumption of work must be in place prior to restarting work.

4.3.2 In most cases, a Stop Work Order affects only those areas immediately involved in the hazardous situation. AECOM may issue a Stop Work Order for a portion of the work area(s) or for an entire work area when unacceptable risks exist that cannot be mitigated by reasonable engineering controls, administrative actions, or personal protective equipment. The Stop Work Order will remain in effect until the responsible organization resolves the problem(s) and brings the work area(s) to satisfactory conformance with established SH&E requirements. Work will not resume until appropriate corrective actions have been completed, ensuring that the condition has been rectified. The Stop Work Order will apply to AECOM and its direct subcontractors placed at risk by the situations or conditions.

4.4 Severity of Hazards

4.4.1 Imminent Danger Situations

- Upon becoming aware of an imminently dangerous situation that AECOM does not control, the employee should immediately inform the persons or entities in control of such imminently dangerous activities and his or her project manager about the situation. If the activities pertain to work that is controlled by AECOM, then the employee may stop the work upon discovering an imminently dangerous situation and then immediately notify his project manager, who may determine the appropriate further action to be taken (including the issuance of a formal Stop Work Order).
- "Stopping work" for AECOM-controlled work includes stabilizing an imminent danger situation to the extent that it can be left unattended for a prolonged period of time until the issue is resolved.
- The person requesting the work stoppage will notify the organization responsible for the work.
- The responsible organization will notify AECOM project/office management immediately of any stop work action(s) taken to rectify the situation.
- An AECOM's failure to comply with any Stop Work Order in whole or in part may result in disciplinary action. An AECOM subcontractor employee's failure to comply with any Stop Work Order may result in immediate removal from the project and/or office location.

4.4.2 Potentially Dangerous Situations

- Informal stop work interventions to correct minor conditions (e.g., to remind workers to put on their hard hats, safety glasses, etc.) do not require formal notification.
- If the minor condition cannot be corrected, a formal Stop Work Order must be issued and work must not be resumed until the situation has been eliminated.

4.5 Management-issued Stop Work Orders

4.5.1 **Region, District**, and **Office Managers, Project Managers** and/or **SH&E Managers** may issue a formal Stop Work Order for AECOM-controlled work in the following situations:

- Imminent danger exists involving the public or employee's safety and health or damage to the environment, facilities, or property.
- Continuing work or equipment usage will result in significant repair, rework, or removal.
- A project, or any segment of the project, is executed improperly or is out of compliance with applicable regulations or standards.

4.6 Resuming Work

4.6.1 Work associated with the affected area or operation will not resume unless all corrective actions identified in the applicable Stop Work Order have been completed and closed.

4.6.2 All personnel affected by the Stop Work Order will be instructed on the corrective actions and preventative measures taken.

5.0 Records

5.1 The completed Stop Work Order and any corrective action reports generated will be maintained at the project site for the duration of the project and placed in the closed project file.

6.0 Attachments

6.1 S3-NA002-FM Stop Work Order

S3NA-004-PR Incident Reporting

1.0 Purpose and Scope

1.1 To document and report all SH&E incidents in a timely and accurate manner. Additionally, to gather appropriate Lessons-Learned from all SH&E incidents and that all information required for regulatory reports is generated and filed as required for compliance.

1.2 This procedure applies to all AECOM North America based employees and operations.

2.0 Terms and Definitions

SH&E Incident Reporting Line: 1-800-348-5046;

Email: sri@aecom.com;

Fax: 804-515-8312

2.1 **SH&E Incidents:** The following events or situations as applied to AECOM employees and/or AECOM-controlled operations are considered SH&E Incidents:

- Any injury or illness (including pain and soreness) to an AECOM employee, that could be potentially work related or become aggravated by the work environment. This includes AECOM subcontractor, temporary employee or third party contractor, performing work under the control of an AECOM operation.
- Fire, explosion, or flash that is not an intended result of a remediation process, laboratory procedure, or other planned event.
- Any accidents involving company-owned, rented, or leased vehicles (including personal vehicles used for company business).
- Any breach of a numeric limit attached to a governmental permit or consent.
- Any failure to perform the requirements of a non-numeric requirement contained in a government permit or consent.
- Any failure to obtain a government permit or consent when required (including failure to obtain revisions before an existing permit or consent expires).
- Any notice of violation or notice of non-compliance received from a regulatory authority with enforcement powers.
- Property damage resulting from any AECOM or subcontractor activity.
- Unexpected release or imminent release of a hazardous material.
- Unexpected chemical exposures to workers or the public.
- A safety, health or environmental related complaint from the public regarding AECOM activities.
- SH&E-related incidents that could result in adverse public media interest concerning AECOM or an AECOM project.
- Any inspection by a federal, provincial, or local safety, health, and environmental enforcement agency.
- Any boating incident that includes the following:
    - Fatality.
    - A person disappeared from the vessel under circumstances that indicated death or injury.
    - A person was injured and required medical treatment beyond first aid.
    - Damage to vessels and other property totaled $2000 or more.
    - The boat was destroyed (physically destroyed or sank).

2.2 **Near Miss Incidents:** This is defined as an incident having the potential to cause injury, health effects, environmental impairment, or property damage as described in the above categories – but did not. For example:

- A crane drops a steel beam during a lift – and nobody is hurt, no equipment is damaged.
- A work crew is conducting a survey along the highway. A vehicle leaves the roadway and the vehicle enters the survey area at a fast speed. The vehicle just misses an employee; the driver recovers control of the vehicle and leaves the area.
- Awareness of an equipment recall or incident that occurs at another similar worksite.
- Unsafe condition that could have caused an incident if not corrected.
- Awareness of an equipment recall or incident that occurs at another similar worksite.
- Unsafe condition that could have caused an incident if not corrected.

2.3 **Significant Learning Experience:** Defined as a near miss incident that the affected group (i.e. project team, office staff, etc.) believes could have wide-ranging impacts throughout AECOM.

2.4 **Serious SH&E Incident:** Any SH&E incident that meets/involves the following criteria:

- Any amputation.
- Hospitalization for treatment (admission).
- Absence from work for more than 30 calendar days due to work-related injury/illness.
- Any single event resulting in more than one employee requiring medical treatment.
- Any SH&E-related Consent Agreement/Order/Lawsuit or enforcement action seeking more than $10,000 or alleging criminal activity.
- Any spill or release of a hazardous material that is reportable to a government agency.
- Any Notices of Violation.
- Near miss incidents that, in the opinion of the **Business Line Manager, Regional SH&E Manager, Regional Chief Executive, Group or Corporate SH&E Director,** may have otherwise resulted in any of the above.

2.5 **Fatality:** Loss of life of any AECOM employee, AECOM subcontractor personnel, client personnel or member of the general public that can be perceived to be related to work performed or controlled by AECOM.

2.6 **General Liability:** Incidents where AECOM could potentially be held liable.

2.7 **AECOM Recordable Injury:** See S3NA-601-PR Recordkeeping for definitions.

2.8 **H&W:** Health and Welfare Human Resource office which manages all US based injury and illness claims.

2.9 **Lost Time Days:** The total number of days the injured person accumulates before returning back to regular duties.

2.10 **Lost Time Injury or Disease:** A work-related injury or disease that has caused a worker to be absent from his or her regular work following the day that the injury or awareness of the disease occurred.

2.11 **Restricted Work (also called "Modified Work"):** Where an injury is medically treated, but the person is not able to return to regular duties. The restricted duties are done within the limitation of the injured person's abilities. (documentation may be required per regulatory requirements)

2.12 **Restricted Work Days:** The total number of restricted work days the injured person accumulates before being able to return to regular duties.

2.13 **Supervisor's Report of Incident (SRI):** Form used to document incidents which shall be completed within 24 hours.

2.14 **Support Services:** AECOM entities of Legal, Human Resources, Communications, SH&E Department, etc.

2.15 **WCB:** Workers' Compensation Board (Canada; known provincially by variations such as WCB, WSIB, CSST, WSCC, etc.)

2.16 **WC Carrier:** Workers Compensation Insurance Carrier (US)

3.0 References

3.1 S3NA-606-PR Modified Duty Program

3.2 S3NA-603-PR Incident Investigation and Review

3.3 S3NA-601-PR Recordkeeping

4.0 Procedure

4.1 All incidents, regardless of type or severity, shall be reported to the on-site supervisor immediately.

4.2 All incidents, regardless of type or severity, shall be reported to the Incident Reporting Line by the supervisor as soon as possible but no later than the end of the current work shift.

4.3 Completed Supervisor's Report of Incident shall be submitted to sri@aecom.com and the **Regional SH&E Manager** within 24 hours.

4.4 Fatalities and serious SH&E incidents shall be reported to the **Regional SH&E Manager**. as soon as reasonably possible but no more than 2 hours after the incident

4.5 Where there is potential for criminal, civil or regulatory action against AECOM or any of its employees or subcontractors, AECOM's **North America Chief Cou**nsel shall be contacted prior to any external communication, correspondence, or meeting concerning any incident, governmental investigation, or environmental impact. AECOM's **North America Chief Counsel**, or the Chief Counsel's designee, may supplement this Policy or require additional measures to protect the best interests of AECOM and its employees.

4.6 Roles and Responsibilities

4.6.1 **Employees.** Each employee involved in an SH&E incident will:

- Notify his/her supervisor immediately that an incident (including a near miss) has occurred, the circumstances involved, the nature and extent of the injuries/illness, and whether medical treatment may be required. Except for emergency situations, affected employees are required to discuss their injury/illness status with their supervisor, **Regional SH&E Manager** or project SH&E professional prior to obtaining medical treatment.
- Assist supervisor in completing appropriate reporting and investigation forms. If issues are raised regarding the content prepared in the SRI, contact the **Regional SH&E Manager** for guidance.

4.6.2 **Supervisors.** In an emergency/life-threatening situation, supervisors will:

- Use the appropriate local emergency phone numbers and seek immediate medical care for the employee.
- Address any immediate corrective actions needed. Consult with the **Regional SH&E Manager** if guidance is required.
- Call the Incident Reporting Line as soon as the situation is stabilized, but not later than the end of the current work shift.
- Complete the applicable forms and email to sri@aecom.com and the **Regional SH&E Manager** within 24 hours of the incident.
    - Supervisor's Report of Incident (SRI) or Near Miss/Observation Report (completed with assistance and acknowledgement from affected employees).
    - Federal/State/Province Specific Forms, if required (contact applicable Support Services for guidance).
- Notify the appropriate line or lead manager (i.e., manager responsible for personnel involved/project oversight/business line, etc.).
- As appropriate, initiate an Incident Investigation and Review per the requirements of S3NA-603-PR Incident Investigation and Review.
- Completion of any external reporting requirements. For example, the U.S. Coast Guard CG-3865, Recreational Boating Accident Report may be required if the incident involved a boat (contact the **Regional SH&E Manager** for clarification). (See S3NA-004-WI2 Incident Response and Reporting for further instruction.)

- Report all fatalities and/or serious SH&E incidents to the appropriate **Regional SH&E Manager** and Regional Executive as soon as reasonably possible but no more than 2 hours after the incident.

4.6.3 **Regional SH&E Manager or Designee**

- Coordinate with the appropriate NA SH&E incident reporting support staff.
- Upon receipt of an Incident Notification, contact the supervisor to discuss the incident as well as short term and long term corrective actions.
- Engage AECOM Corporate Medical Provider for non urgent medical guidance, if needed.
- Notify appropriate **Business Line or Operations Manager** of the incident.
- Coordinate with appropriate Regional Business Line SH&E Manager.
- As appropriate, initiate or assist an Incident Investigation and Review.
- Report all fatalities and/or serious SH&E incidents to the appropriate **Regional SH&E Manager** and Regional Executive as soon as reasonably possible but no more than 2 hours after the incident.

4.6.4 Incident Reporting Support Staff

- Inform appropriate personnel that have not already been notified of incidents.
- Audit data of incident reporting system.
- Coordinate with **Regional SH&E Manager** or designee for management of medical support.
- Forward incident data to support agencies for insurance claims.

5.0 Records

5.1 Incident reports and supporting documentation are maintained in a secure file by the incident reporting support staff.

5.2 The completed Supervisor Report of Incident and supporting documents must be retained by AECOM. Records relating to occupational injury and accidents must be kept for up to 30 years (or permanently in the Northwest Territories), depending on the classification of incident.

6.0 Attachments

6.1 S3NA-004-FM1 Supervisor's Report of Incident

6.2 S3NA-004-FM2 Near Miss Incident Report

6.3 S3NA-004-WI1 Supervisor's Incident Reporting Flowchart

6.4 S3NA-004-WI2 Incident Response and Reporting Instructions

S3NA-005-PR Vehicle and Driver Safety Program

1.0 Purpose and Scope

1.1 Reduce the number and frequency of driving-related incidents and injuries, the risks to which AECOM employees are exposed while driving and potential harm to members of the public; and improve overall safety performance.

1.2 This procedure applies to all AECOM North America based employees and operations.

2.0 Terms and Definitions

2.1 **Authorized Driver:** Staff who possess and provide proof of a current driver's license with full privileges and have a current driver training course.

2.2 **Incident:** An incident, for the purposes of this procedure, is a vehicle collision or other event where personal injury or property damage occurs, or a citation is issued while on AECOM business under certain circumstances. This may also include acts of theft, vandalism, and criminal mischief. Circumstances for citations to be considered as incidents include, but are not limited to, an instance where the citation results in the restriction or suspension of the employee's ability to legally operate a vehicle, a governmental motor vehicle agency assigning points to the employee's license, or the employee receives a citation where AECOM insurance is provided as proof of insurance at the time of issuance.

2.3 **Local Laws:** All signs, postings, laws, regulations, ordinances and codes applicable for the jurisdiction in which the motor vehicle is being operated.

2.4 **Operating Under the Influence (OUI):** OUI is the operation of any vehicle on company business under the influence of alcohol, drugs, medications, or other substances capable of inducing an altered mental state and/or impairing physical and mental judgments such that the influence of said substances produces impairment in violation of governmental laws for the location of the impairment.

2.5 **Spotters:** Extra personnel that may provide guidance when maneuvering in close and/or complex situations in order to avoid the occurrence of an incident.

3.0 References

3.1 AECOM Employee Handbook (HR Department)

3.2 S3NA-004-PR Incident Reporting

3.3 S3NA-603-PR Incident Investigation and Review

4.0 Procedure

4.1 General Procedures and Practices

4.1.1 Only Authorized Drivers shall operate a motor vehicle (rental, personal, or AECOM owned/leased) while on AECOM business.

4.1.2 Drivers are prohibited from using hand-held electronic devices or "texting" while operating a motor vehicle while on AECOM business. If drivers require use of such devices, they shall drive to a safe location where they can park to perform these activities. The only exception to this prohibition is the use of a "hands-free" cell phone where local laws allow use and where weather and traffic conditions permit. In general, it is AECOM's policy to discourage use of all two-way communication devices while operating motor vehicles.

4.1.3 Seat belts shall be worn by all occupants whenever the vehicle is in motion.

4.1.4 The number of passengers shall not exceed the manufacturer's specifications for the vehicle.

4.1.5 Loads shall be secured and shall not exceed the manufacturer's specifications and legal limits for the vehicle.

4.1.6 Motorcycles, boats, and off-road vehicles may not be operated on company business unless:

- Specific approval is provided by the Supervisor.
- A hazard analysis is completed.
- Required training and license is in place.

4.1.7 Staff inexperienced in two-way radio communication protocols and/or driving on gravel roads shall get on-site training from experienced personnel.

4.1.8 Headlights or daytime running lights will be used at all times.

4.2 AECOM Owned or Leased Vehicles (additional requirements)

4.2.1 The granting of driving privileges for AECOM owned or leased vehicles shall include the following:

- Having the appropriate qualifications.
- Having a good driving record.
- Complying with the procedures set out in this section and with applicable Safe Work Practices adopted and issued through the AECOM SH&E program.

4.2.2 An employee's driving privileges for company business may be removed at any time should AECOM determine that these criteria are not being met.

4.2.3 Perform pre-operation inspections.

4.2.4 Arrange for preventive maintenance services for the vehicle and maintain it in sound mechanical condition.

4.2.5 Not operate the vehicle if unsafe or if conditions exist that would result in vehicle damage.

4.2.6 Not use the vehicle for any unofficial use including personal business unless specific permission is given from the Supervisor.

4.2.7 Transport only persons on AECOM related business or those persons receiving transportation as a prescribed service.

4.2.8 Not pick up hitchhikers.

4.2.9 Not use the vehicle for transportation to or from work or park at a residence overnight unless approved by the employee's Supervisor.

4.2.10 Not smoke or allow anyone else to smoke in the vehicle.

4.2.11 Be responsible for any damage caused by abuse.

4.2.12 Secure the vehicle when left unattended.

4.2.13 Upon request the HR Representative will provide a copy of the employee's driving report to AECOM's insurance carrier.

4.2.14 An employee will be deemed to have an unsatisfactory driving record if, during the immediately preceding three (3) years, the employee has had their Driver's License suspended or revoked, or has had more than two (2) minor convictions, or a major conviction, or more than one (1) at fault claim, or more than six (6) demerits points for driving violations.

4.2.15 To maintain driving privileges, AECOM may also require the employee to take a defensive driver course at AECOM's expense.

4.2.16 If the employee's driving privileges are revoked and their position requires the use of a vehicle for AECOM business, AECOM may, at its discretion, attempt to identify a suitable alternative position with AECOM for which use of a vehicle is not required and which is consistent with the employee's skills and AECOM's operating needs.

4.2.17 AECOM reserves the right to require employees to take in-car driver training should driving conditions, performance or their driving record warrant it.

4.3 Vehicle Maintenance

4.3.1 Vehicles shall be fit for purpose and shall be maintained in a safe working order, with seat belts fully functional. This applies to all vehicles owned or leased by AECOM and to personally-owned vehicles used for company business.

4.4 Safety Equipment

4.4.1 The following suggested items should be kept in all vehicles used for company business in remote project locations:

- First Aid kit, appropriate to the work and crew size, or per regulations.
- Emergency equipment (e.g. flares, flashlight, blanket, etc.) based on conditions.
- Supervisors Report of Incident (which includes a Motor Vehicle Accident Form)

4.4.2 Safety helmets shall be worn by the driver and passengers of all-terrain vehicles, snowmobiles and other similar types of vehicles when used for company business and/or as required by local laws.

4.5 Driver Fitness

4.5.1 Drivers are responsible for being appropriately licensed, trained and medically fit to operate the vehicle.

4.5.2 AECOM employees operating vehicles on AECOM business shall be alert and not operate a vehicle when fatigued.

4.6 Driver Impairment

4.6.1 Drivers shall not operate a motor vehicle while under the influence of alcohol or drugs, or any other substance or medication that impairs their ability to drive.

4.7 Vehicle Incident

4.7.1 In the event of a traffic accident while on AECOM business, an employee MUST follow *S3NA-004-PR Incident Reporting*, including seeking assistance, reporting the incident to the appropriate authority, completing and submitting the required forms.

4.7.2 Testing for Alcohol and/or Drugs – See the AECOM Employee Handbook; refer any questions to the HR Department. In the event that a police/regulatory officer responding to a vehicle incident administers field and/or laboratory impairment testing AECOM reserves the right to obtain copies of such testing results for inclusion in the incident report and consideration in a subsequent incident investigation.

4.7.3 Investigation Process – refer to *S3NA-603-PR Incident Investigation and Review*.

4.7.4 Consequences if determined to be at “fault” – taking a Defensive Driving Training course shall be among the considerations as a corrective action. The **Regional SH&E Manager** can advise as to the availability of such training.

4.7.5 In addition, the employee will:

- If requested, provide police and other driver(s) with their liability insurance information.
- Not operate a damaged vehicle if its safety is questionable, its operating condition is illegal by applicable laws or its condition is such that further damage would result from its operation.
- If requested, provide and discuss the completed draft Supervisor’s Report of Incident form with **Regional Counsel**. The employee should then forward the completed form to the **Regional Counsel** with copies to others as required.
- If the employee receives a Summons, Complaint or other legal documents relating to a traffic incident, note the date, time, place and method of delivery and immediately forward the original documents to **Regional Counsel**.

- THE EMPLOYEE SHOULD NOT ADMIT LIABILITY, AGREE TO PAY FOR ANY DAMAGE OR SIGN ANY DOCUMENT EXCEPT AS REQUIRED BY LAW. Statements made in haste or anger may be legally damaging.

4.7.6 In the event of an accident, the supervisor must follow the procedures set out in *S3NA-004-PR Incident Reporting* for reporting the accident.

4.8 Traffic Citations

4.8.1 The employee is personally responsible for payment of any fines for moving violations and parking citations incurred while driving any vehicle on AECOM business.

4.9 Vehicle Insurance

4.9.1 For information about insurance carried by AECOM for AECOM owned or leased vehicles and any questions about insurance the employee may have as to business use of employee-owned vehicles, questions should be directed to the AECOM Insurance Department.

4.10 Roles and Responsibilities

4.10.1 **District or Office Managers. Project Managers** (including Field Task Managers, Supervisors) will be responsible for the following:

- Managers and supervisors are responsible for confirming employees are informed and follow the provisions of this procedure.
- Managers and supervisors shall provide a copy of this procedure to any employee who will be driving an AECOM owned, leased or personal vehicle for company business.

4.10.2 **SH&E Department** shall receive a copy of the Driver's Acknowledgement Form signed by the employee along with a copy of the employee's Motor Vehicle Driving Record (for AECOM leased or owned vehicles).

4.10.3 **Employees** will be responsible for the following:

- As an Authorized Driver, employees are responsible for following this procedure including participating in required training, following all applicable laws while operating a vehicle and reporting all vehicle incidents and/or traffic summonses to their supervisor.
- Must immediately report any change or limitation to his or her Driver's License to his or her supervisor and make the required modifications to their verification.
- Verify that the vehicle has appropriate registration and carries at least the minimum limits of automobile third party liability insurance required by the state/province/territory where the vehicle is registered and obtain confirmation that the insurance includes unrestricted business use coverage.
- Be alert and not allow themselves to become fatigued.

4.10.4 In addition, employees operating AECOM Owned or Leased Vehicles will be responsible for the following:

- Before being able to drive an AECOM owned or leased vehicle and as periodically requested by AECOM, employees will provide a Motor Vehicle Driving Record (Driver's Abstract report).
- Inspect the vehicle for any damages and deficiencies and report any items found prior to driving the vehicle.
- Verify that a current proof of insurance certificate, vehicle registration and Supervisor's Report of Incident (with Motor Vehicle Incident Report) are in the vehicle before driving it.

5.0 Records

5.1 Driver's Acknowledgement forms (and associated Motor Vehicle Driving Records) shall be filed in HR employee personnel files.

6.0 Attachments

6.1 S3NA-005-FM Driver's Acknowledgement Form

6.2 S3NA-005-WI Driver Safe Work Practices

S3NA-208-PR Personal Protective Equipment Program

1.0 Purpose and Scope

1.1 Provide an effective Personal Protective Equipment (PPE) Program to protect AECOM employees from potential workplace safety and health hazards.

1.2 This procedure applies to all AECOM North America-based employees and operations.

1.3 The proper use of appropriate PPE, in combination with effective engineering and administrative controls, can provide AECOM employees with protection against potential workplace hazards and can reduce the potential for workplace injury and illness.

2.0 Terms and Definitions

2.1 **PPE**: Personal Protective Equipment

2.2 **ANSI:** American National Standards Institute

3.0 References

3.1 Occupational Safety and Health Administration (OSHA) PPE standard (29 CFR 1910.132) requires AECOM to assess workplace(s) to determine if hazards that necessitate the use of PPE exist in the workplace, and, if such hazards are present, to

3.1.1 Select the appropriate types of PPE and

3.1.2 Provide employees with training about the use and care of the selected PPE.

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Regional SH&E Manager

- Provide guidance to Project Managers, Field Task Managers, Supervisors, and field staff on the assessment of hazards and the selection of PPE.
- Provide training materials to Project Managers, Field Task Managers and Supervisors for employee training.

4.1.2 Project Managers (Field Task Managers, Supervisors)

- Conduct Hazard Assessments to identify hazards present and to specify PPE appropriate for those hazards.
- Determine which of your staff members will require employee-issued PPE.
- Approve the purchase of company-issued PPE.
- Verify that appropriate PPE is utilized by your employees when required or necessary.

4.1.3 Employee

- In accordance with your training and instructions, utilize appropriate PPE that has been issued to them when required or necessary.
- Inspect your PPE prior to use to confirm that it is functional, and maintain your PPE in a clean and functional condition.
- Follow instructions and manufacturers' guidance on the care, use, and storage of your PPE.
- Prior to using any type of PPE, confirm that it is in good shape, free of dirt and debris, and that you are familiar with its correct use. Always make sure PPE fits adequately to perform the use intended.
- Refrain from wearing PPE outside of the work area for which it is required if doing so would constitute a hazard.

4.2 Hazard Assessment for Office Locations

S3NA-209-FM PPE Hazard Analysis will serve as the certificate of hazard assessment, as defined in 29 CFR 1910.132 (d) (2), for office activities that require PPE. This checklist will also be used to determine the PPE requirements for nonroutine maintenance tasks that may not be evaluated during the initial hazard assessments.

4.3 Hazard Assessment for Off-Site Locations

4.3.1 HAZWOPER Locations

- Each Health and Safety Plan (HASP) that is prepared for waste site investigations/remediation includes a hazard assessment for each proposed field activity. Task-specific PPE requirements are listed in the HASP. Therefore, the HASP will serve as the certificate of hazard assessment for each project that involves off-site work activities that require the use of PPE.

4.3.2 All Other Off-Site Locations

- The Task Hazard Analysis will serve as the certificate of hazard assessment for projects that involves offsite work activities that require the use of PPE. The checklist will be reviewed with the entire field team prior to arriving at the site.

4.4 Training

4.4.1 Staff will receive adequate instruction on the correct use, limitations, and assigned maintenance duties for the equipment to be used. The following information, at a minimum, will be covered during PPE training:

- What PPE is required.
- When it is required.
- Why it is required.
- How to properly don, doff, adjust, and wear the PPE described.
- The limitations of the PPE, including its expected useful life.
- How to properly care for, maintain, and dispose of the PPE.

4.4.2 Field staff are responsible for confirming that they have reviewed the operation manual for the PPE before work commences.

4.4.3 All staff will receive an orientation to the hazards on the job site as well as initial Field Safety orientation that outlines appropriate PPE requirements.

4.4.4 AECOM employees who have participated in the 40-hour HAZWOPER training course are considered to have met the employee training requirements of the PPE standard. The training certificates that are issued as documentation of successful completion of the 40-hour HAZWOPER course will also serve as documentation of training as required by the PPE standard. Employees who have not participated in the HAZWOPER training will be provided PPE training specific to your assignment and/or location. The PPE Facts Sheets (attached) can serve as the basis for training.

4.5 Determining the Need for PPE

4.5.1 Using the Task Hazard Assessment or HASP, the need for the following types of PPE will be evaluated.

4.5.2 PPE will:

- Be selected and used in accordance with recognized standards and provide effective protection.
- Not in itself create a hazard to the wearer.
- Be compatible, so that one item of PPE does not make another item ineffective.
- Be maintained in good working order and in a sanitary condition.

4.5.3 Prior to entering any regulated work area, confirm that you have access to or are equipped with the following CSA-approved PPE, appropriate to the site hazards:

- Head Protection
- Eye & Face Protection
- Foot Protection
- Hi-Visibility Vests
- Hearing Protection

4.5.4 After the hazard assessments have been completed, the Project Manager will select the appropriate PPE for each job category or task, as necessary. The selected equipment will be indicated on the hazard assessment. PPE will be provided to each employee appropriate for the hazards present. All PPE selected and purchased by AECOM will meet or exceed the American National Standards Institute (ANSI) standards, Canadian Standards Association (CSA) standards, or other standards as dictated by provincial, territorial, or state legislation.

4.6 Eye and Face Protection

4.6.1 The OSHA standard requires that AECOM employees use appropriate eye and face protection when exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acid and caustic liquids, chemical gases or vapors, and injurious light radiation. The standard further requires that eye protection provide side protection when there is a hazard from flying objects.

4.7 Head Protection

4.7.1 Protective helmets (hard hats) are required when employees are working in areas where there is a potential for falling objects to cause injury to the head. When working near exposed electrical conductors that could contact the head, helmets designed to reduce electrical shock will be worn.

4.8 Foot Protection

4.8.1 Protective footwear is required when employees are working in areas where there is a danger of foot injuries from falling and rolling objects or from objects piercing the sole and where an employee's feet are exposed to electrical hazards.

4.9 Hand Protection

4.9.1 Appropriate hand protection is required when employee's hands are exposed to hazards such as those from skin absorption of harmful substances, severe cuts and lacerations, severe abrasions, punctures, chemical burns, thermal burns, or harmful temperature extremes.

4.9.2 Chemically Resistant Clothing

4.9.3 Chemically resistant clothing is required when there is significant potential for the employee to come in direct contact with the chemicals he/she is handling. Tasks that involve chemical handling will be evaluated for the potential of splashing or spilling.

4.9.4 High-Visibility Apparel

4.9.5 High-visibility apparel with reflective banding (ANSI Class II and III garment) is required for all field activities in close proximity to moving traffic and other modes of transportation (transit, airlines, marine, etc.), in proximity to heavy equipment operations, or whenever otherwise specified in a project HASP. Color of apparel (orange or lime) may be client/project-specific.

