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Final

Accident Prevention Plan
Activated Carbon Amendments Pilot Study
Monitoring at Parcel F

Hunters Point Naval Shipyard
San Francisco, California

May 2015
Document Control No: KCH-2622-0059-0076

Contract No: N62473-09-D-2622 **CTO No: 0059**

Prepared for:

Prepared by:

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Prepared for:

Department of the Navy
Base Realignment and Closure
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1.0 Signature Page

Final

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Activated Carbon Amendments Pilot Study Monitoring at Parcel F
Hunters Point Naval Shipyard
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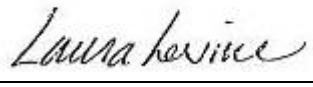
Plan Preparer:  April 30, 2015
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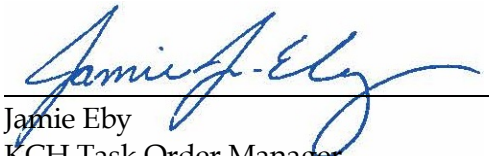
Plan Concurrence:  April 30, 2015
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Contents

Appendices

Acronyms and Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
AHA	Activity Hazard Analysis
APP	Accident Prevention Plan
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CO	Contracting Officer
COEC	chemical of ecological concern
COR	Contracting Officer Representative
CPR	cardiopulmonary resuscitation
CSHO	Corporate Safety and Health Officer
CSP	Certified Safety Professional
EAP	Employee Assistance Program
EMR	experience modification rate
HAZWOPER	Hazardous Waste Operations and Emergency Response
HMIS	Hazardous Materials Identification System
HPNS	Hunters Point Naval Shipyard
IARC	International Agency for Research on Cancer
IDW	investigation-derived waste
IIPP	Injury and Illness Prevention Program
JV	joint venture
KCH	CH2M HILL Kleinfelder, A Joint Venture
MSDS	Material Safety Data Sheet
NAVFAC	Naval Facilities Engineering Command
Navy	United States Department of the Navy
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
PPE	personal protective equipment
PSHM	Program Safety and Health Manager
ROICC	(Navy) Resident Officer in Charge of Construction
RPM	Remedial Project Manager

TOM	Task Order Manager
USACE	U.S. Army Corps of Engineers

2.0 Background Information

This Accident Prevention Plan (APP) has been developed to protect and guide the personnel conducting the pilot study for in situ treatment of polychlorinated biphenyl (PCB)-contaminated sediments in the South Basin of Parcel F at Hunters Point Naval Shipyard (HPNS) in San Francisco, California. This APP has been prepared to meet applicable requirements of the United States Army Corps of Engineers (USACE) Safety and Health Requirements Manual EM 385-1-1, 15 August 2011; the Code of Federal Regulations (CFR) Hazard Communication Standard (29 CFR 1910.1200); and the respective corporate Safety and Health policies of CH2M HILL and Kleinfelder in partnership under a joint venture (JV) contract known as CH2M HILL Kleinfelder, A Joint Venture (KCH). The Site Safety and Health Plan (SSHP) for this project is provided as Appendix A of this APP. The Response to United States Department of the Navy (Navy) Resident Officer in Charge of Construction (ROICC) and Remedial Project Manager (RPM) Comments is included as Appendix B.

2.1 Contractor

KCH; The JV partners are CH2M HILL and Kleinfelder.

2.2 Contract Number

Naval Facilities Engineering Command (NAVFAC) Southwest Contract No. N62473-09-D-2622

2.3 Project Name

Activated Carbon Amendments Pilot Study Monitoring at Parcel F

2.4 Project Location and Description

HPNS is located in southeast San Francisco on a peninsula that extends east into the San Francisco Bay (Figure 1 of the SSHP). Parcel F consists of approximately 457 acres of offshore sediment within San Francisco Bay that bounds HPNS to the north, east, and south (Figure 2 of the SSHP). The South Basin portion of Parcel F, which is where the field activities will be conducted, is to the south of HPNS. The South Basin is a shallow embayment with water depths ranging from 6 feet to less than 2 feet. Yosemite Creek enters the South Basin and is characterized as a shallow, tidally influenced channel with no permanent flow. There are no current uses of the South Basin.

2.5 Contractor Accident Experience

Work performed under the KCH JV has not resulted in any Occupational Safety and Health Administration- (OSHA) recordable accidents, injuries, or illnesses. Therefore, the

Experience Modification Rate (EMR) for each JV partner has not been adversely impacted as a result of work under this contract.

2.6 Work Requiring Activity Hazard Analysis

The planned field tasks requiring Activity Hazard Analyses (AHAs) are as follows:

- 01 General site activities and oversight
- 02 Working in and Adjacent to Water
- 03 Vessel operation including grab sediment sampling and deployment of sediment profile imaging equipment (subcontractor Dixon Marine)
- 04 Passive sampler Deployment (subcontractor Texas Tech)

AHAs for each of the above field tasks are included in the SSHP (Appendix A). AHAs for work conducted by subcontractors will be added when the specific subcontractors are chosen and their respective AHAs are submitted for review and accepted.

3.0 Statement of Safety and Health Policy and Compliance Procedures

KCH was established in November 2007 as a joint venture between CH2M HILL and Kleinfelder. Each JV partner has its own separate corporate safety and health program and associated policies and compliance procedures. Therefore, this APP constitutes the Safety and Health Policy and Compliance Procedures for the JV partners performing work under the JV. Persons conducting activities covered in this APP and the attached SSHP will be accountable for complying with this APP and SSHP as well as their respective companies' corporate safety and health programs, and they will undergo the required training as specified in Section 6.

KCH is committed to providing a safe and healthful workplace for employees. These conditions will be ensured through an aggressive and comprehensive worker safety and health program that is integrated with other site worker protection activities. KCH regards employee protection as a core value and is committed to developing, implementing, and improving safety and health practices. KCH implements practices that will afford optimal protection to employees and enable continuous improvement of the quality of worker protection performance. The safety and health of employees will take precedence whenever conflicts with production or other objectives arise.

Managers and supervisors are required to provide leadership and resources that will inspire and empower KCH employees to be accountable for worker safety and health. Accountability is achieved by assigning worker protection responsibilities, evaluating personnel performance, and holding personnel responsible for their actions.

In addition to complying with this APP and the respective corporate safety and health program, persons working under the JV are encouraged to be active participants in their workplace safety and health activities, and to actively take advantage of the worker rights in a responsible manner, without reprisal. Workplace health and safety is a system of continual evaluation and improvement. Positive acknowledgement is preferred over negative feedback on performance.

The following may result in disciplinary action, up to and including discharge of any employee from their company:

- Violation of the safety and health requirements of their company's policy or of this APP
- Unauthorized or illegal possession, use, or sale of alcohol or controlled substances on work premises, during working hours, while engaged in corporate activities, or in corporate vehicles
- Use or sale of firearms or explosives on work premises

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4.0 Responsibilities and Lines of Authorities

4.1 Personnel with Safety Responsibilities

Participating personnel are responsible for complying with safety procedures and for proactively making safety awareness part of their day-to-day conduct. KCH, through their task order managers, has the ultimate responsibility for the implementation of this health and safety program. As such, the site managers are accountable for any and all unsafe activities resulting in an incident.

The following positions have specific corporate and project safety responsibilities:

- Program Safety and Health Manager (PSHM)
- Corporate Safety and Health Officer (CSHO)
- Task Order Manager (TOM)
- Site Safety and Health Officer (SSHO)
- Field Team Lead and other project field staff

The SSHP (Appendix A) lists the specific personnel that will fill the stated positions for this project. Lines of authority are also detailed in the SSHP. See Section 2 of the SSHP for details.

Work is conducted under a behavior-based and loss prevention system. AHAs are a vital part of this system, as well as using pre-task safety planning. All work is prepared under these processes and no work will commence until the pre-task safety and health analysis is completed and approved by the PSHM.

Staff members are accountable for their own health and safety and have the authority to request a work stoppage when they feel unsafe behaviors, actions, or situations are occurring.

All work requiring a competent person per OSHA definition (29 CFR 1926.32(f)) will not be started until that competent person is designated and onsite. *Competent person* means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees. A c*ompetent person* has authorization to take prompt corrective measures to eliminate any hazardous conditions.

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5.0 Subcontractors and Suppliers

Subcontractors and suppliers providing services onsite will be subject to the safety provisions of this APP and attached SSHP. See Section 3 of the SSHP for details.

This APP was developed to directly track with the 2011 USACE EM 385-1-1 Appendix A, "Minimum Basic Outline for Accident Prevention Plan."

KCH and subcontractor personnel will conduct site work in accordance with this APP and associated documents. KCH will address compliance with specific safety and health requirements, including those listed in the SSHP (Appendix A), through safety meetings at the start of each shift. The site-specific safety and health requirements and site conditions will be reviewed with field personnel during these meetings. KCH partners shall also comply with the requirements of their respective Injury and Illness Prevention Programs (IIPPs).

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6.0 Training

Site workers, supervisors, and managers will have training appropriate to their assigned duties and as specified in the attached SSHP and AHAs that are applicable to the work being performed. As specified in Section 4 of the SSHP, the SSHO (who will also conduct the project safety and health inspections) will meet the training and indoctrination requirements prescribed in this APP and the attached SSHP, as well as the Hazardous Waste Operations and Emergency Response (HAZWOPER) supervisory training. All assigned and alternate SSHOs will also have completed 30-Hour OSHA Construction Safety training. The SSHO also serves as the site competent person for all general tasks, unless AHAs identify a specific person for that task.

All staff will complete initial safety and health orientation training upon their first day of arrival on the site. This is conducted by the SSHO.

All required training documentation is collected during the Field Readiness Review process (approximately 1-2 weeks prior to start of field work) and maintained with the site files as part of the SSHO duties.

This work will be completed in an area where potential low-level radiological contamination may be present. As a precautionary measure to protect site workers, a fully qualified and current state of California-licensed radiological contractor will monitor all operations. Radiological operations will be conducted in accordance with CCR Title 17. Furthermore, all radiation screening operations shall comply with USACE EM 385-1-1, Section 06.F, Ionizing Radiation Procedures. The qualified operator (the Navy's Basewide Radiation Safety Contractor) shall have copies of all permits, training, and applicable credentials with them onsite. Details of required training are specified in Section 4 of the SSHP.

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7.0 Safety and Health Inspections

7.1 Inspection Details

The project SSHO (specifically identified in the attached SSHP) will provide onsite safety and health inspections for this project. The SSHO will meet the training and indoctrination requirements as prescribed in this APP and the attached SSHP, including HAZWOPER supervisory training, cardiopulmonary resuscitation (CPR), first aid, and blood-borne pathogen awareness training. The SSHO will also have hands-on experience overseeing pilot study and sampling activities. Some field activities conducted under this scope of work require OSHA-competent person training. At a minimum, the SSHO will conduct daily visual inspections of work areas for hazards specific to conducting tasks and document in written site inspection checklists.

For all general field investigation tasks, the SSHO will serve as the competent person. For tasks conducted by a subcontractor, the subcontractor will designate and identify their competent person.

See Section 5.0 of the SSHP for further inspection details.

7.2 Recordkeeping

Project safety and health documentation will be maintained by the CSHOs for the respective JV companies. Records to be maintained (both in project files of each of the respective JV companies, and in the KCH onsite field trailer or vehicles) will include:

- HAZWOPER training certificates
- First aid and CPR training certificates
- Documentation of medical surveillance
- Daily safety and health briefing acknowledgment forms
- Radiological daily survey records
- Deficiency identification, correction, and follow-up documentation
- Accident reports and investigation records, if applicable
- Material Safety Data Sheet (MSDS) for sample preservatives

7.3 External Inspection/Certifications

No external inspections or certifications will be required for this work.

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8.0 Accident Reporting

The SSHO and PSHM are responsible for all incident reporting. Specific details are found in Section 6.0 of the SSHP.

Also, all accidents shall be reported as soon as possible, but not more than 24 hours afterwards, to the Contracting Officer/Contracting Officer Representative (CO/COR) and/or (Navy) Resident Officer in Charge of Construction (ROICC). The contractor shall thoroughly investigate the incident and submit the findings of the investigation along with appropriate corrective actions to the CO/COR in the prescribed format as soon as possible, but no later than 5 working days following the incident. The contractor will implement corrective actions as soon as reasonably possible.

The following types of incidents require immediate accident notification:

- A fatal injury
- A permanent total disability
- A permanent partial disability
- The hospitalization of three or more people resulting from a single occurrence
- Property damage of $2,000 or more

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9.0 Plans Required by the EM 385-1-1 Safety Manual

Upon review of the minimum basic outline for APPs as listed in Appendix A of the 2011 USACE EM 385-1-1, the plans required by the EM 385-1-1 Safety Manual are presented below. Plans and procedures that are not applicable to this project will be noted with a short explanation.

9.1 Layout Plan (04.A.01)

A site layout will be provided in the SSHP, when decisions regarding field trailer location, if required, and equipment staging have been finalized.

9.2 Hospital Addresses and Route

Information on the nearest medical facility with emergency care is discussed below in Section 9.5, as well as in Section 13.0 of the SSHP.

9.3 Emergency Response Plans (01.E)

See Section 13.0 of the SSHP for site details.

Medical support for this project will be provided onsite and offsite. Emergency response specific to work over water is addressed in the Float Plan (SSHP, Attachment 3).

9.4 Onsite Medical Support (Section 03.A.02; 03.D)

When two or more field staff are present onsite, at least two will have current certification in basic first aid and CPR, along with annual bloodborne pathogens training. The SSHO will be the lead person, unless he or she is injured, to initiate any required first aid until offsite medical support can be engaged.

9.5 Offsite Medical Support

In the event of a medical emergency, or if follow-up to basic first aid is required, offsite medical support will be engaged. The contact and location information for the nearest offsite medical support is presented below. A map indicating the travel route to the nearest medical facility with emergency care is presented in Figure 5 of the SSHP (Appendix A).

Medical facility: San Francisco General Hospital
1001 Potrero Avenue, San Francisco, CA
(415) 206-8000

Emergency numbers: **In case of emergency contact the Police, Fire Department, and Medical Emergency dispatch for the Hunters Point Naval Shipyard by calling 911.**

Further specific details are provided in the SSHP Section 13.0.

9.6 Alcohol and Drug Abuse Prevention (01.C.02)

In order to maintain a drug- and alcohol-free workplace, the respective partners of the JV have established a drug- and alcohol-free awareness program to educate employees on 1) the danger of drug abuse and alcohol in the workplace; 2) the corporate drug- and alcohol-free workplace policy; 3) the availability of any drug and alcohol counseling, rehabilitation, and employee assistance programs; and 4) the penalties that may be imposed upon employees for drug abuse and alcohol violations and violations of the respective companies' drug- and alcohol-free workplace policies. Such education includes the distribution of the drug- and alcohol-free workplace policy at the employment interview; a discussion of the drug- and alcohol-free workplace policy at the new employee orientation session; and inclusion of the companies' drug- and alcohol-free workplace policy in the Employee Handbook and any other relevant personnel policy publications.

The following discuss the alcohol and drug abuse prevention programs for each of the two JV partners.

9.6.1 CH2M HILL

The company has vital interests in ensuring a safe, healthy, and efficient working environment for its employees, coworkers, and clients. The unlawful or improper use of controlled substances or alcohol in the workplace presents a danger to everyone.
In addition, as a federal contractor we have a duty to comply with the requirements of the Drug-Free Workplace Act of 1988. For these reasons, CH2M HILL has established, as a condition of employment and continued employment with the company, the following drug- and alcohol-free workplace policy.

Employees are prohibited from reporting to work or working while using illegal or unauthorized substances. Employees are prohibited from reporting to work or working when using any drugs, except when the use is pursuant to a doctor's orders and the doctor has advised the employee that the substance does not adversely affect the employee's ability to safely perform his or her job duties. This does not include the authorized use of alcohol at corporate-sponsored functions or activities.

In addition, employees are prohibited from engaging in the unlawful or unauthorized manufacture, distribution, sale, or possession of illegal or unauthorized substances and alcohol in the workplace, including on client paid time, on client premises, in client vehicles, or while engaged in client activities.

In accordance with the Drug-Free Workplace Act of 1988, employees must notify their supervisor of any criminal drug statute conviction for a violation occurring within the workplace within 5 days of such conviction.

Employment with the company is conditioned upon employees' full compliance with the foregoing drug- and alcohol-free workplace policy. Any violation of this policy may result in disciplinary action, up to and including discharge. Furthermore, any employee who violates this policy and who is subject to termination may be permitted, in lieu of termination and at the company's sole discretion, to participate in and successfully complete an appropriate treatment, counseling, or rehabilitation program as recommended by a substance abuse professional and in accordance with applicable federal, state, and local laws.