4.10 Personal Clothing

4.10.1 For personal safety on the job site, do not wear

- Loose or unsecured clothing or loose fitting cuffs.
- Greasy or oily clothing, gloves, or boots.
- Torn or ragged clothing.

4.10.2 Neck chains are hazardous and will be worn under clothing so that they do not hang out. Long hair will be tied back or otherwise confined.

4.10.3 Clothing made of synthetic fibres can be readily ignited and melted by electric flash or extreme heat sources. Cotton or wool fabrics are recommended for general use.

4.11 Specialized PPE

4.11.1 In addition to basic PPE, additional specialized PPE may be required to provide appropriate protection to the employee. Refer to applicable OH&S legislation and related Standard Operating Procedures for additional information on PPE requirements.

- Fall Protection: Only full body harnesses with shock-absorbing lanyards will be used for personal fall arrest.
- Respiratory Protection: Respiratory protection shall be selected based on the contaminant and concentration to which the employee will be exposed. Refer to*S3NA-519-PR-Repiratory Protection Program* and the task- or project-specific Baseline Hazard Assessments for specific requirements.
- Fire Resistant Clothing: Approved fire resistant outer clothing may be required at work locations with flammable or explosive materials or environments.
- Other Head Protection: Operators and passengers (if permitted) of all terrain vehicles and snowmobiles will wear approved helmets.
- Chemical Protective Clothing: Approved chemical protection appropriate to the hazard will be worn. Review applicable Material Safety Data Sheets (MSDSs) for appropriate PPE.
- Protection from Drowning: Employees being transported by boat are required to wear life jackets. Employees exposed to any other drowning hazards are required to wear personal flotation devices. Life jackets and personal flotation devices will have the proper regulatory approval.

4.12 PPE Supplies

4.12.1 Each AECOM office will maintain a supply of safety equipment including safety glasses, gloves, and chemically resistant clothing based on the nature of their field activities. The Office Manager or designee will be responsible for maintaining this inventory. PPE that is required for large field efforts will be ordered by the Project Manager or their designee.

4.12.2 At a minimum, the office will review its PPE program annually.

4.13 Obtaining Personalized Safety Gear

4.13.1 The OSHA standard in 29 CFR 1910 - Subpart I / 29 CFR 1926 requires that protective equipment, including PPE for eyes, face, head, and extremities, protective clothing, and respiratory devices, be provided to employees wherever necessary by reason of hazards.

4.13.2 Employees are not expected to provide their own general PPE. Although each AECOM office stocks and issues various general issue safety gear such as hard hats, plan safety glasses, disposable gloves and coveralls, fall protection, and hearing protection, certain personalized safety gear such as prescription safety glasses, safety-toed (capped) boots, and cotton coveralls will be ordered and sized specifically for the user.

4.13.3 Most PPE will be provided to the employee at no charge, with the exception of the above personalized safety equipment (safety glasses, safety toed boots, washable coveralls). A partial cost reimbursement to the employee may be made based on legacy company practice or project stipulations.

4.13.4 Prescription Safety Glasses

- As with all hazards, staff will be notified of their potential for injury and will be provided with the appropriate PPE. If wearing contact lenses poses a hazard to the worker's eyes during work, the worker will be advised of the hazards and the alternatives to wearing contact lenses.
- Eligibility
    - Employees will wear safety glasses during activities that involve exposure to eye hazards such as flying particles, chemical splash, or certain types of radiation such as

ultraviolet light from welding operations. Typically, the following types of field activities will require the use of safety glasses:

- Site investigation or remediation and construction activities.
- Stack monitoring and other types of air emissions monitoring.
- Audits and assessments in industrial or manufacturing facilities.
- Activities conducted within laboratories.
- Activities at client facilities where safety glasses are required.

- Eligibility to obtain prescription safety glasses will be determined by the employee's supervisor based upon the guidance above.

- Procurement of Prescription Safety Glasses
  - Employees who have been authorized to purchase prescription safety glasses by their supervisor should consult the AECOM SH&E Department's Intranet for obtaining detailed instructions on how and where to purchase the equipment. Employees will be able to choose from several styles of approved frames, all equipped with permanently attached sideshields. Various lens materials are also available, although polycarbonate is recommended.
  - Except for eye examinations, associated prescription eyewear costs will be paid by AECOM. The employee may be asked to pay an optician's dispensing fee, which may be submitted on an expense report for reimbursement. Because eye examinations are not covered, employees who have had recent eye examinations should contact the eye care professional in advance to determine their procedure for handling a current prescription.
  - Employees who are eligible will be allowed to order one pair of prescription safety glasses every other year from the selection of glasses offered by the program.
  - Contact the Regional SH&E Manager for guidance on the procurement of prescription safety glasses.

4.13.5 Safety Toed Boots/Shoes

- Eligibility
  - Employees will wear safety boots/shoes during activities that pose the potential for foot injury from dropped objects or penetrations through the sole. Typically, safety toed boots/shoes will be required for the same type of activities, with the exception of laboratory activities, for which safety glasses are required. In addition, work around all types of heavy equipment will typically require the use of safety shoes.
  - Eligibility to obtain safety shoes will be determined by the employee's supervisor based upon the guidance above.
- Procurement of Safety Shoes
  - Eligible employees will be allowed to purchase one pair of safety shoes every other year.
  - Employees who have been authorized to purchase safety shoes by their supervisor should consult the Regional SH&E Manager for obtaining for detailed instructions on how and where to purchase the equipment. The style chosen (i.e., boot or shoe) should be determined based upon the application. For example, low cut shoes may be appropriate for audits and assessments in light industry applications, while safety boots will be more appropriate for environmental remediation, construction, and heavy industry work with significant foot hazards. Before purchasing, the employee is required to verify that the safety boots or shoes meet the specifications above.
  - After the purchase, an employee expense report, including a dated receipt for the shoes, should be submitted for approval and reimbursement. AECOM will reimburse the employee up to a amount that is specified by the SH&E Department or Regional Operations management.

4.13.6 Reusable Coveralls

- Eligibility
  - Reusable cotton (or some other washable fabric) coveralls may be made available to employees who regularly perform field work based on conditions. Coveralls can be worn over personal clothing to help protect and keep them clean.
  - Eligibility to obtain washable coveralls will be determined by the employee's supervisor based upon the guidance above.
- Procurement of Reusable Coveralls
  - AECOM has established a master services agreement with a work clothing vendor that supplies us with long- sleeved, blue coveralls bearing the AECOM logo. These coveralls can be ordered through a standard purchase requisition authorized by the employee's supervisor. The cost of the coveralls will be covered entirely by your region.
  - Employees who are eligible will be allowed one pair of coveralls per year.

5.0 Records

5.1 Completed *S3NA-209-FM PPE Hazard Analysis* forms will be maintained in local office safety files.

6.0 Attachments

6.1 S3NA-209-FM PPE Hazard Analysis

6.2 S3NA-209-WI1 PPE Selection

6.3 S3NA-209-WI2 Eye and Face Protection Fact Sheet

6.4 S3NA-209-WI3 Head Protection Fact Sheet

6.5 S3NA-209-WI4 Foot Protection Fact Sheet

6.6 S3NA-209-WI5 Hand Protection Fact Sheet

6.7 S3NA-209-WI6 Protective Clothing Fact Sheet

S3NA-210-PR Project Safety Meetings

1.0 Purpose and Scope

1.1 Establishes the requirements for conducting and documenting meetings on topics that are designed to promote Safety, Health & Environmental (SH&E) awareness and facilitate discussion regarding hazards and risks.

1.2 This procedure applies to all AECOM North America-based employees and operations in the performance of services directed and controlled by AECOM.

2.0 Terms and Definitions

None.

3.0 References

None.

4.0 Procedure

4.1 Project Initiation/Kick-off meeting

4.1.1 A project initiation/kick-off safety meeting will be conducted prior to the start of field operations. Discussion points for this meeting will come from the project-specific SH&E documentation (e.g., Health and Safety Plan (HASP), Safe Work Plan, Task Hazard Analysis, etc.). The meeting will involve representatives from all organizations with a direct contractual relationship with AECOM on the job site. Topics for this meeting will include:

- Communication to all participants regarding on site SH&E responsibilities and authority.
- Establishing safety points of contact for each organization and phase of work.
- Communication of organizational SH&E performance expectations.
- Identification of significant project SH&E issues, risks, and solutions.
- Coordination of organizational SH&E conflicts and interactions.

4.2 Timing of Meetings

4.2.1 Change in Scope/Activity– Conducted for all AECOM staff and site personnel with a direct contractual relationship with AECOM to discuss changes to scope or a new phase of work.

4.2.2 Periodic – Conducted at a regular, recurring frequency of not less than biweekly, but preferably once per week.

4.2.3 Daily – Daily safety discussions as part of daily routine project coordination meetings. Daily meetings are required for HAZWOPER activities and other activities as identified in the safety plan. Daily safety discussions will involve representatives from all organizations with a direct contractual relationship with AECOM on the job site.

4.2.4 Significant Personnel Turn-over – Conducted at the start of any workday where a new organization begins work on site or when more than 25 percent of the day's work force is new to the site.

4.2.5 Post-Incident – Conducted at the start of the work day following the occurrence of a significant incident as defined in *S3NA-004- PR Incident Reporting*. All project initiation/kick-off safety meetings will be documented using the *S3NA-210-FM Tailgate Safety Meeting Log*.

4.2.6 All special situation safety meetings listed above will include review of applicable Task Hazard Analyses for the scope of services to be performed and be documented using the *S3NA-210-FM Tailgate Safety Meeting Log* or equivalent.

4.2.7 Daily safety discussions not otherwise required by HAZWOPER or the project safety plan will be documented.

4.3 **Supplemental Training Meetings**

4.3.1 The PM, Site Supervisor or Site Safety Officer (SSO) will implement worker training on general safety topics as part of routine on-site training activities. Where such training is conducted it will be documented on the *S3NA-210-FM Tailgate Safety Meeting Log*.

4.4 Safety Orientation

4.4.1 All project employees will attend a project-specific safety orientation and training session prior to the start of any project and/or task.

4.4.2 The PM, site supervisor, or SSO will conduct the meeting based on project specifics (e.g., location, unique hazards and risks, client requirements, etc.) and any mandatory topics required by *S3NA-003-PR SH&E Training*. The Regional SH&E Manager can provide examples of project safety orientation material for reference.

4.4.3 The depth/level of training will be commensurate with the job function(s) to be performed. Site visitors will receive general orientation and task-specific training.

4.4.4 At a minimum, employee orientation and training will consist of the items listed below:

- Identification of hazards associated with the individual's job function and responsibilities.
- Specific safety procedural instruction needed to perform his or her required job function or task.
- Content of the HASP and any Task Hazard Analyses (THA) in accordance with *S3NA- 209-PR Project Hazard Assessment and Planning*.

4.5 Periodic Safety Training Meetings

4.5.1 Sit-down safety training meetings will be scheduled and conducted throughout the duration of the project.

4.5.2 Meetings shall give project personnel an opportunity to maintain a high degree of safety awareness through timely and quality safety education. Meeting time will be used to discuss specific safety topics and obtain employee feedback.

4.5.3 Safety meetings will be conducted by the PM, Site Supervisor or SSO and supplemented by lead persons of the various crafts represented at the site (e.g., electrician, heavy equipment operator, foreman, inspector, resident engineer, etc.).

4.5.4 Topics for discussion will include SH&E hazards noted during routine and non-routine work situations and an explanation of job safety procedures unique to the project.

4.5.5 The PM and SSO will monitor safety meetings to ensure that subject matter is properly presented.

4.5.6 All periodic safety meetings will be documented using the Safety Training Log (Attachment 3). Sign-in of every meeting participant is required to ensure proper accountability and to meet AECOM project recordkeeping requirements.

4.5.7 Safety, Health and Environmental considerations will be discussed at every project meeting. Once on-site:

- All on-site personnel must review and acknowledge the form or plan at a “tailgate” or “toolbox” meeting.
- Any new or previously unidentified hazards must be documented on the form or plan as a Revision and acknowledged with initials by all on-site staff.
- The Project Safety Plan must be reviewed regularly as required and documented on the plan.

4.5.8 All signed copies of the field forms and project plans must be placed in the appropriate project folder.

4.6 Roles and Responsibilities

4.6.1 **Regional SH&E manager** shall provide assistance to Project Managers (PM) as required to carry out the requirements of this Standard Operating Procedure (SOP), particularly in the area of making training materials available and providing spot-checks of proper documentation.

4.6.2 **Regional Manager, District and Office Managers** shall ensure that PMs of projects within their areas of responsibility are conducting and properly documenting safety meetings in accordance with requirements of this SOP.

4.6.3 **Project Managers (field task managers, supervisors)** shall ensure that all employees and personnel under the control of AECOM (e.g., subcontractors, temporary agency employees) assigned

to projects within their areas of responsibility participate in project initiation/kick-off meetings, special situation meetings, task hazard analyses, on-site safety inspections, and supplemental training meetings.

5.0 Records

None.

6.0 Attachments

6.1 S3NA-210-FM Tailgate Safety Meeting Log

S3NA-305-PR Hand and Power Tools

1.0 Purpose and Scope

1.1 Provides the AECOM requirements for all manually-operated hand and power tools and equipment use, handling and storage.

1.2 This procedure applies to all AECOM North America based employees and operations.

2.0 Terms and Definitions

None.

3.0 References

3.1 S3NA-305-GL1 Hand and Power Tools

3.2 S3NA-410-PR Hazardous Energy Control

3.3 S3NA-302-PR Electrical, General

3.4 S3NA-208-PR Personal Protective Equipment Program

3.5 S3NA-510-PR Hearing Conservation Program

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 **Project Managers/Field Task Managers/Supervisors**. Each Manager/Supervisor must ensure that all aspects of this procedure are followed and adhered to on all AECOM projects, sites and locations. If a specific tool is not included in this work instruction section of this SOP, appropriate guidelines shall be established prior to work associated with that equipment, including following manufacturer's recommendations.

4.1.2 **Regional SH&E Manager** provides technical guidance and support as to this procedure.

4.1.3 **Employees.** Employees shall not work with any tool that they are not familiar with without first obtaining training associated with that equipment. In addition, employees must following manufacturer's recommendations for its use and must not modify the equipment without first obtaining authorization from the manufacturer.

4.2 Restrictions

4.2.1 No employee shall use any hand tool, unless they are familiar with the use and operation of the equipment or have received specific instruction on its use and operation.

4.2.2 All tools will be used in accordance with manufacturer's specifications.

4.3 Training

4.3.1 Instruction in the proper use, safe handling, and maintenance of tools will be provided to employees unfamiliar with the tool.

4.4 Personal Protective Equipment

4.4.1 Lockout devices (padlocks, multiple lock hasps, tags), gloves appropriate to the task, safety-toed boots, as required, hard hats and eye & face protection, as required.

4.5 Inspections

4.5.1 All tools must be inspected prior to each use. Any tool that is defective or has missing parts must not be used. Every broken or defective tool must be tagged or identified as such. Tagged tools will be returned to your supervisor for repair or replacement. Tagged tools will be immediately removed from service.

4.5.2 All tools must be inspected to manufacture's specifications according to tool rests and guard adjustment tolerances. All tools will be inspected to ascertain that all safety devices are present and functioning properly.

5.0 Records

None.

6.0 Attachments

6.1 S3NA-305-GL Hand and Power Tools Guide

6.2 S3NA-305-WI1 Chainsaw Safety Card

6.3 S3NA-305-WI2 Circular Saw Safety Card

6.4 S3NA-305-WI3 Cut Off Saw Safety Card

6.5 S3NA-305-WI4 Hand-held Grinder Safety Card

6.6 S3NA-305-WI5 Impact Wrench Safety Card

6.7 S3NA-305-WI6 Nail Gun Safety Card

6.8 S3NA-305-WI7 Pentak Vacuum Safety Card

6.9 S3NA-305-WI8 Power Drill Safety Card

6.10 S3NA-305-WI9 Pressure Washer Safety Card

6.11 S3NA-305-WI10 Reciprocating Saw Safety Card

6.12 S3NA-305-WI11 Sander Safety Card

6.13 S3NA-305-WI12 Utility Knife Safety Card

6.14 S3NA-305-WI13 Wood Chipper Safety Card

6.15 S3NA-305-WI14 Clearing and Grubbing Equipment Safety Card

6.16 S3NA-305-WI15 Pneumatic Tools Safety Card

6.17 S3NA-305-WI16 Manual Hand Tools Safety Card

6.18 S3NA-305-WI17 Small Engines Safety Card

6.19 S3NA-305-WI18 Electric and Battery Powered Hand Tools Safety Card

S3NA-308-PR Manual Lifting, Field

1.0 Purpose and Scope

1.1 This procedure provides the requirements for use when performing manual materials handling activities (e.g., lifting/handling of items or materials).

1.2 This procedure applies to all field staff for AECOM North America-based operations.

2.0 Terms and Definitions

2.1 **Manual Materials Handling:** Moving or handling things by lifting, lowering, pushing, pulling, carrying, holding, or restraining.

2.2 **Team Handling:** Team handling occurs when more than one person is involved during the lift.

3.0 References

3.1 OSHA Technical Manual: http://www.osha.gov/dts/osta/otm/otm_vii/otm_vii_1.html

3.3 National Safety Council: www.nsc.org

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 The **Project Manager** will effectively implement the procedure, providing resources as required, and providing direction on proper lifting/handling techniques.

4.1.2 The **Regional SH&E Manager** will assist in identifying activities with a high potential for lifting/handling strains/injuries as well as the associated mitigation strategies and training on proper lifting/manual materials handling techniques.

4.1.3 **Employees** are responsible for reviewing and following *S3NA-308-WI Manual Lifting Safe Work Practices*.

4.2 Mechanical Controls

4.2.1 Mechanical equipment or assistance such as dollies, carts, come-alongs, or rollers are preferable to be used whenever possible rather than the employee physically moving materials.

4.2.2 Mechanical assistance will be of proper size, have wheels sized for the terrain, and be designed to prevent pinching or undue stress on wrists.

4.2.3 Objects to be moved will be secured to prevent falling and properly balanced to prevent tipping.

4.3 Administrative Controls

4.4 When significant, sustained lifting work is required, it is desirable to rotate employees to spread the work load among several people and thereby avoid fatigue.

4.5 Rotation is not simply performing a different job but instead is performing a job that utilizes a completely different muscle group from the ones that have been overexerted.

5.0 Records

None.

6.0 Attachments

6.1 S3NA-308-WI Manual Lifting Safe Work Practices

S3NA-309-PR Mobile or Heavy Equipment

1.0 Purpose and Scope

1.1 Outline the safe working requirements for working with and near mobile equipment and heavy equipment operation.

1.2 This procedure applies to all AECOM North America based employees and operations.

2.0 Terms and Definitions

2.1 **Heavy equipment:** All excavating equipment include scrapers, loaders, crawler or wheel tractors, excavators, backhoes, bulldozers, off-highway trucks, graders, agricultural and industrial tractors, and similar equipment.

2.2 **Operator:** Any person who operates the controls while the heavy equipment in is motion or the engine is running.

2.3 **Ground personnel/workers:** Personnel performing work on the ground around heavy equipment (note: operators are considered ground personnel when outside of the equipment cab).

3.0 References

3.1 S3NA-205-PR Equipment Inspections & Maintenance

4.0 Procedure

4.1 For work under AECOM's control, Project Managers are responsible for ensuring all equipment is in good working order and all equipment operators are qualified on the piece of machinery they are assigned.

4.2 Staff will confirm that all rented equipment arrives in proper working order with the manufacturer's operating manual before acceptance from the supplier.

4.3 The operator of mobile equipment is the only worker permitted to ride the equipment unless the equipment is a worker transportation vehicle.

4.4 A person will not operate mobile equipment unless the person has received adequate instruction and training in the safe use of the equipment, has demonstrated to a qualified supervisor or instructor competency in operating the equipment.

4.5 The operator of mobile equipment will operate the equipment safely, maintain full control of the equipment, and comply with the laws governing the operation of the equipment

4.6 **Communication**

4.6.1 Communication between site supervisors/managers, heavy equipment operators, and other site personnel is a key method of preventing serious injury or death during heavy equipment operations.

4.6.2 The following outline the communication requirements during heavy equipment operations:

- Site supervisors/managers shall confirm that all operators are notified/informed of when, where, and how many ground personnel will be working on site.
- Site supervisors/managers shall inform all ground personnel before changes are made in the locations of designated work areas.
- Prior to work initiating onsite the site supervisor/manager is to confirm all operators and ground personnel are trained on the hand signals that will be used to communicate between operators and ground personnel.
- Personnel working around heavy equipment operations are to maintain eye contact with operators to the greatest extent possible (always face equipment). Never approach equipment from a blind spot or angle.
- All heavy equipment whose backup view can be obstructed shall be equipped with reverse warning devices (i.e., backup alarms) that can be significantly heard over equipment and other background noise. Reverse signaling lights shall be in working order.

- When feasible, two-way radios shall be used to verify the location of nearby ground personnel.
- When an operator cannot adequately survey the working or traveling zone, a guide shall use a standard set of hand signals to provide directions. Flags or other high visibility devices may be used to highlight these signals.

4.7 Ground Personnel

4.7.1 Ground clearance around heavy equipment may significantly reduce hazards posed during heavy equipment operations.

4.7.2 The following outline the clearance requirements during heavy equipment operations:

- Ground personnel shall always yield to heavy equipment.
- Ground personnel shall maintain a suitable “buffer” area of clearance from all active heavy equipment.
- A job-specific hazard analysis that identifies any special precautions shall be completed and communicated to all AECOM personnel.
- Site supervisors/managers shall designate areas of heavy equipment operation and confirm that all ground personnel are aware of designated areas. Designated areas shall include boundaries and travel routes for heavy equipment. Travel routes shall be set up to reduce crossing of heavy equipment paths and to keep heavy equipment away from ground personnel.
- When feasible, site supervisors/managers shall set up physical barriers (e.g., caution tape, orange cones, concrete jersey barriers) around designated areas and confirm that unauthorized ground personnel do not enter such areas.
- Operators shall stop work whenever unauthorized personnel or equipment enter the designated area and only resume when the area has been cleared.
- Operators shall only move equipment when aware of the location of all workers and when the travel path is clear.
- Ground personnel shall never stand between two pieces of heavy equipment or other objects (i.e., steel support beams, trees, buildings, etc.).
- Ground personnel shall never stand directly below heavy equipment located on higher ground.
- If working near heavy equipment, ground personnel shall stay out of the travel and swing areas (excavators, all-terrain forklifts, hoists, etc.) of all heavy equipment.
- Ground personnel shall never work near heavy equipment.
- Personnel shall keep all extremities, hair, tools, and loose clothing away from pinch points and other moving parts on heavy equipment.
- Personnel shall not talk on a cell phone while standing or walking on a roadway or other mobile equipment path.

4.7.3 At a minimum, all ground personnel and operators outside of heavy equipment shall wear the following:

- High visibility, reflective (Class 2) safety vest that is visible from all angles and made of fluorescent material and orange, white, or yellow reflective material (confirm that vest is not faded or covered with outer garments, dirt, etc.).
- Retro-reflective striping for arms and legs (night work)
- ANSI-CSA approved hard hat
- ANSI-CSA approved safety glasses with side shields
- ANSI-CSA approved work boots (unless project requirements are more stringent)
- ANSI-CSA approved hearing protection as needed
- Appropriate work clothes (i.e., full length jeans/trousers and a sleeved shirt; no tank, crew tops or other loose clothing permitted).

4.8 Prior to work commencing

4.8.1 All mobile equipment will be regularly inspected pre-shift and then regularly as required with the details of the inspection recorded in a log book.

4.8.2 The operator will report defects and conditions affecting the safe operation of the equipment to the supervisor or employer. Any repair or adjustment necessary for the safe operation of the equipment will be made before the equipment is used.

4.8.3 Exposed moving parts on mobile equipment which are a hazard to the operator or to other workers will be guarded and if a part will be exposed for proper function it will be guarded as much as is practicable consistent with the intended function of the component.

4.8.4 An approved Underwriter's Laboratories (UL) 4A40BC fire extinguisher should be present on all mobile equipment.

4.8.5 Inform the operators of the equipment that AECOM employees are in the area and inquire if there are any restricted areas or specific rules or requirements. In some industrial facilities, mobile equipment has the 'right of way'.

4.8.6 Where the operator will not have a full view of the path of travel, a signal person will be used on the ground that has a full view of the load, the operator, and the path.

4.8.7 Mobile equipment in which the operator cannot directly or by mirror or other effective device see immediately behind the machine will have an automatic audible warning device which activates whenever the equipment controls are positioned to move the equipment in reverse, and if practicable, is audible above the ambient noise level.

4.9 Operation

4.9.1 The operator of mobile equipment will operate the equipment safely, maintain full control of the equipment, and comply with the laws governing the operation of the equipment.

4.9.2 A supervisor will not knowingly operate or permit a worker to operate mobile equipment which is, or could create, an undue hazard to the health or safety of any person.

4.9.3 The operator of mobile equipment will not leave the controls unattended unless the equipment has been secured against inadvertent movement such as by setting the parking brake, placing the transmission in the manufacturer's specified park position, and by chocking wheels where necessary.

4.9.4 The operator will maintain the cab, floor and deck of mobile equipment free of material, tools or other objects which could create a tripping hazard, interfere with the operation of controls, or be a hazard to the operator or other occupants in the event of an accident.

4.9.5 If mobile equipment has seat belts required by law or manufacturer's specifications, the operator and passengers will use the belts whenever the equipment is in motion, or engaged in an operation which could cause the equipment to become unstable.

4.9.6 When approaching or crossing the intended path of travel of mobile equipment, establish eye contact with the operator of the mobile equipment and confirm that it is safe to proceed.

4.9.7 Have vehicle headlights on at all times when driving in the area.

4.9.8 Park motor vehicles off the haul roads, or away from the work areas.

4.9.9 Do not wear loose clothing where there is a danger of entanglement in rotating equipment.

4.9.10 Do not enter the swing area of machines such as cranes, mobile drill rigs, or excavators, without first making eye contact with the operator, and receiving permission to do so.

4.9.11 Stay out of the blind areas around mobile equipment and never assume that the equipment operators have seen them or are aware of their presence.

4.9.12 Maintain a distance of 60 cm (2 ft.) between the counterweight of swing machines and the nearest obstacle. If this distance cannot be maintained, the area will be barricaded or guarded to prevent access.

4.9.13 Vibration from moving traffic or mobile equipment can cause excavations or spoil piles to become unstable. Be aware of the risk and keep clear.

4.9.14 All heavy equipment shall be operated in a safe manner that will not endanger persons or property.

4.9.15 All heavy equipment shall be operated at safe speeds.

4.9.16 Always move heavy equipment up and down the face of a slope. Never move equipment across the face of a slope.

4.9.17 Slow down and stay as far away as possible while operating near steep slopes, shoulders, ditches, cuts, or excavations.

4.9.18 When feasible, operators shall travel with the “load trailing”, if the load obstructs the forward view of the operator.

4.9.19 Slow down and sound horn when approaching a blind curve or intersection. Flagmen equipped with 2-way radio communications may be required to adequately control traffic.

4.9.20 Operators shall remain in cab while heavy equipment is being loaded.

4.9.21 Equipment shall be shut down prior to and during fueling. Do not smoke or use electrical devices while fueling. Fuel shall not be carried in or on heavy equipment, except in permanent fuel tanks or approved safety cans.

4.9.22 Turn off heavy equipment, place gear in neutral and set parking brake prior to leaving vehicle unattended. Buckets and blades are to be placed on the ground and with hydraulic gears in neutral. Heavy equipment parked on slopes shall have the wheels chocked.

4.9.23 Never jump on to or off of a piece of heavy equipment, always maintain 3-points of contact at a minimum.

4.9.24 Never exit heavy equipment while it is in motion.

4.9.25 Passengers shall only ride in heavy equipment designed for occupancy of passengers.

4.9.26 Never ride on the outside of a piece of heavy equipment (e.g., tailgates, buckets, steps, etc.).

4.9.27 Site vehicles will be parked in a designated parking location away from heavy equipment.

4.9.28 Operators shall never push/pull “stuck” or “broken-down” equipment unless a spotter determines that the area is cleared of all personnel around and underneath the equipment.

4.9.29 If designated for work in contaminated areas/zones, equipment shall be kept in the exclusion zone until work or the shift has been completed. Equipment will be decontaminated within designated decontamination areas.

4.9.30 Equipment left unattended at night adjacent to traveled roadways shall have appropriate lights or reflectors, or barricades equipped with appropriate lights or reflectors, to identify the location of that equipment, and shall not be closer than 6 feet (or the regulatory requirement for the work location) to the active roadway.

4.9.31 Pneumatic-tired earthmoving haulage equipment, with a maximum speed exceeding 15 miles per hour, shall be equipped with fenders on all wheels.

4.9.32 Lift trucks shall have the rated capacity clearly posted on the vehicle, and the ratings are not exceeded.

4.9.33 Steering or spinner knobs shall not be attached to steering wheels.

4.9.34 High lift rider industrial trucks shall be equipped with overhead guards.

4.9.35 When ascending or descending grades in excess of 5%, loaded trucks shall be driven with the load upgrade.

4.9.36 All belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains, or other reciprocating, rotating or moving parts of equipment shall be guarded when exposed to contact by persons or when they otherwise create a hazard.