Consistent with its fair employment policy, the company maintains a policy of nondiscrimination and reasonable accommodation with respect to recovering addicts and alcoholics, and those having a medical history reflecting treatment for substance abuse conditions. CH2M HILL encourages employees to seek assistance before their drug and alcohol use renders them unable to perform their essential job functions or jeopardizes the health and safety of themselves or others. The company will attempt to assist its employees through referrals to rehabilitation, appropriate leaves of absence, and other measures consistent with the company's policies and applicable federal, state, or local laws.

The company further reserves the right to take any and all appropriate and lawful actions necessary to enforce this drug- and alcohol-free workplace policy including, but not limited to, the inspection of company-issued lockers, desks, or other suspected areas of concealment. Employees are required to submit for "post-accident" and "for cause" drug and alcohol screening following any incident. Random drug and/or alcohol screening is not a requirement of CH2M HILL unless required by a client.

9.6.2 Kleinfelder

Individuals involved in the use of illegal drugs and/or alcohol are more likely to have workplace accidents, incur lost time, and perform their job requirements in a substandard manner. Kleinfelder has implemented a Substance Abuse Policy intended to support the Kleinfelder Health and Safety Program and overall productivity by striving to create a drug-free working environment. The full contents of the Substance Abuse Policy are available to all Kleinfelder employees on the Kleinfelder intranet website.

Kleinfelder has a vital interest in maintaining the highest standards for its employee work environment. Kleinfelder is committed to providing quality client services and to protecting the safety, health, and well being of its employees. The use, possession, or sale of illegal drugs and/or the sale, furnishing, or use of alcohol in the workplace, on company premises, during company functions, and/or while on duty is incompatible with this commitment and the Substance Abuse Policy. Compliance with this requirement is considered an essential ongoing job qualification.

To help ensure that Kleinfelder maintains a drug- and alcohol-free work environment, employees must submit to mandatory drug and alcohol tests per policy requirements. Kleinfelder employees who are participants in the company's medical surveillance program will undergo a drug and alcohol screen during their pre-employment physical. Additionally, employees are also required to submit for "post-accident" and "for cause" drug and alcohol screening following any incident. Random drug and/or alcohol screening is not a requirement of the Kleinfelder Substance Abuse Policy unless required by a client.

9.7 Employee Assistance Program

The following sections discuss the Employee Assistance Programs (EAPs) for each of the two JV companies.

9.7.1 CH2M HILL

Employees may participate in CH2M HILL's EAP immediately upon hire. The EAP helps eligible employees and their immediate families with a wide range of problems including marriage and family problems, emotional problems, alcoholism and alcohol abuse, drug abuse and dependency, financial problems, compulsive gambling, and eating disorders. Employee conversations and records under the EAP are strictly confidential. The administrative cost of this program is fully paid by the company.

9.7.2 Kleinfelder

Kleinfelder benefits include an EAP and Kleinfelder employees have access to the program. The EAP is a confidential service designated to help Kleinfelder employees and their family members improve life's quality through assessment, referral, and brief sessions. The Kleinfelder EAP can provide assistance with life's challenges such as financial and legal difficulties, relationship and personal conflicts, stress and emotional management, substance abuse (alcohol and drugs), health concerns, loss and grief, and family and parenting issues.

9.8 Site Sanitation Plan (Section 02)

The following constitutes the Site Sanitation Plan for this project.

9.8.1 Drinking Water

A cooler containing an adequate supply of drinking water (in bottles) will be available at the site for the site workers and will be replenished each day. The cooler will be stored outside the exclusion zone on or near the field vehicles.

9.8.2 Toilets

Access to portable toilet facilities will be made available onsite.

9.8.3 Washing Facilities

Access to portable washing facilities will be available onsite at the same location as the toilets.

9.8.4 Food Service

No food service will be provided onsite. Site workers will either bring their food, and consume it outside of the exclusion zone and only after proper decontamination, or will go offsite for food.

9.8.5 Waste Disposal

Investigation-derived waste (IDW) will consist of disposable sampling equipment (e.g., plastic scoops) and personal protective equipment (PPE) (e.g., nitrile gloves) generated during sediment sampling activities. The IDW will be collected in heavy-duty plastic bags and disposed of in an onsite waste container designated by the Navy Remedial Project Manager (RPM), ROICC, and/or Navy's Basewide Radiological Safety Contractor prior to and during the sampling activities. If such a waste container does not exist, the project team will find a safe, temporary storage location until the waste can be disposed of properly in accordance with the Work Plan.

Nonhazardous waste materials, vegetation, and rubbish will be contained in a garbage bag and disposed of with regular site sanitary service disposal or at an offsite disposal facility.

9.8.6 Vermin Control

No enclosed spaces are being constructed for this project and waste materials will be securely stored and transported offsite to provide vermin control.

9.9 Access and Haul Road Plan (04.B)

Not applicable; all roads are established and no hauling will be done.

9.10 Respiratory Protection Plan (05.G)

Exposure to respiratory hazards are not anticipated for the scope of work being performed under this APP.

9.11 Health Hazard Control Plan (06.A)

Safety and health hazards for performing work covered under this APP are identified through the preparation of AHAs (provided in the attached SSHP). Each AHA also indicates recommended controls for each identified potential safety/health hazard.

Appropriate PPE shall be supplied and used at all times for this project. PPE selection is based on the selected hazard control measures specified in the AHAs of the SSHP (Section 10.0 of SSHP).

9.12 Hazard Communication Program (06.B.01)

Chemical products may occasionally be stored and used on the project site, and/or stored in field vehicles. Examples of chemicals include hydrogen peroxide, gases used to calibrate sensing equipment, preservative chemicals in sample bottles, and lubricants. Other chemicals may be used as well. These chemicals may pose hazards including flammability, corrosiveness, reactivity and incompatibility, and toxicity. Because of these potential hazards, special precautions must be taken including:

- Tracking and controlling hazardous chemical products received and stored.

- A hazard evaluation of each chemical product, using such sources as MSDSs.
- Informing workers of the potential hazards through training, MSDSs, and appropriate labeling of containers.
- Air monitoring in the case of potential respiratory hazards.
- Design and implementation of engineering controls such as ventilation and source control.
- Developing storage, handling, housekeeping, and decontamination procedures.
- Assigning appropriate PPE such as eye and face protection, gloves, body protection, and respirators (when applicable). Respirator usage by CH2M HILL or Kleinfelder employees will be in accordance with the employees' IIPP.
- Training personnel handling chemicals on safe handling procedures, personal protective equipment, and emergency and spill cleanup procedures.

Hazardous substances that may be encountered in soil on the project site are not covered by this program. The SSHP (Appendix A) addresses chemical and other hazard assessment and mitigation associated with site contaminants including investigation and remediation of waste materials.

9.12.1 Chemicals Covered by this Project Program

For the purposes of this program, chemicals considered to be hazardous are those:

- Listed in the OSHA Permissible Exposure Limits
- Included in the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values for Chemical Substances (2011)
- Found to be suspected or confirmed carcinogens by the National Toxicology Program in the latest edition of the Annual Report on Carcinogens, or by the International Agency for Research on Cancer (IARC) in the latest edition of the IARC monographs
- Chemicals known to the State of California to cause cancer or reproductive health effects, as regulated under Health and Safety Code Section 25249.5 et seq. ("Proposition 65 Chemicals")

No hazardous chemicals are expected to be used during field activities as part of this scope of work.

Exceptions to this policy, by OSHA definition, include consumer products that are used in a consumer fashion and pose no more of an exposure hazard than a consumer would face.

9.12.2 Training

Employees who work with or are potentially exposed to hazardous chemicals will receive initial training on the elements of this Hazard Communication Program, including:

- Content and requirements of this program and the OSHA Hazard Communication Standards

- The potential physical and toxic hazards of the chemicals used in their work location, and especially the hazards of non-routine tasks
- Chemical inventory and tracking procedures
- Location of this program, the chemical inventory, and the MSDS
- How to read MSDSs
- Methods to detect the release of or exposure to chemicals in their area
- Content and interpretation of labels
- Safe use and handling of chemicals
- Required personal protective equipment
- Basic emergency procedures

Additional training will be provided on an annual basis, whenever a new chemical is added to the workplace, and when non-routine tasks are planned.

9.12.3 Labeling

The SSHO will ensure that hazardous chemicals brought onto the site are properly labeled with at least the following information, in English, as a minimum, and the language of non-English-speaking employees who may use the product, as appropriate:

- The identity of the product and chemical components
- Appropriate hazard warnings
- Name and address of the manufacturer, importer or other responsible party

Hazard warnings will also be transmitted in the form of the National Fire Protection Association (NFPA) or Hazardous Materials Identification System (HMIS) color-coded warnings, which are ranked on a 0 to 4 scale. When chemicals are transferred to a portable container, labels containing chemical identification and hazard warnings must be affixed to the portable container.

9.12.4 Current Onsite Inventory

There is not currently an inventory of hazardous materials stored onsite for this project. Non-toxic carbon amendments (SediMite™ and AquaGate™) will be handled by the subcontractors. MSDSs for these products will be submitted with subcontractor AHAs.

9.13 Process Safety Management Plan (06.B.04)

Not applicable to this project's scope of services.

9.14 Lead Abatement Plan (06.B.05)

Not applicable to this project's scope of services.

9.15 Asbestos Abatement Plan (06.B.05)

Not applicable to this project's scope of services.

9.16 Radiation Safety Program (06.E.03.a)

The radiological screening program is addressed in Section 7.12 of the SSHP (Appendix A). Radiological screening will be conducted as a strictly precautionary measure by the Navy's Basewide Radiation Safety Contractor. All staff will be instructed in this process prior to the start of work.

9.17 Abrasive Blasting (06.H.01)

Not applicable to this project's scope of services.

9.18 Heat/Cold Stress Monitoring Plan (06.I.02)

Addressed in detail in Section 7.8 of the SSHP.

9.19 Crystalline Silica Monitoring Plan (06.M)

Not applicable to this project's scope of services.

9.20 Night Operations Lighting Plan (07.A.08)

Not applicable to this project's scope of services.

9.21 Fire Prevention Plan (09.A)

The following serves as the Fire Prevention Plan for the project.

9.21.1 Workplace Fire Hazards

Work is being conducted over water within the South Basin of Parcel F. Dry vegetation is not anticipated to pose a potential fire hazard to site workers.

9.21.2 Potential Ignition Sources

The only potential ignition source is dry vegetation, or other combustible material contacting hot engine or exhaust parts of the support vehicles.

9.21.3 Fire Suppression Equipment

The field vehicles will be supplied with Class ABC fire extinguishers.

9.21.4 Responsibility Assignments

Equipment maintenance (truck, fire extinguisher, and sampling equipment) falls under the responsibility of the field staff and will be overseen by the SSHO, including an inspection of vehicles and fire extinguishers to ensure they are in proper condition.

The SSHO will ensure that vehicles are not brought into immediate proximity to dried vegetation that could come in contact with vehicle ignition sources (i.e., the undercarriage). The SSHO will also ensure proper site housekeeping including collection and disposal of any rubbish.

9.22 Wild Land Fire Management Plan (09.K)

Work is being conducted over water in the South Basin of Parcel F. Dry vegetation is not anticipated to pose a potential fire hazard to site workers. There will be no smoking allowed onsite.

9.23 Hazardous Energy Control Plan (12.A.01)

Not applicable to this project's scope of services.

9.24 Critical Lift Plan (16.H)

Not applicable to this project's scope of services.

9.25 Contingency Plan for Severe Weather (19.A.03)

Development of a severe weather contingency plan is related to marine operations. This work is being conducted over water, near to the shoreline, in the South Basin of Parcel F. It is anticipated that lightning or rain may have the potential to affect the field activities. Field work on this project will be suspended if severe weather occurs that could affect field activities. Daily weather forecasts will be reviewed prior to start of days tasks. No work shall proceed if rain or high winds are forecasted. Such work suspension will be communicated immediately to the TOM.

9.26 Float Plan (19.F.04)

Pilot study activities will be performed in or near water using a boat. A float plan is included in Attachment 3 of the SSHP (Appendix A).

9.27 Fall Prevention and Protection Plan (21.C)

See Section 7.11.1 of Appendix A for controls in place related to fall exposures during the pilot study activities.

9.28 Demolition Plan (23.A.01)

Not applicable to this project's scope of services.

9.29 Excavation/Trenching Plan (25.A.01)

Not applicable to this project's scope of services.

9.30 Emergency Rescue (Tunneling) (26.A)

Not applicable to this project's scope of services.

9.31 Underground Construction Fire Prevention and Protection Plan (26.D.01)

Not applicable to this project's scope of services.

9.32 Compressed Air Plan (26.I.01)

Not applicable to this project's scope of services.

9.33 Formwork and Shoring Plans (27.C)

Not applicable to this project's scope of services.

9.34 Pre-cast Concrete Plan (27.D)

Not applicable to this project's scope of services.

9.35 Lift Slab Plans (27.E)

Not applicable to this project's scope of services.

9.36 Steel Erection Plan (27.F.01)

Not applicable to this project's scope of services.

9.37 Safety and Health Plan (28.B)

A SSHP is attached to this APP as Appendix A. The SSHP meets the requirements for work on hazardous waste sites in accordance with 29 CFR 1910.120 and 29 CFR 1926.65.

Detailed site-specific hazards and controls are provided in the attached SSHP (Appendix A) and AHAs.

9.38 Blasting Safety Plan (29.A.01)

Not applicable to this project's scope of services.

9.39 Diving Plan (30.A.13)

Not applicable to this project's scope of services.

9.40 Confined Space Program (34.A)

Not applicable to this project's scope of services.

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10.0 Risk Management Processes

The specific processes are addressed in the attached SSHP (Appendix A) and in the task-specific AHAs included in Attachment 1 of the SSHP.

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Appendix A
Site Safety and Health Plan

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Final

Site Safety and Health Plan
Activated Carbon Amendments Pilot Study Monitoring at Parcel F

Hunters Point Naval Shipyard
San Francisco, California

Contract No: N62473-09-D-2622
Contract Task Order: 0059
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Prepared for:

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Acronyms and Abbreviations

°C	degrees Celsius
°F	degrees Fahrenheit
ACGIH	American Conference of Governmental Industrial Hygienist
AHA	Activity Hazard Analysis
APP	Accident Prevention Plan
Cal-OSHA	California OSHA
CAS	Chemical Abstract System
CCR	California Code of Regulations
CFR	*Code of Federal Regulations*
CNS	central nervous system
COC	chemical of concern
CPR	cardiopulmonary resuscitation
CRZ	Contamination Reduction Zone
CSHO	Corporate Safety and Health Officer
CSIR	Contractor Safety Incident Report
CTO	Contract Task Order
dBA	decibels
HAZWOPER	Hazardous Waste Operations and Emergency Response
HPNS	Hunters Point Naval Shipyard
IIPP	Injury and Illness Prevention Program
JV	joint venture
KCH	CH2M HILL Kleinfelder, A Joint Venture
LEL	lower explosive limit
LOI	loss of ignition
mg/m	milligrams per cubic meter
NA	not applicable
Navy	United States Department of the Navy
NRDL	Naval Radiological Defense Laboratory
NSC	National Safety Council
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated biphenyl
PEL	permissible exposure limit
PFD	personal floatation device
PPE	personal protective equipment
ppm	parts per million

PSHM	Program Safety and Health Manager
RF	radio frequency
ROICC	Resident Officer in Charge of Construction
RPM	Remedial Project Manager
SAP	Sampling and Analysis Plan
SHM	Safety and Health Manager
SPI	Sediment Profile Imaging
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
STEL	short-term exposure limit
TLV	threshold limit values
TOC	total organic carbon
TOM	Task Order Manager

1.0 Introduction

This Site Safety and Health Plan (SSHP) has been developed to protect and guide the personnel conducting the pilot study and grab sediment sampling activities at the Hunters Point Naval Shipyard (HPNS) in San Francisco, California. The work is being conducted under Contract Task Order (CTO) 0059 of United State Department of the Navy (Navy) Contract N62473-09-D-2622. The provisions of this SSHP apply to CH2M HILL Kleinfelder, A Joint Venture (KCH), and its subcontractors. Employees of agencies (federal, state, and local), the client, and client-retained subcontractors are expected to observe the safety rules and regulations established by their respective organizations (including preparing and implementing their own SSHP, as may be required by their organizations) in addition to the requirements of this document. This SSHP is intended to provide site-specific safety and health awareness for the project. A complete and current copy of the SSHP will be available onsite at all times.

The SSHP has been prepared to meet applicable requirements of the United States Army Corps of Engineers Safety and Health Requirements Manual EM 385-1-1 (USACE, 2008), the California Code of Regulations (CCR) (Title 8 CCR 5192 and 5193), and KCH safety and health policies. This SSHP is attached to the Accident Prevention Plan (APP) for Activated Carbon Amendments Pilot Study Monitoring at Parcel F. The APP contains general health and safety program elements that are detailed in this SSHP.

1.1 Project Location and Description

HPNS is located in southeast San Francisco on a peninsula that extends east into the San Francisco Bay (Figure 1). Parcel F consists of approximately 457 acres of offshore sediment within San Francisco Bay that bounds HPNS to the north, east, and south (Figure 2). The South Basin portion of Parcel F, which is to the south of HPNS, is the site where the field activities will be conducted. The South Basin is a shallow embayment with water depths ranging from 6 feet to less than 2 feet. Yosemite Creek enters the South Basin and is characterized as a shallow, tidally influenced channel with no permanent flow. There are no current uses of the South Basin.

1.2 Background

A commercial dry dock facility operated at this site from 1869 until the Navy purchased the property on December 29, 1939. From 1945 until 1974, the Navy predominantly used HPNS as a shipyard repair facility. HPNS was also partially occupied by the Naval Radiological Defense Laboratory (NRDL) from its formation in 1948 until 1969. Work at the NRDL included radiological decontamination of ships exposed to atomic weapons testing, and conducting research and experiments on radiological decontamination and the effects of radiation on both living organisms and non-organic materials. In 1974, the Navy ceased shipyard operations at HPNS. From May 1976 to June 1986, Triple A Machine Shop, Inc., leased most of HPNS from the Navy and operated a commercial ship repair facility. The

facility was closed in 1991 under the United States Department of Defense's Base Realignment and Closure Program.

Historical site activities resulted in the release of chemicals to the environment, including offshore sediments in Parcel F (Figures 1 and 2). Two apparent major source areas of polychlorinated biphenyls (PCBs) to South Basin have been identified: the Parcel E-2 landfill area and Yosemite Creek (Figure 2). PCB-concentration gradients indicate that the highest concentrations of PCBs were discharged to South Basin via the former slough at the north end of the basin. Based on estimated sedimentation rates, the most significant PCB releases in this area appear to have occurred during the 1960s, coinciding with periods when Parcel E-2 was being filled. This suggests that the fill material itself, or waste materials disposed with the fill, served as the primary sources of PCBs migrating to South Basin. Shoreline erosion and surface runoff from Parcel E-2 also may have transported contaminants to the basin. A previous pilot test was conducted between 2005 and 2008 at the South Basin in very shallow intertidal areas and the amendment was mechanically mixed into the sediment.

1.3 Project and Site Safety and Health Plan Objectives

The purpose of this field investigation is to conduct field activities to support a pilot study for in situ treatment of PCB-contaminated sediments in the South Basin of Parcel F. This pilot study will include placement of the activated carbon in both shallow and deeper water on the sediment surface without any mechanical mixing. The pilot study will focus on validating (1) placement of two activated carbon amendments within 2 half-acre plots of Parcel F sediments in South Basin, (2) physical stability and longevity of the amendments in the sediment following placement, (3) effectiveness of the amendments in controlling contaminant bioavailability over time, and (4) response of the benthic community to the amendments.

The objective of this SSHP is to ensure that field activities are conducted in a manner protective of the safety and health of site workers. Hazards associated with identified site chemicals are discussed in detail of Section 7.10 of this SSHP.

1.4 Scope of Work

The Pilot Study Monitoring Program will include five rounds of sampling including baseline, immediate placement, and 6-, 12-, and 18-month post placement of the activated carbon amendments. The proposed field tasks include:

- Sediment profile imaging (SPI) to visually monitor the placement and stability of the two activated carbon amendments (AquaGate™ and SediMite™).
- Hydrodynamic monitoring to measure the waves, water levels, and currents on regular intervals each day.
- Grab sediment sampling using a Ponar grab sampler to analyze moisture content, loss of ignition, total organic carbon (TOC), and grain size.
- Sediment core samples (approximately 20 centimeters), obtained by push cores to analyze TOC and black carbon content.

- Tissue sampling of bent-nosed clams, *Macoma nasuta,* after 28-day field exposures of transplanted organisms to analyze PCB congeners, percent solids, and lipid content.
- Passive samplers to analyze PCB congeners in porewater.
- Benthic community analysis to determine the abundance, species richness, and diversity.

The work to be conducted is discussed in detail in the Work Plan and Sampling and Analysis Plan (SAP) Activated Carbon Amendments Pilot Study Monitoring at Parcel F Hunters Point Naval Shipyard, San Francisco, California, which is being submitted under separate cover. Figures 3 and 4 show the location of the carbon amendment plot area and sample locations.

1.5 Period of Execution

Field work for the project will begin after approval of the SAP, APP, and this SSHP. Field work is expected to start in April 2015 and is scheduled through 2016; field work should continue for approximately 1 month for each of the five sampling events.

1.6 Principal Subcontractors Onsite

Subcontractors for the pilot study activities will be added upon approval by the Program Safety and Health Manager (PSHM). The following subcontractors have been identified for their respectively listed activities:

- Dixon Marine for placement of activated carbon
- Dixon Marine for marine vessel support for use during deployment and retrieval of SPI survey equipment, passive samplers, and bioaccumulation chambers as well as grab sediment sampling
- Batelle for SPI surveying
- Integral Consulting for hydrodynamic surveying
- Texas Tech University for passive sampling

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2.0 Responsibilities and Lines of Authority, Administrative Requirements

Personnel responsible for project safety include the PSHM, the Task Order Manager (TOM), the Site Safety and Health Officer (SSHO), and participating project personnel.

Title	Name	Company
Program Safety and Health Manager	Mr. Rick Cavil	KCH
Corporate Safety and Health Officer	Mr. Rick Cavil	CH2M HILL
Program Manager	Mr. Dana Sakamoto	KCH
Task Order Manager	Jamie Eby	CH2M HILL
Team Manager	George Hicks	CH2M HILL
Field Manager	Laura Levine	CH2M HILL
Site Safety and Health Officer	Shannon Mackenzie	KLF

2.1 Personnel with Safety Responsibilities

Participating personnel are responsible for complying with safety procedures and for proactively making safety awareness part of their day-to-day conduct.

The following positions have specific corporate and project safety responsibilities:

- Program Safety and Health Manager (SHM)
- Corporate Safety and Health Officer (CSHO)
- TOM
- SSHO
- Other project field staff

2.1.1 Program Safety and Health Manager

The SHM is a Certified Safety Professional for sites that involve hazardous waste investigation and/or remediation. The SHM is responsible for the following activities.

- Review APP (in conjunction with the TOM)
- Perform site visits as necessary to audit APP effectiveness
- Remain available to address project emergencies
- Develop modifications to the APP as needed (in conjunction with the TOM)
- Evaluate occupational exposure monitoring/air sampling data and adjust the APP requirements as necessary
- Approve the APP by signature

2.1.2 Corporate Safety and Health Officers

The CSHOs have overall responsibility for the administration of and compliance with their respective company's safety and health policy with direct line of authority to the two company leaders. TOMS coordinate project-specific safety plans through the CSHOs to ensure that training requirements, standard operating procedures, and incident reporting plans are in compliance. Site inspection and safety audits may be conducted by the CSHOs. Any accident/safety incident reporting is overseen and ultimately reviewed by the CSHOs, who coordinate with the SHM.

2.1.3 Task Order Manager

The TOM has ultimate authority and responsibility for project safety and health. Accordingly, the TOM has the authority and responsibility to audit compliance with the provisions of this APP, suspend work or modify work practices for safety and health reasons, and to dismiss individuals from a site whose onsite conduct does not comply with the provisions of the APP and/or endangers the safety and/or health of others. The TOM is responsible for distributing the plans to field personnel and to an authorized representative of each firm that has a subcontract with KCH to conduct onsite work, and for overall coordination with subcontractor activities. The TOM is also responsible for implementing the provisions of the APP and any applicable addenda.

Implementation includes:

- Review of the APP requirements
- Review of the provisions of the APP with field personnel involved with the project
- Provisions for safety equipment
- Submittal of the requisite safety and health documentation (training rosters, site personnel logs, medical releases) to the SSHO
- Designation/identification of a project member as the SSHO

2.1.4 Site Safety and Health Officer

The SSHO is responsible for assisting the TOM with onsite implementation of the APP. The SSHO has the responsibility and authority for the following actions:

- Being present during field operations to implement the APP.
- Inspecting site activities to identify safety and occupational health deficiencies and correct them.
- Coordinating changes/modifications to the APP with the SHM, TOM, and the CSHOs.
- Providing project-specific safety training.
- Maintaining safety equipment supplies.
- Enforcing compliance with air quality monitoring action levels, if applicable to the project.

- Directing decontamination operations.
- Directing emergency action operations until public emergency personnel arrive onsite. This includes verifying and establishing all necessary communications with possible responding agencies.
- Setting up work zone limits.
- Reporting accidents, incidents, and infractions of safety rules and requirements to the TOM.
- Serves as competent person for general tasks where a specific AHA does not designate a competent person.

The SSHO has the authority to suspend work any time the SSHO judges that the provisions of the APP are inadequate to provide a working environment conducive to worker safety. Further, the SSHO is to inform the TOM of any individuals whose onsite presence jeopardizes safety and health. The SSHO will be a full-time position during all work noted as a "high risk category" according to the Activity Hazard Analysis'.

2.1.5 Project Field Staff

Onsite project personnel are responsible for complying with the provisions of this APP, performing work in a manner that is conducive to good worker safety and health, and reading and being knowledgeable of this APP. Project field staff may include personnel from CH2M HILL, Kleinfelder, and/or any identified KCH subcontractor or supplier. Site personnel will review this APP, attend a daily safety and health briefing, and provide written acknowledgment of their understanding of the APP.

2.2 Lines of Authority

Figure 5 provides the Lines of Authority. In addition to the responsibilities and authorities described above, project personnel have the authority to stop field work if they witness an incident or observe an unsafe condition. Unsafe conditions and incidents are to be immediately reported to the SSHO who, in turn, notifies the TOM and SHM. Work may only proceed once unsafe conditions are mitigated.

The TOM reports to the Navy Remedial Project Manager (RPM) on any incident that results in an Occupational Safety and Health Administration (OSHA) recordable injury or illness, or a safety hazard mitigation that results in project delays affecting deliverable milestone deadlines, out-of-scope costs, or that must be coordinated with other Navy contractors.

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3.0 Subcontractors and Suppliers

3.1 Identified Subcontractors and Suppliers

Subcontractors and suppliers providing services onsite will be subject to the safety provisions of this APP and SSHP.

3.2 Means for Controlling and Coordinating Subcontractors and Suppliers

In the event that project subcontractors or suppliers providing onsite services are identified, these firms will conduct their work at the direction of the Field Manager, who may also act as the SSHO depending on the size and scope of work. Onsite subcontractor and supplier personnel that conduct activities as specified in the AHA will provide the SSHO with Hazardous Waste Operations and Emergency Response (HAZWOPER) and other safety training certification records as necessary for their work. These personnel will also take part in the required onsite radiation safety training orientation (as required) performed by the Navy's Basewide Radiological Safety contractor prior to conducting any work.

Subcontractors and suppliers will check in and out with the KCH Field Manager prior to and following completion of each day's activities.

Subcontractors and suppliers will also be subject to any required radiation program access/egress restrictions imposed by the Navy's Basewide Radiological Safety Contractor.

3.3 Safety Responsibilities of Subcontractors and Suppliers

Subcontractors and suppliers involved with conducting field work will read and sign this APP/SSHP. They will provide their employees with any required safety training such as HAZWOPER, respirator fit-testing, and if required, cardiopulmonary resuscitation (CPR), first aid, and blood-borne pathogen training, and will provide associated certification as requested. Subcontractors and suppliers will attend daily safety meetings conducted by the SSHO and any required radiation safety awareness training provided by the Navy radiation safety contractor.

Subcontractors and suppliers are responsible for having and certifying required workers compensation insurance.

3.4 Subcontractors

1. Placement of Activated Carbon
2. Subcontractor: Dixon Marine
   Subcontractor Contact Name: Mark Sutton
   Telephone: 415-669-7369Marine Vessel Support

Subcontractor: Dixon Marine
Subcontractor Contact Name: Chris Auer
Telephone: 415-697-9131

3. SPI Surveying

   Subcontractor: Battelle
   Subcontractor Contact Name: Heather Thurston
   Telephone: (781) 681-5527

4. Hydrodynamic Surveying

   Subcontractor: Integral Consulting
   Subcontractor Contact Name: Craig Jones
   Telephone: (831) 621-5146

5. Passive Sampling

   Subcontractor: Texas Tech University
   Subcontractor Contact Name: Danny Reible
   Telephone: (806) 834-8050

Subcontractors must comply with the following activities, and are responsible to:

- Comply with local, state, and federal safety standards
- Comply with project and owner safety requirements
- Actively participate in the project safety program and hold/attend/participate in required safety meetings
- Provide a qualified safety representative to interface with KCH
- Maintain safety equipment and personal protective equipment (PPE) for their employees
- Maintain and replace safety protection systems damaged or removed by the subcontractor's operations
- Notify the SSHO of any accident, injury, and/or incident immediately and submit reports to KCH within 24 hours
- Install contractually required general conditions for safety (example: handrail, fencing, fall protection systems, floor opening covers)
- Conduct and document weekly safety inspections of project-specific tasks and associated work areas
- Conduct site-specific and job-specific training for all subcontractor employees (including review of the KCH SSHP, subcontractor Health and Safety Plans, and subcontractor AHAs) and sign appropriate sign-off forms
- Determine and implement necessary controls and corrective actions to correct unsafe conditions

The subcontractors listed above may be required to submit their own site-specific health and safety plans and other plans such as lead or asbestos abatement compliance. Subcontractors are responsible for the health and safety procedures specific to their work, and are required to submit their plans to KCH for review and acceptance before the start of field work.

Subcontractors are also required to prepare AHAs before beginning each activity posing hazards to their personnel. The AHA will identify the principal steps of the activity, potential health and safety hazards for each step, and recommended control measures for each identified hazard. In addition, a listing of the equipment to be used to perform the activity must be identified; inspection requirements and training requirements for the safe operation of the equipment listed must also be identified.

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4.0 Training

Site workers, supervisors, and managers will have training appropriate to their assigned duties and as specified in the AHAs that are applicable to the work being performed (Attachment 1). As specified in this section, the SSHO (who will also conduct the project safety and health inspections), will meet the training and indoctrination requirements prescribed in the APP and this SSHP, as well as the HAZWOPER supervisory training.

All applicable training documentation is collected upon determination of final staff and contracted subcontractors. All documentation is maintained with the site safety files.

4.1 Initial Training Subjects

Subjects discussed with employees during their respective company-specific safety indoctrination include:

- Implementation and maintenance of the company Illness and Injury Prevention Program/Plan
- Emergency action and fire prevention
- Provisions for medical services and first aid, including emergency procedures
- Prevention of musculoskeletal disorders, including proper lifting techniques
- Proper housekeeping
- Prohibition of horseplay, scuffling, or other acts that could adversely affect safety
- Proper materials storage to prevent unstable stacking of goods and to ensure proper clearance for walkways, doors/exits, fire extinguishers, first aid supplies, and electrical panels
- Proper reporting of hazards and accidents to supervisors and the SHM
- Hazard communication, including awareness of potential chemical hazards and proper labeling of containers
- Proper storage and handling of toxic and hazardous substances, including prohibiting eating or storing food and beverages in areas where they can become contaminated
- Job duties and determination of any special safety training requirements (for example, HAZWOPER, client site-specific training)

4.2 Mandatory Training and Certification for this Project

The types of mandatory training and certifications required for this project are dependent on job categories and specific tasks contracted. These categories and the associated project-specific training and certifications are presented below.

4.2.1 Site Workers

Employees who would be considered general or occasional site workers under the Federal OSHA *Code of Federal Regulations* (CFR) (29 CFR 1910.120) and 29 CFR 1926.65 or California OSHA (Cal-OSHA) California Code of Regulations (Title 8 CCR 5192) will be currently certified as having completed the following training:

- 40-hour offsite course in HAZWOPER, provided by an outside firm(s) certified to conduct HAZWOPER training.
- 8-hour HAZWOPER annual refresher training, provided by an outside firm(s) certified to conduct the refresher training.
- Three days of field experience under the direct supervision of a trained, experienced supervisor.
- For workers who may be required to don and use respiratory protection, fit-testing certification is required for the specific piece of respiratory PPE to be used. If respirator usage by either CH2M HILL or Kleinfelder employees is required, such usage will be in accordance with CH2M HILL's and Kleinfelder's Injury and Illness Prevention Program (IIPP), respectively. However, the scope of work for this task order does not necessitate a need for respirator use.
- OSHA Construction Safety training in relevant areas.
- When two or more field staff will be present onsite at any one time, at least two will have the following training:
  - First aid and CPR training from the American Red Cross, the American Heart Association, or from an organization whose training is deemed equivalent by one of these organizations (as documented in writing), or from a licensed physician.
  - Staff designated as responsible for first aid will be included in their employers blood-borne pathogen program and trained in accordance with 29 CFR 1910.1030, by an outside firm certified to providing blood-borne pathogen training.

4.2.2 Supervisors and Managers

Employees who would be considered onsite supervisors and managers under the Federal OSHA 29 CFR 1910.120 and 29 CFR 1926.65. or Cal-OSHA Title 8 CCR 5192 will have current HAZWOPER supervisory certification in addition to the training required of site workers.