4.9.37 All hot surfaces of equipment, including exhaust pipes or other lines, shall be guarded or insulated to prevent injury and fire.

4.9.38 All equipment having a charging skip shall be provided with guards on both sides and open end of the skip area to prevent persons from walking under the skip while it is elevated.

4.9.39 Platforms, foot walks, steps, handholds, guardrails, and toeboards shall be designed, constructed, and installed on machinery and equipment to provide safe footing and access ways.

4.9.40 Substantial overhead protection shall be provided for the operators of fork lifts and similar equipment.

4.10 Utilities

4.10.1 When contacted by heavy equipment, aboveground and underground utilities may cause severe injuries or death as a result of electrocution, explosion, etc.

4.10.2 The following outline the requirements while performing heavy equipment operations that may lead to contact with aboveground or underground utilities:

- Always be aware of surrounding utilities.
- Confirm all equipment (i.e., dump trailers, loaders, excavators, etc.) is lowered prior to moving underneath of aboveground utilities.
- Confirm utilities are cleared and identified prior to beginning any earthmoving operation. Contact the local utility service providers for clearance prior to performing work. Confirm documentation of the contact is made; date, number; contact name, organization, etc.

4.11 Training

4.11.1 The operator or other qualified supervisor will provide all on-site personnel with an orientation to the mobile equipment and its associated hazards and controls.

4.11.2 Only designated, qualified personnel shall operate heavy equipment.

4.11.3 Operators shall have all appropriate local, state, or federal licenses or training to operate a designated piece of heavy equipment.

4.11.4 Operators shall be evaluated through documented experience and routine monitoring of activities unless the equipment is operated by an AECOM operator in which case a practical evaluation is needed. Operators shall be knowledgeable and competent in the operation of a designated piece of heavy equipment.

4.12 Inspection and Maintenance

4.12.1 Maintenance records for any service, repair or modification which affects the safe performance of the equipment will be maintained and be reasonably available to the operator and maintenance personnel during work hours.

4.12.2 Maintenance records will be maintained on the site or project for mobile equipment.

4.12.3 Servicing, maintenance and repair of mobile equipment will not be done when the equipment is operating, unless continued operation is essential to the process and a safe means is provided.

4.12.4 All heavy equipment shall have a documented inspection and if necessary, repaired prior to use. Operators shall not operate heavy equipment that has not been cleared for use. All machinery and mechanized equipment will be certified to be in safe operating condition (certification form attached) by a competent individual seven days prior to on-site operation, and is valid for one year.

4.12.5 All heavy equipment shall be inspected at a minimum to the manufacturer's recommendations prior to each work shift. All defects shall be reported to the site supervisor/manager immediately. Inspection records shall be maintained at the site. If a manufacturer's or company-specific inspection checklist is not provided, use the Heavy Equipment Pre-Operation Inspection Checklist (attached).

4.12.6 Defective heavy equipment shall be immediately taken out of service until repaired.

4.13 Fueling and batteries

4.13.1 A well-ventilated area shall be used for refueling.

4.13.2 Only the type and quality of fuel recommended by the engine manufacturer shall be used.

4.13.3 Fuel tanks shall not be filled while the engine is running. All electrical switches shall be turned off.

4.13.4 No one shall spill fuel on hot surfaces. Any spillage should be cleaned before starting an engine.

4.13.5 Spilled fuel shall be cleaned with cotton rags or cloths; do not use wool or metallic cloth.

4.13.6 Open flames, lighted smoking materials, or sparking equipment shall remain well away from the fueling area.

4.13.7 Heaters in carrier cabs shall be turned off when refueling the carrier or the drill rig.

4.13.8 Portable fuel containers shall not be filled completely to allow expansion of the fuel during temperature changes.

4.13.9 The fuel nozzle shall be kept in contact with the tank being filled to prevent static sparks from igniting the fuel.

4.13.10 Portable fuel containers shall not travel in the vehicle or carrier cab with personnel.

4.13.11 Fuel containers and transfer hoses shall be kept in contact with a metal surface during travel to prevent buildup of a static charge.

4.13.12 Batteries shall be serviced in a ventilated area while wearing appropriate PPE.

4.13.13 When a battery is removed from a vehicle or service unit, the battery shall be disconnected ground post first.

4.13.14 When installing a battery, the battery shall be connected ground post last.

4.13.15 When charging a battery, cell caps shall be loosened prior to charging to permit gas to escape.

4.13.16 When charging a battery, the power source shall be turned off to the battery before either connecting or disconnecting charger loads to the battery posts.

4.13.17 Spilled battery acid shall be immediately flushed off the skin with a continuous supply of water.

4.13.18 Should battery acid get into the eyes, the eyes shall be flushed immediately with copious amounts of water and medical attention sought immediately.

4.13.19 To avoid battery explosions, the cells shall be filled with electrolytes. A flashlight (not an open flame) shall be used to check water electrolyte levels. Avoid creating sparks around battery by shorting across a battery terminal. Lighted smoking materials and flames shall be kept at least 25 feet away from battery-charging stations.

5.0 Records

5.1 Inspection records shall be maintained with the equipment.

6.0 Attachments

6.1 S3NA-309-FM1 Certification of Machinery and Mechanized Equipment

6.2 S3NA-309-FM2 Heavy Machinery Pre-Operation Checklist

6.3 S3NA-309-WI Brokk180 Safety Card

S3NA-313-PR Wildlife, Plants and Insects

1.0 Purpose and Scope

1.1 Communicates the requirements and precautions to be taken by AECOM employees to protect against the biological hazards associated with insects, arachnids, snakes, poisonous plants, and other animals referred to herein collectively as “biological hazards”.

1.2 This procedure applies to all AECOM North America (NA) based employees and operations.

2.0 Terms and Definitions

2.1 **Field Work**: Field work is defined as any activity conducted at a site that contains brush, overgrown grass, leaf litter, poisonous plants, or is located near mosquito breeding areas and includes work in structures where animals might exist that harbor fleas or ticks or where spiders and mites could be present. Field work includes, but is not limited to, Phase I, Phase II, Operations Monitoring & Maintenance (OM&M), biological surveys, and other work that meets the definition of field work.

2.2 **Poisonous:** Capable of harming or killing by or as if by poison; toxic or venomous.

2.3 **Phase I Environmental Site Assessment:** Investigation of real property to determine the possibility of contamination, based on visual observation and property history, but no physical testing. Under new Environmental Protection Agency regulations that went into effect on November 1, 2006, a Phase I, as it is called for short, will be mandatory for all investors who wish to take advantage of CERCLA defenses that will shield them from liability for future cleanup, should that prove necessary. The new Phase I rules, called “All Appropriate Inquiry” or AAI, also require more investigation than previously mandated. Investors can expect to see dramatic price increases over prior experiences.

2.4 **Phase II Environmental Site Assessment:** Investigation of real property through physical samplings and analyses to determine the nature and extent of contamination and, if indicated, a description of the recommended remediation method.

3.0 References

3.1 Public Health Agency of Canada (http://www.phac-aspc.gc.ca/id-mi/tickinfo-eng.php) on Ticks and Lyme Disease in Canada

3.2 Public Health Agency of Canada (http://www.phac-aspc.gc.ca/wn-no/index-eng.php) on West Nile Virus

3.3 United States Center for Disease Control (CDC) (http://www.cdc.gov/ncidod/dvbid/lyme/index.htm) on Lyme Disease

3.4 New York State Department of Health, 2007. Health Advisory, Tick and Insect Repellents. http://www.health.state.ny.us/nysdoh/westnile/pdf/2737.pdf

3.5 Spectrum Brands, 2007. Personal Insect Repellent Products. http://www.spectrumbrandshomeandgarden.com/CorpNav/AboutSpectrum/ProductCategories/insect_repellent.htm

3.6 U.S. Centers for Disease Control and Prevention, 2004. Tick Management Handbook. http://www.cdc.gov/ncidod/dvbid/lyme/resources/handbook.pdf

3.7 U.S. Environmental Protection Agency, 2006. Permethrin Facts: Preregistration Eligibility Decision Fact Sheet. http://www.epa.gov/oppsrrd1/reregistration/REDs/factsheets/permethrin_fs.htm

3.8 U.S. National Pesticide Information Center, 1997, National Pesticide Telecommunications Network Fact Sheet for Permethrin. http://npic.orst.edu/factsheets/permethrin.pdf

3.9 U.S. Environmental Protection Agency, 2005. New Pesticide Fact Sheet, Picaridin http://www.epa.gov/opprd001/factsheets/picaridin.pdf

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Project Managers and Supervisors

- **Project Managers** and **Supervisors** responsible for managing field work will work with employees conducting the work to see that a Task Hazard Analysis (THA) for the work to be conducted has been performed prior to the beginning of the field work and that it includes an assessment of potential biological hazards.
- If biological hazards are identified as an exposure risk in the workplace, control measures that may be applied at the project site will be implemented to reduce the potential for employees to be exposed to injuries and illnesses while working.
- If the exposures cannot be eliminated or managed with engineering controls, the **Project Manager** or **Supervisor** will approve the use of PPE and protective repellents and lotions and ensure that exposed employees have and use these products.

4.1.2 District Operations Manager

- Approve the costs associated with the PPE and materials necessary to protect employees from the biological hazards covered by this Procedure.
- During the performance of project site visits, managers will assess the precautions being taken against the requirements of this Procedure.

4.1.3 Regional SH&E Manager

- Participate in incident reporting and investigations when appropriate.
- Work with office SH&E Department and project Safety Professionals, provide training and guidance to employees consistent with this procedure.
- Assist project teams in identifying hazards and selecting appropriate control measures.

4.1.4 Operational Managers

- Assure implementation of this procedure in their regions and offices.
- Participate in incident reporting and investigations when appropriate.

4.1.5 Employees

- Participate in required training on this procedure.
- Participate in the development of THAs for the project, identify control measures to limit exposure and request PPE, repellents, and protective lotions required by this Procedure.
- Obtain approval from **Project Managers** and/or **Supervisors** to purchase selected PPE prior to purchasing.
- Implement the precautions appropriate to prevent exposure to the hazardous wildlife, insects and plants.
- Observe requirements for reporting as detailed within the Procedure.
- Participate in incident reporting and investigations when appropriate.

4.2 Overview

4.2.1 The procedures discussed below are detailed because these hazards have historically posed the most significant risk to AECOM employees. Note that this discussion is not a fully encompassing list of hazards and as part of the Task Hazard Analysis conducted by the project team, additional consideration must be given to other biological hazards.

4.2.2 Departments of Public Health local to the worksite, as well as the Centers for Disease Control (CDC) can serve as a resource for identifying biological hazards not discussed in this Procedure.

4.2.3 If additional biological hazards are identified, the project team should contact the **Regional SH&E Manager** to discuss the hazards and identify effective control measures that can be implemented at the project site.

4.3 Planning and Hazard Assessment

4.3.1 The AECOM project team shall ensure that the potential for exposure to specific biological hazards are assessed prior to the commencement of work and that the procedures specified by this SOP are integrated into the project planning process and conveyed to AECOM employees conducting the field work. This information shall be communicated in the site specific Safe Work Plan (SWP), Health and Safety Plan (HASP), the THA, pre-project kickoff meetings, and tailgate meetings at the project site.

4.3.2 It is important to note that the precautions to be taken by AECOM employees to decrease the risk of exposure to biological hazards can directly increase the risk of heat-related illness due to thermal stresses. Therefore, heat stress monitoring and precautions shall be included as a critical component of the project-specific hazard assessments in accordance with *S3NA-511-PR Heat Stress.*

4.3.3 During the preparation of the project specific Safe Work Plan (SWP), HASP and project specific THA, **Project Managers**, **Supervisors**, and the project staff will determine what biological hazards might be encountered during the project and will prescribe the precautions to be taken to reduce the potential for exposure and the severity of resulting illnesses. Consideration will be given to conditions such as weather, proximity to breeding areas, host animals, and published information discussing the presence of the hazards.

4.3.4 It should be assumed that at least one of the biological hazards exists whenever working on undeveloped property. This can include insect activity any time that local temperatures exceed 40°F for a period of more than 24 hours. The stubble and roots of poisonous plants can be a hazard any time of year, including when some plants are dormant or mown.

4.3.5 The hazard assessments must also consider the additional hazards posed by vegetative clearing such as the increased risk of coming in contact with poison ivy, oak or sumac and hazards associated with the use of tools and equipment to remove vegetation.

4.3.6 Employees in the field where biological hazards exist will not enter the hazard areas unless they are wearing the appropriate protective clothing, repellents, and barrier creams specified below. If the hazard is recognized in the field but was not adequately assessed during the THA, the affected employees shall stop work and not proceed until the THA has been amended and protective measures implemented.

4.3.7 A decision flow chart and table for determining the potential for biological hazards in US states has been provided in *S3NA-313-WI1 Biological Hazard Assessment Decision Flow Chart Hazard Assessment (US States).*

4.4 Restrictions

4.4.1 Staff with life-threatening reactions shall not undertake work in areas infested with the allergen (e.g., wasps, poison ivy), unless precautions are met which satisfy a medical practitioner's requirements.

4.5 Employee Sensitivity

4.5.1 Sensitivity to toxins generated by plants, insects and animals varies according to dosage and the ability of the victim to process the toxin, therefore it is difficult to predict whether a reaction will occur, or how severe the reaction will be. Staff should be aware that there are a large number of organisms capable of causing serious irritations and allergic reactions. Some reactions will only erupt if a secondary exposure to sunlight occurs. Depending on the severity of the reaction, the result can be severe scarring, blindness or even death.

4.5.2 Employees also need to consider whether they are sensitive to the use of insect repellents.

4.6 Personal Protective Equipment

4.6.1 The selection of Personal Protective Equipment is dependent on the hazard present and a PPE Hazard Analysis should be conducted to determine situation specific PPE required. (refer to SOP *S3NA-208 Personal Protective Equipment Program*)

4.6.2 At a minimum, in addition to any project specific PPE, long sleeves and pants should be worn on field projects where the risk of biological encounter exists.

4.6.3 PPE for insects should include sunscreen, bug nets, bug jackets, or insect repellent. Socks should be pulled over pant legs and rubber boots should be worn where the threat of exposure is anticipated.

4.6.4 Epi-pens[1] or other personal medication should be carried by those staff that are aware that anaphylactic shock is a possibility for them.

4.7 Remedies

4.7.1 If you suspect exposure to an irritant, identify the cause including obtaining a specimen if possible. Document the occurrence as a safety precaution if the exposure should lead to complications.

4.7.2 Go to a doctor or call WorkCare for advice if necessary.

4.8 Training

4.8.1 Field staff must learn to recognize organisms that represent a threat in the regions in which they work – experienced field staff must provide on the job training to assist staff with hazard recognition.

4.8.2 Staff who have severe allergic reactions are strongly recommended to notify their project manager, field supervisor, and co-workers of the potential for a reaction and demonstrate what medication they might need and how it is administered.

4.9 Insects

4.9.1 Insects for which precautionary measures should be taken include but are not limited to: mosquitoes (potential carriers of disease aside from dermatitis), black flies, wasps, bees, ticks, Fire Ants and European Fire Ants.

4.9.2 Wasps and bees will cause a painful sting to anyone if they are harassed. They are of most concern for individuals with allergic reactions who can go into anaphylactic shock. Also, instances where an individual is exposed to multiple stings can cause a serious health concern for anyone. These insects are most likely to sting when their hive or nest is threatened.

4.9.3 Ticks can be encountered when walking in tall grass or shrubs. They crawl up clothing searching for exposed skin where they will insert mouthparts to drink blood. The most serious concern is a possibility of contracting Lyme disease which is spread by the Black-legged or Deer Tick. The larger Wood Ticks are widespread in the west but these rarely carry diseases. Occasionally a tick can cause Tick Paralysis if it is able to remain feeding for several days. Full recovery usually occurs shortly after the tick is removed.

4.9.4 The Fire Ant (southern and western US) and the European Fire Ant (northeastern US and eastern Canada) is often very abundant where it is established. It is very aggressive and commonly climbs up clothing and stings unprovoked when it comes into contact with skin. Painful irritations will persist for an hour or more.

4.10 Ticks

4.10.1 Data from the CDC indicates that tick-borne diseases have become increasingly prevalent. At the same time, tick repellents have become both safe and effective so it is possible to prevent the vast majority of bites and therefore most related illnesses.

4.10.2 The most common and severe tick-borne illnesses in the U.S. are Lyme disease, Ehrlichiosis, and Rocky Mountain spotted fever. A summary table listing CDC informational resources for these diseases is provided in *S3NA-313-WI2 Ticks* along with a listing of CDC information resources and maps showing the distribution of common tick-borne diseases in the U.S.

4.10.3 When working in areas where ticks may occur, it is recommended that clothes are turned inside out and shaken at the end of day; do not wear the same clothes two days in a row.

4.10.4 To remove ticks that are embedded in skin, use tweezers or fingers to carefully grasp the tick as close to the skin as possible and pull slowly upward, avoiding twisting or crushing the tick. Do not try to burn or smother the tick. Cleanse the bite area with soap and water, alcohol, or household antiseptic. Note the date and location of the bite and save the tick in a secure container such as an empty pill vial or film canister. A bit of moistened paper towel placed inside the container will keep ticks from drying out.

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[1] *Epi-pens must be prescribed by a personal physician. Renew epi-pens on a regular schedule to ensure effectiveness and make sure your field companions know where it is and how to use it if you cannot self administer the dose.*

4.10.5 Familiarize yourself with the characteristic bulls-eye pattern of Lyme disease infection surrounding the bite. If noted, report to medical help for inoculation.

4.10.6 If possible, submit any ticks found or captured to the following laboratories for species identification.

- Canada – National Microbiology Laboratory (NML) (Phone: (204) 789-2000; email: ticks@phac-aspc.gc.ca). The NML will conduct diagnostic testing for the Lyme disease agent as well as several other disease-causing agents. The NML results will not only benefit anyone bit by the tick, but will also assist the NML in their goal to accurately map the distribution of the tick species and associated diseases in Canada.
- US – IGeneX, Inc. (Phone: (800) 832-3200; www.igenex.com). IGeneX will test the tick for the presence of the Lyme bacteria. They also test ticks for *Babesia microti* and/or *Babesia duncani* (formerly WA-1), Ehrlichia, Bartonella henselae and Rickettsia (Rocky Mountain Spotted Fever). These diseases are also carried by ticks. The testing request form is attached as *S3NA-313-FM Tick Test Request Form*.

4.10.7 If you experience symptoms such as fever, headache, fatigue, and a skin rash, you should immediately visit a medical practitioner as Lyme disease is treated easily with antibiotics in the early stages, but can spread to the heart, joints, and nervous system if left untreated.

4.11 Chiggers

4.11.1 Chiggers are mite larvae, approximately ½ mm in size, and typically invisible to the naked eye. While chiggers are not known to carry infectious diseases, their bites and resulting rashes and itching can lead to dermatitis and a secondary infection.

4.11.2 Chiggers are typically active from the last hard freeze in the winter or spring to the first hard freeze. They are active all year in the Gulf Coast and tropical areas.

4.12 Spiders

4.12.1 Spiders can be found in derelict buildings, sheltered areas, basements, storage areas, well heads and even on open ground. Spiders can be found year round in sheltered areas and are often present in well heads and valve boxes.

4.12.2 Most spider bites produce wounds with localized inflammation and swelling. The Black Widow and Brown Recluse spiders in the US and others outside the US inject a toxin that causes extensive tissue damage and intense pain.

4.12.3 Additional information on spider identification can be found in attachment *S3NA-313-WI3 Poisonous Spider Identification*.

4.13 Mosquitoes

4.13.1 Mosquitoes can transmit the West Nile Virus and other forms of encephalitis after becoming infected by feeding on the blood of birds which carry the virus. Positive cases of West Nile Virus have been confirmed throughout North America since 2007.

4.13.2 Most people infected with the virus experience no symptoms or they have flu-like symptoms. Sometimes though, the virus can cause severe illness, resulting in hospitalization and even death ,so proper precautions should be taken. Consult a medical practitioner if you suspect you have West Nile Virus.

4.13.3 When a mosquito bites, it injects an enzyme that breaks down blood capillaries and acts as an anticoagulant. The enzymes induce an immune response in the host that results in itching and local inflammation. The tendency to scratch the bite sites can lead to secondary infections.

4.13.4 CDC data indicates that mosquito-borne illnesses, including the strains of encephalitis, are a health risk to employees working in outdoor environments. At least one of the Encephalitis strains listed below is known to exist in every area of the U.S. and in many other countries as well:

- Eastern Equine encephalitis (EEE)
- Western Equine encephalitis (WEE)
- West Nile Virus
- St. Louis encephalitis (SLE)
- La Crosse (LAC) encephalitis

4.13.5 Other diseases including Dengue Fever and Malaria are spread by mosquitoes in the sub-tropic and tropical parts of the world. See *S3NA-313-WI4 Mosquito Borne Diseases* for information on the locations where mosquito borne diseases are known to be present.

4.14 Bees and Hornets

4.14.1 Bees, hornets, and wasps may be found in derelict buildings, sheltered areas, and even on open ground. The flying/stinging insects are not specifically included in the scope of this procedure and the PPE and other protective measures are not normally effective against aggressive, flying insects. Avoid reaching into areas where visibility is limited.

4.14.2 If stung by a wasp or bee or hornet, notify a co-worker or someone who can help should you have an allergic reaction. Stay calm and treat the area with ice or cold water. Seek medical attention if you have any reactions to the sting such as developing a rash, excessive swelling or pain at the site of the bite or sting, or any swelling or numbness beyond the site of the bite or sting.

4.14.3 Employees with known allergies to insect stings should consult their personal physician for advice on any immediate medications that they should carry with them. AECOM highly recommends that employees with known allergies inform their co-workers of the allergy and the location of the medications they might carry for the allergy.

4.15 Poisonous Plants

4.15.1 Poisonous plants including poison ivy, oak and sumac, which contain the oil urushiol that produces a rash, can lead to dermatitis and infections. Exposure to urushiol produces a rash that can be irritating and cause the exposed employee to scratch the affected area, increasing susceptibility for an infection. It should be noted that each time an employee is exposed to urushiol the severity of the reaction increases. In cases that involve severe rashes, medical treatment may be necessary to control the rash.

4.15.2 Wild parsnip is found throughout the U.S. and contains a poison that produces a rash similar to poison oak and ivy. Unlike poison oak and ivy, the active oil will not be present on unbroken leaves. See *S3NA-313-WI6 Wild Parsnip Identification* for additional information and photos of wild parsnip.

4.15.3 Plants that field staff should recognize and take precautions to avoid include: Poison Sumac, Poison Ivy (terrestrial and climbing), Poison Oak, Giant Hogweed[2] (or Giant Cow Parsnip), Wild Parsnip, Devil's Club and Stinging Nettle. Many others are extremely poisonous to eat (e.g., Poison Hemlock; Water Parsnip) – do not eat anything that has not been identified.

4.15.4 See *S3NA-313-WI5 Plants of Concern* for information on locations where some of these poisonous plants are found in the US.

4.15.5 Of the toxic plants in the cashew family, Poison Ivy (*Rhus radicans*) is most widespread occurring across southern Canada. It is usually a low sprawling shrub or ground cover but in southwestern Ontario it also grows as a thick woody vine that grows high into the tree canopy. Poison Oak (*Rhus diversiloba*) is a low shrub that grows only in southwestern British Columbia and Poison Sumac (*Rhus vernix*) is a tall shrub that grows in southern Ontario but is quite rare. All of these plants possess urushiol oils in nearly all parts of the plant. Touching the plant causes an itchy skin rash that shows up several days following contact. People have a wide range of reactions which in severe cases can lead to oozing blisters on large parts of the body. Some people apparently never react and others may develop an allergy after no reaction after years of frequent contact.

4.15.6 Several plants in the carrot family contain toxic sap that causes severe dermatitis if it comes into contact with skin that is then exposed to sunlight. The most serious reaction is caused by the Giant Hogweed (*Heracleum mantegazzianum*), a garden that is spreading in southern Ontario and is also present in southwestern British Columbia. The plant is enormous, attaining up to 5 m in height, which it does in one growing season. Contact causes painful blistering that can cause permanent disfigurement. It is to be avoided. Similar but less serious reactions can be caused by Meadow Parsnip (*Pastinaca sativa*) and Cow Parsnip (*Heracleum lanatum*). Meadow Parsnip can be very abundant on disturbed sites.

4.15.7 Nettles, particularly Stinging Nettle (*Urtica dioica*) and Wood Nettle (*Laportea canadensis*) contain urticating hairs on the leaves and stems that cause sharp pain or itchiness on contact with skin. The irritation is immediate and normally lasts no more than an hour and there are no lasting consequences.

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[2] *Phytodermatisi producer: keep skin covered and wash well after exposure*

4.15.8 Some plants contain abundant stiff spines that can present a safety hazard, particularly if one is to fall into them. Fragile Prickly Pear cactus (*Opuntia fragilis*) is common in semi arid areas of the southern Prairie Provinces and interior British Columbia. Pieces will break off and imbed into one's ankle by scarcely brushing them. Devils Club (*Oplopanax horridum*) can form dominant understorey in humid forests among the western mountains. It contains semi-soft spines on the stems that will break off in the skin causing considerable irritation for days. In some areas of Ontario, Prickly-ash (*Zanthoxylon americanum*) a tall shrub with sturdy spines, sometimes forms dense single stands that are nearly impenetrable.

4.15.9 A large number of plants are not harmful to touch but may contain poisonous berries or foliage that could cause serious complications or death if they are ingested. It goes without saying not to eat any berries or plants if you are not absolutely sure of their identity.

4.15.10 Of all the plants, Giant Hogweed presents the most serious health risk. Field staff should learn to recognize and avoid it if encountered.

4.15.11 Employees who develop a rash as a result of exposure to poisonous plants shall report the exposure immediately to their **Supervisor** or **Project Manager** who will then forward the report to the **Regional SH&E Manager**.

4.16 Additional Biological Hazards

4.16.1 Additional Work Instructions are provided for protection and prevention from the following:

- *S3NA-313-WI11 Large Carnivores*
- *S3NA-313-WI12 Bear Safety*
- *S3NA-313-WI13 Small Mammals*
- *S3NA-313-WI14 Snakes*
- *S3NA-313-WI15 Alligators*

4.17 Habitat Avoidance, Elimination, and/or Control

4.17.1 Ticks, Spiders and Insects

- The most effective method to manage worker safety and health is to eliminate, avoid and/or control hazards. Clearing the project site of brush, high grass and foliage reduces the potential for exposure to biological hazards. Clearing will not eliminate the exposure to flying insects and there might be an increased exposure to ticks, spiders, and poisonous plants during the clearing process.
- AECOM projects such as subsurface environmental assessment or remediation are often candidates for brush and overgrown grass to be cleared. In these instances, the AECOM project manager shall either request that the client eliminate vegetation, or request approval from the client to have vegetation clearing added to the scope of work.
- When projects must be conducted in areas that cannot or may not be cleared of foliage, personal precautions and protective measures outlined in this SOP shall be prescribed.
- Mosquitoes breed in stagnant water and typically only travel a quarter mile from their breeding site. Whenever possible, stagnant water should be drained to eliminate breeding areas. Project Managers and client site managers should be contacted to determine whether water can be drained and the most appropriate method for draining containers, containment areas, and other objects of standing water.
- If water cannot be drained, products similar to Mosquito Dunks® can be placed in the water to control mosquitoes. Once wet, the Mosquito Dunks® kill the immature, aquatic stage of the mosquito. The active ingredient is a beneficial organism that is lethal to mosquito larvae, but harmless to fish, humans, and other animals. Mosquito Dunks® provide long-term protection for 30 days or more.

4.17.2 Poisonous Plants

- If poisonous plants are identified in the work area, employees will mark the plants using either flags or marking paint, and discuss what the specific indicator will be to signal to other employees to avoid the designated area. If employees decide to use ground-marking paint to identify poisonous plants, they should discuss this tactic with the **Project Manager** and/or Client to gain approval.

- If removal of the plants is considered, it should be subcontracted to a professional landscaping service that is capable and experienced in removing the plant. If herbicides are considered for use, a discussion will need to occur with the **Project Manager** and Client to determine whether it is acceptable to apply herbicides at the work site. Application of herbicides may require a license.
- AECOM employees shall not attempt to physically remove poisonous plants from the work area unless a clearing procedure including PPE is prepared in advance and approved by the Regional SH&E Manager. If a SWP or HASP is prepared for the project, the clearing procedure should be included and the required PPE specified.

4.17.3 Bird Droppings

- Bird excrement may be encountered due to the nesting of pigeons and other birds and winged animals (e.g., bats) on or in structures. Substantial accumulations of droppings can pose physical and health risks as slippery surfaces (if wet) and if the material is disturbed and becomes airborne, it can be inhaled or ingested if personal hygiene practices are not implemented. Inhalation of airborne droppings can cause diseases such as histoplasmosis. Exposure to surfaces with bird droppings shall be safeguarded by implementing proper work practices, training employees for awareness and using PPE. See *S3NA-313-WI10 Bird Droppings Safe Work Practices*.