4.2.3 Basewide Radiation Contractor

For radiological screening, the Navy's Basewide Radiological Safety Contractor will identify their competent person prior to mobilization. Field staff will be trained and screened by the contractor.

4.3 Emergency Response Training

Site workers will have training sufficient to meet the requirements of HAZWOPER's Emergency Response Plan "First Responder Awareness Level". First Responders at the Awareness Level are individuals who are likely to witness or discover a hazardous substance release and who have been trained to initiate an emergency response sequence by notifying the proper authorities of the release. These individuals would take no further action beyond notifying the authorities of the release. First responders at the awareness level 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 created when hazardous substances are present.
- The ability to recognize the presence of hazardous substances in an emergency.
- The ability to identify the hazardous substances, if possible.
- An understanding of the role of the First Responder Awareness Level individual in the employer's emergency response plan, including site security and control and the United States Department of Transportation's Emergency Response Guidebook.
- The ability to realize the need for additional resources, and to make appropriate notifications to the communication center.
- Emergency evacuation procedures, rally points, and means for accounting for personnel.

4.4 Supervisory and Employee Safety Meetings

Project safety meetings will consist of an initial project orientation and subsequent daily safety meetings.

4.4.1 Project Orientation

In addition to the HAZWOPER certification, site workers including supervisors, field staff, and any field subcontractor personnel will attend an initial project orientation. The orientation will include training on AHAs and elements of the APP and SSHP. This meeting will be conducted prior to starting any field work and will be conducted by the Field Manager, who may also be acting as the SSHO.

4.4.2 Daily Safety Meeting

During the active field components of the project, the SSHO, or designee, will conduct daily safety meetings prior to beginning field work. These meetings will include information on the following subjects, as applicable:

- Review of safe work practices
- Review of AHAs
- Review of emergency response procedures

- Feedback from employees on hazards, safety suggestions, or concerns
- Recognition for compliance, good safety performance, or attitude

Attendance at the daily safety meeting is considered a part of each field staff's job duties and will be documented on a sign-in sheet.

4.5 Medical Surveillance

Employees considered general site workers under the Federal OSHA 29 CFR 1910.120 and 29 CFR 1926.65 or Cal-OSHA Title 8 CCR 5192 will be included in their employer's medical surveillance program. Site workers participating in hazardous waste operations or emergency response will maintain an adequate medical surveillance program in accordance with 29 CFR 1910.120 or 29 CFR 1926.65 and other applicable OSHA standards. Documentation of employee medical qualification (for example, physician's written opinion) will be maintained in the project files and made available for inspection.

KCH and subcontractor employees will supply a consulting physician with personal exposure information. These consulting physicians must be licensed and board certified in occupational medicine. Annual physicals will be required of those employees who spend more than 30 hours per year in exclusion zones in any given month over a 1-year period. Physicals will otherwise be required on a biannual basis.

At a minimum, project personnel who will be involved with onsite field activities are advised to be in good physical condition and free of cardiopulmonary impairment. As an extension of the above requirement, workers wearing respiratory protective equipment during this project will first be examined by an occupational physician and be proclaimed to be in good health prior to the use of such equipment. As part of this examination, the physician should evaluate the examinee's ability to use negative-pressure respirators. Personnel diagnosed as either unfit or unable to utilize a respirator, or as having medical conditions that could directly or indirectly be aggravated by either exposure to dusts, particulates, petroleum hydrocarbon vapors, solvent vapors, or by the use of PPE, will not be allowed to participate in field activities. Based on the nature of the work and knowledge of the levels of soil contamination, respirators are not anticipated to be required.
If respirator usage by CH2M HILL or Kleinfelder employees is required, such usage will be in accordance with CH2M HILL's and Kleinfelder's IIPP.

In addition, personnel with illnesses or injuries involving open wounds may not be allowed onsite. Field personnel that develop a potentially work-related illness or injury during the project should be examined by a physician. The physician must assess that the employee is fit to return to work before participating in the field activities onsite.

5.0 Safety and Health Inspections

5.1 Inspection Details

The project SSHO will provide daily onsite safety and health inspections for this project. The SSHO will meet the training and indoctrination requirements as prescribed in the APP and this SSHP, including HAZWOPER supervisory training, CPR, first aid, and blood-borne pathogen awareness training. The SSHO will also have hands-on experience overseeing assigned tasks of the CTO. Field activities conducted under this scope of work require OSHA competent-person training.

Prior to beginning field work and periodically during field activities, the SSHO will contact the SHM by telephone to discuss the status of safety and health issues. Prior to beginning work, the SSHO will ensure that required safety documentation, including certification of first aid and CPR training, are on file for persons conducting field activities. The SSHO will conduct onsite safety and health inspections as unanticipated site conditions arise or as otherwise needed. The SSHO will use the appropriate AHA and applicable requirements of the APP and SSHP as a basis for identifying any deficiencies during these inspections.

A brief description of each inspection, along with details of any deficiencies, will be recorded on a safety inspection form. The SSHO will immediately notify the affected employee regarding any observed deficiencies and will develop a mitigation measure with input from the TOM and SHM. Corrective actions (including timetable and responsibility) will be determined and implemented as soon as possible to ensure safe working conditions.

A safety and occupational health deficiency tracking system will be implemented that lists and monitors the status of safety and health deficiencies in chronological order. The list will be in the possession of the KCH SHM, will be discussed at the daily safety meetings, and will include the following elements:

- Date deficiency was identified
- Description of deficiency
- Name of person responsible for correcting deficiency
- Projected resolution date
- Date deficiency was actually resolved

5.1.1 Recordkeeping

Project safety and health documentation will be maintained by the CSHOs for the respective joint venture (JV) companies. Records to be maintained (in project files of each of the respective JV companies, in the KCH project folder, and onsite) will include:

- HAZWOPER training certificates
- First aid and CPR training certificates
- Documentation of medical surveillance
- Daily safety and health briefing acknowledgment forms
- Deficiency identification, correction, and follow-up documentation (Attachment 4)

- Accident reports and investigation records
- Respirator usage and fit training, as applicable
- Material Safety Data Sheet for sample preservatives

5.2 External Inspection/Certifications

No external inspections or certifications are anticipated for this work.

6.0 Accident Reporting

The following records will be kept to support any necessary accident reporting.

6.1 Exposure Data

The SSHO will log the number of man-hours worked by each field staff on a daily basis in the bound logbook. Data such as air monitoring equipment calibrations, gauge reading, and any related action items (such as engineering controls implemented) will be recorded in the logbook at the time these activities are performed, if required, during field work.

6.2 Accident Investigations, Reports, and Logs

Accident/exposure investigations will include:

- Interviewing injured workers and witnesses
- Examining the workplace for factors associated with the accident/exposure
- Determining the root cause (there may be more than one) of the accident/exposure
- Taking corrective action to prevent the accident/exposure from recurring
- Recording and communicating the findings and actions taken

Investigations will be directed by the TOM in concert with the CSHOs and reviewed by the SHM, as necessary. Investigations will be recorded on an Accident/Exposure Investigation Report form and root-cause analysis will be performed. Notes of this investigation will be made in the field logbook with the investigation form being centrally filed by the CSHOs.

If the accident/exposure results in an OSHA-recordable incident, the CSHOs will complete the required OSHA 300-related forms and file reports to OSHA accordingly.

All findings will be submitted to the client within 5 days of finalizing.

6.3 Immediate Notification of Major Accidents

Major accidents include any occupational hazard exposure or physical injury that requires more than basic first aid (physical injury/exposure) or that include fire, explosion, or property damage. Major accidents require immediate notification of appropriate personnel, as discussed below. OSHA designates a major incident as a fatal injury, hospitalization of three or more staff, and $2,000 or more in damages.

All incident reporting to the client will be done by the TOM and will be completed on the Navy Contractor Safety Incident Report (CSIR) form, included as Attachment 2.

6.3.1 Physical Injury/Exposure

In the event of an injury that constitutes an OSHA-recordable incident, the SSHO will notify the Navy RPM, the Navy Resident Officer in Charge of Construction (ROICC), the TOM, the CSHO, and the SHM as soon as practical after the incident. A written report is also to be prepared and submitted by the SSHO to the CSHOs and SHM within 24 hours of the incident.

If the SSHO is unable to prepare the report (due to injury), an individual designated by the TOM will prepare the report.

As soon as practical following the incident, the SSHO, or a designate, will complete OSHA Form 301, Injury and Illness Incident Report, and submit the form to OSHA.

6.3.2 Fire, Explosion, and Property Damage

In the event of a fire, explosion, or client or third party property damage, the SSHO will notify the Navy RPM, the ROICC, the TOM, the SHM, and the CSHOs as soon as practical after the incident. A written report is also to be prepared and submitted by the SSHO to the CSHOs and the SHM within 24 hours of the incident. If the SSHO is unable to make the report, an individual designated by the TOM will make the report.

Company or subcontractor property damage with no associated client or third-party damage and an estimated damage value greater than $500 will be reported to the TOM within 24 hours.

7.0 Hazard Analysis

This section presents a hazard analysis and details the physical, industrial, and chemical hazards identified or potentially present during field activities. Table 1 presents a summary of the hazard analysis. A detailed analysis of these hazards is presented in the sections that follow.

Per Navy instruction, AHAs have been prepared for this project and are included as Attachment 1 to the SSHP. Applicable AHAs will be reviewed by site personnel before each activity. The following AHAs are applicable to this project:

- 01 General site activities and oversight
- 02 Working in and adjacent to water
- 03 Vessel operation including grab sediment sampling and deployment of SPI equipment (subcontractor submittal)
- 04 Passive sampler deployment (subcontractor submittal)

7.1 Mechanical Hazards

7.1.1 Material Handling/Back Injury

An estimated 28 percent of industrial workers will experience disabling lower back pain or injury in the course of their careers. The factors that lead to these injuries are more chronic than acute and include routine lifting or one-time-only lifting; the weight of the object; the frequency of lifting; bending, twisting, or rotating during lifting; prolonged sitting; exposure to vibrations; poor arch support in shoes; and not stretching prior to physical activity.

Hand tools will be secured and care will be taken when entering areas where work is being performed above eye level. Before attempting to lift and carry an object, always test the weight first. If it is too heavy, get help. If possible, use mechanical lifting aids. If manageable, the proper method for lifting includes the following routine:

- Get a good footing
- Place feet about shoulder-width apart
- Bend knees to pick up load; never bend from the waist
- Keep back straight
- Get a firm hold and grasp opposite corners of the load, if possible
- Keep the back as upright as possible
- Lift gradually by straightening the legs
- Keep the weight as close to the body as possible
- When changing directions, turn the entire body, including the feet—do not twist the body

If devices are used for handling materials manually (for example, two-handed lifters, barrel-ring clamps, hand trucks, wheelbarrows), workers should wear protective equipment (for example, gloves and safety shoes) to minimize the potential for fingers and feet to be pinched or smashed between the load and stationary features. Avoid overloading the handling device.

7.1.2 Striking Injuries

Injuries often result when a worker unexpectedly contacts an object. These occurrences typically result from inadvertent slips, trips, and falls.

Personnel will maintain a constant program of good housekeeping and keep work areas clear of trip hazards and slippery surfaces.

7.1.3 Struck-by Injuries

Injuries often result when a worker becomes an unexpected receptor of contact with an object. These occurrences typically result from the worker being struck by a dropped or collapsed mass or a moving piece of equipment or vehicle. Site workers must be aware of their surroundings and of equipment operating nearby.

7.2 General

Adequate illumination intensity will be provided in active work areas as outlined in 29 CFR 1926.56. A meter to establish illumination values in foot candles can be rented from safety supply companies. Table 2 summarizes the illumination requirements of 29 CFR 1926.56.

7.3 Electrical/Utility Hazards

Contact with electrical current can cause shock, electrical burns, and instant death. For the project scope of work, the potential for exposure to electrical current exists through contact with electrical tools and generators. There is no potential for contact with overhead and underground power lines. When an individual is injured and in contact with energized equipment, rescues should only be attempted with extreme caution. If a rescue is attempted, use a long, dry, unpainted piece of wood or a long, dry, clean rope. Keep as far away from the victim as possible and do not touch the victim until he/she is completely clear of the energized equipment, drill rig, or electrical lines. When the victim is completely clear of the electrical source, and if unconscious and a heartbeat (pulse) cannot be detected, begin CPR immediately and contact emergency response personnel.

7.4 Utilities (Underground)

Do not begin subsurface construction activities (for example, trenching, excavation, drilling, hand augering) until a check for underground utilities and similar obstructions has been conducted. The use of as-built drawings and utility company searches must be supplemented with a geophysical or other survey by a qualified, independent survey contractor to identify additional and undiscovered buried utilities.

Examples of the types of geophysical technologies include the following:

- **Ground Penetrating Radar** can detect pipes (including gas pipes, tanks, conduits, cables), both metallic and nonmetallic, at depths up to 30 feet (9.1 meters) depending on equipment. Sensitivity for both minimum object size and maximum depth detectable depends on factors such as equipment selected and soil conditions.
- **Radio Frequency (RF)** involves inducing an RF signal in a pipe or cable and using a receiver to trace it. Some electric and telephone lines emit RF naturally and can be detected without an induced signal. This method requires knowing where the conductive utility can be accessed to induce RF field, if necessary.
- **Dual RF** is a modified version of RF detection using multiple frequencies to enhance sensitivity but with similar limitations to RF.
- **Ferromagnetic Detectors** are metal detectors that will detect ferrous and nonferrous utilities. Sensitivity is limited (for example, 100-millimeter iron disk to a depth of about 1 meter or a 25-millimeter steel paper clip to a depth of about 20 centimeters).
- **Electronic markers** are emerging technologies that impart a unique electronic signature to materials such as polyethylene pipe to facilitate location and tracing after installation. Electronic markers are promising for future installations but not of help for most existing utilities already in place.

Procedure

The following procedures shall be used to identify and mark underground utilities during subsurface construction activities on the project:

- The survey contractor will use the most appropriate geophysical technique or combination of techniques to identify the buried utilities on the project, based on the survey contractor's experience and expertise, types of utilities anticipated to be present, and specific site conditions.
- The survey contractor will employ the same geophysical techniques used on the project to identify the buried utilities to also survey the proposed path of subsurface construction work, and to confirm no buried utilities are present.
- The survey contractor will provide written verification of the completion of the clearances.

KCH personnel will complete the following:

- Identify Navy-specific permit and/or procedural requirements for excavation and drilling activities. For military installations, contact the Base Civil Engineer and obtain the appropriate form to begin the clearance process.
- Contact utility companies or the state/regional utility protection service at least 2 working days prior to excavation activities to notify them of the proposed work and to request the locations of the utility underground installations prior to the start of actual excavation.
- Schedule the independent utility survey by a private utility location subcontractor.

- Obtain utility clearances for subsurface work on both public and private property.
- Protect and preserve the markings of approximate locations of facilities until the markings are no longer required for safe and proper excavations. If the markings of utility locations are destroyed or removed before excavation commences or is completed, the TOM, or a designee, will notify the utility company or utility protection service to inform them that the markings have been destroyed.
- Conduct a site briefing for employees regarding the hazards associated with working near the utilities and the means by which the operation will maintain a safe working environment. Detail the method used to isolate the utility and the hazards presented by breaching the isolation.

7.5 Utilities (Overhead)

7.5.1 Proximity to Power Lines

No work is to be conducted within 50 feet (15.2 meters) of overhead power lines without first contacting the utility company to ascertain the voltage of the system. No aspect of any piece of equipment is to be operated within 50 feet (15.2 meters) of overhead power lines without first making this determination.

Operations adjacent to overhead power lines are PROHIBITED unless one of the following conditions is satisfied:

- Power has been shut off, positive means (such as lockout) have been taken to prevent the lines from being energized, lines have been tested to confirm the outage, and the utility company has provided a signed certification of the outage.
- The minimum clearance from energized overhead lines is as shown in the following chart. Equipment will be repositioned and blocked to ensure that no part of the equipment, including cables, can come within the minimum clearances shown in the chart.

MINIMUM DISTANCES FROM POWERLINES

Powerlines Nominal System kV	Minimum Required Distance, Feet (Meters)
0 to 50	10 (3.0)
51 to 100	12 (3.7)
101 to 200	15 (4.6)
201 to 300	20 (6.1)
301 to 500	25 (7.6)
501 to 750	35 (10.7)
751 to 1,000	45 (13.7)

(These distances have been determined to eliminate the potential for arcing based on the line voltage.)

- The power lines have been isolated through the use of insulating blankets that have been properly placed by the utility. If insulating blankets are used, the utility will determine the minimum safe operating distance; this determination should be in writing and include the utility representative's signature.

Inquiries regarding electric utilities must be made in writing and a written confirmation of the outage/isolation must be received by the TOM prior to the start of work.