4.18 Personal Precautions and Personal Protective Measures

4.18.1 Precautions

- Be aware of the potential irritants in your area and know how to recognize them.
- Modify activities to avoid encounters (diurnal rhythms, seasonal rhythms).
- Wear protective clothing.
- When working in areas where there may be small insects that “hitchhike” (e.g., ticks, spiders, scorpions), it is recommended that clothes are turned inside out and shaken at the end of day; do not wear same clothes two days in a row.
- Staff should always be aware of where they are placing their hands, or where they are sitting in order to avoid contact with potential toxins.

4.18.2 PPE

- The following recommendations may be considered by the project team to determine if the use of PPE is necessary for the type of work planned: Disposable gloves may be cotton, leather, or synthetic materials and must not be reused after removing.
- Clearing activities present the greatest risk of employee exposure but reduce the risks once completed. Recommendation – AECOM employees actively participating in clearing will use full protection from ticks and insects during the clearing activities including insect repellents, Tyvek® coveralls, and gloves.
- If the foliage being cleared includes poisonous plants, exposed skin will be treated with a dermal barrier cream such as Tecnu®’s Oak ‘n Ivy Armor or Enviroderm’s Ivy Block and either a full face respirator or a half face respirator (with goggles) fitted with a P-100 (HEPA) dust filter.
- Work in habitats with direct exposure to ticks, mosquitoes, and poisonous plants is likely and the scope of work does not allow for worksite control measures like vegetative clearing: Recommendation – Full protection from biological hazards including insect repellents, Tyvek® coveralls or full length clothing, poisonous plant barrier creams and wipes, and gloves.
- Work in habitats with direct exposure to ticks and mosquitoes and no exposure to poisonous plants is likely and the scope of work typically does allow for worksite control measures like vegetative clearing: Recommendation – Protection including insect repellents and Tyvek® coveralls or full length clothing.
- Work in habitats with direct exposure to poisonous plants and no exposure to ticks or insects is likely and the scope of work does not allow for worksite control measures like vegetative clearing: Recommendation – Full protection from poisonous plants including insect repellents, Tyvek® coveralls or full length clothing, poisonous plant barrier creams and wipes, and gloves.
- Industrial/Commercial/Office Facilities – Direct contact with biological hazards is considered unlikely or low risk: Recommendation – PPE for biological hazards are not required; however, Tyvek coveralls and insect repellentrepellent should be available if exposure to spiders, flying insects, or other biological hazards is encountered.
- Work in areas where no biological hazards are expected because of the local environment, winter weather, or property development: Recommendation – PPE for biological hazards is not required;

however, Tyvek® coveralls and insect repellentrepellent should be available if exposures to spiders, flying insects, or other biological hazards are encountered.

- The following precautions and protective measures shall be implemented by AECOM employees conducting field work where the biological hazards covered by this SOP exist:

4.18.3 Insects, Spiders, and Ticks

- Chemically-treated field clothing, full-length clothing, or Tyvek® coveralls.
- Application of insect repellent to clothing and/or exposed skin.
- Routine personal checks.
- Exercise care when collecting samples and avoid reaching into areas where visibility is limited. If stung by an insect or bitten by a spider or tick, attempt to identify the attacker and notify a co-worker or someone who can help should the bite site become painful, discolored, or swollen. Stay calm and treat the area with ice or cold water. Seek medical attention if you have any reactions to the sting such as developing a rash, excessive swelling or pain at the site of the bite, or any swelling or numbness beyond the site of the bite.
- Oil of lemon eucalyptus, DEET, and Permethrin have been recommended by the Centers for Disease Control and Prevention for effective protection against mosquitoes that may carry the West Nile virus and related diseases.
- Note that DEET will reduce the effectiveness of Fire Resistance Clothing (FRC) and should not be applied to this clothing. If working in FRC, employees can apply DEET to their skin and let dry prior to putting FRC on, or use Permethrin as it has been shown not to reduce the effectiveness of FRC. Permethrin will need to be applied to FRC well in advance of the planned work.

4.18.4 Poisonous Plants

- Employees working in areas where poisonous plants exist shall wear either long sleeve clothing or Tyvek® coveralls, and disposable cotton, leather or synthetic gloves. Employees must not touch exposed skin (neck and face) with potentially contaminated gloves. Tyvek® and gloves worn to protect from exposure to poisonous plants will be treated as contaminated, removed from the body in a manner that the contamination is not spread, and placed in plastic bags for disposal.
- Personal clothing that has been exposed to poisonous plants shall be decontaminated with a poisonous plant cleanser such as Tecnu® or removed in a careful manner, bagged and washed separately from other clothing to remove urushiol.
- Work boots will be decontaminated with either soap and water or a cleansing agent such as Tecnu® cleanser.
- Remember that in the fall and winter the hazard still exists in the form of stubble and roots.
- Employees who develop a rash as a result of exposure to poisonous plants shall report the exposure immediately to their **Supervisor** or **Project Manager** who will forward the report to the RSHEM.
- For dermatitis caused by Poison Ivy, Poison Oak, or Poison Sumac, calamine lotion is effective.

4.19 Selection and Configuration of Field Clothing

4.19.1 At a minimum, employees will wear long legged pants and long sleeve shirts or Tyvek® coveralls to reduce the amount of exposed skin when biological hazards are identified at the work site. Gloves will also be worn consistent with the recommendations of the site-specific SWP, HASP and/or THA to minimize hand exposure.

4.19.2 Where ticks, chiggers, and spiders are presumed to exist, the Tyvek® or chemically-treated clothing will be taped to the work boots.

4.19.3 See *S3NA-313-WI7 Configuration Clothing for Protection* against ticks and insects for illustrations and instructions for configuring, taping, and tucking clothing.

4.19.4 Chemical Treatment of Field Clothing

- Oil of lemon eucalyptus, DEET, and Permethrin have been recommended by the Centers for Disease Control and Prevention for effective protection against mosquitoes that may carry the West Nile virus and related diseases.
- Note that DEET will reduce the effectiveness of Fire Resistance Clothing (FRC) and should not be applied to this clothing. If working in FRC, employees can apply DEET to their skin prior to putting FRC on, or use Permethrin as it has been shown not to reduce the effectiveness of FRC. Permethrin will need to be applied to FRC well in advance of the planned work.

4.19.5 Permethrin

- When selected as part of a project's PPE requirements, the AECOM **Project Manager** shall ensure that field teams wear clothing treated with the chemical Permethrin, which is an insecticide with repellent properties registered with the U.S. Environmental Protection Agency (EPA), and recommended by the CDC. Information regarding the toxicity and product safety of Permethrin is provided in *S3NA-313-WI8 Insect Repellent Active Ingredient Product Information*. Permethrin is highly effective in preventing tick bites when applied to clothing, but is not effective when applied directly to the skin. Two options are available for Permethrin treatment of clothing worn during field work: 1) pre-treatment of fabric by the clothing manufacturer; or 2) employee treatment of their personal clothing using 0.5% Permethrin spray. AECOM strongly recommends the first option (employees obtaining pre-treated clothing) to avoid the time required, potential risk, and housekeeping issues involved with manually treating the clothing with spray. Purchase pre-treated clothing in accordance with *S3NA-208-PR Personal Protective Equipment Program* and with the approval of your **Supervisor**. For more information visit the AECOM NA SH&E website.
- The Permethrin pre-treatment is odorless and retains its effectiveness for approximately 25 washings. After 25 washings, the pre-treated clothing will be considered no longer effective and removed from service. Clothing that has been manually treated by employees will be considered effective for 5 wash cycles.
- Also, use of clothing that has been pre-treated with Permethrin offers a reduction in the use and application of other insect repellents that must be applied directly to the skin.. Costs for clothing shall be charged to projects as a consumable item. If charging to the project is not possible, the charges should be managed as a department expense. **Supervisor** or **Department Manager** approval is required prior to purchase.
- If an employee opts not to utilize chemically pre-treated clothing while potentially exposed to insects, spiders and/or ticks, they must either: 1) wear Tyvek® coveralls taped to the boots, 2) full length clothing consisting of long legged pants and long sleeved shirts treated with an insect repellent containing Permethrin, DEET, or an organic alternative to their work clothing.

4.19.6 Manual Treatment of Field Clothing

- If clothing pre-treated with Permethrin is not available or not purchased prior to field work, employees may manually treat their clothing with Permethrin spray. The outer surfaces of all external clothing to be worn during field work should be treated with 0.5% Permethrin spray a minimum of 2 to 4 hours prior to field work (boots, trousers, shirt, jackets, rain gear; refer to Section 4.16 for selection of field clothing) in accordance with recommendations provided by the New York State Department of Health presented in *S3NA-313-WI9 New York Department of Health Recommendations for Permethrin Application*. This will likely require treatment at home or the office prior to field mobilization. Caution should be used when applying Permethrin as it is highly toxic to fish and house cats. Clothing treatment will last for approximately 5 wash cycles (check the specific instructions for the product used.)

4.19.7 Lemon Eucalyptus

- Lemon Eucalyptus is a plant-based insect repellent on the market as Repel Lemon Eucalyptus. The products have been proven to be effective against mosquitoes, deer ticks, and no-see-ums for up to six hours. Derived from Oil of Lemon Eucalyptus, this non-greasy lotion or spray has a pleasant scent and is not known to be toxic to humans. The spray or lotions will be effective for approximately two to six hours and should be reapplied every two hours to sustain protection. Lemon Eucalyptus products cannot be applied to fire retardant clothing.

4.19.8 Purchase of PPE and Repellents and Lotions

- Costs for clothing, repellents, lotions, and other PPE shall be charged to projects as a consumable item. If charging to the project is not possible, the charges should be managed as a department expense. Supervisor or Department Manager approval is required prior to purchase.
- Material Safety Data Sheets (MSDS) for the repellents, lotions, and cleansers discussed in this Procedure are not required because the repellents, lotion, and clothing are consumer products used in the manner intended for the general public. Although not required, a MSDS should be obtained for the products used and placed into the office MSDS library and site-specific health and safety plans. Selected MSDSs are available on the AECOM NA SH&E web site.

4.20 **Personal Hygiene and Body Checks**

4.20.1 Tick-borne diseases typically require that the tick be imbedded for four hours to begin disease transfer. The oils from poisonous plants can take up to 4 hours after exposure to penetrate the skin and react with the live proteins under the skin.

4.20.2 It is recommended that exposed skin be checked frequently for the presence of ticks, insects, rashes, or discolorations. External clothing should also be checked for the presence of ticks and insects; these should be retained for identification and to determine if medical treatment is needed.

4.20.3 Employees will shower as soon as practical after working in the field and examine their bodies for the presence of ticks, insect bites, rashes, or swollen areas. If imbedded ticks are found, they should be removed using the technique described in *S3NA-313-WI2 Ticks*, the tick should be preserved with the date and location of the bite noted, and retained for identification if medical treatment is needed as described in Section 4.13.1 of this Procedure.

4.20.4 The presence of an imbedded tick, rash, or abnormal reactions will be reported as an SH&E Incident to the **Project Manager** or **Supervisor** who will forward the report to the RSHEM for follow up.

5.0 Records

None.

6.0 Attachments

6.1 S3NA-313-FM Tick Test Request Form

6.2 S3NA-313-WI1 Biological Hazard Assessment Decision Flow Chart

6.3 S3NA-313-WI2 Ticks

6.4 S3NA-313-WI3 Poisonous Spider Identification

6.5 S3NA-313-WI4 Mosquito Borne Diseases

6.6 S3NA-313-WI5 Plants of Concern

6.7 S3NA-313-WI6 Wild Parsnip Identification

6.8 S3NA-313-WI7 Configuration Clothing for Protection against ticks and insects

6.9 S3NA-313-WI8 Insect Repellent Active Ingredient Product Information

6.10 S3NA-313-WI9 New York Department of Health Recommendations for Permethrin Application

6.11 S3NA-313-WI10 Bird Droppings Safe Work Practices

6.12 S3NA-313-WI11 Large Carnivores

6.13 S3NA-313-WI12 Bear Safety

6.14 S3NA-313-WI13 Small Mammals

6.15 S3NA-313-WI14 Snakes

6.16 S3NA-313-WI15 Alligators

S3NA-405-PR Drilling, Boring, and Direct Push Probing

1.0 Purpose and Scope

1.1 Provides the minimum requirements to be followed when drilling and boring work are performed.

1.2 This procedure applies to all AECOM North America-based employees and operations.

2.0 Terms and Definitions

None.

3.0 References

None.

4.0 Procedure

4.1 All client on-site safety procedures shall be understood and adhered to.

4.2 Be aware of the provincial/territorial regulations that govern drill rig operations and exposed moving parts.

4.3 **Roles and Responsibilities**

4.3.1 **Project Manager or Resident Engineer** is responsible for ensuring that sound principles of safety, training, inspection, maintenance, and operation consistent with all resource data available from the manufacturer, OSHA, and ANSI is provided to the operator and users by the Contractor or operating entity.

4.3.2 **Site Safety Coordinator (SSC)** shall assist the **Project Manager** in compliance with the requirements of this procedure.

4.3.3 The **SH&E Department** shall assist site management with guidance about this procedure.

4.3.4 **AECOM employees** engaged in project field activities shall be cognizant of contractor activities that may affect their safety and shall follow these procedures.

4.3.5 **AECOM Equipment Operator**

- In cases where AECOM owns and operates drilling, boring, or probing equipment, the lead equipment operator is responsible for the maintenance and safe operation of equipment under their control consistent with those responsibilities of a Contractor.
- Operations will be terminated during an electrical storm, and all crew members will move away from the rig. If lightning is observed, shut down all rig operations immediately.

4.3.6 **Contractors**

- **Contractors** have direct control over the application and operation of all drilling, boring, and probing equipment owned by their organization.
- It is the **Equipment Contractor** operator's responsibility to implement safe work practices provided by the **Contractor's** project management or supervisory staff supplemented by good judgment, safe control, and caution whenever operating drilling, boring, and probing equipment.

4.3.7 **Safety Representative**: Unless the **Contractor** has a designated **Safety Representative**, the **Contractor'**s responsible person for safety for the drill crew will be the drill rig operator. The safety person's responsibilities are to

- Consider the "responsibility" for safety and the "authority" to enforce safety to be a matter of first importance.
- Be the leader in using proper personal protective equipment (PPE) and set an example in following the rules that are being enforced on others. See section 4.5 for PPE required by this SOP.
- Enforce the use of proper safety equipment and take appropriate corrective action when proper PPE is not being used.

- Understand that the proper maintenance of tools and equipment and general housekeeping on the drill rig will provide an environment that promotes and enforces safety. See Sections 4.7 and 4.9 for housekeeping and maintenance requirements of this SOP.
- Ensure that the operator has had adequate training and is thoroughly familiar with the rig, its controls, and its capabilities prior to commencement of drilling activities.
- Inspect the l rig at least daily for structural damage, loose bolts and nuts, proper tension in chain drives, loose or missing guards or protective covers, fluid leaks, damaged hoses, and/or damaged pressure gauges and pressure relief valves. A Rig Inspection Form has been provided in S3NA-405-FM1 Drill Rig Inspection for use in performing inspections when the Contractor does not have their own.
- Check and test all safety devices such as emergency shutdown switches at least daily and preferably at the start of a work shift. Rig operation should not be permitted until all emergency shutdown and warning systems are working correctly. Wiring around, bypassing, or removing an emergency device is not permitted.
- Check that all gauges, warning lights, and control levers are functioning properly, and listen for unusual sounds on each starting of an engine.
- Ensure that all new rig workers are informed of safe operating practices on and around the rig. Provide each new rig worker with a copy of the organization's drilling operations safety procedures and, when appropriate, the rig manufacturer's operations and maintenance manual. The safety person should ensure that each new employee reads and understands the safety procedures.
- Ensure that a first aid kit and fire extinguishers are available and properly maintained on each rig and on each additional vehicle.
- Be well trained and capable of using a first aid kit, a fire extinguisher, and all other safety devices and equipment.
- Maintain a list of addresses and telephone numbers of emergency assistance units (ambulance services, police, hospitals, etc.), and inform other members of the drill crew of its location.
- See that new workers are instructed in rig safety, and observe the new worker's progress toward understanding safe operating practices.
- Observe the mental, emotional, and physical capability of workers to perform the assigned work in a proper and safe manner. Dismiss from the job site any worker whose mental and physical capabilities might cause injury to the worker or coworkers.
- Rig Crew and Other Field Personnel (Those employees involved in fieldwork): All personnel engaged in site activities are required to become thoroughly familiar with, and to conform to, the provisions of AECOM's safety plan, procedures, and such other safety directives as may be considered appropriate by **Project Managers**, **Safety Officers,** and **Supervisors**.
- Rig Workers: Personnel are encouraged to offer ideas, suggestions, or recommendations regarding any operational condition, procedure, or practice that may enhance the safety of site personnel or the public. Their primary responsibilities will be:
    - Perform all required work safely.
    - Familiarize themselves with and understand the plan, including proper use of personal protective equipment.
    - Report any unsafe conditions to supervisory personnel.
    - Be aware of signs and symptoms of thermal stress.

4.4 Training

4.4.1 All staff shall be provided with on-site orientation to the rig and its operator.

4.4.2 All operators and assistants shall have industry-standard safety training and be versed in the equipment to be utilized. This may include, but is not limited to, HAZWOPER, Petroleum Safety Training (or Construction Safety Training), and H2S Alive as appropriate.

4.5 Personal Protective Equipment

4.6 For most geotechnical, mineral, and/or groundwater drilling projects, PPE should include

- Hard hat: Hard hats shall be worn by everyone working at a drilling/boring site. Hats should meet the requirements of ANSI Z89 and be kept clean and in good repair with the headband and crown straps properly adjusted for the employee.

- Safety shoes: Safety shoes or boots shall be worn by all drilling personnel and all visitors to the site who observe operations within close proximity of the rig. Safety shoes or boots should meet the requirements of ANSI Z4 1.1.
- Safety glasses: All rig personnel shall wear safety glasses meeting the requirements of ANSI Z87.1.
- High Visibility Class II Safety Vest shall be worn by all **AECOM employees**. All rig personnel should attempt to wear high-visibility clothing that should be close fitting and not have large cuffs or loose material that can catch on rotating or translating components of the rig.
- Close fitting gloves and clothing: All rig personnel should wear gloves for hand protection against cuts and abrasions that could occur while handling wire rope or cable and from contact with sharp edges and burrs on drill rods and other drilling or sampling tools. Gloves should be close fitting and not have large cuffs or loose ties which can catch on rotating or translating components of the rig.
- Other protective equipment: For some operations, the project may dictate use of other protective equipment. The management of the contractor and its safety person shall determine the requirements. Such equipment might include face or ear protection or reflective clothing. The design and composition of the protective equipment and clothing should be determined as a joint effort of management and the client.
- Each worker should wear noise reducing ear protectors around operating equipment or during elevated noise levels.
- When drilling, boring, or probing is performed in chemically or radiological contaminated ground, special protective equipment and clothing will probably be required.
- The clothing of the individual rig worker is not generally considered protective equipment; however, clothing should be close fitting and comfortable without loose ends, straps, draw strings or belts or otherwise unfastened parts that might catch on some rotating or translating component of the rig. Rings and jewelry should not be worn during a work shift.

4.7 Housekeeping

4.7.1 A key requirement for safe field operations is that the Contractor safety person understands and fulfills the responsibility for maintenance and “housekeeping” on and around the drill rig, including the following:

- Suitable storage locations should be provided for all tools, materials, and supplies so that tools, materials, and supplies can be conveniently and safely handled without hitting or falling on a member of the crew or a visitor.
- Storage or transporting tools, materials, or supplies within or on the mast (derrick) of the rig should be avoided.
- Pipe, drill rods, probe rods, casing augers, and similar tooling should be orderly stacked on racks or sills to prevent spreading, rolling, or sliding.
- Penetration or other driving hammers should be placed at a safe location on the ground or be secured to prevent movement when not in use.
- Work areas, platforms, walkways, scaffolding and other accesses should be kept free of materials, debris and obstructions and substances such as ice, grease, or oil that could cause a surface to become slick or otherwise hazardous.
- All controls, control linkages, warning and operation lights, and lenses should be kept free of oil, grease, and/or ice.
- Do not store gasoline in any portable container other than a non-sparking, red safety container with a flame arrester in the fill spout and having the word “gasoline” easily visible.

4.8 Traffic Control

4.8.1 When operating near public vehicular and pedestrian traffic, the on-site personnel shall take every precaution necessary to see that the work zone is properly established, identified, and isolated from both moving traffic and passerby pedestrians.

4.8.2 All traffic control devices shall be installed, placed, and maintained in accordance with the Traffic Control Plan, client specifications, and/or the Manual of Uniform Traffic Control Devices (MUTCD). Traffic control devices shall consist of and not be limited to:

- Directional and informational signage;
- High visibility barricades, cones, or barrels;

- Lighting; and
- Other equipment and devices as required.

4.9 Maintenance & Inspection

4.9.1 Good maintenance and thorough inspection will make operations safer. Maintenance tasks should be done safely by a qualified maintenance person. Inspection and maintenance tasks include but are not limited to the following requirements:

- Inspections shall be completed at the beginning of each day by the equipment operator and in the presence of an AECOM employee when the equipment is not owned and operated by AECOM. A Rig Inspection Form is provided in S3NA-405-FM1 Drill Rig Inspection for use in performing inspections.
- Safety glasses should be worn when performing maintenance on a rig or on drilling or probing tools.
- The drill rig engine should be shut down to make repairs or adjustments to a drill rig or to lubricate fittings (except repairs or adjustments that can only be made with the engine running).
- Precautions should be taken to prevent accidental starting of an engine during maintenance by removing or tagging the ignition key.
- Wheels or the lowering of leveling jacks or both should be blocked ("zero energy state") and hand brakes set before working under a drill rig.
- When possible and appropriate, all pressure on the hydraulic systems should be released as well as the drilling fluid system and the air pressure systems of the drill rig prior to performing maintenance. In other words, reduce the drill rig and operating systems to a “zero energy state” before performing maintenance. Use extreme caution when opening drain plugs and radiator caps and other pressurized plugs and caps.
- Personnel shall not touch an engine or the exhaust system of an engine following its operation until the engine and exhaust system have adequate time to cool.
- Welding and cutting shall not occur on or near a fuel tank.
- Wire rope safety factors shall be in accordance with American National Standards Institute B 30.5-1968 or SAE J959-1966.
- Gasoline or other volatile or flammable liquids shall not be used as a cleaning agent on or around an l rig.
- The manufacturer's recommendations should be followed for applying the proper quantity and quality of lubricants, hydraulic oils, and/or coolants.
- All caps, filler plugs, protective guards, panels, high-pressure hose clamps, chains, or cables that have been removed for maintenance should be replaced.

4.10 Hand Tools

4.10.1 A large number of hand tools can be used on or around a drill or probe rig and in repair shops and more than an equal number of instructions for proper use exist. “Use the tool for its intended purpose” is the most important rule. Additionally, equipment operators and assistants should not use their hand in place of the proper tool; work shall be stopped until the correct tool can be found. The following are a few specific and some general suggestions that apply to the safe use of several hand tools that are often used on and around rigs:

- When a tool becomes damaged, either repair it before using it again or get rid of it.
- When using a hammer, any kind of hammer for any purpose, wear safety glasses and require all others around you to wear safety glasses.
- When using a chisel, any kind of chisel, for any purpose, wear safety glasses and require all others around you to wear safety glasses.
- Keep all tools cleaned and orderly stored when not in use.
- Use wrenches on nuts; don't use pliers on nuts.
- Use screwdrivers with blades that fit the screw slot.
- When using a wrench on a tight nut, first use some penetrating oil, use the largest wrench available that fits the nut, when possible pull on the wrench handle rather than pushing, and apply force to the wrench with both hands when possible and with both feet firmly placed. Don’t push or pull with one or both feet on the drill rig or the side of a mud pit or some other blocking-off device. Always assume that you may lose your footing – check the place where you may fall for sharp objects.

- Keep all pipe wrenches clean and in good repair. The jaws of pipe wrenches should be wire brushed frequently to prevent an accumulation of dirt and grease which would otherwise build up and cause wrenches to slip. Replace hook and heel jaws when they become visibly worn.
- Avoid the use pipe wrenches in place of a rod-holding device whenever possible.
- When breaking tool joints on the ground or on a drilling platform, position your hands so that your fingers will not be smashed between the wrench handle and the ground or the platform, should the wrench slip or the joint suddenly let go.

4.11 Clearing Work Areas

4.11.1 Prior to set up, adequate site clearing and leveling should be performed to accommodate the rig and supplies and provide a safe working area. Clearing the site includes clearing the intended drilling area of underground utilities in accordance with S3NA-417-PR Utilities, Underground. Drilling or probing should not be commenced when tree limbs, unstable ground or site obstructions cause unsafe tool handling conditions.

4.11.2 Start-Up

- All rig personnel and visitors should be instructed to "stand clear" of the rig immediately prior to and during starting of an engine.
- Make sure all gear boxes are in neutral, all hoist levers are disengaged, all hydraulic levers are in the neutral-actuating positions, and the cathead rope is not on the cathead before starting a drill rig engine.
- Start all engines according to the manufacturer's manual.

4.12 Drilling and Probing Operations

4.12.1 The following safety measures shall be taken during drilling and probing operations on-site:

- The operator and helper shall be present during all active rig operations.
- Site personnel shall remain within visual contact of the rig operator.
- Hard hats, approved safety boots and hearing protection shall be worn in the presence of a rig.
- Services shall be cleared prior to drilling or probing.
- Hands shall be kept away from moving parts (augers).
- The emergency shut-off switch on the rig should be identified to site personnel and tested on a regular basis by the operator.
- Unauthorized personnel shall be kept clear of the rig.

4.12.2 Safety requires the attention and cooperation of every worker and site visitor.

- Do not drive the rig from hole to hole with the mast (derrick) in the raised position.
- Before raising the mast (derrick) look up to check for overhead obstructions. Refer to *S3NA-417-PR Utilities, Underground* and *S3NA-406-PR Electrical Lines, Overhead*.
- Before raising the mast (derrick), all rig personnel (with the exception of the operator) and visitors should be cleared from the areas immediately to the rear and the sides of the mast. All rig personnel and visitors should be informed that the mast is being raised prior to raising it.
- Before the mast (derrick) of a drill rig is raised and drilling is commenced, the drill rig shall be first leveled and stabilized with leveling jacks and/or solid cribbing. The drill rig should be releveled if it settles after initial set up. Lower the mast (derrick) only when the leveling jacks are down, and do not raise the leveling jack pads until the mast (derrick) is lowered completely.
- Before starting drilling operations, secure and/or lock the mast (derrick) if required according to the drill manufacturer's recommendations.
- The operator of a rig should only operate a drill rig from the position of the controls. If the operator of the rig shall leave the area of the controls, the operator should shift the transmission controlling the rotary drive into neutral and place the feed control lever in neutral. The operator should shut down the drill engine before leaving the vicinity of the drill.
- Throwing or dropping tools will not be permitted. All tools should be carefully passed by hand between personnel or a hoist line should be used.
- Do not consume alcoholic beverages or other depressants or chemical stimulants prior to starting work on a rig or while on the job.
- If it is necessary to operate the rig within an enclosed area, make certain that exhaust fumes are conducted out of the area. Exhaust fumes can be toxic and some cannot be detected by smell.

- Clean mud and grease from your boots before mounting a rig platform and use hand holds and railings. Watch for slippery ground when dismounting from the platform.
- During freezing weather, do not touch any metal parts of the rig with exposed flesh. Freezing of moist skin to metal can occur almost instantaneously.
- All air and water lines and pumps should be drained when not in use if freezing weather is expected.
- All unattended bore holes shall be adequately covered or otherwise protected to prevent rig personnel, site visitors, or animals from stepping or falling into the hole. All open bore holes should be covered, protected, or backfilled adequately and according to local or state regulations on completion of the drilling project.
- “Horsing around” within the vicinity of the drill rig and tool and supply storage areas should never be allowed, even when the rig is shut down.
- When using a ladder on a rig, face the ladder and grasp either the side rails or the rungs with both hands while ascending or descending. Always use adequate fall protection and a full body harness when climbing above six feet of the ground. Do not attempt to use one or both hands to carry a tool while on a ladder. Use a hoist line and a tool “bucket” or a safety hook to raise or lower hand tools.

4.13 Elevated Derrick Platforms

4.13.1 The following precautions should be used:

- When a rig worker first arrives at a derrick platform, the platform should immediately be inspected for broken members, loose connections, and loose tools or other loose materials.
- A derrick platform over 4 feet (1.2 m) above ground surface should have toe boards and safety railings that are in good condition.
- When climbing to a derrick platform that is higher than 6 feet (am), a fall arresting device shall be used. The fall arresting device should consist of a full body harness and fall protection. The harness should fit snugly but comfortably. The lifeline when attached to the derrick should be less than 6 feet (2 m) long and attached to a fall arrester. The harness and lifeline should be strong enough to withstand the dynamic force of a 250-pound (115 kg) weight (contained within the belt) falling 6 feet (2 m).
- When a rig worker is on a derrick platform, the lifeline should be fastened to the derrick just above the derrick platform and to a structural member that is not attached to the platform or to other lines or cables supporting the platform.
- Tools should be securely attached to the platform with safety lines. Do not attach a tool to a line attached to your wrist or any other part of your body.
- When you are working on a derrick platform, do not guide drill rods or pipe into racks or other supports by taking hold of a moving hoist line or a traveling block.
- Loose tools and similar items should not be left on the derrick platform or on structural members of the derrick.
- Workers on the ground or the drilling floor should avoid being under rig workers on elevated platforms whenever possible.

4.14 Lifting Heavy Objects

4.14.1 Before lifting any object without using a hoist, make sure that the load is within your personal lifting capacity. If it is too heavy, ask for assistance.

4.14.2 Before lifting a relatively heavy object, approach the object by bending at the knees, keeping your back vertical and unarched while obtaining a firm footing. Grasp the object firmly with both hands and stand slowly and squarely while keeping your back vertical and unarched. In other words, perform the lifting with the muscles in your legs, not with the muscles in your lower back.

4.14.3 If a heavy object shall be moved some distance without the aid of machinery, keep your back straight and unarched. Change directions by moving your feet, not by twisting your body.

4.14.4 Move heavy objects with the aid of handcarts or lifting devices whenever possible.

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4.15 Use of Wire Line Hoists, Wire Rope, and Hoisting Hardware

4.15.1 The use of wire line hoists, wire rope, and hoisting hardware should be as stipulated by the American Iron Steel Institute, Wire Rope Users Manual.

- All wire ropes and fittings should be visually inspected during use and thoroughly inspected at least once a week for abrasion, broken wires, wear, reduction in rope diameter, reduction in wire diameter, fatigue, corrosion, damage from heat, improper revving, jamming, crushing, bird caging, kinking, care protrusion, and damage to lifting hardware. Wire ropes should be replaced when inspection indicates excessive damage according to the Wire Rope Users Manual. All wire ropes that have not been used for a period of a month or more should be thoroughly inspected before being returned to service.
- End fittings and connections consist of spliced eyes and various manufactured devices. All manufactured end fittings and connections should be installed according to the manufacturer's instructions and loaded according to the manufacturer's specifications.
- If a ball-bearing type hoisting swivel is used to hoist drill rods, swivel bearings should be inspected and lubricated daily to ensure that the swivel freely rotates under load.
- If a rod-slipping device is used to hoist drill or probe rods, do not drill through or rotate drill rods through the slipping device; do not hoist more than 1 foot (.3 m) of the rod column above the top of the mast (derrick); and do not hoist a rod column with loose tool joints while the rod column is being supported by a rod slipping device. If rods should slip back into the hole, do not attempt to break the fall of the rods with your hands or by applying tension to the slipping device.
- Most sheaves on exploration drill rigs are stationary with a single part line. The number of parts of line should never be increased without first consulting with the manufacturer of the drill rig.
- Wire ropes shall be properly matched with each sheave. If the rope is too large, the sheave will pinch the wire rope; if the rope is too small, it will groove the sheave. Once the sheave is grooved, it will severely pinch and damage larger-sized wire ropes and therefore shall be replaced.

4.15.2 The following procedures and precautions shall be understood and implemented for safe use of wire ropes and rigging hardware.

- Use tool-handling hoists only for vertical lifting of tools (except when angle hole drilling). Do not use tool-handling hoists to pull on objects always from the rig; however, drills may be moved using the main hoist if the wire rope is spooled through proper sheaves according to the manufacturer's recommendations.
- When struck tools or similar loads cannot be raised with a hoist, disconnect the hoist line and connect the stuck tools directly to the feed mechanism of the drill. Do not use hydraulic leveling jacks for added pull to the hoist line or the feed mechanism of the drill.
- When attempting to pull out a mired down vehicle or drill rig carrier, only use a winch on the front or rear of the vehicle and stay as far as possible away from the wire rope. Do not attempt to use tool hoists to pull out a mired down vehicle or drill rig carrier.
- Minimize shock loading of a wire rope. Apply loads smoothly and steadily. Avoid sudden loading in cold weather.
- Never use frozen ropes.
- Protect wire rope from sharp corners or edges.
- Replace faulty guides and rollers.
- Replace damaged safety latches on safety hooks before using.
- Know the safe working load of the equipment and tackle being used. Never exceed this limit.
- Clutches and brakes of hoists should be periodically inspected and tested.
- Know and do not exceed the rated capacity of hooks, rings, links, swivels, shackles, and other lifting aids.
- Always wear gloves when handling wire ropes.
- Do not guide wire rope on hoist drums with your hands.
- Following the installation of a new wire rope, first lift a light load to allow the wire rope to adjust.
- Never carry out any hoisting operations when the weather conditions are such that hazards to personnel, the public, or property are created.
- Never leave a load suspended in the air when the hoist is unattended.

- Keep your hands away from hoists, wire rope, hoisting hooks, sheaves, and pinch points while slack is being taken up and when the load is being hoisted.
- Never hoist the load over the head, body, or feet of any personnel. Never use a hoist line to "ride" up the mast (derrick) of a drill rig.
- Replacement wire ropes should conform to the drill rig manufacturer's specifications.

4.16 Use of Cathead and Rope Hoists

4.16.1 The following safety procedures should be employed when using a cathead hoist:

- Keep the cathead clean and free of rust and oil and/or grease. The cathead should be cleaned with a wire brush if it becomes rusty.
- Check the cathead periodically, when the engine is not running, for rope wear grooves. If a rope groove forms to a depth greater than 1/8 inches (3 mm), the cathead should be replaced.
- Always use a clean, dry, sound rope. A wet or oily rope may “grab” the cathead and cause drill tools or other items to be rapidly hoisted to the top of the mast.
- Should the rope “grab” the cathead or otherwise become tangled in the drum, release the rope and sound an appropriate alarm for all personnel to rapidly back away and stay clear. The operator should also back away and stay clear. If the rope “grabs” the cathead, and tools are hoisted to the sheaves at the top of the mast, the rope will often break, releasing the tools. If the rope does not break, stay clear of the drill rig until the operator cautiously returns to turn off the drill rig engine and appropriate action is taken to release the tools. The operator should keep careful watch on the suspended tools and should quickly back away after turning off the engine.
- The rope should always be protected from contact with all chemicals. Chemicals can cause deterioration of the rope that may not be visibly detectable.
- Never wrap the rope from the cathead (or any other rope, wire rope or cable on the drill rig) around a hand, wrist, arm, foot, ankle, leg or any other part of your body.
- Always maintain a minimum of 18 inches of clearance between the operating hand and the cathead drum when driving samplers, casing or other tools with the cathead and rope method. Be aware that the rope advances toward the cathead with each hammer blow as the sampler or other drilling tool advances into the ground.
- Never operate a cathead (or perform any other task around a drill rig) with loose unbuttoned or otherwise unfastened clothing or when wearing gloves with large cuffs or loose straps or lacings.
- Do not use a rope that is any longer than necessary. A rope that is too long can form a ground loop or otherwise become entangled with the operator's legs.
- Do not use more rope wraps than are required to hoist a load.
- Do not leave a cathead unattended with the rope wrapped on the drum. Position all other hoist lines to prevent contact with the operating cathead rope.
- When using the cathead and rope for driving or back driving, make sure that all threaded connections are tight and stay as far away as possible from the hammer impact point.
- The cathead operator shall be able to operate the cathead standing on a level surface with good, firm footing conditions without distraction or disturbance.

4.17 Use of Augers

4.17.1 The following general procedures should be used when starting a boring with continuous flight of hollow-stem augers:

- Prepare to start an auger boring with the drill rig level, the clutch or hydraulic rotation control disengaged, the transmission in low gear, and the engine running at low RPM.
- Apply an adequate amount of down pressure prior to rotation to seat the auger head below the ground surface.
- Look at the auger head while slowly engaging the clutch or rotation control and starting rotation. Stay clear of the auger.
- Slowly rotate the auger and auger head while continuing to apply down pressure. Keep one hand on the clutch or the rotation control at all times until the auger has penetrated about one foot or more below ground surface.
- If the auger head slides out of alignment, disengage the clutch or hydraulic rotation control and repeat the hole starting process.
- An auger guide can facilitate the starting of a straight hole through hard ground or a pavement.

- The operator and tool handler should establish a system of responsibility for the series of various activities required for auger drilling, such as connecting and disconnection auger sections, and inserting and removing the auger fork. The operator shall ensure that the tool handler is well away from the auger column and that the auger fork is removed before starting rotation.
- Only use the manufacturer's recommended method of securing the auger to the power coupling. Do not touch the coupling or the auger with your hands, a wrench, or any other tools during rotation.
- Whenever possible, use tool hoists to handle auger sections.
- Never place hands or fingers under the bottom of an auger section when hoisting the auger over the top of the auger section in the ground or other hard surfaces such as the drill rig platform.
- Never allow feet to get under the auger section that is being hoisted.
- When rotating augers, stay clear of the rotating auger and other rotating components of the drill rig. Never reach behind or around a rotating auger for any reason.
- Use a long-handled shovel to move auger cuttings away from the auger. Never use your hands or feet to move cuttings away from the auger.
- Do not attempt to remove earth from rotating augers. Augers should be cleaned only when the drill rig is in neutral and the augers are stopped from rotating.

4.18 Rotary and Core Drilling

4.18.1 Rotary drilling tools should be safety checked prior to drilling:

- Water swivels and hoisting plugs should be lubricated and checked for "frozen" bearings before use.
- Drill rod chuck jaws should be checked periodically and replaced when necessary.
- The capacities of hoists and sheaves should be checked against the anticipated weight to the drill rod string plus other expected hoisting loads.

4.18.2 Special precautions that should be taken for safe rotary or core drilling involve chucking, joint break, hoisting, and lowering of drill rods:

- Only the operator of the drill rig should brake or set a manual chuck so that rotation of the chuck will not occur prior to removing the wrench from the chuck.
- Drill rods should not be braked during lowering into the hole with drill rod chuck jaws. Drill rods should not be held or lowered into the hole with pipe wrenches.
- If a string of drill rods are accidentally or inadvertently released into the hole, do not attempt to grab the falling rods with your hands or a wrench.
- In the event of a plugged bit or other circulation blockage, the high pressure in the piping and hose between the pump and the obstruction should be relieved or bled down before breaking the first tool joint.
- When drill rods are hoisted from the hole, they should be cleaned for safe handling with a rubber or other suitable rod wiper. Do not use your hands to clean drilling fluids from drill rods.
- If work shall progress over a portable drilling fluid (mud) pit, do not attempt to stand on narrow sides or cross members. The mud pit should be equipped with rough-surfaced, fitted cover panels of adequate strength to hold drill rig personnel.
- Drill rods should not be lifted and leaned unsecured against the mast. Either provide some method of securing the upper ends of the drill rod sections for safe vertical storage or lay the rods down.

4.19 Site Movement of Equipment

4.19.1 The individual who transports a rig on and off a drilling site should:

- Be properly licensed and should only operate the vehicle according to federal, state, and local regulations.
- Know the traveling height (overhead clearance), width, length and weight of the rig with carrier and know highway and bridge load, width and overhead limits, making sure these limits are not exceeded with and adequate margin.
- Never move an l rig unless the vehicle brakes are in sound working order.
- Allow for mast overhand when cornering or approaching other vehicles or structures.

- Be aware that the canopies of service stations and motels are often too low for a drill rig mast to clear with the mast in the travel position.
- Watch for low hanging electrical lines, particularly at the entrances to drilling sites or restaurants, motels, other commercial sites.
- Never travel on a street, road, or highway with the mast (derrick) of the rig in the raised or partially raised position.
- Remove all ignition keys if rig is left unattended.

4.19.2 Loading and Unloading

- Use ramps of adequate design that are solid and substantial enough to bear the weight of the rig with carrier, including tools.
- Load and unload on level ground.
- Use the assistance of someone on the ground as a guide.
- Check the brakes on the rig carrier before approaching loading ramps.
- Distribute the weight of the rig, carrier, and tools on the trailer so that the center of eight is approximately on the centerline of the trailer and so that some of the trailer load is transferred to the high of the pulling vehicle. Refer to the trailer manufacturer's weight distribution recommendations.
- The rig and tools should be secured to the hauling vehicle with ties, chains, and/or load binders of adequate capacity.

4.19.3 Off-Road Movement

The following safety suggestions relate to off-road movement:

- Before moving a drill rig, first walk the route of travel, inspecting for depressions, stumps, gullies, ruts, and similar obstacles.
- Always check the brakes of a drill rig carrier before traveling, particularly on rough, uneven, or hilly ground.
- Check the complete drive train of a carrier at least weekly for loose or damaged bolts, nuts, studs, shafts, and mountings.
- Discharge all passengers before moving a drill rig on rough or hilly terrain.
- Engage the front axle (for 4 x 4, 6 x 6, etc. vehicles or carriers) when traveling off highway on hilly terrain.
- Use caution when traveling side-hill. Conservatively evaluate side-hill capability of drill rigs, because the arbitrary addition of drilling tools may raise the center of mass. When possible, travel directly uphill or downhill. Increase tire pressures before traveling in hilly terrain (do not exceed rated tire pressure).
- Attempt to cross obstacles such as small logs and small erosion channels or ditches squarely, not at an angle.
- Use the assistance of someone on the ground as a guide when lateral or overhead clearance is close.
- After the drill has been moved to a new drilling site, set all brakes and/or locks. Always block/chock the wheels.

4.20 Tires, Batteries, and Fuel

4.20.1 Tires on the rig shall be checked daily for safety and during extended travel for loss of air and they shall be maintained and/or repaired in a safe manner. If tires are deflated to reduce ground pressure for movement on soft ground, the tires should be inflated to normal pressures before movement on firm or hilly ground or on streets, roads and highways. Under-inflated tires are not as stable on firm ground as properly inflated tires. Air pressures should be maintained for travel on streets, roads, and highways according to the manufacturer's recommendations. During air pressure checks, inspect for:

- Missing or loose wheel lugs.
- Objects wedged between dual or embedded in the tire casing. Damaged or poorly fitting rims or rim flanges.
- Abnormal wear, cuts, breaks, or tears in the casing.
- The repair of truck and off-highway tires should only be made with required special tools and following the recommendations of a tire manufacturer's repair manual.

4.20.2 Batteries contain strong acid. Use extreme caution when servicing batteries.

- Batteries should only be serviced in a ventilated area while wearing safety glasses.
- When a battery is removed from a vehicle or service unit, disconnect the battery ground clamp first.
- When installing a battery, connect the battery ground clamp last.
- When charging a battery with a battery charger, turn off the power source to the battery before either connecting or disconnecting charger leads to the battery posts. Cell caps should be loosened prior to charging to permit the escape of gas.
- Spilled battery acid can burn your skin and damage your eyes. Spilled battery acid should be immediately flushed off of your skin with lots of water. Should battery acid get into someone's eyes, flush immediately with large amounts of water and see a physician at once.
- To avoid battery explosions, keep the cells filled with electrolyte; use a flashlight (not an open flame) to check electrolyte levels and avoid creating sparks around the battery by shorting across a battery terminal. Keep lighted smoking materials and flames away from batteries.

4.20.3 Special precautions shall be taken for handling fuel and refueling the rig or carrier. Only use the type and quality of fuel recommended by the engine manufacturer.

- Refuel in a well-ventilated area.
- Do not fill fuel tanks while the engine is running. Turn off all electrical switches. Do not spill fuel on hot surfaces. Clean any spillage before starting an engine. Wipe up spilled fuel with cotton rags or cloths. Do not use wool or metallic cloth.
- Keep open lights, lighted smoking materials, and flames or sparking equipment well away from the fueling area.
- Turn off heaters in carrier cabs when refueling the carrier or the drill rig.
- Do not fill portable fuel containers completely full to allow expansion of the fuel during temperature changes.
- Keep the fuel nozzle in contact with the tank being filled to prevent static sparks from igniting the fuel.
- Do not transport portable fuel containers in the vehicle or carrier cab with personnel.
- Fuel containers and hoses should remain in contact with a metal surface during travel to prevent the buildup of static charge.

4.21 First Aid (see S3NA-207-PR Medical Services and First Aid)

4.21.1 At least one member of the crew (and if only one, preferably the drilling and safety supervisor) should be trained to perform first aid. First aid is taught on a person-to-person basis, not by providing or reading a manual. Manuals should only provide continuing reminders and be used for reference. It is suggested that courses provided or sponsored by the American Red Cross or a similar organization would best satisfy the requirements of first aid training for drill crews.

4.21.2 For drilling and probing operations it is particularly important that the individual responsible for first aid should be able to recognize the symptoms and be able to provide first aid for electrical shock, heart attack, stroke, broken bones, eye injury, snake bite, and cuts or abrasions to the skin. Again, first aid for these situations is best taught to drill crewmembers by instructors qualified by an agency such as the American Red Cross.

4.21.3 A first aid kit should be available and well maintained on each drill site. The contents of the first aid kit shall be placed in a weatherproof container with individual sealed packages for each type of item.

4.22 Rig Utilization

4.22.1 Do not attempt to exceed manufacturers' ratings of speed, force, torque, pressure, flow, etc.

4.22.2 Only use the drill rig and tools for the purposes that they are intended and designed.

4.23 Rig Alterations

4.23.1 Alterations to a rig or drilling or probing tools should only be made by qualified personnel and only after consultation with the manufacturer.

5.0 Records

None.

6.0 Attachments

6.1 S3NA-405-FM1 Drill Rig Inspection

6.2 S3NA-405-FM2 Subsurface Investigation Checklist

6.3 S3NA-405-ST Drilling and Boring

6.4 S3NA-405-WI Core Drilling Machine Safety Card

S3NA-417-PR Utilities, Underground

1.0 Purpose and Scope

1.1 Establishes requirements to ensure that underground installations are identified properly before excavation work commences.

1.2 This procedure applies to all AECOM North America-based employees and operations.

2.0 Terms and Definitions

2.1 **Underground Utilities:** All utility systems located beneath grade level, including, but not limited to, gas, electrical, water, compressed air, sewage, signaling and communications, etc.

2.2 **Ground Disturbance (GD):** Any indentation, interruption, intrusion, excavation, construction, or other activity in the earth's surface as a result of work that results in the penetration of the ground.

3.0 References

3.1 American Public Works Association, Excavator's Damage Prevention Guide and One-Call System Directory International 1990-1991, Utility Location and Coordination Committee.

4.0 Procedure

4.1 Ground disturbance may be a conducted for a variety of purposes, including, but not limited to, exposing existing buried lines, soil sampling, remedial excavations, or installing monitoring wells or test pits.

4.2 Improper ground disturbance may impact a buried pipeline or utility line and cause a major release of a hazardous substance, flood, or electrocution. Serious injuries and significant property damage have resulted from insufficient/inadequate identification of underground installations during the course of ground disturbance work.

4.3 To control hazards associated with coming in contact with such installations, the American Public Works Association's (APWA) guidelines for the uniform identification of underground installations has been adopted.

4.4 **Project Managers** are responsible for ensuring that all work, including the identification, location, and access to all underground utilities, is planned and performed in accordance with contract specifications and safety requirements.

4.4.1 The planning for associated work and avoidance of contacting underground utilities shall be part of the project safety planning in the HASP.

4.5 The **Lead Site Manager or Supervisor** is responsible for the execution of work in accordance with this and other associated AECOM SOPs, including:

- The review of the HASP.
- Verification that all steps have been taken to identify existing underground utilities in the area to be disturbed.

4.6 **Regional SH&E Manager** provides guidance as needed.

4.7 **Personal Protective Equipment**

- Long sleeved shirt and pants (coveralls/Nomex LILA for upstream oil and gas)
- Safety toe boots
- Hard hat
- High-visibility clothing
- Gloves
- Respirator with organic vapor/particulate filter cartridge (for use when the exposure exceeds the occupational exposure limit stated on the MSDS), as required
- Hydrogen Sulfide (H2S) Monitor (for areas with known or suspected H2S

4.8 Training

4.8.1 Staff shall successfully complete a Ground Disturbance training course.

4.8.2 Some clients may also have required client-based Ground Disturbance training.

4.9 Underground Utility Lines

4.9.1 To avoid injury from electrical and other utilities on site, utility lines shall be located and marked prior to conducting any drilling or digging on site. If available, refer to site drawings or client interviews for information pertaining to utilities on site.

4.9.2 Types of underground lines:

- Gas line
- Potable water line
- Raw water line
- Sewer line
- Power line
- Cable television/communication line
- Cathodic protection lines
- Grounding cable
- Process piping/flow line

4.9.3 Prior to conducting the ground disturbance, you shall locate all pipelines and utilities that pass within (30 m) of the work area. This is your search and control area. To do so, you need to do the following:

- Notify all pipeline and utility companies, and confirm that their notification requirements are fulfilled prior to conducting a ground disturbance.
- Identify pipelines, power lines, utilities, and irrigation canals in a 30-foot (9.1 m) zone of the work area with the owner of the utility.
- On private property, a properly trained and competent third party utility locator shall be used.
- Get approval for work within a right-of-way (ROW) or within 15 feet (4.6 m) of a line if there is no ROW.
- Prepare a site map identifying the search area, the ground disturbance area, and known underground utilities.
- Confirm that all pipelines, power lines, and utilities are marked.

4.9.4 Look for pipeline indicators:

- Look for warning signs where pipelines cross roads or water courses.
- Look for cut lines, wells, tanks, or valves that may indicate the presence of pipelines.
- Look for ground settling from previous work.
- Talk to nearby landowners and residents.
- Look for vegetation appearing “different” from the surrounding vegetation (e.g., greener, taller, shorter, or more brown than surrounding vegetation).

4.9.5 When you are working within a pipeline right-of-way, you shall get written approval from the pipeline owner prior to doing your work.

4.9.6 Call the pipeline owner at least two full working days before you dig so the pipeline can be located and marked.

4.9.7 Expose the pipeline by hand/hydrovac before digging within 15 feet (4.6 m) of the pipeline with machinery (no machinery comes may come within 2 feet [60 cm] of the pipeline) with the supervision of the owner or their representative, and call the owner at least one full day before you cover the exposed line.

4.9.8 During ground disturbance:

- All underground utilities shall be hand exposed or hydrovac’d within 3.3 feet (1 m) of a mark out or within the distance required by the owner of the utility before operating any mechanized equipment.
- Make arrangements for supervision (“a Signal Person”) during hand exposure.

- If for any reason these hand excavations are temporarily filled in, mark them.
- Make arrangements for supervision ("a Signal Person") during any mechanical excavation within 5 m of the underground utility.
- Make arrangements for supervision ("a Signal Person") during backfilling of utilities.
- Cutting back and shoring of excavations shall be completed to ensure that there are no cave-ins (follow *SOP S3NA-303-PR Excavation and Trenching*).
- Do not damage utilities by shovels when hand exposing and picks should not be used.
- Remember that all workers have the right and responsibility to refuse to carry out any work or procedures that they feel are unsafe.
- If the ground disturbance is deeper than 3.3 feet (1 m), all crew members shall have appropriate training for excavations and trenches and shall be protected from cave-ins or sliding/rolling materials (follow *SOP S3NA-303-PR Excavation and Trenching*).
- Remember that incidents, injuries, and near misses shall be reported immediately.
- Review the site-specific emergency response plan.

4.9.9 If you hit an underground facility, stop the work immediately and notify the owner of the facility.

- The owner shall be informed of the location of the contact and the type of damage that resulted.
- If the facility is a pipeline, the company (client) shall immediately notify the required agencies and regulatory bodies of the location of the contact and the type of damage that resulted.
- The government agencies will require a written record and the company (client) should conduct an incident investigation into the causes and make recommendations for the future prevention of this incident.

4.10 Identification of Installations

4.10.1 Various forms of underground utility lines or pipes may be encountered during AECOM deployments to field sites. Damaged utilities, in particular, can present other hazards including asbestos, explosion, electric shock, scalding, etc., and they shall be avoided. The presence of damaged utilities at any work location shall be immediately brought to the attention of the field Lead Manager or other member of the AECOM site management team.

4.10.2 Guidance will be provided on the appropriate action to be taken, which could include suspension of work until the responsible utility agency is contacted and the hazard is either isolated or eliminated.

4.10.3 Extreme caution shall always be exercised when attempting to locate underground utilities. The location of utilities can be in some cases not consistent as shown on drawings, as indicated by the placement of surface signage, or as described by personnel. Coordination and planning of the job shall be required with the client or owner.

- Prior to digging and drilling operations, the client shall always be informed of the potential location(s) of underground utility systems.
- If a utility permit is required from the client or owner, it shall be secured.
- The client shall explain how the utility line may be identified—e.g., red concrete encasement.
- All underground installations shall be considered "live" and "operational" until the owner, client, or utility authority isolates any hazardous energy or deactivates the system and can demonstrate that condition.
- Where a line placement and depth is known or suspected and where there is potential for contact, hand digging, or hand auguring, instrumentation and other investigative techniques shall be used.

4.10.4 The One Call System Definition and Directory or its equivalent shall be used to prepare for excavation work in the event the identity of an underground installation(s) is unknown.

4.10.5 Line location documentation (or appropriate regional agency or company) provides a listing of companies that have registered buried facilities in the proposed work area. Some public utilities and private companies are not members of the One Call System. In order to give line operators sufficient time to respond to a request to locate, a minimum waiting period of 72 business hours is required prior to beginning work.

4.10.6 Once the underground installation has been identified, proper surface markings shall be made in accordance with the guidelines contained in this SOP or as contract-specified.

4.11 Surface Markings

4.11.1 Color-coded surface marks (paints or similar coatings) shall be used to indicate the type, location, and route of buried installations. Additionally, to increase visibility, color-coded vertical markers (temporary stakes or flags) shall supplement surface marks.

4.11.2 All marks and markers shall indicate the name, initials, or logo of the company that owns or operates the installation and the width of the installation if it is greater than two inches.

4.11.3 If the surface over the buried installation is to be removed, supplemental offset marking shall be used. Offset markings shall be on a uniform alignment and shall clearly indicate that the actual installation is a specific distance away.

4.12 Uniform Color-Coding

4.12.1 The colors and corresponding installation type are as follows unless otherwise contract-specified.

4.12.2 Red: Electric Power Lines, Cables, Conduit, and Lighting Cables

4.12.3 Yellow : Gas, Oil, Stream, Petroleum, or Gaseous Materials

4.12.4 Orange :Communication, Alarm or Signal Lines, Cables, or Conduit

4.12.5 Green: Sewers and Drain Lines

4.12.6 White : Proposed Ground Disturbance area

4.12.7 Pink: Temporary Survey Markings

4.12.8 Purple: Nonpotable Water

5.0 Records

5.1 The following records on the identification of and response to underground utilities will be maintained in the project files:

5.1.1 All information regarding the identification of underground installations (this information can also be transferred to the appropriate drawings and/or prints and shall be available on site).

5.1.2 Drawings and/or prints shall be maintained for the life of this project.

5.1.3 Identifying Underground Installations Checklist.

6.0 Attachments

6.1 S3NA-417-FM Identifying Underground Installations Checklist

6.2 S3NA-417-WI One Call System Definition and Directory

6.3 S3NA-417-ST Underground Utilities

S3NA-505-PR Cold Stress Prevention

1.0 Purpose and Scope

1.1 To protect workers from the severest effects of cold stress (hypothermia) and cold injury and to identify exposures to cold working conditions under which it is believed nearly all workers can be repeatedly exposed without adverse health effects.

1.2 This procedure applies to all AECOM North America-based employees and operations.

2.0 Terms and Definitions

2.1 **Cold Stress:** The production of physiological effects due to cold temperatures and\or wind chill.

2.2 **Frostbite:** Freezing of tissue, often resulting in tissue death.

2.3 **Hypothermia:** Condition of reduced core body temperature resulting in loss of dexterity, loss of mental alertness, collapse, and possible death.

2.4 **Wind Chill:** The effect of air movement on apparent temperature in a cold environment.

3.0 References

None.

4.0 Procedure

4.1 Restrictions

4.1.1 Staff working in extreme cold or snow for extended periods of time away from a shelter or vehicle shall not work alone.

4.1.2 All staff working in extreme cold or snow conditions should understand the following guidelines for preventing and detecting hypothermia and frost bite.

4.1.3 If you experience frost bite or hypothermia, find shelter and warmth and contact a medical practitioner if symptoms persist.

4.1.4 Take frequent short breaks in warm dry shelters to allow your body to warm up. Limit time of exposure.

4.1.5 Try to schedule work for the warmest part of the day or when the wind is most calm.

4.1.6 Avoid exhaustion or fatigue because energy is needed to keep muscles warm.

4.1.7 Because prolonged exposure to cold air or to immersion in cold water at temperatures even well above freezing can lead to dangerous hypothermia, whole-body protection shall be used.

4.2 Roles and Responsibilities

4.2.1 **Project Managers/field task managers**

- Implement cold stress prevention measures as applicable at each work site.
- Develop/coordinate a work-warning regimen, as applicable.
- Confirm cold stress hazard assessments/evaluations were completed for the planned activities.
- Assign personnel physically capable of performing the assigned tasks.
- Confirm personnel are properly trained to recognize the symptoms of cold stress.

4.2.2 **Regional SH&E Managers**

- Conduct/support cold stress assessments/evaluations.
- Conduct/support incident investigations related to potential cold stress-related illnesses.
- Assist project teams develop appropriate work-warming regimens.
- Provide cold stress awareness training.

4.2.3 **Supervisors**

- Identify the tasks that may be most impacted by cold stress and communicate the hazard to the assigned employees.
- Confirm that employees have been trained on the recognition of cold stress-related illnesses.
- Confirm that adequate supplies of warm fluids/drinks are readily available to employees.
- Confirm that a warm/sheltered rest area is available, as applicable.
- Conduct cold stress monitoring, as applicable.
- Implement the work-warming regimen.
- Confirm that first aid measures are implemented once cold stress symptoms are identified.
- Confirm that personnel are physically capable of performing the assigned tasks and are not in a physically compromised condition.