7.6 Noise Hazards

Exposure to high levels of noise, both chronic and acute, can lead to different types of reactions. Acute (impulse) noise, such as noise associated with heavy equipment operation, jack hammers, drilling activities, and work performed in the flight path of aircraft can afflict the operator with a temporary loss of hearing at certain frequencies associated with the equipment being used. However, chronic exposure to this noise may eventually cause the hearing acuteness to be permanently and irreversibly changed. The change may be subtle and occur over a period of time.

Permanent noise-induced hearing loss is attributed to the intensity and frequency distribution of the noise, the time pattern and duration of exposure, and individual susceptibility. Sound levels (noise) are measured in decibels (dBA). The Threshold Limit Values (TLVs) for noise exposure are 85 dBA for an 8-hour duration and 90 dBA for a 4-hour duration. It is not expected that the noise level generated during fieldwork will exceed the TLVs.

Ordinarily, acute hearing loss is reversible when removed from the exposure. After a short period of time (less than 1 day), the hearing generally returns to normal. Earplugs are available onsite for hearing protection. Previous surveys indicate that heavy equipment such as drilling or excavation equipment may produce continuous noise and impact noise at or above the action level of 85 dBA. KCH personnel within 25 feet of operating equipment, or near an operation that creates noise levels high enough to impair conversation, shall wear hearing protective devices (either muffs or plugs). Personnel will wash their hands with soap and water prior to inserting ear plugs to avoid initiating ear infections.

If an employee feels it is necessary to shout to be heard at a distance of 3 feet, then hearing protection such as earplugs or earmuffs or muffled equipment may be necessary. Employees should request the SSHO conduct a noise level evaluation using a sound level meter, and post the results as well as any protection levels required to continue working in this area.

7.7 Biological Hazards

7.7.1 Poisonous Plants, Insects, and Animals

Contact with plants, insects, and animals present at a site should be avoided. Plants such as poison oak may be present at a site and can cause an allergic reaction and skin rash in some individuals. Specially prepared cream barriers, such as Teknu®, for protection against poison oak are commercially available and may minimize the potential for development of skin rash due to exposure to poison oak. Stinging and biting insects, including bees, spiders, and ticks, may be present. Insect repellent may be used to discourage insect contact with skin.

Poisonous animals such as snakes may be present at a site. Before beginning field work each day, observe the work area for the potential presence of inhabitant reptiles and take measures necessary to minimize the potential for contact.

The primary concern with animal bites and scratches is the potential for infection and/or rabies. Although the disease rabies can be fatal, it takes a few days to develop. Be sure a victim obtains medical attention quickly if an animal bite or scratch occurs. In the meantime, scrub the wound with soap and water and rinse thoroughly under running water. Dry off and place a clean bandage on the wound.

Insect bites are generally not dangerous unless they are from a poisonous insect. Snake or scorpion bites can also be dangerous, but more from infection or trauma than the toxins injected by the snake or scorpion. Victims of these bites should lie down and remain motionless; cold packs should be applied and medical attention sought immediately. If you are allergic to bee or wasp stings and you are stung, seek immediate medical attention.

Snakebites should initially be treated as if they are poisonous. The effects of poisonous bites depend on the size of the victim, location of the bite, and the amount of venom injected. The victim should be transported to receive immediate medical attention.

7.7.2 Blood-Borne Pathogens

Disease transmission occurs when bacteria or viruses from one person enter the body of another person. In the event of an accident at a site where a victim is bleeding, assume that the potential for infectious disease is present. If contact is made with the victim's blood and a sore, cut, scrape, or scab is present, a path exists for infection to enter the body. Action to control bleeding is important to prevent infectious disease transmission as well. A properly equipped first aid kit will contain barriers and antiseptics to wash hands before and after treating a bleeding victim, as a minimum of protection.

To further reduce the risk of transmission, take the following precautions:

- Avoid being splashed by blood.
- Place a barrier between you and the victim's blood by wearing disposable gloves and covering the wound with a dressing or plastic wrap
- Cover any cuts or scrapes or skin conditions you have
- Wash your hands immediately after providing care, even if you are wore gloves
- Avoid eating, drinking, or touching your mouth, eyes, or nose while providing care before you wash your hands
- Avoid handling your personal items (comb, pen, knife) until you wash your hands

These steps are precautions to reduce the risk of disease transmission. Your primary goal is to care for the victim, but providing protection from disease transmission is critical for both you and the victim.

7.7.3 Infectious Disease (Hanta Virus)

Hanta virus is a potentially lethal disease carried by the feces and urine of specific rodents that attacks pulmonary function (lung performance). Contact is most likely to occur when personnel open and work in control boxes, wellheads, and remediation equipment that are located in rural areas and have rodents potentially nesting in the equipment or support trailers. The dried feces and urine can be carried by dust and inhaled. The best protection for

Hanta virus is to maintain good housekeeping at field sites. Secondly, wet an area down if dust is present. This will allow easier cleanup without the risk of dust inhalation.

7.8 Thermal Hazards

The following subsections discuss the various health risks posed by prolonged heat exposure, as well as proper treatment of various heat-related syndromes. In hot conditions, more-frequent rest and fluid intake are required; institute a work/rest program. Total water consumption should be 1 to 2 gallons per day to avoid dehydration. Workers should not drink tea, coffee, or alcoholic beverages when working in hot conditions or suffering from ill effects of heat exposure, as caffeine and alcohol are diuretics and, thus, will exacerbate dehydration.

7.8.1 Exposure to Sunlight

Overexposure to sunlight can result in personnel becoming sick or obtaining sunburns. Personnel should wear sunscreen during warm weather and the summer months. This includes days with either overcast skies or direct sunlight.

7.8.2 Heat Stress

Heat stress occurs when the body produces or absorbs more heat than it is able to dissipate. Heat is produced internally as the result of metabolic activity and increases with body activity or the level of physical work being performed. Heat can be absorbed by the body from ambient air and from the radiant heat of the sun.

The body's ability to absorb heat is therefore affected by factors such as the ambient air temperature and humidity, air density, radiant energy, and cloud cover, wind velocity and air flow, and localized heat generation, such as that from power equipment.

The body's ability to dissipate heat to the environment is dependent on factors such as the amount of heat and radiant energy in the ambient environment, exposure to the ambient or radiant heat in that environment, and its own inherent ability to cool itself (perspiration).

Exposure to ambient conditions is affected by such factors as wind velocity or airflow, cloud cover or shade, and the type of protective clothing being worn. Table 3 shows the adjusted temperature equivalents for permeable and impermeable work clothing. The adjusted temperatures are based on the ambient temperature multiplied by 13 percent sunshine.

Any of these factors may contribute to a loss of body fluids and electrolytes and an increase in body temperature. A significant increase in body temperature can be life threatening and rapidly become fatal or result in permanent injury. Heat stress may cause any or all of the following conditions: heat cramps, heat syncope, heat exhaustion, and heat stroke.

Heat-related illnesses are caused by more than just temperature and humidity factors.

Physical fitness influences a person’s ability to perform work under heat loads. At a given level of work, the more fit a person is, the less the physiological strain, the lower the heart rate, the lower the body temperature (indicates less retrained body heat—a rise in internal temperature precipitates heat injury), and the more efficient the sweating mechanism.

Acclimatization is the degree to which a worker's body has physiologically adjusted or acclimatized to working under hot conditions. Acclimatization affects their ability to do work. Acclimatized individuals sweat sooner and more profusely than un-acclimatized individuals. Acclimatization occurs gradually over 1 to 2 weeks of continuous exposure, but it can be lost in as little as 3 days in a cooler environment.

Dehydration reduces body water volume. This reduces the body's sweating capacity and directly affects its ability to dissipate excess heat.

The ability of a body to dissipate heat depends on the ratio of its surface area to its mass (surface area/weight). **Heat dissipation** is a function of surface area, while heat production depends on body mass. Therefore, overweight individuals (those with a low ratio) are more susceptible to heat-related illnesses because they produce more heat per unit of surface area than if they were thinner. Monitor these persons carefully if heat stress is likely.

When wearing **impermeable clothing**, the weight of an individual is not as important in determining the ability to dissipate excess heat because the primary heat dissipation mechanism (evaporation of sweat) is ineffective.

Precautions

- Drink 16 ounces of water before beginning work. Disposable cups and water maintained at 50 degrees Fahrenheit (°F) (10 degrees Celsius [°C]) to 60°F (15.6°C) should be available. Under severe conditions, drink 1 to 2 cups every 20 minutes, for a total of 1 to 2 gallons (7.5 liters) per day. Do not use alcohol in place of water or other nonalcoholic fluids. Decrease your intake of coffee and caffeinated soft drinks during working hours.
- Acclimate yourself by slowly increasing workloads (for example, do not begin with extremely demanding activities).
- Use cooling devices, such as cooling vests, to aid natural body ventilation. These devices add weight, so their use should be balanced against efficiency.
- Use mobile showers or hose-down facilities to reduce body temperature and cool protective clothing.
- Conduct field activities in the early morning or evening and rotate shifts of workers, if possible.
- Avoid direct sun whenever possible, which can decrease physical efficiency and increase the probability of heat stress. Take regular breaks in a cool, shaded area. Use a wide-brim hat or an umbrella when working under direct sun for extended periods.
- Provide adequate shelter/shade to protect personnel against radiant heat (sun, flames, hot metal).
- Maintain good hygiene standards by frequently changing clothing and showering.
- Observe one another for signs of heat stress. Persons who experience signs of heat syncope, heat rash, or heat cramps should consult the SSHO to avoid progression of heat-related illness.

Thermal Stress Monitoring

The following procedures should be implemented when the ambient air temperature exceeds 70°F (21°C), the relative humidity is high (greater than 50 percent), or when the workers exhibit symptoms of heat stress:

- The heart rate should be measured by the radial pulse for 30 seconds, as early as possible in the resting period.
- The heart rate at the beginning of the rest period should not exceed 110 beats per minute, or 20 beats per minute above resting pulse.
- If the heart rate is higher, the next work period should be shortened by 33 percent, while the length of the rest period stays the same.
- If the pulse rate still exceeds 110 beats per minute at the beginning of the next rest period, the following work cycle should be further shortened by 33 percent.
- Continue this procedure until the rate is maintained below 110 beats per minute, or 20 beats per minute above resting pulse.
- Alternately, the oral temperature can be measured before the workers have something to drink. Use of a digital thermometer with disposable probe covers is recommended.
- If the oral temperature exceeds 99.6°F (37.6°C) at the beginning of the rest period, the following work cycle should be shortened by 33 percent. If the temperature exceeds 104°F, suspend work and initiate emergency treatment.
- Continue this procedure until the oral temperature is maintained below 99.6°F (37.6°C). While an accurate indication of heat stress, oral temperature is difficult to measure in the field.

SYMPTOMS AND TREATMENT OF HEAT STRESS

	Heat Syncope	**Heat Rash**	**Heat Cramps**	**Heat Exhaustion**	**Heat Stroke**
Signs and Symptoms	Sluggishness or fainting while standing erect or immobile in heat	Profuse tiny raised red blister-like vesicles on affected areas, along with prickling sensations during heat exposure	Painful spasms in muscles used during work (arms, legs, or abdomen); onset during or after work hours	Fatigue, nausea, headache, giddiness; skin clammy and moist; complexion pale, muddy, or flushed; may faint on standing; rapid thready pulse and low blood pressure; oral temperature normal or low	Red, hot, dry skin; dizziness; confusion; rapid breathing and pulse; high oral temperature of 104°F or higher.
Treatment	Remove to cooler area; rest lying down; increase fluid intake; recovery usually is prompt and complete	Use mild drying lotions and powders, and keep skin clean for drying skin and preventing infection	Remove to cooler area; rest lying down; increase fluid intake	Remove to cooler area; rest lying down, with head in low position; administer fluids by mouth if staff are not nauseated or vomiting; seek medical attention	Cool rapidly by soaking in cool—but not cold—water; call ambulance, and get medical attention *IMMEDIATELY*

7.8.3 Heat Cramps

Heat cramps are caused by perspiration that is not balanced by adequate fluid and electrolyte intake. Heat cramps are often the first sign of a condition that may lead to heat stroke. Symptoms include acute painful spasms of voluntary muscles (for example, abdomen and extremities).

For treatment, remove victim to a cool area and loosen clothing. Have victim drink 1 to 2 cups of water (preferably supplemented with an electrolyte solution such as Gatorade) immediately and every 20 minutes thereafter until symptoms subside. Total water consumption should be 1 to 2 gallons per day. Consult with a physician.

7.8.4 Heat Syncope (Unconsciousness)

Syncope or sudden loss of consciousness may be a consequence of heat illness, particularly when the worker stands relatively still in a hot environment. Although the worker may be slightly disoriented immediately after he/she regains consciousness, alterations of the mental state (for example, confusion, delirium, disorientation) or prolonged unconsciousness (a few minutes) are not parts of this syndrome. The possibility of heat stroke must always be considered when a worker loses consciousness.

7.8.5 Heat Exhaustion

Heat exhaustion is a state of very definite weakness or exhaustion caused by the loss of fluids from the body. This condition is much less dangerous than heat stroke but it must still be treated. Symptoms include pale, clammy, moist skin; profuse perspiration; and extreme weakness. Body temperature is normal, pulse is weak and rapid, and breathing is shallow. The victim may have a headache, may vomit, and may be dizzy.

For treatment, remove victim to a cool area and loosen clothing, remove PPE clothing, place in a head-low position, and provide bed-rest. Consult with a physician, especially in severe cases. Follow physician directions, such as have the victim drink 1 to 2 cups of water (preferably supplemented with an electrolyte solution such as Gatorade) immediately and every 20 minutes thereafter until symptoms subside. Total water consumption should be 1 to 2 gallons per day.

7.8.6 Heat Stroke

Heat stroke is an acute and dangerous reaction to heat stress caused by a failure of the heat-regulating mechanisms of the body (for example, sweating stops). The body temperature rises so high that brain damage and death may result if the victim is not cooled quickly.

Symptoms include red, hot, dry skin, although a person may have been perspiring earlier; nausea; dizziness; confusion; extremely high body temperature; rapid breathing and pulse; unconsciousness; or coma.

For treatment, cool the victim quickly. Remove PPE and external clothing as necessary and decency permits. Place in a cool, shady environment immediately. Call 911 and activate onsite emergency response and first aid treatment. If the body temperature is not brought down quickly, permanent brain damage or death will result. If directed by a physician, soak the victim in cool—but not cold—water; sponge the body with cool water; and pour water

on the victim's body to get the body temperature to a safe level (102°F). Observe the victim and support until medical help arrives. Do not give the victim tea, coffee, or alcoholic beverages. In hot conditions, more frequent rest and fluid intake is required. Institute a work/rest program.

7.8.7 Cold

General

Low ambient temperatures increase the heat lost from the body to the environment by radiation and convection. In cases where the worker is standing on frozen ground, the heat loss is also due to conduction.

Wet skin and clothing, whether because of water or perspiration, may conduct heat away from the body through evaporative heat loss and conduction. Thus, the body cools suddenly when chemical protective clothing is removed if the clothing underneath is perspiration soaked.

Movement of air across the skin reduces the insulating layer of still air just at the skin's surface. Reducing this insulating layer of air increases heat loss by convection.

Non-insulating materials in contact or near-contact with the skin, such as boots constructed with a metal toe or shank, conduct heat rapidly away from the body.

Certain common drugs, such as alcohol, caffeine, or nicotine, may exacerbate the effects of cold, especially on the extremities. These chemicals reduce the blood flow to peripheral parts of the body, which are already high-risk areas because of their large surface area to volume ratios. These substances may also aggravate an already hypothermic condition.

Precautions

- Be aware of the symptoms of cold-related disorders and wear proper, layered clothing for the anticipated fieldwork. Appropriate rain gear is a must in wet weather.
- Consider monitoring the work conditions and adjusting the work schedule using guidelines developed by the United States Army (wind-chill index) and the National Safety Council (NSC).
- The wind-chill index (below) is used to estimate the combined effect of wind and low air temperatures on exposed skin. The wind-chill index does not take into account the body part that is exposed, the level of activity, or the amount or type of clothing worn. For those reasons, it should only be used as a guideline to warn workers when they are in a situation that can cause cold-related illnesses.
- NSC guidelines for work and warm-up schedules can be used with the wind-chill index to estimate work and warm-up schedules for fieldwork. The guidelines are not absolute; workers should be monitored for symptoms of cold-related illnesses. If symptoms are not observed, the work duration can be increased.
- Persons who experience initial signs of immersion foot, frostbite, and/or hypothermia should report it immediately to their supervisor/project manager to avoid progression of cold-related illness.

- Observe one another for initial signs of cold-related disorders.
- Obtain and review weather forecast—be aware of predicted weather systems along with sudden drops in temperature, increase in winds, and precipitation.