4.2.4 **Employees**

- Observe each other for the early symptoms of cold stress-related illnesses.
- Maintain an adequate intake of available fluids.
- Report to work in a properly vested condition.
- Report all suspected cold stress-related illnesses.

4.3 Training

4.3.1 Before they begin work, project staff who may be exposed to cold stress will be informed of the potential for cold stress and how to prevent cold stress.

4.3.2 Personnel potentially exposed to cold stress will receive training including, but not limited to:

- Sources of cold stress, the influence of protective clothing, and the importance of acclimatization
- How the body loses heat.
- Recognition of cold-related illness symptoms.
- Preventative/corrective measures.
    - Employees will be informed of the harmful effects of excessive alcohol consumption in a cold stress environment.
- First aid procedures for symptoms related to cold stress.

4.4 Personal Protective Equipment

4.4.1 Wear multiple layers of clothing to maintain immobile layers of warm air next to the body.

4.4.2 Avoid cotton, especially blue jeans.

4.4.3 Wear proper clothing, including head coverings and gloves or mittens for cold, wet, and windy conditions.

4.4.4 Use insulated footwear with adequate traction to prevent slips and falls.

4.4.5 Confirm extra blankets or sleeping bags are on-site.

4.4.6 Sunglasses and sunscreen should be used when there is a persistent combination of snow and direct sun.

4.4.7 If shelter is not readily available, confirm that staff carry fire starter materials (see the Safe Work Practice for Wilderness Isolation).

4.4.8 Pack warm, sweet drinks, and high-calorie food for snacks.

4.5 General Cold Stress Prevention Measures

4.5.1 In order to prevent hypothermia:

- Wear multiple layers of clothing to maintain immobile layers of warm air next to the body. Avoid cotton, especially blue jeans.
- When active, ventilate excess heat by opening or removing outer layers of clothing to avoid sweating.
- Start with the mitten or gloves, unless protection from ice, snow, or cold metal surfaces is needed.
- Next remove head gear and neck wrappings.

- Then coats/parkas should be opened at the waist and sleeves.
  - Finally, layers of clothing should be taken off.
  - When resting or tired, or colder conditions are encountered, add additional layers of clothing/ close outer layers in the reverse of the above order, or get out of the cold. Have a sweet drink but do not indulge in heavy eating.
  - Garments worn to keep out rain and spray should also allow water vapor to escape.
  - Take advantage of heat from the sun and stay out of the wind as much as possible.
  - Have available emergency shelter providing protection from wind and rain and insulation from the ground.
  - Replace wet clothing. If wet clothing cannot be replaced, then cover it with a layer of non-breathing material to prevent evaporation. Place an insulation layer over this non-breathing material.
  - Get adequate rest; conserve energy.
  - Get adequate nutrition to replenish energy stores; rest after meals.
  - Drink adequate fluids to avoid dehydration.
  - If any project staff member shows signs of hypothermia, stop and treat him/her.

4.5.2 In order to prevent frost bite:

- Dress to prevent hypothermia and protect the feet and hands.
- Avoid obstruction of circulation by, for example, tight boots or tightly fitting clothing.
- Avoid nicotine, particularly cigarettes, and alcohol.
- Keep ears and nose covered and out of the wind.
- Frostbite of the corneas of the eyes can be prevented by protective goggles.
- Adopt a “buddy system” of constantly watching the faces of others in the party for white skin tissue, which is evidence of frostbite (frostnip).
- Practice constant personal vigilance for signs of trouble in one’s own fingers and toes; when in doubt, investigate thoroughly before it is too late.

4.5.3 Adequate, insulating dry clothing that will help maintain core temperatures above 96.8^{o}F (37^{o}C) shall be provided to workers if work is performed in air temperatures below 40^{o}F (5^{o}C). Wind chill cooling rate and the cooling power of air are critical factors. The higher the wind speed and the lower the temperature in the work area, the greater the insulation value of the protective clothing required.

4.5.4 An Equivalent Chill Temperature (ECT) chart relating the actual dry bulb air temperature and the wind velocity is presented in *S3NA-505-WI1 Temperature Thresholds.* Unless unusual or extenuating circumstances exist, cold injury to other than hands, feet, and head is not likely to occur without the development of the initial signs of hypothermia. Superficial or deep local tissue freezing will occur only at temperatures below 32^{o}F (0^{o} C) regardless of wind speed. However, older workers or workers with circulatory problems require special precautionary protection against cold injury. The use of extra insulating clothing and/or a reduction in the duration of the exposure period are among the special precautions that should be considered.

4.5.5 Continuous exposure of skin should not be permitted when the air speed and temperature results in an ECT of –25^{o}F (-32^{o} C) or below.

4.5.6 At air temperatures of 40^{o}F (5^{o}C) or less, it is imperative that workers who become immersed in water or whose clothing becomes wet be immediately removed from the cold environment, provided a change of clothing, and be treated for hypothermia.

4.5.7 If the air velocity at the job site is increased by wind, draft, or artificial ventilating equipment, the cooling effect of the wind should be reduced by shielding the work area or by wearing an easily removable windbreak garment.

4.5.8 Adequate protection, such as general ventilation, shall be incorporated into any warming shelter design to prevent carbon monoxide poisoning.

4.5.9 Operation of internal combustion or similar devices within warming shelters is prohibited.

4.5.10 If the available clothing does not give adequate protection to prevent hypothermia or frostbite, work should be modified or suspended until adequate clothing is made available or until weather conditions improve.

4.6 Cold Stress Prevention Measures for the Hands

4.6.1 Special protection of the hands is required to maintain manual dexterity for the prevention of accidents including, but not limited to the following:

- If fine work is to be performed with bare hands for more than 10 to 20 minutes in an environment below 60oF (15o C), special provisions should be established for keeping the workers' hands warm. For this purpose, warm air jets, radiant heaters (fuel burner or electric radiator), or contact warm plates may be utilized. Metal handles of tools and control bars should be covered by thermal insulating material at temperatures below 30oF (-1o C).
- If the air temperature falls below 60oF (15o C) for sedentary work, 40oF (5o C) for light work, or 20oF (-6o C) for moderate work, and fine manual dexterity is not required, workers should use gloves.

4.6.2 To prevent contact frostbite, workers should wear anti-contact gloves:

- When cold surfaces below 20^{o}F (-6^{o} C) are within reach, each worker should be warned to prevent inadvertent contact by bare skin.
- If the air temperature is 0^{o}F (-18^{o} C) or less, workers should protect their hands with mittens. Machine controls and tools for use in cold conditions should be designed so that they can be handled without removing the mittens.

4.6.3 Provisions for additional total body protection are required if work is performed in an environment at or below 40^{o}F (5^{o} C). The workers should wear cold protective clothing appropriate for the level of cold and physical activity.

4.6.4 Additional Cold Stress Prevention Measures. For work practices at or below 10^{o}F (-12^{o} C) ECT, the following will apply:

- The worker should be under constant protective observation (buddy system or supervision).
- The work rate should not be so high as to cause heavy sweating that will result in wet clothing. If heavy work is being performed, rest periods should be taken in heated shelters and opportunities to change into dry clothing should be provided.
- New employees should not be required to work full time in the cold during the first days of employment until they become acclimated to the working conditions and required protective clothing.
- The weight and bulkiness of clothing should be included in estimating the required work performance and weights to be lifted by the worker.
- The work should be arranged in such a way that sitting still or standing still for long periods is minimized. Unprotected metal chair seats should not be used. The worker should be protected from drafts to the greatest extent possible.
- Workers should be instructed in safety and health procedures, which should address:
  - Proper rewarming procedures and appropriate first aid treatment.
  - Proper clothing practices.
  - Proper eating and drinking habits.
  - Recognition of impending frostbite.
  - Recognition of signs and symptoms of impending hypothermia or excessive cooling of the body even when shivering does not occur.
  - Safe work practices.

4.6.5 Eye protection for workers employed outdoors in a snow and/or ice-covered terrain should be supplied. Special safety goggles to protect against blowing ice crystals and ultraviolet light and glare (which can produce temporary conjunctivitis and/or temporary loss of vision) should be required when there is an expanse of snow coverage causing a potential eye exposure hazard.

4.6.6 Workers handling evaporative liquid (gasoline, alcohol, or cleaning fluids) at air temperatures below 40^{o}F should take special precautions to avoid soaking of clothing or gloves with the liquids because of the added danger of cold injury due to evaporative cooling. Special note should be taken of the particularly acute effects of splashes of "cryogenic fluids" or those liquids with a boiling point that is just above ambient temperature.

4.6.7 Trauma sustained in freezing or subzero conditions requires special attention, because an injured worker is predisposed to cold injury. Special provisions should be made to prevent hypothermia and freezing of damaged tissue in addition to providing for first aid treatment.

4.7 **Work-Warming Regimen**

4.7.1 If work is performed continuously in the cold at an equivalent chill temperature (ECT) at or below -15°F (–26°C), heated warming shelters (tents, cabins, rest rooms, etc.) should be made available nearby. The workers should be encouraged to use these shelters at regular intervals; the frequency will depend on the severity of the environmental exposure.

4.7.2 The onset of heavy shivering, minor frostbite (frostnip), the feeling of excessive fatigue, drowsiness, irritability, or euphoria are indications for immediate return to the shelter.

4.7.3 When entering the heated shelter, the outer layer of clothing should be removed and the remainder of the clothing should be loosened to permit sweat evaporation or a change of dry work clothing provided.

4.7.4 A change of dry work clothing should be provided as necessary to prevent workers from returning to the cold environment with wet clothing.

5.0 Records

None.

6.0 Attachments

6.1 S3NA-505-WI1 Temperature Thresholds

6.2 S3NA-505-WI2 Symptoms and Treatment

6.3 S3NA-505-ST Cold Exposure

S3NA-507-PR Hazardous Materials Communication / WHMIS

1.0 Purpose and Scope

1.1 Provides a Hazard Communication Program so that AECOM employees are informed of the hazards of the chemicals to which they may be exposed in the course of their work by way of container labeling and other forms of warning, material safety data sheets (MSDS), and employee training.

1.2 This procedure applies to all AECOM North America based employees and operations.

1.3 The program applies to the use of any hazardous substances which are known to be present in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency.

2.0 Terms and Definitions

A complete list of definitions can be found in their entirety in the HMR, the TDG Regulations, and the IATA DGR.

2.1 **Acute Effect:** An adverse effect on the human body with immediate onset of symptoms.

2.2 **Article:** A manufactured item: (1) which is formed to a specific shape or design during manufacture; (2) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and, (3) which does not release or otherwise result in exposure to, a hazardous chemical, under normal conditions of use.

2.3 **Carcinogen:** Those chemicals appearing in any of the following reference sources are established as carcinogens for hazard communication purposes:

- National Toxicology Program (NTP) Annual Report on Carcinogens.
- International Agency for Research on Cancer (IARC) Monographs, Volumes 1-34. Note: The Registry of Toxic Effects of Chemical Substances published by NIOSH indicates whether a substance has been found by NTP or IARC to be a potential carcinogen.

2.4 **Chemical Name:** The scientific designation of a substance in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry or the system developed by the Chemical Abstracts Service.

2.5 **Chronic Effect:** An adverse effect on the human body with symptoms which develop slowly over a long period of time or which frequently recur.

2.6 **Combustible Liquid:** Any liquid having a flash point at or above 100°F (37.8°C) but below 200°F (93.3°C), except any mixture having components with flash points of 200°F (93.3°C), or higher, the total volume of which makes up 99% or more of the total volume of the mixture.

2.7 **Common Name:** Any designation or identification such as code name, code number, trade name or brand name used to identify a substance other than by its chemical name.

2.8 **Container:** Any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank or the like that contains a hazardous chemical. For purposes of this Safety Operating Procedure (SOP) and Occupational Safety and Health Administration (OSHA) standard, pipes or piping systems, and engines, fuel tanks, or other operating systems in a vehicle are not considered to be containers.

2.9 **Establishment:** Any separate and distinct AECOM office, laboratory or other company facility.

2.10 **Exposure:** Any situation arising from work operations where an employee may ingest, inhale, absorb through the skin or eyes or otherwise come into contact with a hazardous substance.

2.11 **Flammable:** A substance that falls into one of the following categories:

- **Flammable Aerosol**: An aerosol that when tested by the method described in 16 CFR 1500.45, yields a flame projection exceeding 18 inches at full valve opening or flashback (a flame extending back to the valve) at any degree of valve opening;

- **Flammable Gas**: A gas that at ambient temperature and pressure:
  - Forms a flammable mixture with air at a concentration of 13% of volume or less; or
  - Forms a range of flammable mixtures with air wider than 12% by volume, regardless of the lower limit.
- **Flammable Liquid**: Any liquid having a flash point below 100°F (37.8°C), except any mixture having components with flash points of 100°F (37.8°C) or higher, the total of which make up 99% or more of the total volume of the mixture.
- **Flammable Solid**: A solid, other than a blasting agent or explosive as defined in 8 CCR 5237(a), that is liable to cause fire through friction, absorption of moisture, spontaneous chemical change or retained heat from manufacturing or processing or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious hazard.
  - A chemical shall be considered to be a flammable solid if, when tested by the method described in 16 CFR 1500.44, it ignites and burns with a self-sustained flame at a rate greater than one-tenth of an inch per second along its major axis.

2.12 **Flash Point:** Minimum temperature of a liquid at which it gives off sufficient vapors to form an ignitable mixture with the air near the surface of the liquid or within the container used.

2.13 **Hazardous Chemical:** Those chemicals appearing in any of the following reference sources are established as hazardous chemicals for hazard communication purposes.

- 29 CFR Part 1910, Subpart Z, Toxic and Hazardous Substances, OSHA.
- Hazardous Products Act, R.C.S. 1985, c. H-3, section 2, Canada
- For operations within the state of California, the list of hazardous substances prepared by the California Director of Industrial Relations pursuant to Labor Code Section 6382. The concentrations and footnotes, which are applicable to the list, shall be understood to modify the same substance on all other source lists or hazard determinations set forth in § 8 CCR 5194(d)(3)(B) and (d)(5)(D).

2.14 **Hazardous Substance:** A hazardous chemical or carcinogen, or a product or mixture containing a hazardous chemical or carcinogen provided that:

- The hazardous chemical is 1% or more of the mixture or product or 2% if the hazardous chemical exists as an impurity in the mixture; or
- The carcinogen is 0.1%or more of the mixture or product.
- Manufacturers, importers and distributors will be relied upon to perform the appropriate hazard determination for the substances they produce or sell.

2.15 The following materials are not covered by the Hazard Communication Standard:

- Any hazardous waste as defined by the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 USC 6901 et seq.) when subject to regulations issued under that act by the Environmental Protection Agency.
- Tobacco or tobacco products
- Wood or wood products. Note: Wood dust is not exempt since the hazards of wood dust are not “self-evident” as are the hazards of wood or wood products
- Consumer products (including pensm, pencils, adhesive tape) used in the work place under typical consumer usage
- Articles (i.e. plastic chairs)
- Foods, drugs, or cosmetics intended for personal consumption by employees while in the work place
- Foods, drugs, cosmetics in retail store packaged for retail sale
- Any drug in solid form used for direct administration to the patient (i.e., tablets or pills)

2.16 **Hazardous Substance Inventory (HSI):** A listing of all chemicals stored or used at an office or project site. Note that the HSI may be imbedded in a project Health and Safety Plan.

2.17 **Immediate Use:** Means that the hazardous chemical will be under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it is transferred.

2.18 **MSDS:** A material safety data sheet prepared pursuant to state and federal regulations, OSHA Form 174 and Canada regulations (Controlled Products regulations, schedule 1).

2.19 **MSDS Administrator:** The individual designated by the Office Manager to maintain the additional establishment-specific HSI and the MSDS binder required if that establishment uses or stores hazardous substances.

2.20 **NFPA:** A system of categories, colors and numbers was created to provide basic hazard information. It enables firefighters and other emergency personnel to easily decide whether or not to evacuate an area or proceed with emergency control operations. The three principal categories of identification are Health, Flammability and Instability. A numerical range of “0 to 4” indicates the severity of the hazard. A “4” indicates the most severe and a “0” indicates a minimal hazard.

2.21 **Mixture:** Any solution or intimate admixture of two or more substances which do not react chemically with each other**.**

2.22 **Reactivity:** A measure of the tendency of a substance to undergo chemical reaction with the release of energy.

2.23 **Solubility:** The ability of substance to blend and mix uniformly with another.

2.24 **Specific Gravity (density):** Ratio of the weight of a substance to the weight of the same volume of another substance. As used in this directive, specific gravity or density refers to the weight of substance as compared to the weight of an equal volume of water.

2.25 **Vapor Density:** The weight of a vapor-air mixture resulting from the vaporization of a volatile liquid at equilibrium temperature and pressure conditions, as compared with the weight of an equal volume of air under the same conditions.

2.26 **WHMIS:** The Workplace Hazardous Materials Information System (WHMIS) is Canada's national hazard communication standard. The key elements of the system are cautionary labelling of containers of WHMIS "controlled products", the provision of material safety data sheets (MSDSs) and worker education and training programs.

3.0 References

None.

4.0 Procedure

4.1 All employees have a right to, and should, know the properties and potential hazards of substances to which they may be exposed.

4.2 Should AECOM assign employees that do not read and speak English to tasks with chemical exposures, communications will be provided in the language understood by that employee.

4.3 **Hazardous Waste Exemption**

4.3.1 In the U.S., hazardous wastes are excluded from the state and federal Hazard Communication standards. However, AECOM employees who handle or are otherwise exposed to hazardous wastes are covered by the requirements of the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) standard at 29 CFR 1910.120 – Hazardous Waste Operations And Emergency Response. This standard requires that:

- Employees receive 40-hour initial and 8-hour annual SH&E training; and that

- Information on the hazards of hazardous wastes be documented in a site-specific Health and Safety Plan (HASP) and communicated to all employees in site-specific briefing on-site training required by the standard.

4.3.2 Therefore, AECOM HAZWOPER projects are not required to comply with the requirements of this SOP as they relate to the hazardous wastes that are present at those project sites.

4.3.3 AECOM's HASP requirements are specified in *S3NA-509-PR Hazardous Waste Operations and Emergency Response.*

4.4 Hazardous Substance Inventory

4.4.1 Establishment-Specific HSI

- If an AECOM establishment uses or stores additional hazardous substances, an establishment-specific HSI must be maintained at that establishment.
- If it is determined that an office-specific HSI is needed, the AECOM **Office Manager** shall assure that one is developed and maintained by someone appointed as the establishment's MSDS Administrator.
- The content of the office-specific written inventory shall be updated as new hazardous substances are procured for, or removed from, the establishment and shall be verified by the **Regional SH&E Manager** through regular inspections of the establishment.
- In order to meet the 30-years-after-employment-termination record retention requirement, the office-specific HSIs shall be treated as a permanent record.

4.5 Material SAFETY Data Sheets

4.5.1 Establishment-Specific MSDS Inventory

- If it is determined that an AECOM establishment is required to maintain an establishment-specific HSI ,MSDSs for those specific hazardous substances must be maintained on file at that establishment.
- The **Regional SH&E Manager** shall audit the local office program for MSDS request and maintenance and report deficiencies to the appropriate management level, as necessary, to assure compliance with this SOP.

4.5.2 Field Project Sites and Client Facilities

- The **Project Manager** and/or the **Site Safety Officer** shall access or obtain, and maintain copies of MSDS from:
  - All AECOM subcontractors bringing chemicals onto the project site; and
  - The client, for all of the client's chemicals to which AECOM or AECOM subcontract employees are potentially exposed.

4.5.3 Employee Access to MSDSs

- MSDSs should be maintained at the local establishment that uses that hazardous substance. Copies of the MSDS should be made available to the employee upon request to the office's MSDS Administrator.

4.5.4 Field Access to MSDSs

- When hazardous substances are brought into the field, the user must assure that a copy of the MSDS for that substance accompanies it and is available at the field location where it is to be used.

4.5.5 MSDSs for AECOM Products

- It is unlikely that AECOM activities would create a chemical for which a new MSDS were needed. If such a chemical were created, the Corporate SH&E Department shall work with the appropriate operations groups to draft, review, and publish the new MSDS.

4.5.6 Content of the Material Safety Data Sheet

- As a minimum, the MSDS must contain the following information:

- The name, address, and telephone number of the source of the product or material, preferably those of the manufacturer
- The trade name and synonyms of the product or material
- Chemical names of hazardous ingredients, including, but not limited to, those in mixtures
- An indication of the percentage, by weight or volume, which each ingredient of a mixture bears to the whole mixture
- Physical data pertaining to the product or material, including boiling point (in °F); vapor pressure (in mm of mercury); vapor density of gas or vapor (air = 1); solubility in water (in percent by weight); specific gravity of material (water = 1); percentage volatile by volume (at 70 °F); evaporation rate for liquids (either butyl acetate or ether may be taken as 1); and appearance and odor
- Fire and explosion hazard data pertaining to the product or material, including flash point (in °F); flammable limits (in percent by volume in air); suitable extinguishing media or agents; special fire fighting procedures; and unusual fire and explosion hazard information
- Health hazard data pertaining to the product or material, including exposure limits, effects of overexposure and medical conditions aggravated by exposure, and emergency and first-aid procedures
- Reactivity data, including stability, incompatibility, hazardous decomposition products, and hazardous polymerization
- Procedures to be followed and precautions to be taken in cleaning up and disposing of materials leaked or spilled
- Special protection information, including use of personal protective equipment, such as respirators, eye protection, and protective clothing, and ventilation or other control measures
- Special precautionary information about handling and strong
- Any other general precautionary information

- MSDSs that do not contain this information shall be returned to the distributor or manufacturer to be updated.

4.5.7 Trade Secrets

- Some hazardous substance suppliers may claim the information requested on MSDSs is proprietary and not provide the information to AECOM.
- When MSDSs supplied to the AECOM Regional SH&E Manager indicate that proprietary information has been withheld, the Regional SH&E Manager will either obtain the necessary information to make a hazard assessment or reject the material for use within AECOM.

4.6 Labeling

4.6.1 Containers of hazardous substances used or stored in each AECOM establishment must be labeled, tagged or marked with the following information:

- Identification of the hazardous substance(s)
- Appropriate hazard warnings
- Name and address of the manufacturer, importer or other responsible parties
- Safe Handling Instructions
- Statement that an MSDS is available for the product

4.6.2 Labels on containers shall not be removed or defaced. Labels or other forms of warning shall be legible, in English and French (Canada), and prominently displayed on the container.

4.6.3 Any failure to have the appropriate labeling information on a container at any time will be cause to suspend use of the product until the container is properly labeled.

4.6.4 Carcinogen Labeling

- Chemicals which have been indicated as positive or suspect carcinogens by either OSHA, ACGIH, the International Agency for Research on Cancer (IARC) (World Health Organization), or the National Toxicology Program (NTP) will be considered to be carcinogenic for purpose of the HCS. Those chemicals identified as being “known to be carcinogenic” by NTP must have carcinogen warnings on the label and information on the MSDSs.

4.6.5 Stationary Process Containers

- If there is stationary process equipment within a work area, signs, placards, process sheets, batch tickets, operating procedures, or other such written materials may be used in lieu of fixed labels on the containers, as long as the alternative method conveys the appropriate hazard information. The written materials shall be readily accessible to the employees in the work area.

4.6.6 Portable Containers

- Portable containers of hazardous substances need not be labeled when the substance is transferred from labeled containers and is intended for immediate use of the employee who performs the transfer.
- Containers of hazardous substances transferred from labeled containers and not intended for the immediate use of the employee performing the transfer shall be labeled with the chemical name and a hazard warning label in accordance with the National Fire Protection Association’s (NFPA) 704M Hazard Identification System shall be attached.

4.7 Chemical Storage

4.7.1 Hazardous chemicals are to be stored in their original, labeled containers with the lids securely closed and taped if possible. Flammable and combustible materials must be stored in fire impervious cabinets in designated stockroom areas. Chemicals must be stored in compliance with instructions provided on their labels, MSDS, or the manufacturer’s specifications.

4.7.2 All hazardous chemicals must be stored in a manner that prevents spillage and leakage from exposing people or the environment to the chemical.

4.7.3 Hazardous chemicals shall not be stored with foods or beverages. Food and beverages shall not be consumed in areas where hazardous chemicals are used or stored.

4.8 Chemical Use in Offices

4.8.1 In general, hazardous substances should not be taken into office areas, conference rooms, or break areas. If this general requirement is infeasible, contact the SH&E Department for guidance.

4.8.2 General exceptions to this rule are the following:

- Liquid paper
- Toner
- Cleaners
- Isobutylene calibration gas
- pH calibration solutions for instruments

4.9 Employee Information and Training

4.9.1 Each AECOM employee who handles or is exposed to hazardous substances must be provided information and training on hazardous substances in their work area.

- At the time of their initial assignment
- Whenever a new hazard is introduced into their work area

4.9.2 As a minimum, the training requirements apply to AECOM personnel in the following job categories:

- All personnel who perform field work that involves the use of, or potential exposure to, hazardous substances
- Laboratory Employees

4.10 Initial Training Content

4.10.1 The Initial Training will provide instruction in the following:

- Methods and observations that may be used to detect the presence or release of a hazardous substance in the work area (such as personal monitoring, visual appearance or odor of hazardous substances being released, etc.);
- The physical and health hazards of substances in the work area and measures and procedures AECOM has implemented to protect employees; and
- The details of this hazard communication program (SOP), including an explanation of the labeling system and the MSDS, and how he/she can obtain and use appropriate hazard information.

4.10.2 The Initial Training will also inform the employee of the following:

- Any operations in their work area in which hazardous substances are present
- Location and availability of this written hazard communications program (SOP)
- Their right to personally receive information regarding hazardous substances to which they may be exposed
- Their right to have their physician receive information regarding hazardous substances to which they may be exposed
- Their right against discharge or other discrimination (in California) due to the employee's exercise of rights afforded pursuant to provisions of the California Hazardous Substances Information and Training Act

4.11 Periodic Training and Training for Non-Routine Tasks

4.11.1 Additional training will be provided to employees who have received initial training whenever:

- A new hazardous substance is introduced into their work area
- A new or revised MSDS is received, which indicates significantly increased risks to employee health as compared to those stated on the previous MSDS
- Non-routine tasks are performed, which will potentially result in exposure to hazardous substances, or exposure under circumstances, which were not addressed during initial training

4.11.2 Supervisors, in coordination with their **Regional SH&E Manager**, shall provide such training through an explanation of the information on the contents of the MSDS for that substance.

4.11.3 When training their employees, supervisors shall explain:

- Any health hazards associated with use of the substance or mixture
- Proper precautions for handling
- Necessary personal protective equipment or other safety precautions to prevent or minimize exposure
- Emergency procedures for spills, fire, disposal, and first aid

4.11.4 For most projects involving field work, this periodic training requirement will be facilitated through the implementation of the site specific HASP that has been developed for the project.

4.12 Documentation of Initial and Periodic Training

4.12.1 All training required by this SOP shall be documented at the time it is performed by having the employee sign a copy of a training attendance sheet.

4.13 Chemical Usage

4.13.1 Prior to using any chemical, a Task Hazard Analysis (THA) shall be completed by the employees assigned to use the chemical. The analysis will identify the hazards associated with the tasks to be performed and prescribe the Personal Protective Equipment (PPE) to be used.

4.14 Office Specific Written Program

4.14.1 Each office or location using or storing hazardous materials will develop a written office/ location-specific Hazard Communication/WHMIS Program. If the local office decides to implement the requirements of the standard in any way that differs from this procedure, they shall verify the changes with the SH&E department, document the changes, and communicate the differences to all affected employees.

4.14.2 For Canadian operations, all relevant MSDS must be current (no more than 3 years) and readily available (in French and English) for all hazardous materials.

4.15 Canada-specific

4.15.1 Consumer products are exempt from supplier labels and MSDS requirements. Some cleaning solvents may be packaged as consumer products and these must be labelled in accordance with the Consumer Product Act requirements.

4.15.2 In addition to the labelling of storage containers in the workplace, the contents of process piping (including valves), process vessels and reaction vessels are required to be identified through the use of colour coding, labels, placards or other modes of identifications that must be communicated to workers through training programs. It is very important for employees to be aware of and understand Client labelling requirements for these types of process systems.

4.16 Roles and Responsibilities

4.16.1 **Regional SH&E Managers** will:

- Audit their regional offices to assure that they maintain an establishment-specific Hazardous Substance Inventory (HSI).
- Audit their regional offices to assure that if an establishment-specific HSI is required, that MSDSs are available for each substance listed on the HSI.
- Provide interpretation of MSDSs and hazard information for HMIS labels/NFPA labels and other information to assist in training employees.
- Provide hazard communication training to AECOM employees and file documents of this training in the Corporate SH&E office.
- Review MSDS for adequacy of completion to meet the OSHA and Canadian standard and returning them to supplier, if necessary.

4.16.2 **Office Managers** will:

- Have an operations-specific, written hazard communication program which at least describes how the requirements of this Procedure and the US OSHA and Canadian Hazard Communication requirements for labels and other forms of warning, material safety data sheets, and employee information and training will be met.
- Appoint an MSDS administrator for their establishment if they store or use hazardous substances.
- Confirm, if required, that the MSDS Administrator maintains an HSI for their establishment.
- Confirm that MSDS are available for all substances listed on their establishment's HSI.