SYMPTOMS AND TREATMENT OF COLD STRESS			
	Immersion (Trench) Foot	**Frostbite**	**Hypothermia**
Signs and Symptoms	Feet discolored and painful; infection and swelling present	Blanched, white, waxy skin, but tissue resilient; tissue cold and pale.	Shivering, apathy, sleepiness; rapid drop in body temperature; glassy stare; slow pulse; slow respiration
Treatment	Seek medical treatment *IMMEDIATELY*	Remove victim to a warm place; re-warm area quickly in warm—but not hot—water; have victim drink warm fluids, but not coffee or alcohol; do not break blisters; elevate the injured area, and get medical attention	Remove victim to a warm place; have victim drink warm fluids, but not coffee or alcohol; get medical attention

7.9 Fires and Explosions

The two primary methods of preventing thermal injury from fire or explosions are to prevent their occurrence or, if they should happen, to be at a safe distance away.

To prevent or control the risk of fire or explosion, the preferred method involves recognizing the hazard and taking appropriate steps. This includes using equipment to detect an explosive or flammable atmosphere (for example, explosimeter with a 10 percent lower explosive limit [LEL] action level) and using equipment that will not ignite flammable gases or vapors (for example, intrinsically safe instruments, non-sparking brass, bronze, or aluminum tools).

In areas where flammable liquids are stored, handled, used, dispensed, or transferred, smoking and the carrying of lighters, matches, and other spark-producing devices should be prohibited. A spark generated by static electricity can have sufficient energy to ignite flammable or explosive gases, vapors, or dusts. Static electricity is generated by the contact and separation of dissimilar material and can occur between two charged bodies even if there is no good electrical conductive path between them.

Static electricity can be prevented from causing a spark during flammable liquid transfer by bonding and grounding. Bonding is the linking of two containers by an electrical connection. Grounding eliminates a difference in electrical potential between a container and the earth. For bonding and grounding to be effective, both containers must be metal and at least one container must be grounded. It is important that clamps or clips make a good metal-to-metal contact and are not blocked by a nonconductive material such as paint.

7.10 Chemical Hazards

The following discusses the chemical hazards that may exist during the implementation of project activities. The hazards are discussed by the common chemical group. Table 4 discusses the toxicological properties and exposure thresholds for the chemicals. The chemicals of concern (COC) included in this plan are based on previous investigations supplied to KCH by the client, and represent potential contaminants that may be expected to be encountered. Based on this information, PCBs were identified as the only COC at the site. If additional sampling is added to the sampling program, chemical hazards will be re-evaluated, and Appendix A will be updated as necessary to include any additional chemicals that present a potential for exposure.

7.10.1 Polychlorinated Biphenyls

PCBs have been classified by the National Institute of Safety and Health as being of low acute toxicity, but it has been demonstrated that they will cause chloracne, a painful and disfiguring condition resulting from exposure to various chlorinated hydrocarbons. Exposure pathways for PCBs include ingestion, dermal, and injection. The toxicological properties, exposure thresholds, and symptoms of exposure for PCBs are shown in Table 4.

7.11 Water Hazards

KCH plans on working above and near water to complete the field activities. Pilot cap placement and sampling will be performed in two half-acre pilot cap areas within the South Basin of HPNS (Figures 3 and 4).

7.11.1 Working Above or Near Water

Marine vessels and support boats will be used to facilitate sediment and benthic community sampling, hydrodynamic surveying, and transport of equipment when working in the South Basin. It is anticipated that a barge with hopper and conveyer belt system will be used as part of the carbon amendment placement activities.

7.11.2 Safety Components

Specific safety components to be implemented during work above or near the water are as follows:

- The buddy system will be used when working above or near water.
- Fall protection should be provided to prevent personnel from falling into water. Where fall protection systems are not provided and the danger of drowning exists, United States Coast Guard-approved personal flotation devices (PFDs), or life jackets, shall be worn.
- Inspect PFDs prior to use. Do not use defective PFDs.
- If contact with sediments occurs, decontamination processes are required for both personnel and equipment. All equipment in contact with the sediment will require screening before and after for radioisotopes by the Navy's Basewide Radiological Safety Contractor.

- A minimum of one ring buoy with 90 feet of 3/8-inch solid-braid polypropylene (or equal) rope must be provided for emergency rescue.
- Use sampling and other equipment according to the manufacturers' instructions.
- Float Plan for working on water can be found in Attachment 3 of this SSHP. This plan will be completed by the subcontractor and submitted to the SSHO the morning of the work, prior to launch.

7.12 Radiological Hazards

Work is being conducted in an area where potential low level radiological contamination may be present. The Navy's Basewide Radiological Safety Contractor will be responsible for radiological screening of site personnel and equipment. The basic elements of the KCH radiological screening program are as follows, and are spelled out in more detail in the site Radiological Work Instructions, Attachment 5:

- All work, including site restoration, shall be conducted by a qualified Environmental Contractor with workers and supervisors trained and certified in accordance with 29 CFR 1910.120. The activities included in this SSHP will be conducted outside any known radiological controlled areas. However, as a precautionary measure to protect site workers, a fully qualified and current State of California licensed Radiological Contractor will monitor soil sampling activities. Radiological operations will be conducted in accordance with State of California Title 17, CCR, and United States Army Corps of Engineers EM 385-1-1 section 06.E.
- The Radiological Contractor will monitor field operations by performing radiological screening of sediment samples, equipment, and personnel to verify that the sediment does not exceed dose limits established per 10 CFR 20 and generates no radiological contamination for equipment and materials in excess of limits per Regulatory Guide 1.86. To evaluate sediment contamination the contractor will establish investigation limits using a Navy-approved background reference area at HPNS.
- The Radiological Contractor will also monitor the work area and survey all tools, equipment, and personnel entering and leaving the work area.
- If radiological limits are exceeded during field activities, work will stop and the area will be secured. The Navy will be immediately notified, and an alternative course of action will be discussed.
- After work is completed, all tools and equipment used in the work area shall be screened prior to release from the work area. Screening shall be performed by the Radiological Contractor using an alpha/beta probe/ratemeter with detection capabilities for releasing materials per Regulatory Guide 1.86. Additionally all personnel must be frisked out of the controlled work area. (Note: If radiological limits are exceeded during screening or personnel frisking activities, work will stop, the area will be secured, the Navy will be immediately notified, and an alternative course of action will be discussed.)

8.0 Exclusion Zone and Restricted Access Work Zone

An exclusion zone (constructed by the Navy's Basewide Radiological Safety Contractor) will be maintained around work areas where contracted activities are occurring or with any activity where chemical materials may be encountered. Protective clothing and equipment (per Section 10.0) are to be worn by any personnel working within the exclusion zone. At a minimum, Level D PPE is required. The purpose of the exclusion zone is to limit outside personnel from entering the work area and potentially injuring themselves or exposing themselves to hazardous work conditions or chemicals. The exclusion zone will include a limited access ingress and egress for personnel and equipment. The zone is to be demarcated with caution/hazard tape and barricades (or similar restricting material). The exclusion zone is to be clearly labeled as such. All personnel are required to log in/out of exclusion zones daily.

For any work not defined previously that is to occur at the site, a restricted access work zone will be maintained around the work area. The restricted access work zone will be demarcated using traffic cones or delineators to clearly indicate the work area. The purpose of the restricted access work zone is to limit the number of outside personnel from accidentally entering the work area and potentially injuring themselves.

Field personnel while working in the exclusion zone or restricted access work zone during the field activities are to work with another person at the site. Under no circumstances, other than completion of paperwork at the end of the day, are field personnel to work alone at the site while conducting field activities.

See Attachment 5 for full Radiological Work Instructions as prepared by the base Radiological Safety Contractor, TetraTech.

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9.0 Monitoring

Based on knowledge of the site, previous historical documents related to operations, and scope of work, no air monitoring beyond radiological screening is required during the field activities. The Navy's Basewide Radiological Safety Contractor will perform radiological screening of equipment and personnel on a daily basis in accordance with standard operating procedures and safety plans (prepared by the Navy's Basewide Radiological Safety Contractor).

9.1 Direct Reading Monitoring Specifications

Instrument	Tasks	Action Levels[a]	Action to be Taken when Action Level reached	Frequency [b]	Calibration
Radiation Meter: Ludlum Model 2 with GM probe model 44-9, or equivalent	Radiological screening of personnel and equipment	Consult Navy's Basewide Radiological Safety Contractor	Consult Radiation Health Manager and Navy's Basewide Radiological Safety Contractor	Initially, periodically, and at end of task	Daily

NOTES:
[a] Action levels apply to sustained breathing-zone measurements above background.
[b] The exact frequency of monitoring depends on field conditions and is to be determined by the Navy's Basewide Radiological Safety Contractor; generally, every 5 to 15 minutes if acceptable; more frequently may be appropriate.

9.2 Calibration Specifications

No air monitoring equipment is anticipated for use by KCH field staff during field activities. The Navy's Basewide Radiological Safety Contractor will calibrate and operate radiological screening equipment.

9.3 Integrated Personal Air Sampling

No personal air sampling is anticipated.

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10.0 Personal Protective Equipment

10.1 Required PPE

PPE must be worn by employees when actual or potential hazards exist and engineering controls or administrative practices cannot adequately control those hazards.

A PPE assessment has been conducted by the SHM based on project tasks (see PPE specifications in the following table). Verification and certification of assigned PPE by task is completed by the SHM that approved this plan. Following are items that need to be followed when using any form of PPE:

- In work areas where actual or potential hazards are present at any time, PPE must be worn by employees working or walking through the area.
- Areas requiring PPE should be posted or employees must be informed of the requirements in an equivalent manner.

The following table outlines PPE to be used according to task based on project-specific hazard assessment. If a task other than the tasks described in this table needs to be performed, contact the SHM so this table can be updated.

Project-Specific PPE Requirements[a]

Task	Level	Body	Head	Respirator[b]
General site entry	D	Work clothes, safety-toed leather work boots, and gloves.	Hardhat[c,] safety glasses with side shields, ear protection[d]	None required
Work over water	Modified D	Work clothes or cotton coveralls and personal flotation device. **Boots:** Safety-toe, chemical-resistant boots OR Safety-toe, leather work boots with outer rubber boot covers **Gloves:** Inner surgical-style nitrile and outer chemical-resistant nitrile gloves.	Hardhat[c,] safety glasses with side shields, ear protection[d]	None required

Reasons for Upgrading or Downgrading Level of Protection (with approval of SHM)

Upgrade[f]	Downgrade
• Request from individual performing tasks. • Change in work tasks that will increase contact or potential contact with hazardous materials. • Occurrence or likely occurrence of gas or vapor emission. • Known or suspected presence of dermal hazards. • Instrument action levels in the "Site Monitoring" section exceeded.	• New information indicating that situation is less hazardous than originally thought. • Change in site conditions that decrease the hazard. • Change in work task that will reduce contact with hazardous materials.

[a] Modifications are as indicated. CH2M HILL will provide PPE only to CH2M HILL employees.
[b] No facial hair that would interfere with respirator fit is permitted.
[c] Hardhat and splash-shield areas are to be determined by the SSHO.
[d] Ear protection should be worn when conversations cannot be held at distances of 3 feet (1 meter) or less without shouting.
[e] See cartridge change-out schedule.
[f] Performing a task that requires an upgrade to a higher level of protection (for example, Level D to Level C) is permitted only when the PPE requirements have been approved by the SHM, and an SSHO qualified at that level is present.

Appropriate PPE shall be supplied and used at all times for this project. PPE selection is based on the selected hazard control measures specified in the AHAs (Attachment 1).

10.2 Activity Hazard Analysis Process

The CSHOs (which included the SHM) and the TOM performed an AHA for each primary activity with subsequent review by the SHM. The project-specific AHAs are included as Attachment 1 of this SSHP.

The AHAs present the scope of work activities and then identify hazards and controls for each principal work step. Engineering and administrative controls shall be used to control hazards; in cases where engineering or administrative controls are not feasible, PPE may be used.

Exposure through inhalation, ingestion, skin absorption, injection, or physical contact to any chemical, biological, or physical agent in excess of the acceptable limits specified in the most recently published American Conference of Governmental Industrial Hygienist (ACGIH) *Threshold Limit Values and Biological Exposure Indices* or by OSHA, whichever is more stringent, shall be prohibited.

In case of conflicts between ACGIH and other standards or regulations referenced in this manual, the more stringent shall prevail.

This plan shall comply with applicable standards and regulations to reduce contaminant concentration levels as low as reasonably achievable.

10.3 Procedures for Selection, Use, and Maintenance of PPE

KCH shall communicate PPE decisions to each affected employee/subcontractor and select PPE that properly fits each affected employee.

Employees/subcontractors shall use PPE that may be required to maintain their exposure within acceptable limits.

KCH will make reasonable efforts to accommodate employees/subcontractors with religious beliefs that may conflict with the PPE requirements contained within the APP and this SSHP. However, when reasonable efforts to accommodate the employee/ subcontractor's religious beliefs do not provide the necessary safe working environment (without PPE), then KCH shall require the employee/subcontractor to use the appropriate PPE or the employee/subcontractor will not be allowed to work in the area where he/she will be exposed to the hazard requiring protection.

Employees/subcontractors shall be physically able and medically determined qualified to use the personal protective and safety equipment that may be required in their job duties.

KCH shall ensure that users of personal protective and safety equipment are trained to know the following: when PPE and what types of PPE are necessary; how to properly don, doff, adjust, and wear PPE; limitations of the PPE; and proper care, inspection, testing, maintenance, useful life, storage, and disposal of the PPE. Each affected employee/subcontractor shall demonstrate an understanding of this training and the ability to use PPE properly before being allowed to perform work requiring the use of PPE.

When KCH has reason to believe that any affected employee/subcontractor who has been trained does not have the understanding and skill required for the use of the PPE, KCH or its designated subcontractor shall ensure that the employee receives the necessary retraining to acquire the appropriate skills or not be used on the project.

KCH shall verify, either directly or through its subcontractor, that each affected employee has received and understood the required training by a written certification that identifies the name of each employee trained, the date(s) of the training, and the subjects taught.

Personal protective and safety equipment shall be tested, inspected, and maintained in serviceable and sanitary condition as recommended by the manufacturer.

Defective or damaged equipment shall not be used. It shall be tagged as out of service and locked-up or immediately removed from the work site to prevent use.

Before being stored or reissued to another person, equipment shall be cleaned, disinfected, inspected, and repaired.

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11.0 Spill Prevention and Control Measures

No known hazardous materials are expected to be transported, used, or generated onsite as part of this scope of work.

Activated carbon amendments will be kept free of water, heat, debris, and foreign material during storage, handling, and placement. The material will be kept in a ventilated storage area. Best management practices will be followed in accordance with the Storm Water Pollution Prevention Plan, submitted under separate cover. Any release onto the ground surface will be contained to the extent possible. Although activated carbon is non-toxic, the time, location, and quantity of such a release will be documented in the field log and the TOM and Navy ROICC will be contacted immediately.

Also, should any spill occur, please contact the CSO Doug Delong 415-743-4713

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12.0 Decontamination

The following decontamination (cleansing/disposal) procedures for equipment and PPE have been developed with the intent of reducing the potential for cross-contamination of samples and the transfer of contaminated material outside the Exclusion Zone. Decontamination will be performed in direct proximity to the Exclusion Zone. The decontamination methods will be visually monitored by the SSHO for effectiveness.

12.1 Contamination Reduction Zone

The Contamination Reduction Zone is a transition area at/near the Exclusion Zone to dispose of consumable PPE and perform personal hygiene cleaning.

12.2 Equipment Decontamination

Decontamination of equipment will be conducted per the following procedures:

- Scrub with detergent from a spray bottle or in a bucket
- Scrub a second time with clean detergent
- Rinse with tap water
- Rinse twice with deionized or distilled water
- Let air dry or use again
- Maintain plastic sheeting, aluminum foil, or other disposable clean surface for air drying

12.3 Personal Protective Equipment Decontamination

Decontamination of PPE will be accomplished by passing personnel through various stages of contamination reduction and removing impacted clothing and/or equipment in decreasing order of the degree of potential impact. Personnel who have come in contact with areas of significant contamination will be subjected to these procedures. The personnel decontamination may comprise the following procedural stages.

12.3.1 Stage No. 1: Segregated Equipment Drop

Equipment and consumables that require either disposal or special handling (for example, special washing/decontamination) will remain in this area until decontaminated or disposed.

12.3.2 Stage No. 2: Protective Clothing Removal

Decontaminate and/or remove all but inner gloves and respirator and dispose of or store accordingly.

12.3.3 Stage No. 4: General Field Wash

Personnel will remove inner gloves and wash face and hands with hand soap and tap water and rinsing with tap water before leaving the site or eating. A drum will be available to store/dispose of potentially impacted consumables. The disposition of this waste will be determined prior to the termination of work.

13.0 Emergency Action Plan

13.1 Procedures and Tests

In the event of an emergency that requires vacating the work area, field personnel will evacuate the immediate work area and assemble at the guard entrance to HPNS. The SSHO will take a roll call using the SSHP daily sign-in sheet to confirm presence of field personnel.