- Confirm that a copy of this Procedure and the site-specific MSDS are available to all employees. Employees shall be instructed in the location of this Procedure and the MSDS.
- Confirm that all employees in their office affected by the HAZCOM standard are provided with the appropriate training, including new employees.

4.16.3 **Project Managers (field task managers, supervisors)** will:

- Confirm that all employees under their supervision have received the initial and periodic training required by this SOP prior to assigning employees to tasks involve the use of, or potential exposure to, hazardous substances.
- Notify employees of hazardous substances covered by this SOP that are used in their work area.
- Determine the potential fire, toxic, or reactivity hazards which are likely to be encountered in the handling or utilization of a hazardous substance and will communicate this information to their affected employees, before any are permitted to work with it.
- Confirm that an MSDS is available for each hazardous substance used, or potentially encountered, in the work areas or on the projects that are under their supervision.
- Notify subcontractors (working for AECOM) of any hazardous substances that are used or stored by AECOM to which the subcontractor's employees may be exposed.
- Notify clients or property owner/operators of chemicals brought onto their property by AECOM or AECOM's subcontractors.
- Request MSDSs from all subcontractor organization for the relevant chemicals they bring onto an AECOM controlled site.

4.16.4 **Employees** will:

- Confirm that they have received appropriate hazard communication training prior to working with materials that fall under the standard.
- Only work with materials for which they have been instructed on how to find an MSDS and how to work with that material safely.
- Provide a copy of all MSDSs received to the MSDS Administrator at their facility.
- Verify that an MSDS is available in their work area for each hazardous substance that they use.
- Confirm that containers of hazardous substances that they use are properly labeled.

5.0 Records

None.

6.0 Attachments

None.

S3NA-509-PR Hazardous Waste Operations and Emergency Response Activities

1.0 Purpose and Scope

1.1 Provides requirements for AECOM operations pertaining to hazardous waste and emergency response (HAZWOPER) services.

1.2 This procedure applies to all AECOM North America-based employees and operations.

1.3 In Canada there is no direct federal or provincial counterpart to HAZWOPER; however, as due diligence and in compliance with applicable provincial duty of care/general duty clauses, staff working in Canada will comply with this procedure.

2.0 Terms and Definitions

2.1 **Emergency Response**: A response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual-aid groups, local fire departments, etc.) to an occurrence that results, or is likely to result, in an uncontrollable release of a hazardous substance. Responses to incidental release of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area or by maintenance personnel are not considered to be emergency responses within the scope of the HAZWOPER standard. Responses to releases of hazardous substances where there is no potential safety or health hazard are not considered to be emergency responses.

2.2 **Health and Safety Plan**: A document prepared for each project that contains site-specific information including the Emergency Response Plan for the project.

2.3 **Incident Command System (ICS)**: ICS is a standardized on-scene incident management concept designed specifically to allow responders to adopt an integrated organizational structure equal to the complexity and demands of any single incident or multiple incidents without being hindered by jurisdictional boundaries. In the ICS the first person responding to an incident becomes the Incident Commander and turns that title and duties over to more qualified responders as they arrive on scene.

2.4 **First Responder**: First responders are individuals who are likely to witness or discover a hazardous substance release, injury, fire, or other incident and who have been trained to initiate an emergency response sequence by notifying the proper authorities of the release. They would take no further action beyond first aid, initial control of the incident, and notifying the authorities and others of the incident.

2.5 **Hazardous Materials Specialist**: Hazardous materials specialists are individuals who respond with and provide support to hazardous materials technicians. Their duties parallel those of the hazardous materials technician; however, those duties require a more directed or specific knowledge of the various substances they may be called upon to contain. The hazardous materials specialist would also act as the site liaison with federal, state, local, and other government authorities in regards to site activities.

2.6 **Hazardous Materials Technician**: Hazardous materials technicians are individuals who respond to releases or potential releases for the purpose of stopping the release. They assume a more aggressive role than a first responder in that they will approach the point of release in order to plug, patch, or otherwise stop the release of a hazardous substance.

2.7 **Incident Commander**: The Incident Commander (IC) is responsible for all aspects of the response, including developing incident objectives and managing all incident operations. The title and responsibilities are typically assumed by a qualified IC from the client or public sector.

2.8 **Hazardous Waste**: Hazardous waste is waste that is dangerous or potentially harmful to our health or the environment. Hazardous wastes can be liquids, solids, gases, or sludges. They can be discarded commercial products, like cleaning fluids or pesticides, or the byproducts of manufacturing processes. Hazardous waste are divided into Listed wastes, Characteristic wastes, Universal wastes,

and mixed wastes. Specific procedures determine how waste is identified, classified, listed, and delisted.

2.9 **Hazardous Materials:** A hazardous material is any item or agent (biological, chemical, physical) that has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors. Additionally a hazardous material may be defined as any substance or chemical which is a "health hazard" or "physical hazard," including chemicals that are carcinogens, toxic agents, irritants, corrosives, sensitizers; agents that act on the hematopoietic system; agents that damage the lungs, skin, eyes, or mucous membranes; chemicals that are combustible, explosive, flammable, oxidizers, pyrophorics, unstable-reactive, or water-reactive; and chemicals that in the course of normal handling, use, or storage may produce or release dusts, gases, fumes, vapors, mists, or smoke that may have any of the previously mentioned characteristics. This may be caused when released by spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, disposing into the environment, by being transported or moved, and items or chemicals that are "special nuclear source" or byproduct materials or radioactive substances.

3.0 References

3.1 Federal Emergency Management Agency—**FEMA: Incident Command System**

3.2 29 CFCR 1910.120, Hazardous Waste Operations and Emergency Response

3.3 29 CFR 1910.38, Emergency Action Plans

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 **Regional Operations Managers** and **District Managers** shall be responsible for the following:

- Provide support to the implementation of Health and Safety Plans and Emergency Action Plans.

4.1.2 **Project managers** shall be responsible for the following:

- Prepare or request a HASP for every AECOM project.
- Verify that all personnel working on the project are qualified.
- Request client's emergency response procedures.
- Appoint a Site Safety Officer (SSO) for each project.
- Communicate the site-specific emergency response details to all employees assigned to a field project.
- Confirm that the necessary communications equipment for the project is available.
- Confirm that an accident/incident investigation is performed and a report is filed.

4.1.3 **Regional SH&E managers** shall be responsible for the following:

- Provide technical guidance for the development and implementation of Health and Safety Plans and Emergency Action Plans.
- Prepare emergency action plans as part of project HASPs and emergency reference sheets.
- Interface with the local emergency responders when necessary.
- Interface with clients regarding facility emergency response procedures.

4.1.4 **Site Safety Officer** is responsible for the following:

- Verify that a HASP is available for the project.
- Communicate the site-specific emergency response details to all employees assigned to a field project.
- Stop work and initiate emergency response procedures as required.
- Account for all AECOM and subcontractor employees after site evacuation.

- Conduct pre-entry briefing and daily tailgate meetings and review facility and site-specific emergency procedures.
- Brief on-site and off-site responders in the event of an emergency.

4.1.5 **Employees**

- Maintain HAZWOPER training.
- Follow the HASP and emergency procedures prepared for the project.
- Initiate emergency response via verbal communications or the alarm system if first to encounter the emergency.

4.1.6 All personnel (e.g., AECOM employees, general laborers, equipment operators, chemists, supervisors, etc.) performing activities at hazardous waste sites that expose or potentially expose them to hazardous wastes and health hazards are considered HAZWOPER site workers and must meet the training and medical surveillance requirements specified in 29 CFR 1910.120(e) and (f), respectively. Additional training may be required based on site activities including related exposures and risks (e.g., confined space entry, excavations, fall protection, other materials [lead], etc.). These additional training requirements are to be outlined in the project- or site-specific health and safety plan (HASP).

4.2 Personnel Qualifications—Medical Surveillance and Training

4.2.1 HAZWOPER-qualified employees will participate in the following medical surveillance and training requirements.

4.2.2 Medical Surveillance

- Specific HAZWOPER medical examination protocols have been developed by AECOM's Corporate Medical Provider (CMP) to meet the requirements of 29 CFR 1910.120(f). To be medically qualified to perform HAZWOPER work, employees receive the following medical examinations:
    - Initial (Baseline) Examination—The initial examination is part of pre-employment requirements and must be completed (with results received) prior to the employee's start of work date.
    - Annual Examination—HAZWOPER-qualified employees will complete a medical examination once each year. Medical qualification expires on the anniversary date of the last examination completed. There will be no "grace period" exemptions beyond this date without the express approval of the Regional SH&E Manager. At the recommendation of the SH&E Department, the CMP may approve an alternate examination frequency at periods of up to two years (biennial) in cases in which the worker's exposures to environmental contaminants are infrequent and typically well below any occupational exposure limits (e.g., senior management personnel).
    - Termination Examination—When reassigned to non-HAZWOPER duties, or at the conclusion of employment at AECOM, HAZWOPER-qualified personnel will be provided with the opportunity to receive a termination medical examination.
    - Special Examinations—The SH&E Department and the CMP will jointly determine the need for special examinations because of
        - Unusual exposure conditions.
        - In response to possible overexposures.
- The CMP will determine the medical protocol elements for each of these examinations based on exposure information provided by the SH&E Department. The CMP will evaluate the results of each employee's examination and will provide a written statement of medical clearance clearly stating medical compliance with the HAZWOPER regulatory standard (29 CFR 1910.120(f)) and approval of the employee to perform unrestricted HAZWOPER activities. for initial and annual examinations, the CMP will also evaluate the employee for the use of air purifying and supplied air respiratory protection. The written evaluation from these examinations will indicate the CMP's approval/limitations on the employee's use of respiratory protection.

4.2.3 AECOM Training

- All personnel assigned to work at a hazardous waste site must participate in training meeting the requirements of 29 CFR 1910.120(e).
- Initial 40-Hour Training—Before being assigned to a HAZWOPER site, AECOM employees must complete 40 hours of off-site training meeting the requirements of 29 CFR 1910.120(e)(3)(i). At the conclusion of training, personnel will receive a written certification of course completion, signed by the instructor, that indicates the course of instruction (40-hour HAZWOPER) and training dates. A copy of this certification must be provided to the employee's SH&E Coordinator. Employees are responsible for maintaining their own copy of this certificate and for presenting it to the site supervisor when working on any HAZWOPER site.
- In addition to the initial 40-hour training, the employee must receive three days of actual supervision by a trained experienced supervisor.
    - Available Training Sources:
        - On-site training provided by the SH&E Department.
        - Outsourced training providers approved by the SH&E Department.
- Refresher 8-Hour Training—To remain qualified to perform on-site HAZWOPER work activities, each AECOM employee will complete 8 hours of HAZWOPER refresher training meeting the requirements of 29 CFR 1910.120(e)(8) at yearly intervals following completion of Initial 40-hour training. At the conclusion of training, personnel will receive a written certification of course completion, signed by the instructor, that indicates the course of instruction (8-hour HAZWOPER Refresher) and the training date. A copy of this certification must be provided to the employee's SH&E Coordinator. Employees are responsible for maintaining their own copy of this certificate and for presenting it to the site supervisor when working on any HAZWOPER site.
    - Available Training Sources:
        - Internet-based training approved by SH&E Department
        - On-site training provided by the SH&E Department
        - Outsourced training providers approved by the SH&E Department
- Supervisor 8-Hour Training—Any AECOM employee acting in a management capacity for HAZWOPER activities (e.g., project management personnel, field managers/foremen, site safety officers, etc.) must complete an additional 8 hours of HAZWOPER Supervisor training meeting the requirements of 29 CFR 1910.120(e)(4). Although this training is required only once, supervisors must maintain their overall HAZWOPER qualification through annual completion of refresher training. At the conclusion of Supervisor 8-Hour Training personnel will receive a written certification of course completion, signed by the instructor, that indicates the course of instruction and the training date. A copy of this certification must be provided to the employee's SH&E coordinator. Employees are responsible for maintaining their own copy of this certificate and for presenting it to the senior site supervisor when working on any HAZWOPER site.
    - Available Training Sources:
        - On-site training provided by the SH&E Department
        - Outsourced training providers approved by the SH&E Department
- 24-Hour HAZWOPER Training—Site support contractors and site visitors may qualify to substitute 24-hour HAZWOPER training in place of 40-hour training, as specified in 29 CFR 1910.120(e)(3)(ii). Personnel potentially qualifying for this alternative training include:
    - Site support personnel who will not work in any Exclusion Zone areas.
- Subcontractors and site visitors whose duties will not entail significant exposure to site contaminants defined as not working in any areas where airborne contaminant concentrations exceed one-half of any applicable occupational exposure limit, and no contact or exposure to materials with site contaminant concentrations exceeding natural background levels.The Regional SH&E Manager or SH&E department designee must approve the substitution of 24-hour training for initial 40-hour training. Persons qualifying for

24-hour training must provide written certification of course completion prior to beginning work on site. Persons completing 24-hour training must complete 8 hours of annual refresher training at the required interval to maintain eligibility for on-site work and must provide proof of this training (as necessary to demonstrate retraining) prior to beginning work on site.

4.2.4 Subcontractor Personnel

Any subcontractor organization whose employees will support AECOM operations at a HAZWOPER site will:

- Provide the AECOM Project Manager with a copy of their written HAZWOPER medical surveillance and training program requirements. The elements of the program(s) must be similar to those for AECOM's own program, as detailed above.
- Provide the Project Manager with written certification of a physician's approved medical clearance for each employee who will work on the site. Certification can be demonstrated by:
  - A copy of the physician's signed medical clearance for each employee (preferred), or
  - A letter identifying the medical status and clearance expiration date of every employee, signed by the company's safety director or an officer of the company.
  - A copy of the each employee's training certifications, which will include:
    - The initial 40-hour training certificate (24-hour training may be substituted with SH&E department approval).
    - The most current Refresher training certificate (must be current within the previous one-year period).
    - A copy of the Supervisor training certificate for each person serving in a site supervisory capacity (e.g., field managers/foremen, site safety officers, etc.).

4.3 Project SH&E Documentation—Health and Safety Plans

4.3.1 The project SH&E documentation prepared for HAZWOPER activities is referred to as a site-specific Health and Safety Plan (HASP), and must meet the requirements presented in 29 CFR 1910.120(b)(4).

4.3.2 The required plan elements include:

- A description of the work location, the site history, and a summary of any information available concerning site hazards (including both physical hazards and contamination conditions).
- A summary of the work activities to be performed under AECOM's scope of activities.
- A safety and health risk or hazard analysis for each on-site task that will be performed. Identified risks must include both chemical and physical hazards to which personnel may be exposed during the conduct of the work task.
- Protective measures for each work task to prevent or mitigate the potential hazards identified in the hazard analyses.
- Personal protective equipment (PPE) requirements for each work task.
- Frequency and types of air monitoring, personal monitoring, and environmental sampling techniques and instrumentation to be used.
- Site control measures.
- Decontamination procedures.
- An emergency response plan, *S3NA-509-FM4 Emergency Information and Hazard Assessment*, addressing actions to be taken in the event of each type of credible incident that might result during the performance of planned work activities, including minor and major injuries, and chemical release and fire. Response plans must address the means for coordinating the evacuation of all on-site personnel in the event of a catastrophic incident.

4.3.3 Responsibility for development of each AECOM HASP will be coordinated between the **Project Manager** and the **Regional SH&E Manager** or SH&E Department designee as part of project

initiation. Regardless of where the HASP is developed, it will be reviewed and approved by the SH&E Department prior to submission to any agency outside of AECOM.

4.4 Contractors and Subcontractors

4.4.1 The health and safety of any contractor's or subcontractor's employees is solely the responsibility of that contractor or subcontractor, who shall evaluate the hazards and potential hazards to their own employees and shall adhere to their own Health and Safety Plan.

4.4.2 In addition, all AECOM subcontractors' Health and Safety Plans will, at a minimum conform to the requirements of the AECOM Health and Safety Plan. The AECOM Health and Safety Plan does not, nor is it intended to, address procedures of contractors or subcontractors during their site activities.

4.5 Field Emergency Response Plans

4.5.1 AECOM employees are not expected to take action or to participate in rescues or responses to chemical releases beyond the initial discovery of the release and immediate mitigation actions such as closing a valve, placing absorbents, and notifying the client and or public emergency response system (911.) If AECOM employees are to participate in the response to a chemical release beyond the initial reaction, there must be a contractual provision for this response and the employees must be specifically trained for this response. This document is designed to provide guidelines on how to prepare a written plan that will ensure prompt and proper response to an emergency situation that arises during field investigations and to outline the duties of AECOM employees during a field emergency and the associated training requirements.

4.5.2 Site specific health and safety plans that are prepared to comply with the HAZWOPER standard (29 CFR 1910.120) must address emergency response. This standard specifically outlines the elements that must be contained in an emergency response plan. However, the definition of emergency response, as written in 29 CFR 1910.120, focuses on emergencies involving the uncontrolled release of hazardous substances. Under 29 CFR 1910.120, an employer can opt to evacuate employees from the danger area when such an emergency occurs. AECOM does not expect its employees to actively assist in the handling of uncontrollable chemical releases that may occur during the implementation of field programs. As such, and as provided by the HAZWOPER standard, AECOM is exempt from the emergency response plan requirements of the standard as long as it provides an emergency action plan within the HASP that complies with 29 CFR 1910.38 (a). Therefore, all emergency response plans required under 29 CFR 1910.120 will be written to comply with 29 CFR 1910.38 (a).

4.5.3 The HAZWOPER standard does not prohibit AECOM employees from performing limited response activities. AECOM employees can provide response assistance by placing absorbent pillows or vermiculite around a small, contained spill that occurs during sampling efforts. AECOM's SH&E SOP 203—*Spill Containment Program*, describes the specific procedures that AECOM will follow when responding to an incidental chemical spill.

4.5.4 Field Project Preparation

- Every HASP that is prepared by AECOM will contain an emergency response section in which the required elements of an emergency action plan will be contained. For all projects that do not require a HASP, an emergency reference sheet will be prepared; minimally, the sheet will list the telephone numbers of the local emergency responders and the local hospital and provides directions to the local hospital. When AECOM is working at an operating facility, the emergency response procedures of the facility will be appended to the HASP or the emergency reference sheet.
- There are two types of emergency situations that AECOM personnel must be prepared for and that must be addressed in the emergency action plan. These include:
    - Emergencies related to the operations of our clients at the facility where AECOM is working.
    - Emergencies related to our own on-site activities/investigations.
- AECOM employees are typically not expected to take action or participate in responses to chemical releases beyond the initial discovery of the release and immediate mitigation actions such as closing a valve, placing absorbents, and notifying the client and or public emergency response system (911.)
- AECOM employees are not to accept the role of Incident Commander without specific authority from the Regional SH&E Manager and the General Operations Manager

responsible for the project. Assuming the role of the Incident Commander requires training beyond the scope of this Procedure.

4.5.5 Client Facility Emergency Response Procedures

- AECOM implements field programs on active properties, including manufacturing facilities. These facilities have typically developed an emergency response plan that is specific to facility-related emergencies. If AECOM is working at an operating facility, emergency procedures established by the facility must be followed in the event of a facility catastrophe. AECOM personnel must be aware of and familiar with the alarm signals used at the facility to alert personnel to an emergency. AECOM personnel must also know where to assemble in the event of a facility evacuation as the facility must be able to account for all personnel, including subcontractors such as AECOM in the event of an evacuation.
- The first priority in AECOM's preparation of a project emergency action plan is to ensure that the responsibilities under the client's emergency response plan are fully understood. Because of the nature of their business, many of our clients have in-house fire brigades, medical staff, and hazardous materials teams that can assist AECOM in the event of an emergency related to our field activities. In many instances, our clients prefer or require that subcontractors seek emergency assistance through their facility first before calling outside responders to the site.
- A copy of the facility's procedures must be made available to AECOM so that the information can be incorporated into the HASP or attached to the emergency reference sheet. If this information is not available to AECOM prior to arriving on site, the SSO must meet with client representatives upon arrival to the facility to review procedures in the event of an emergency related to plant operations.

4.5.6 Emergency Action Plan

- As a minimum, each emergency action plan must contain the following topics as required by 29 CFR 1910.38 (a):
  - Procedures and contact information for reporting emergencies to public service responders and on-site (client or host employer) emergency control centers.
  - Emergency escape procedures and emergency escape route assignments.
  - Procedures to be followed by employees who remain to operate critical site operations before they evacuate.
  - Procedures to account for all employees after emergency evacuation is complete.
  - Rescue and medical duties for those employees who are to perform them.
  - Preferred means of reporting fires and other emergencies.
  - PPE to protect employees from expected exposures and potential exposures during an emergency.
  - Names of persons or departments who can be contacted for further information (i.e. emergency reference sheet).
  - Availability of medical surveillance for workers who might have been exposed to chemicals, bloodborne pathogens, or other biological agents as a result of project work or emergency response.
- In addition, each plan must establish the specific alarm system that will be used on site to warn employees of an AECOM emergency. The chosen alarm signals should not conflict with alarm signals already in place at the facility.

4.5.7 Escape Routes and Procedures

- Prior to the commencement of on-site activities, the SSO must determine how AECOM employees will evacuate each AECOM work area of the site. Two or more routes that are separate or remote from each other for each work area must be identified. Multiple routes are necessary in case one is blocked by fire or chemical spill. These routes must not overlap because, if a common point were obstructed, all intersecting routes would be blocked.
- Prominent wind direction should also be considered when designating escape routes and assembly areas. Escape routes and assembly areas should be upwind of the site whenever possible.

- Upon arrival to the site, the SSO must verify that the selected routes are appropriate for evacuation. During an emergency, the quickest and most direct route should be selected. However, when working at an operating facility, the established escape routes of the facility should be used whenever possible. In the event of a facility-related emergency, all AECOM employees must meet at the facility's assembly area so that the client can verify that AECOM has evacuated the property.

4.5.8 Accounting Method for All Employees after Evacuation

- The SSO is responsible for determining that all AECOM employees have been successfully evacuated from the work area(s). It is the responsibility of each AECOM subcontractor to verify that all of its employees evacuated the site and to report this information to the AECOM SSO. All employees must meet at the designated assembly area. A headcount is an acceptable way to determine complete evacuation when the field team is of a small size. The site log-in book should be referenced when attempting to account for more than 10 people. In the event of a facility-related emergency, the SSO must notify facility representatives that all AECOM employees and AECOM subcontract employees have successfully evacuated the work area(s). The SSO must notify emergency responders if any employee is unaccounted for and where on the site they were last seen.
- In the event of a project-related emergency, the SSO will provide off-site emergency responders or on-site HAZMAT teams or fire brigades (Incident Commander) with all available knowledge about the emergency situation upon their arrival to the scene.

4.5.9 Employees Who Remain to Operate Critical Site Operations Before They Evacuate

- All equipment and operations are required to cease in accordance with the established alarm signal procedures. The only exception will be related to health and safety. The SSO must determine at the time of the emergency if health and safety will be jeopardized by immediate stoppage of any particular piece of equipment. If such a determination is made, personnel involved in critical operations must be minimized. Once it is determined that the operation is no longer needed or the threat to the operators is imminent, operations will cease and the operators will immediately evacuate.

4.5.10 Rescue and Medical Duties

- Only currently trained individuals will administer first aid or CPR. If the injury is life threatening, the Emergency Medical System (EMS) should be called (911). Depending on the procedures established for the project, the SSO would contact an emergency responder directly or notify the facility representatives for medical assistance. If the employee needs medical attention that can not be provided on-site, the SSO shall escort the individual to the local hospital identified on the emergency reference sheet and shall remain with the person until release or admittance is determined. The escort will relay all appropriate medical information to the Project Manager and Regional SH&E Manager.

4.5.11 Preferred Means of Reporting

- Unless facility representatives specifically indicate that they prefer AECOM personnel to notify them first of an emergency, the SSO will directly contact the appropriate emergency responders listed on the emergency reference sheet.

4.5.12 Alarm Signals

- An emergency communication system must be in effect at all sites. The most simple and effective emergency communication system in many situations will be direct verbal communications. However, verbal communications must be supplemented any time voices cannot be clearly perceived above ambient noise levels and any time a clear line of sight can not be easily maintained among all AECOM personnel because of distance, terrain, or other obstructions.
- Portable two-way radio communications may be used when employees must work out of the line of sight of other workers.
- When verbal communications must be supplemented, the following emergency signals shall be implemented using handheld portable air horns, whistles, or similar devices. Signals must be capable of being perceived above ambient noise by all employees in the affected portions of the workplace.

- One Blast: General Warning—A relatively minor and localized, yet important, on-site event. An example of this type of an event would be a minor chemical spill where there is no immediate danger to life or health yet personnel working on the site should be aware of the situation so that unnecessary problems can be avoided. If one horn blast is sounded, personnel must stop all activity and equipment on-site and await further instructions from the SSO.
- Three Blasts: Medical Emergency—A medical emergency for which immediate first aid or emergency medical care is required. If three horn blasts are sounded, all first aid and/or CPR trained personnel should respond as appropriate. All other activity and equipment should stop and personnel should await further instructions from the SSO.
- Three Blasts Followed by One Continuous Blast: Immediate Threat to Life and Health—A situation that could present an immediate danger to life and health of personnel onsite. Examples include fires, explosions, large hazardous chemical release, severe weather-related emergencies, or security threats. If three horn blasts followed by a continuous blast are sounded, all activity and equipment must stop. All personnel must evacuate the site and meet in the designated assembly area where the SSO will account for all employees. The SSO will arrange for other emergency response actions if necessary. Information concerning the need to follow decontamination procedures during an emergency evacuation will be addressed in the emergency action plan.
- The SSO or his designate will acknowledge the distress signal with two short blasts on the air-horn or whistle.
- One Continuous Blast Following Any of the Above: All Clear/Return to Work—Personnel who sound the initial alarm are required to send an all clear signal when the emergency is over.

4.5.13 Emergency Reference Sheet

- An emergency reference sheet (see *S3NA-509-FM4 Emergency Information and Hazard Assessment*) must be prepared for projects not requiring a HASP. Each emergency reference sheet must list the following:
  - Emergency phone numbers for local police, fire, and ambulance service.
  - In-house facility extensions for reporting an emergency (applies to operating facilities only).
  - Phone number and address of closest hospital with an emergency room to the site.
  - Directions to the hospital from the site.
  - Map highlighting the site-to-hospital route.
  - Phone number for the Poison Control Center.
  - Names and phone numbers of AECOM representatives and facility representatives.

4.5.14 On-site and Off-site Communications

- Regardless of the size or location of AECOM's field projects, it is extremely important that both on-site and off-site communications be maintained so that in the event of an emergency employees can contact each other or place a phone call immediately with the appropriate responder(s).
- Walkie-talkies are required when members of the field team are working in separate areas of the site and verbal communications are no longer effective because of distance. A walkie-talkie must be available for each team that is working in a separate area of the site.
- When AECOM is working at an occupied facility, access to a telephone may not be a problem. When AECOM is working on abandoned properties or when there is no access to a phone, a cellular telephone must be brought to the work location.

4.5.15 Evacuation

- Although emergency evacuation procedures are included in AECOM's initial 40-hour HAZWOPER training, emergency procedures at each site will be different. Therefore, employees must be instructed about the specifics of the emergency procedures developed for the site during the site-specific pre-entry briefing that must be held daily prior to the

commencement of field activities. Update training is required anytime escape routes or procedures change. An evacuation drill will be conducted for projects that are scheduled for one month or longer. Visitors and untrained employees shall not be allowed into the project area until they receive a safety briefing including evacuation alarms and procedures.

4.5.16 First Responder

First responders shall have sufficient training or have had sufficient experience to objectively demonstrate competency in the following areas:

- An understanding of what hazardous substances are, and the risks associated with them in an incident.
- An understanding of the potential outcomes associated with an emergency.
- The ability to recognize the presence of hazardous substances and physical hazards in an emergency.
- An understanding of the role of the first responder.
- The ability to realize the need for additional resources and to make appropriate notifications to the communication center.

4.5.17 First Responder HAZWOPER Operations Level

First responders at the operations level are individuals who respond to releases or potential releases of hazardous substances as part of the initial response to the site for the purpose of protecting nearby persons, property, or the environment from the effects of the release. They are trained to respond in a defensive fashion without actually trying to stop the release. Their function is to contain the release from a safe distance, keep it from spreading, and prevent exposures. First responders at the operational level shall have received at least eight hours of training or have had sufficient experience to objectively demonstrate competency in the following areas in addition to those listed for the awareness level and the employer shall so certify:

- Knowledge of the basic hazard and risk assessment techniques.
- Know how to select and use proper personal protective equipment provided to the first responder operational level.
- An understanding of basic hazardous materials terms.
- Know how to perform basic control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available with their unit.
- Know how to implement basic decontamination procedures.
- An understanding of the relevant standard operating procedures and termination procedures.

4.5.18 Hazardous Materials Technician

Hazardous materials technicians shall have received at least 24 hours of training equal to the first responder operations level and in addition have competency in the following areas and the employer shall so certify:

- Know how to implement the employer's emergency response plan.
- Know the classification, identification, and verification of known and unknown materials by using field survey instruments and equipment.
- Be able to function within an assigned role in the Incident Command System.
- Know how to select and use proper specialized chemical PPE provided to the hazardous materials technician.
- Understand hazard and risk assessment techniques.
- Be able to perform advance control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available with the unit.
- Understand and implement decontamination procedures.
- Understand termination procedures.
- Understand basic chemical and toxicological terminology and behavior.