In the event of an accident resulting in physical injury, call emergency service personnel immediately and perform first aid commensurate with training and seriousness of the injury. Severely injured personnel are to be transported only by emergency service personnel and/or by ambulance personnel, unless a life-threatening condition is judged to exist that must be addressed immediately. At the hospital, a physician's attention is mandatory regardless of how serious the injury appears. Accident reporting is discussed in Section 6.0.

Due to the normal short duration of contracted tasks, Emergency Action Plan testing for this project will consist of review of the SSHP including, but not limited to, identification of emergency escape/hospital routes, emergency contact numbers, and reporting requirements. Cellular phones and hand-held radios will be tested to ensure that they are operable with good reception and any necessary changes to the emergency response procedures deemed necessary by field staff will be communicated and approved by the CSHO or TOM prior to initiating site work and documented on the SSHP in the field. The SHM will also be notified of any changes.

Projects of a longer duration will require a full scale drill of the Emergency Action process.

After any incident, a post-incident review will be conducted, and any lessons learned and/or corrective actions communicated to the project team.

13.1.1 Spill Plan

See Section 11.0 of the SSHP.

13.1.2 Firefighting Plan

In the event of a fire or explosion, notify the fire department immediately by dialing emergency dispatch for the City and County of San Francisco Fire Department (Station #17) at (415)-558-3451. A Class ABC fire extinguisher will be kept with the field vehicles, but should be used to address very small fires and not as a substitute for calling 911.

13.1.3 Posting of Emergency Telephone Numbers

The following emergency telephone numbers will be posted in a conspicuous place such as the dashboard of each field vehicle.

Fire Department ..... 911 or (415) 558-3451

Police Department ..... 911 or (415) 553-8090

National Poison Referral Service……..(800)-222-1222
Ambulance/Paramedics .....911 or (415) 252-7690
Navy RPM, Danielle Janda .....(619) 532-0787
Navy ROICC, Shirley Ng.....(510) 755-5878
Navy Radiological Affairs Support Office, Pat Owens .....(757) 887-7644
Task Order Manager, Jamie Eby .....(510) 587-7551
Site Safety and Health Officer, Shannon Mackenzie.....(415) 424-2225
Program Safety and Health Manager (CH2M HILL), Rick Cavil .....(408) 896-0140
Corporate Safety and Health Manager (Kleinfelder), Jenny Meyer .....(925) 463-7301

Navy CSO, Doug Delong…….(415)-743-4713

13.1.4 Working over Water Plan

All work over water will occur in an approved vessel, meeting all requirements for safe operation per United States Coast Guard rules. A Float Plan (Attachment 3) will detail the actions to be followed should a person fall overboard.

13.1.5 Wild Land Fire Prevention

The only potential ignition source for this project is operation of field vehicles in close proximity to dried-out vegetation. To prevent the possibility of grass fires, vehicles will be driven over areas with either no vegetation or low-lying vegetation to prevent contact with hot mechanical parts such as the engine compartment or the exhaust system. A Class ABC fire extinguisher will be stored on each vehicle and will be readily available.

No smoking will be permitted outside of the designated smoking area.

13.1.6 Medical Emergency

In the event of a medical emergency or if follow up to basic first aid is required, offsite medical support will be engaged. The contact and location information for the nearest offsite medical support is presented below. A map indicating the travel route to the nearest medical facility with emergency care is presented in Figure 6 at the end of this SSHP.

Medical facility: San Francisco General Hospital
1001 Potrero Avenue, San Francisco, CA
(415) 206-8000

Emergency No: **911 – In case of emergency contact the Police, Fire, and Medical Emergency**

Tables

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TABLE 1
Summary of Hazard Analysis

Hazard	Type(s)/Source	Target Organ(s)	Anticipated Physiologic Response	Qualified Exposure Risk	Primary Control
Mechanical	Loading and unloading sampling equipment	NA	NA	Low	Housekeeping and awareness, hard hat, safety glasses, gloves, steel-toed shoes, safety vest
Biological	Germs/bacteria, fecal matter in some places, dogs, spiders, ticks, snakes	Skin, CNS	NA	Moderate	Personal hygiene, PPE, bug spray
Thermal	Heat stress, cold stress from working in water, or all day out in sunshine	Skin	Heat cramps, heat syncope, heat exhaustion and/or heat stroke	Moderate	More-frequent rests, increase fluid intake, institute a work/rest program
Chemical	Sediment, soil, water contaminants	Central nervous system, liver, skin	Nausea, dizziness, headaches	Moderate	PPE

Notes

CNS central nervous system
NA: not applicable
PPE: personal protective equipment

TABLE 2
Minimum Illumination

Foot Candles	Area of Operations
5	General construction
3	General construction, concrete placement, excavation/waste areas, access ways, active storage areas, loading platforms, refueling, and maintenance areas
5	Indoors, warehouses, corridors, hallways, and exits
5	Tunnels, shafts, general underground work (note exception of 10-foot candles required for operations such as drilling, mucking, and scaling)
10	General construction plants and shops
30	First aid stations, infirmaries, and offices

TABLE 3
Temperature Equivalence

Adjusted Temperature ºF	Permeable Clothing Work Prior to Break (minutes)	Impermeable Clothing Work Prior to Break (minutes)
72.5 - 77.5	150	120
77.5 - 82.5	120	90
82.5 - 87.5	90	60
87.5 - 92.5	60	30
92.5 or greater	45	15

The table below summarizes the potential COCs and their occupational exposure limit and signs and symptoms of exposure. The table also includes the maximum concentration of each COC and the associated location and media that was sampled (groundwater, soil boring, surface soil). These concentrations were used to determine engineering and administrative controls described in the "Project-Specific Hazard Controls" section of this SSHP, as well as PPE and site monitoring requirements.

TABLE 4
Contaminants of Concern

Contaminants of Concern					
Contaminant and CAS #	Location and Maximum[a] Concentration (ppm)	Exposure Limit[b]	IDLH[c]	Symptoms and Effects of Exposure	PIP[d] (eV)
PCBs (Limits as Aroclor 1254)	1,000 SED	0.5 mg/m^3	5 CA	Eye and skin irritation, acne-form dermatitis, liver damage, reproductive effects	UK

Footnotes:

[a] Specify sample-designation and media: SB (Soil Boring), A (Air), D (Drums), GW (Groundwater), L (Lagoon), TK (Tank), SS (Surface Soil), SL (Sludge), SW (Surface Water), SED (Sediment).
[b] Appropriate value of permissible exposure limit (PEL), recommended exposure limit (REL), or threshold limit value (TLV) listed.
[c] IDLH = immediately dangerous to life and health (units are the same as specified "Exposure Limit" units for that contaminant); NL = No limit found in reference materials; CA = Potential occupational carcinogen.
[d] PIP = photoionization potential; NA = Not applicable; UK = Unknown.

mg/m^3 = milligrams per cubic meter
ppm = parts per million

Potential Routes of Exposure		
Dermal: Contact with contaminated media. This route of exposure is minimized through use of engineering controls, administrative controls, and proper use of PPE.	Inhalation: Vapors and contaminated particulates. This route of exposure is minimized through use of engineering controls, administrative controls, and proper use of respiratory protection when other forms of control do not reduce the potential for exposure.	Other: Inadvertent ingestion of contaminated media. This route should not present a concern if good hygiene practices are followed (for example, wash hands and face before drinking or smoking).

Notes

CAS:	Chemical abstract substance number
PEL:	Permissible Exposure Limit. The maximum permitted 8-hour time-weighted average concentration of an airborne contaminant.
STEL:	Short-term exposure limit. A 15-minute time-weighted average exposure which is not to be exceeded at any time during a work day even if the 8-hour time-weighted average is below the PEL.

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Figures

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Figure 1. Facility Location – Hunters Point Naval Shipyard

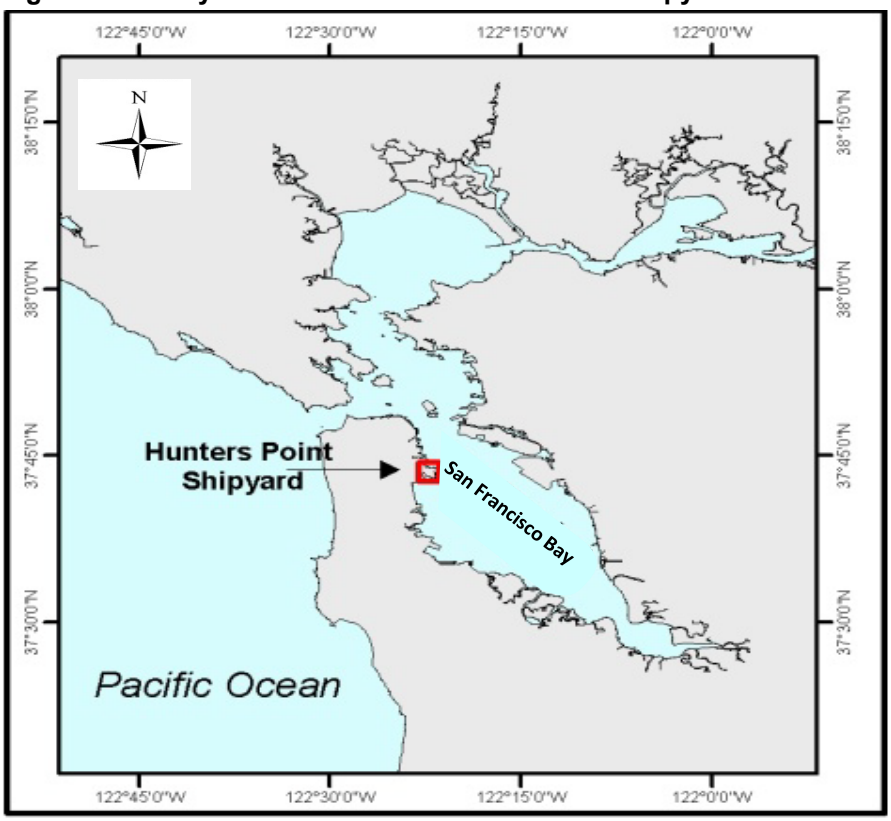

Figure 2. Site Location – Parcel F, South Basin

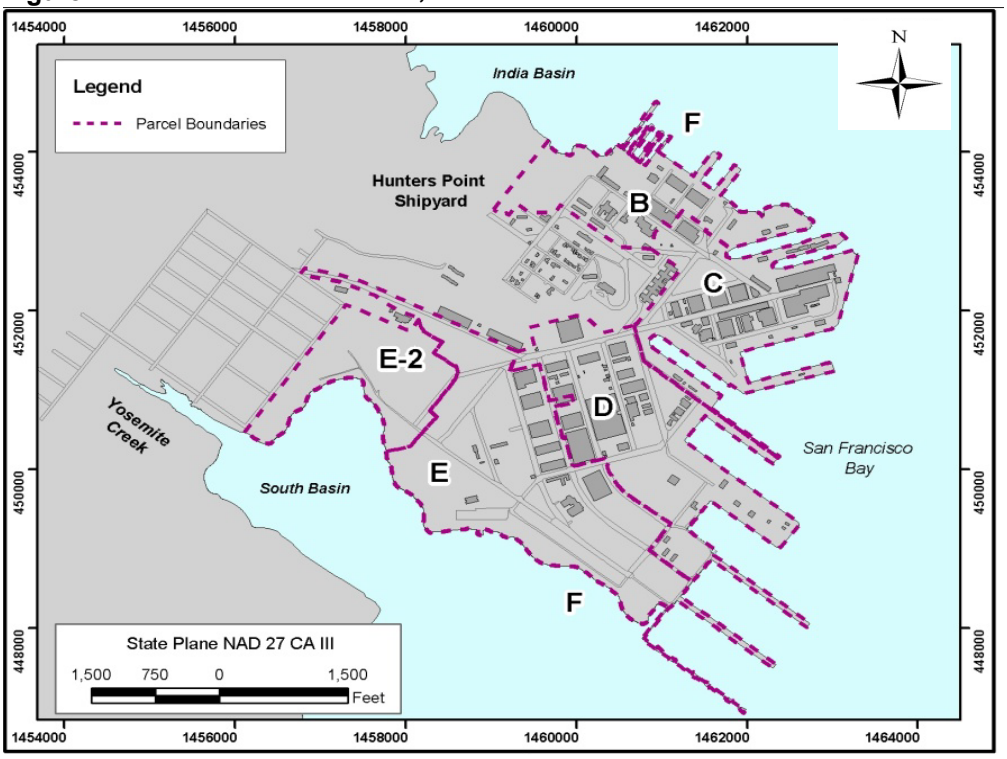

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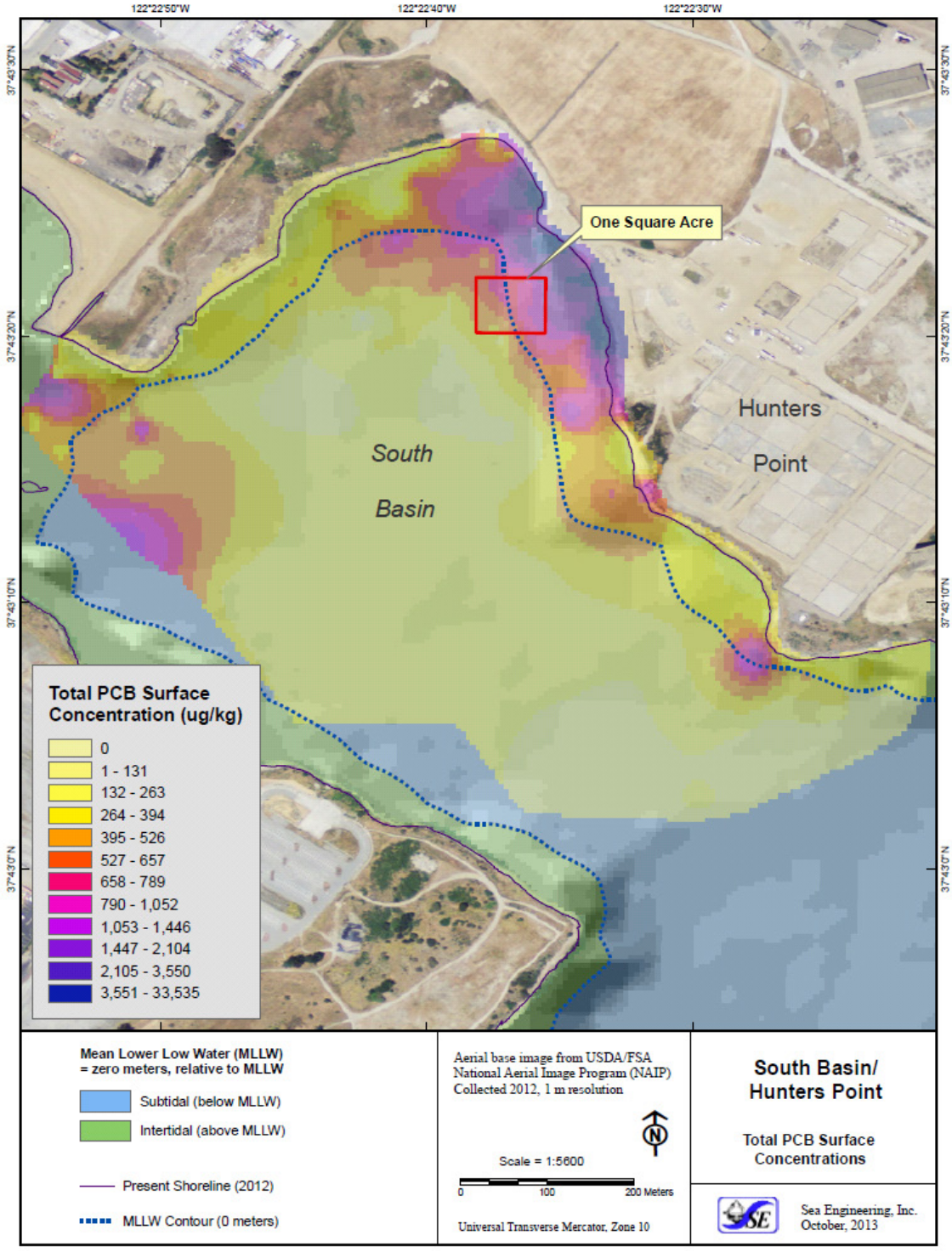
Figure 3. Proposed Location of One Acre Pilot Study Site



Note: The 1-acre Pilot Study site is located along the mean low low water contour in the South Basin of Parcel F, HPNS.