4.5.19 Hazardous Materials Specialist

Hazardous materials specialists shall have received at least 24 hours of training equal to the technician level and in addition have competency in the following areas and the employer shall so certify:

- Know how to implement the local emergency response plan.
- Understand classification, identification, and verification of known and unknown materials by using advanced survey instruments and equipment.
- Know the state emergency response plan.
- Be able to select and use proper specialized chemical PPE provided to the hazardous materials specialist.
- Understand in-depth hazard and risk techniques.
- Be able to perform specialized control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available.
- Be able to determine and implement decontamination procedures.
- Have the ability to develop a site safety and control plan.
- Understand chemical, radiological, and toxicological terminology and behavior.

4.6 Personal Protective Equipment (PPE) Ensembles

4.6.1 Defined HAZWOPER PPE ensembles are specified for general use on all AECOM HAZWOPER operations. The project HASP may specify modifications to these requirements to meet site-specific conditions.

4.6.2 Level D Ensemble

- The Level D ensemble provides a minimal level of skin protection (primarily against physical rather than chemical hazards) and no respiratory protection. Level D PPE is the minimum work uniform which will be used on HAZWOPER sites. Its use is appropriate when there is no significant potential for encountering hazardous substances or health hazards while working in controlled work areas.
- Level D Equipment List
  - Hard hat
  - Eye protection
  - Safety-toe work boots
  - Shirts with sleeves and long pants (shorts are unacceptable for use)
  - Hearing protection (as required)

4.6.3 Modified Level D Ensemble

- The Modified Level D ensemble provides moderate skin protection against contact with hazardous substances, but no respiratory protection. Its use is appropriate where there is a moderate-to-low potential for skin contact with known hazardous substances and health hazards, but no significant inhalation hazard is anticipated. The Modified Level D ensemble will consist of the Level D ensemble, supplemented by the addition of one or more of the following items:
- Modified Level D Equipment List
  - Chemical-resistant disposable outer coveralls
  - Chemical-resistant outer gloves taped to outer coveralls[1]
  - Chemical-resistant inner gloves1
  - Chemical-resistant safety-toe boots (taped to outer coveralls)

4.6.4 Level C Ensemble

1 Selection of specific glove types/materials will be provided in the project HASP based on consideration of the contaminants and the physical conditions of the work.

- The Level C ensemble provides moderate skin protection against contact with hazardous substances and moderate respiratory protection. Its use is appropriate where there is the potential for skin contact with known hazardous substances and health hazards, together with a limited and well-defined potential for exposure via inhalation.
- Level C Equipment List
    - Full-face air-purifying respirator (APR) equipped with cartridge types as designated in the project HASP[2]
    - Chemical-resistant disposable outer coveralls
    - Chemical-resistant outer gloves taped to outer coveralls[3]
    - Chemical-resistant inner gloves[3]
    - Hard hat
    - Safety-toe boots taped to coveralls; the use of boot covers (e.g., booties) or chemical-resistant boots may be specified
    - Hearing protection (as required)

4.6.5 Level B Ensemble

- The Level B ensemble provides both the highest level of inhalation exposure protection and considerable skin contact protection. Its use is appropriate where there are significant known or suspected hazardous substances and health hazards, involving both skin and inhalation exposure (up to and including Immediately Dangerous to Life or Health [IDLH] conditions) or where adverse atmospheric conditions cannot be mitigated by use of air purifying respirators (e.g., oxygen deficient atmospheres or chemicals with poor warning properties). The use of Level B PPE requires prior approval by the Regional SH&E Manager.
- Level B Equipment List
    - Supplied air respirator (SCBA or air line system with Grade D or better breathing air)
    - Chemical-resistant disposable outer coveralls
    - Chemical-resistant outer glove taped to outer coveralls[3]
    - Chemical-resistant inner gloves[3]
    - Hard hat
    - Chemical resistant safety-toe boots taped to coveralls
    - Hearing protection (as required)

4.6.6 Level A Ensemble

- The Level A ensemble provides the highest level of both respiratory and skin protection, up to and including protection against skin contact with vapor-phase contaminants. The use of Level A PPE requires prior approval by the Corporate SH&E Director.
- Specific Level A ensemble components will be determined on a case-by-case basis by the SH&E Department.

4.7 Employee Exposure Monitoring

4.7.1 Exposure monitoring at HAZWOPER sites will be conducted to determine explosive and oxygen levels, monitor and control employee exposures to airborne contaminants, and to determine and regulate controlled work area boundaries (e.g., support zone, contamination reduction zone, and exclusion zone) for the protection of non-HAZWOPER workers and the general public.

4.7.2 Direct Reading Exposure Monitoring Requirements

- Explosive levels, oxygen levels, and airborne contaminants present potential hazards to HAZWOPER personnel working within controlled work areas and to non-HAZWOPER workers and the general public present outside the controlled work areas. On-site exposure

2 Selection of specific cartridges will be made by the SH&E Department (or Competent Person – Respiratory Protection as designated by the DSM) based on contaminants present. A cartridge change-out frequency will also be specified in the HASP based on the manufacturer's cartridge performance data.

3 Selection of specific glove types/materials will be provided in the project HASP based on consideration of the contaminants and the physical conditions of the work.

monitoring will be utilized to assess the magnitude of these hazards and to provide indications of any necessary control procedures to mitigate unacceptable hazards. *S3NA-509-FM1 Direct Reading Instrument Monitoring Log* will be used to record all monitoring efforts using direct reading instruments and will remain part of the project file.

- Specific exposure monitoring requirements will be established in individual HASPs and will be implemented by the project team(s) subject to the following requirements:
    - Direct reading instrumentation will be used in accordance with the following table:

Direct Reading Instrument	Example Trade Names	Use
Flame Ionization Detector (FID)	OVA	Detection of select organic vapors
Photo ionization detector (PID)	miniRAE, Micro-TIP	Detection of select organic vapors
Portable gas chromatograph	OVA	Detection of select organic vapors
Explosive meter	MSA ALTAIR, QRAE II, BW GasAlert	Determine explosiveness (as a percent of the Lower Explosive Limit [LEL])
Oxygen monitor	MSA ALTAIR, QRAE II, BW GasAlert	Determine oxygen concentration (in percent)
Single gas meters (mono-tox) • Hydrogen sulfide • Carbon monoxide • Oxides of nitrogen • Cyanide		Determine airborne concentrations of selected contaminants (in parts per million)
Colorimetric Detector Tubes	Drager	Determine airborne concentrations of selected contaminants (in parts per million)
Aerosol monitor	Mini-RAM	Determine airborne particulate concentration (in milligrams per cubic meter)

- Selected instruments will be capable of discriminating contaminant concentrations to concentrations of at least one-half of the HASP-specified exposure limit. All direct-reading instrumentation will be calibrated daily as directed by the manufacturer. *S3NA-509-FM2 Instrument Calibration Log* will be used to record instrument calibrations.

4.7.3 Work Area Exposure Monitoring

- Work area exposure monitoring will include breathing zone readings for the maximum exposed worker(s).
- Results will be used to determine adequacy of PPE (especially respiratory protection). Specific criteria for upgrade/downgrade will be established in the HASP.

4.7.4 Perimeter Exposure Monitoring

- Perimeter air samples will be collected when the potential exists for airborne contaminants to migrate off-site.
- Perimeter exposure monitoring will be conducted at locations downwind from the project activities at a minimum (also upwind if the potential exists for offsite contamination to migrate onto the site).
- Sample results will be recorded in a log book or on the sample log form provided in *S3NA-509-FM3 Personal Sampling Data Sheet*.

- Records will indicate individual name, SSN (last 4 digits is acceptable), and job/operation at the time of sample collection.
- Samples sent out for independent laboratory analysis will follow chain of custody requirements.
- Exposure results will be posted on site and explained in a safety briefing.
- Employees will receive a written statement of results within 15 days of receipt from the laboratory.
- Results of all personal exposure monitoring will be provided to the SH&E department for inclusion in the employee medical records.

5.0 Records

5.1 All forms and documents generated during a HAZWOPER project will be maintained in the project file.

6.0 Attachments

6.1 S3NA-509-FM1 Direct Reading Instrument Monitoring Log

6.2 S3NA-509-FM2 Instrument Calibration Log

6.3 S3NA-509-FM3 Personal Sampling Data Sheet

6.4 S3NA-509-FM4 Emergency Information and Hazard Assessment

S3NA-510-PR Hearing Conservation Program

1.0 Purpose and Scope

1.1 Establishes procedures to confirm that personal noise exposure remains within acceptable limits and establishes the requirements of an acceptable hearing conservation program.

1.2 This procedure applies to all AECOM North America-based employees and operations.

2.0 Terms and Definitions

2.1 **Decibel (dB):** Logarithmic unit of measurement of sound level.

2.2 **Action Level:** An eight-hour, time-weighted average of 85 decibels measured on the A-scale, slow response, or equivalently; a noise dose of 50 percent.

2.3 **Standard Threshold Shift (STS):** When one's hearing threshold has changed (relative to the baseline audiogram) an average of 10 dB or more at 2000, 3000, or 4000 Hz in either ear).

2.4 **Noise Reduction Rating (NRR):** The measure, in decibels, of how well a hearing protector reduces noise, as specified by the Environmental Protection Agency.

3.0 References

None.

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 **Regional SH&E Managers** or their designate

- Provide access to initial and refresher hearing conservation training.
- Inform employees of noise monitoring results when full-shift noise exposure is at or above the action level.
- Designate areas and tasks where employees' exposure is at or above the action level.
- Conduct noise monitoring, as applicable, and support hazardous noise assessment/evaluation efforts.

4.1.2 **Project or Office Managers**

- Implement the hearing conservation program.
- Confirm that a hazardous noise assessment/evaluation has been conducted.
- Confirm that a hazardous noise assessment/evaluation is conducted when a change in equipment, procedures, or personnel may increase employee exposure to noise.
- Implement engineering controls to reduce noise levels when such measures are considered feasible and when required by regulation.
- Purchase, monitor, and replenish for employees' use a supply of hearing protection devices with a minimum Noise Reduction Rating (NRR) of 26 dBA.
- Confirm that individuals included in the program receive training and that the training meets the criteria outlined in this program.
- Investigate and implement corrective action to all reports of nonconformance with this procedure, including reports of standard threshold shifts or employees' failure to wear hearing protectors in designated areas.

4.1.3 **Supervisors**

- Maintain an awareness of the noise levels in work areas for which he/she is responsible.
- Place warning signs in areas where sound levels would require the use of hearing protectors.
- Request that a hazardous noise assessment/evaluation be conducted when a change in equipment, procedures, or personnel may increase employee exposure to noise.
- Confirm that all employees are aware of the requirements for hearing protection for any designated area or task.
- Enforce the use of hearing protection by employees in designated areas and for designated tasks.

4.1.4 Employees

- Comply with the requirements of the Hearing Conservation program.
- Wear hearing protection devices in designated areas or for designated tasks.
- Inspect and maintain hearing protection devices.
- Report any suspected change in noise levels of work area to supervisor.
- Report any signs or symptoms experienced that could be the result of overexposure to noise to supervisor.
- Participate in audiometric testing and hearing protection training when required.

4.2 Requirements

4.2.1 The requirements of this procedure apply to all locations/facilities/projects where employee noise exposure may equal or exceed 50 percent of the allowable noise dose or Permissible Exposure Limit (PEL). Table 1 provides information relative to the current PEL for noise exposure expressed as a time-weighted average.

Table 1. Permissible Exposure Limit

SOUND LEVEL (dBA)	TIME (hours)
85	8
90	4
95	2
100	1
105	0.5
110	0.25
115	0.125

4.2.2 Table 2 provides information relative to the Action Level (or 50 percent allowable noise dose) expressed as a time-weighted average. The action levels outlined in the table below and PELs described in Table 1 are calculated without regard to the protection afforded by the use of hearing protectors.

Table 2. Action Levels for Hearing Conservation Program

SOUND LEVEL (dBA)	TIME (hours)
85	4
90	2
95	1
100	0.5
105	0.25
110	0.125
115	0.0625

4.3 Training Program

4.3.1 All employees with potential exposure above the action levels established in Table 2 of this procedure or who otherwise utilize any type of hearing protector will participate in a hearing conservation training program.

4.3.2 Training Objectives

4.3.3 The initial and subsequent annual hearing conservation training will address, at a minimum, the following topics:

- The effects of noise on hearing, recognizing hazardous noise, and symptoms of overexposure to hazardous noise.
- When and/or where hearing protectors are required to be worn.
- The purpose of hearing protectors.
- The advantages, disadvantages, and effectiveness of various types of protectors.
- Instructions on how to select, use, fit, and care for hearing protectors.
- The purpose of audiometric testing, including an explanation of the test procedures.
- Hearing Conservation Program requirements and responsibilities.

4.3.4 Hearing protection training is conducted biannually for all affected employees or more frequently for employees who do not properly use hearing protectors or otherwise fail to comply with this policy.

4.4 Audiometric Testing

4.4.1 All AECOM personnel with exposure greater than the action level may be enrolled in the medical surveillance program and undergo a baseline audiogram. Thereafter, annual audiograms will be compared with the baseline exam.

4.4.2 Enrolled employees will receive audiograms during their exit physicals.

4.4.3 When a Standard Threshold Shift (STS), as identified by the AECOM Medical Consultant, is noted between the last valid baseline and the annual audiogram, the following steps will be taken:

- A retest will be conducted within 30 days to confirm the STS. The employee will not be exposed to workplace/hobby noise for 14 hours or will be provided with adequate hearing protection prior to testing.
- If the STS persists, ear protection will be upgraded to one with a greater NRR. The minimum NRR will be 26 dBA.
- The employee will be counseled and AECOM will obtain information regarding the employee's possible noise exposure away from the workplace or existing ear pathology.
- Qualified medical personnel will review the audiograms. This group will determine the need for a medical referral.
- The employee will be notified in writing by either the SH&E Department or the AECOM Medical Provider of the STS, within 21 days of determination, as required by regulation.
- The employee's supervisor will be notified of the shift in hearing threshold.

4.4.4 If the employee who has experienced an STS is exposed to 85 dBA for eight hours or 80 dBA for 12 hours, mandatory use of ear protection is required.

4.5 Monitoring of Noise Levels

4.5.1 As deemed necessary by an SH&E Professional, or a Project Safety Plan AECOM will periodically monitor personal and area noise levels using noise dosimetry and/or sound level meters.

4.6 Hearing Protectors

4.6.1 Selection of appropriate hearing protectors must be based on actual or anticipated exposure levels. At a minimum, hearing protectors must provide a level of protection that brings actual or anticipated exposure below the PEL established for the time period shown in the table above. Additional information relative to hearing protector use is as follows:

- Hearing protection will be mandatory for all employees exposed to 85 dBA for eight hours.

- Hearing protection will be mandatory for all employees working in any area that has not been evaluated for noise exposure and the ambient noise level in the area is such that you must raise your voice to have a normal conversation with someone less than four feet from you and/or when within 25 feet of an operating piece of heavy equipment.
- Hearing protection will be mandatory for all employees who work on or near heavy equipment unless personal dosimetry or other techniques have been used to document actual exposure.
- Hearing protectors will be made available to all employees who may be exposed to 85 dBA for eight hours.
- Hearing protection will be mandatory for all employees exposed to 85 dBA for any period of time and who have experienced an STS.

5.0 Records

5.1.1 Noise exposure measurement records will be retained for three years at the project/facility.

5.1.2 Audiogram records will be retained in the employee's medical records as per AECOM's Medical Surveillance Procedure for a period as directed by regulation or AECOM's Medical Provider.

5.1.3 Employee training session documentation will be retained for the duration of employment.

6.0 Attachments

6.1 S3NA-510-FM Site-Specific Hearing Conservation Program

6.2 S3NA-510-WI Hearing Protection Guidelines

S3NA-511-PR Heat Stress

1.0 Purpose and Scope

1.1 Establishes a heat stress prevention program to help ensure that employees know and recognize the symptoms of heat stress-related illnesses and are prepared to take appropriate corrective action.

1.2 This procedure applies to all AECOM North America-based employees and operations.

2.0 Terms and Definitions

2.1 **Acclimated**: Workers who have developed physiological adaptation to hot environments characterized by increased sweating efficiency, circulation stability, and tolerance of high temperatures without stress. Acclimatization occurs after 7 to 10 consecutive days of exposure to heat and much of its benefit may be lost if exposure to hot environments is discontinued for a week.

2.2 **Chemical Protective Clothing (CPC):** Apparel that is constructed of relatively impermeable materials intended to act as a barrier to physical contact of the worker with potentially hazardous materials in the workplace. Such materials include: Tyvek® coveralls (all types) and polyvinyl chloride (PVC) coveralls and rain suits.

2.3 **Unacclimated**: Workers who have not been exposed to hot work conditions for one week or more or who have become heat-intolerant due to illness or other reasons.

2.4 **Heat Cramps**: A form of heat stress brought on by profuse sweating and the resultant loss of salt from the body.

2.5 **Heat Exhaustion**: A form of heat stress brought about by the pooling of blood in the vessels of the skin and in the extremities.

2.6 **Heat Rash**: A heat-induced condition characterized by a red, bumpy rash with severe itching.

2.7 **Heat Stress.** The combination of environmental and physical work factors that constitute the total heat load imposed on the body.

2.8 **Heat Stroke**: The most serious form of heat stress, which involves a profound disturbance of the body's heat-regulating mechanism.

2.9 **Sunburn**: Is caused by unprotected exposure to ultraviolet light that is damaging to the skin. The injury is characterized by red painful skin, blisters, and/or peeling.

3.0 References

3.1 S3NA-003-PR SH&E Training

3.2 S3NA-208-PR Personal Protective Equipment

3.3 S3NA-314-PR Working Alone and Remote Travel

4.0 Procedures

4.1 Restrictions

4.1.1 Staff working in extreme heat or sun for extended periods of time away from a shelter or vehicle must not work alone.

4.1.2 Staff shall not be exposed to levels that exceed those listed in the screening criteria for heat stress exposure in the heat stress and strain section of the ACGIH Standard.

4.1.3 Clothing corrections shall be applied in accordance with the heat stress and strain section of the ACGIH Standard.

4.2 Roles and Responsibilities

4.2.1 **Project Managers'/field task managers'** responsibilities:

- Evaluate the need for heat stress prevention measures and incorporate as appropriate into the Health and Safety Plan.

- Implement heat stress prevention measures, as applicable, at each work site.
- Develop/coordinate a work-rest schedule, as applicable.
- Ensure heat stress hazard assessments/evaluations were completed for the planned activities.
- Assign personnel physically capable of performing the assigned tasks.
- Ensure that personnel are properly trained in the recognition of heat stress-related symptoms.

4.2.2 **Regional SH&E Managers'** responsibilities**:**

- Provide heat stress awareness training.
- Assist project teams develop appropriate work-rest schedules.
- Conduct/support incident investigations related to potential heat stress-related illnesses.

4.2.3 **Site Supervisors'** responsibilities**:**

- Identify those tasks that may be most impacted by heat stress and communicate the hazard to the assigned employees.
- Ensure that employees have been trained on the recognition of heat stress-related illness.
- Ensure that adequate supplies of appropriate fluids are readily available to employees.
- Ensure that a proper rest area is available.
- Conduct heat stress monitoring, as applicable.
- Implement the work-rest schedule.
- Ensure that first aid measures are implemented once heat stress symptoms are identified.
- Ensure personnel are physically capable of performing the assigned tasks and are not in a physically compromised condition.
- Report all suspected heat stress-related illnesses.

4.2.4 **Employees'** responsibilities:

- Observe each other for the early symptoms of heat stress-related illnesses.
- Maintain an adequate intake of available fluids.
- Be familiar with heat stress hazards, predisposing factors, and preventative measures.
- Report to work in a properly vested and hydrated condition.
- Report all suspected heat stress-related illnesses.

4.3 Controls

4.3.1 If staff are or may be exposed, the supervisor shall:

- Conduct a heat stress assessment to determine the potential for hazardous exposure of workers, and
- Develop and implement a heat stress exposure control plan.

4.3.2 If staff are or may be exposed, the supervisor shall implement engineering controls (e.g., shelters, cooling devises, etc.) to reduce the exposure of staff to levels below those listed in the screening criteria for heat stress exposure in the heat stress and strain section of the ACGIH Standard.

4.3.3 If engineering controls are not practicable, the supervisor shall reduce the exposure of workers to levels below those listed in the screening criteria for heat stress exposure in the heat stress and strain section of the ACGIH Standard by providing administrative controls, including a work-rest cycle or personal protective equipment, if the equipment provides protection equally effective as administrative controls.

4.3.4 If staff are or may be exposed, the supervisor shall provide and maintain an adequate supply of cool, potable water close to the work area for the use of a heat exposed worker.

4.3.5 If a staff person shows signs or reports symptoms of heat stress or strain, they shall be removed from the hot environment and treated by an appropriate first aid attendant, if available, or by a physician.

4.3.6 Heat stress can be a significant field site hazard, especially for workers wearing CPC. The workforce will gradually work up to a full workload under potentially stressful conditions to allow for proper acclimation.

4.3.7 Site personnel shall be instructed in the recognition of heat stress symptoms, the first aid treatment procedures for severe heat stress, and the prevention of heat stress injuries. Workers must be encouraged to immediately report any heat stress that they may experience or observe in fellow

workers. Supervisors must use such information to adjust the work-rest schedule to accommodate such problems.

4.3.8 Wherever possible, a designated break area should be established in an air conditioned space, or in shaded areas where air conditioning is impractical. The break area should be equipped to allow workers to loosen or remove protective clothing, and sufficient seating should be available for all personnel. During breaks, workers must be encouraged to drink plenty of water or other liquids, even if not thirsty, to replace lost fluids and to help cool off. Cool water should be available at all times in the break area, and in the work area itself unless hygiene/chemical exposure issues prevent it.

4.4 Symptoms and Treatment

4.4.1 Workers who exhibit ANY signs of significant heat stress (e.g., profuse sweating, confusion and irritability, pale, clammy skin), shall be relieved of all duties at once, made to rest in a cool location, and provided with large amounts of cool water.

4.4.2 Anyone exhibiting symptoms of heat stroke (red, dry skin, or unconsciousness) must be taken immediately to the nearest medical facility, taking steps to cool the person during transportation (clothing removal, wet the skin, air conditioning, etc.).

4.4.3 Severe heat stress (heat stroke) is a life-threatening condition that must be treated by a competent medical authority.

4.5 Prevention

4.5.1 All staff working in extreme heat or sun should understand the following guidelines for preventing and detecting heat exhaustion and heat stroke.

- If you experience heat exhaustion or heat stroke you must immediately seek shelter and water.
- Take frequent short breaks in areas sheltered from direct sunlight; eat and drink small amounts frequently.
- Try to schedule work for the coolest part of the day, early morning and evening.

4.5.2 Prevention of heat-related illnesses:

- Avoid strenuous physical activity outdoors during the hottest part of the day.
- Wear a hat and light-colored, loose-fitting clothing to reflect the sun.
- Avoid sudden changes of temperature. Air out a hot vehicle before getting into it.
- If you take diuretics, ask your doctor about taking a lower dose during hot weather.
- Drink 8 to 10 glasses of water per day. Drink even more if you are working or exercising in hot weather.
- Avoid caffeine and alcohol as they increase dehydration.
- If you exercise strenuously in hot weather, drink more liquid than your thirst seems to require.

4.6 Personal Protective Equipment

- Wear a hat and light-colored, loose-fitting clothing to reflect the sun.
- Apply sunscreen to exposed skin (SPF 30 or greater, follow directions on label).
- Wear sunglasses with UV protection.
- Pack extra water to avoid dehydration (try freezing water in bottles overnight to help keep the water cooler for longer during the day).

4.7 Work-Rest Schedule Practices

- Intake of fluid will be increased beyond that which satisfies thirst, and it is important to avoid "fluid debt," which will not be made up as long as the individual is sweating.
- Two 8-ounce glasses of water should be taken prior to beginning work, then up to 32 oz. per hour during the work shift; fluid replacement at frequent intervals is most effective.
- The best fluid to drink is water; liquids like coffee or soda do not provide efficient hydration and may increase loss of water.
- If commercial electrolyte drinks (e.g., Gatorade) are used, the drink should be diluted with water, or 8 ounces of water should be taken with each 8 ounces of electrolyte beverage.
- Additional salt is usually not needed and salt tablets should not be taken.
- Replacement fluids should be cool, but not cold.

- Breaks will be taken in a cool, shaded location, and any impermeable clothing should be opened or removed.
- Dry clothing or towels will be available to minimize chills when taking breaks.
- Manual labor will not be performed during breaks, other than paperwork or similar light tasks.
- Other controls that may be used include:
  - Scheduling work at night or during the cooler parts of the day (6 am–10 am, 3 pm–7 pm).
  - Erecting a cover or partition to shade the work area.
  - Wearing cooling devices such as vortex tubes or cooling vests beneath protective garments. If cooling devices are worn, only physiological monitoring will be used to determine work activity.

4.8 Evaluating the Work-Rest Schedule's Effectiveness

4.8.1 Once a work-rest schedule is established, the work supervisor must continually evaluate its effectiveness through observation of workers for signs/symptoms of heart stress. Measurement of each worker's vitals (e.g., pulse, blood pressure, and temperature) can provide additional information in determining if the schedule is adequate, and is accomplished as follows:

4.8.2 At the start of the workday each worker's baseline pulse rate (in beats per minute – bpm) is determined by taking a pulse count for 15 seconds and multiplying the result by four or an automated pulse count device may be utilized. Worker pulse rates can then be measured at the beginning and end of each break period to determine if the rest period allows adequate cooling by applying the following criteria:

- Each worker's maximum heart rate at the start of any break should be less than [180 minus worker's age] bpm. If this value is exceeded for any worker, the duration of the following work period will be decreased by at least 10 minutes.
- At the end of each work period all workers' heart rates must have returned to within +10% of the baseline pulse rate. If any worker's pulse rate exceeds this value the break period will be extended for at least 5 minutes, at the end of which pulse rates will be remeasured and the end-of-break criteria again applied.

4.8.3 Use a clinical thermometer or similar device to measure the oral/ear temperature at the beginning (before drinking liquids) and end of each break period and apply the following criteria:

- If the oral temperature exceeds 99.6^{o}F, shorten the next work cycle by one-third without changing the rest period.
- If the oral temperature still exceeds 99.6^{o}F (36.6^{o}C) at the beginning of the next rest period, shorten the following work cycle by one-third.

4.8.4 Use of an automated or similar blood pressure device will be used to assess each employee's blood pressure at the beginning and end of each break period to determine if the rest period allows adequate cooling by applying the following criteria:

- If the blood pressure of an employee is outside of 90/60 to 150/90, then the employee will not be allowed to begin or resume work; extend the break period by at least five minutes, at the end of which blood pressure rates will be remeasured and the end-of-break criteria again applied.

4.8.5 All physiological monitoring of heat stress will be documented using *S3NA-511-FM Heat/Cold Stress Monitoring Log*.

4.9 Training

4.9.1 Project staff and their supervisors that may be exposed to the hazard will be oriented to the hazard and the controls prior to work commencing.

4.9.2 Those personnel potentially exposed to heat stress will receive training including, but not limited to

- Sources of heat stress, influence of protective clothing, and importance of acclimatization.
- How the body handles heat.
- Recognition of heat-related illness symptoms.
- Preventative/corrective measures.
  - Employees will be informed of the harmful effects of excessive alcohol consumption in the prevention of heat stress.

    - All employees will be informed of the importance of adequate rest and proper diet in the prevention of heat stress.
- First aid procedures for heat stress-related illnesses.

5.0 Records

None.

6.0 Attachments

6.1 S3NA-511-FM Heat Stress Monitoring Log

6.2 S3NA-511-WI1 Temperature Thresholds

6.3 S3NA-511-WI2 Symptoms and Treatment

6.4 S3NA-511-ST Heat Exposure

Attachment C

Port of Oakland

Terminal Safety Guidelines

PORT OF OAKLAND
CONTRACTOR SAFETY

WORKING IN ACTIVE MARINE TERMINALS

The Port Wharfinger Department coordinates Port-sponsored access to the marine terminals. Before entering terminals, contact the appropriate Wharfinger. Any deviation from established procedures or work schedules should be cleared at least 24 hours in advance (or as soon as feasible).

The primary issues when working in marine terminals are:

- The safety of contractor, terminal, trucking, terminal employees, and Port employees.
- Minimizing interference with terminal and vessel operations.
- Security: Vehicle inspection & personnel identification (valid California Driver's license or equal).

VEHICLES

Vehicles brought into the terminal must be equipped with identifying signs on each side. Vehicles not so equipped will not be admitted.

Limit on-terminal vehicles to those necessary to perform the work. Park others outside.

Minimize the need to drive around the terminal. Stage operations and remain there. Enter and exit the terminal only via company vehicle.

Obey terminal driving rules, including speed limits. Terminal equipment has the right-of-way.

SITE OF OPERATIONS

The area of operations shall encumber no more space than is required to perform the work safely.

Delineate the area of operation using traffic cones, K-rail, caution tape, or other high-visibility method. Park vehicles to form a protective barrier.

Workers must wear hard hats, hard-toed shoes, and high visibility clothing (with reflective elements at night).

Individuals must remain in the area of operations.

Use a "spotter" where workers are exposed to traffic.