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Date: 4/9/2015 User: GeomorphIS Path: \\192.168.60.72\drawings_clients\Navy_CLEAN\CHINA_LAKE\CTO_067\MXD\SMP\059_0006.mxd

LEGEND

- HUNTERS POINT NAVAL SHIPYARD BOUNDARY
- SQUARE ACRE SITE
- POTENTIAL REFERENCE AREA, ONE OF THE TWO AREAS SHOWN WILL BE SELECTED BASED ON ACCESSIBILITY CONSIDERATIONS

CONCEPTUAL SAMPLE LOCATION

- SEDIMENT PROFILE IMAGERY (SPI) LOCATION
- SPI AND MULTIMETRIC SAMPLING LOCATION
- SPI, MULTIMETRIC, AND BENTHIC COMMUNITY ANALYSIS (BCA) LOCATION
- SPI AND BCA LOCATION

DEPTH IN METERS RELATIVE TO MLLW (BATHYMETRY DATA COLLECTED IN 2010)

- 1
- 0

SOURCE: ESRI ArcGIS Online Web Service, 2014

0 50 100 200
Feet

South Basin
Proposed Sampling Locations

Hunters Point Naval Shipyard, San Francisco, California

N

FIGURE
4

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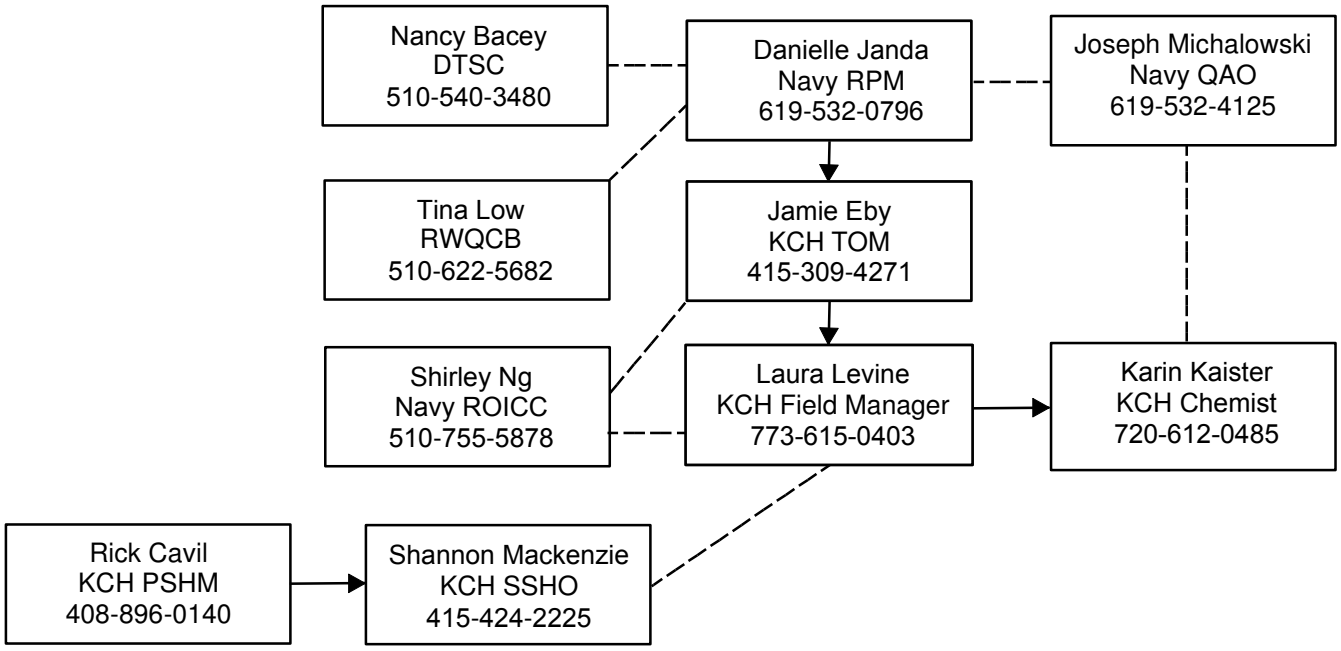

LEGEND

LINES OF AUTHORITY

LINES OF COMMUNICATION

NOTES:

DTSC - Department of Toxic Substances Control
KCH - CH2M HILL Kleinfelder, A Joint Venture
POC - Point of Contact
PQAO - Project Quality Assurance Officer
PSHM - Project Safety and Health Manager
QAM - Quality Assurance Manager
QAO - Quality Assurance Office
RPM - Remedial Project Manager
RWQCB - Regional Water Quality Control Board
SSHO - Site Safety and Health Officer
TBD - To be determined prior to submittal of Draft Final SAP
TOM - Task Order Manager

Project Organization Chart

Hunters Point Naval Shipyard San Francisco, California

FIGURE

5

Name: 064_1517

Date: 6/25/2013

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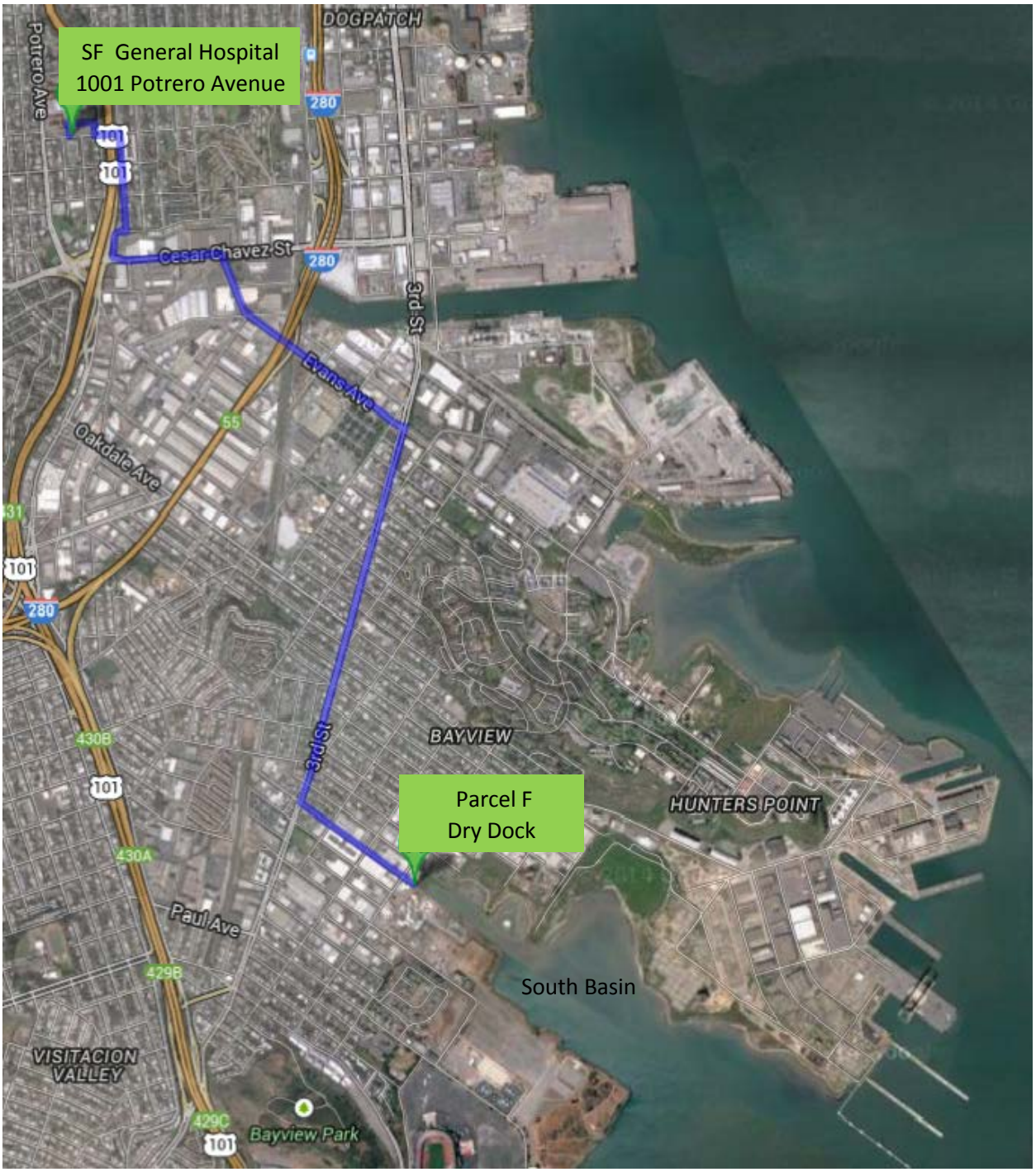

FIGURE **6**
Hospital Route Map – SSHP for Activated Carbon Amendments Pilot Study Monitoring at Parcel F
Hunters Point Naval Shipyard
San Francisco, California

Get on Bayshore Blvd from Ingalls St

1. Head northwest on Yosemite Ave toward Ingalls St

2. Turn left at the 1st cross street onto Ingalls St

3. Turn right onto Jamestown Ave

4. Turn left onto the US 101 S ramp towards San Jose

5. Keep right at the fork, follow signs for Third Street/Cow Palace Brisbane

6. Keep left at the fork, follow signs for US 101 N/Bayshore Boulevard N and merge onto Bayshore Blvd

Take US-101 N to Potrero Ave

6. Merge onto Bayshore Blvd

7. Merge onto US-1-1 N via the ramp on the left to Civic Center/Bay Bridge

8. Take the exit toward Cesar Chavez St/Potrero Ave

9. Merge onto Bayshore Blvd

10. Take the Cesar Chavez St W/Potrero Ave ramp on the left

11. Keep right at the fork, follow signs for Potrero Avenue

12. Continue onto Potrero Avenue

Destination will be on the right

Attachment 1
AHAs

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ACTIVITY HAZARD ANALYSIS 01 – GENERAL OVERSIGHT TASKS

Activity/Work Task: General Oversight Tasks	**Overall Risk Assessment Code (RAC) (Use highest code)**					**M**
Project Location: Hunters Point Naval Shipyard, San Francisco, California	**Risk Assessment Code (RAC) Matrix**					
Contract Number: N62473-09-D-2622	**Severity**	**Probability**				
Date Prepared: March 2015		**Frequent**	**Likely**	**Occasional**	**Seldom**	**Unlikely**
Prepared by: Laura Levine	**Catastrophic**	**E**	**E**	**H**	**H**	**M**
	Critical	**E**	**H**	**H**	**M**	**L**
Reviewed by: Rick Cavil, CSP 03/13/2015	**Marginal**	**H**	**M**	**M**	**L**	**L**
	Negligible	**M**	**L**	**L**	**L**	**L**
Notes: (Field Notes, Review Comments, etc.)	**Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above)**					
Description of the work: General Site Activities and Oversight of Subcontractors. AHA 02 addresses general oversight tasks performed around water.	**"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely**	**RAC Chart**				
	Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible	**E=**	**Extremely High Risk**			
		H=	**High Risk**			
	Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard on AHA. Annotate the overall highest RAC at the top of AHA.	**M=**	**Moderate Risk**			
		L=	**Low Risk**			

Job Steps	Hazards	Controls	RAC
1. General Activities.	Various injuries resulting from being improperly prepared for site conditions, such as twisted ankle, trips, heat or cold stress, struck by vehicles.	• Check the weather conditions each day. • Dress appropriately for the weather conditions. • Use the buddy system at all times. • Confirm that you have a working cell phone for an emergency. • Wear rain gear and/or cold weather gear as appropriate; make sure that the clothing breathes. • Wear Level D PPE (Safety-toed boots, hard hat, reflective vest, and safety glasses) as applicable. • When walking to work area, observe for vehicles or heavy equipment that are crossing your path of travel.	L

IAW EM 385 01.A.13 Contractor-REQUIRED AHA "Work will not begin until the AHA for the work activity has been accepted by the GDA." The AHA shall be reviewed and modified as necessary to address changing site conditions, operations, or competent/qualified persons.

Job Steps	Hazards	Controls	RAC
		• Inspect/survey area for overhead and ground hazards, such as steel deck plates and shallow cuts in grade. Mark all obstacles and hazards in area. • Ensure that vehicles are equipped with a current certified and useable Class ABC fire extinguisher. • Ensure that emergency telephone numbers and procedures for contacting the Fire Department are posted. • Do not park vehicles in or drive over dry vegetation. • Do not use cell phones while operating vehicles. • Fuels shall be stored in approved containers. • Smoking and discarding of any used smoking item shall be done in an approved area	
2. Assisting Surveyors, Samplers, and Other Personnel.	Unfamiliarity with the site	• Brief personnel on the site health and safety procedures with applicable AHAs. • Inform Navy RPM of work plans prior to each day. • Discuss site access rules. • Wear assigned PPE clothing and reflective vests at all times. • Review emergency contact information from SSHP (Attachment 4). • Inspect traffic safety in and around roadways. Review concerns with site staff, revise AHA processes and review with SHM. • Hold daily tailgate meetings. • For security of personnel and equipment, lock all vehicles, do not leave equipment unattended, and use the buddy system.	M

Job Steps	Hazards	Controls	RAC
	Slips, trips, and falls	• Wear foot gear as specified in SSHP. Observe walking surfaces for hazards. • Never approach steep slopes directly, approach at an angle and negotiate carefully. • Be cautious where you walk. Look out for rocks so you do not trip over them. Look for depressions, holes, and ruts and animal burrows. Mark or avoid as needed. • When walking down steep (stable) slopes, walk across the slope to the bottom (switch back as necessary); ensure that no heavy equipment is working above the area. • Wear reflective vest at all times. • Keep walkways, staging areas, and work areas free of clutter including sampling equipment and tools. Mark and remove identified hazards. • Carefully traverse wet and muddy grades.	M
	Biological hazards	• Inspect areas for signs of harmful insects, snakes, rodents, or other hazards. Do not access if these are visible. • Be aware of bees, wasps, and poisonous spiders known to inhibit area. • Wear leather gloves in brush or other areas that may have biological hazards such as black widow or brown recluse spiders, ticks, biting or stinging insects, snakes or rodents. If mosquitoes are noted, use of insect repellent with 10% DEET recommended. Use caution and observe areas before walking, sitting, placing hands and feet. • Keep medicine on site for workers with known allergic reactions to stings. Recommend over the counter type Benadryl as part of first aid kits. • Provide a first aid kit to treat insect bites. • Do not feed or otherwise encourage native species to be friendly or approach.	L

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Job Steps	Hazards	Controls	RAC
		• If scratched or bitten, immediately seek medical attention. • Review sections of SSHP applicable to biological hazards. Avoid reconnaissance of areas that cannot be accessed safely because of hidden hazards. If access is necessary, review increased PPE levels with SSC and SHM.	
	Manual lifting	• Be careful when carrying gear and soil samples. • Bend knees, keep back straight, do not twist torso, and have someone assist if lifting over 50 pounds. • Use caution when loading and unloading the pickup truck bed. Pull items to edge before lifting.	M

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ACTIVITY HAZARD ANALYSIS 01 – GENERAL OVERSIGHT TASKS

Equipment to be used	Training Requirements/Competent or Qualified Personnel Names(s)	Inspection Requirements
Vehicles PPE Emergency equipment, First Aid/CPR kits	• Current California Driver License • 40-hour HAZWOPER (29 CFR 1910.120[e]) • Current 8-hour HAZWOPER refresher • Current medical certifications (29 CFR 1910.120[f])	Vehicles to be inspected as operational by responsible individuals at the beginning of activities for each day. Employees must receive training on how to properly wear, maintain, and the limitations of the PPE being used. This is provided annually through the 8-hour refresher.

Acronyms/Abbreviations:

AHA – Activity Hazard Analysis
CFR – *Code of Federal Regulations*
CTO – Contract Task Order
HAZWOPER – Hazardous Waste Operations and Emergency Response
PPE – Personnel Protection Equipment
RAC – Risk Assessment Code
RPM – Remedial Project Manager
SHM – Program Safety & Health Manager
SSC – Site Safety Coordinator
SSHP – Site Safety and Health Plan

IAW EM 385 01.A.13 Contractor-REQUIRED AHA "Work will not begin until the AHA for the work activity has been accepted by the GDA."
The AHA shall be reviewed and modified as necessary to address changing site conditions, operations, or competent/qualified persons.

ACTIVITY HAZARD ANALYSIS 01 – GENERAL OVERSIGHT TASKS

	PRINT NAME	SIGNATURE	
Supervisor Name:			**Date/Time:**
SSC Name:			**Date/Time:**
Employee Name(s):			**Date/Time:**
			Date/Time:
			Date/Time:
			Date/Time:
			Date/Time:
			Date/Time:
			Date/Time:
			Date/Time:
			Date/Time:
			Date/Time:

IAW EM 385 01.A.13 Contractor-REQUIRED AHA "Work will not begin until the AHA for the work activity has been accepted by the GDA." The AHA shall be reviewed and modified as necessary to address changing site conditions, operations, or competent/qualified persons.

ACTIVITY HAZARD ANALYSIS 02 – WORKING IN AND ADJACENT TO WATER

Activity/Work Task: Water Tasks	**Overall Risk Assessment Code (RAC) (Use highest code)**					**M**
Project Location: Hunters Point Naval Shipyard, San Francisco, California	**Risk Assessment Code (RAC) Matrix**					
Contract Number: N62473-09-D-2622	**Severity**	**Probability**				
Date Prepared: March 2015		**Frequent**	**Likely**	**Occasional**	**Seldom**	**Unlikely**
Prepared by: Laura Levine	**Catastrophic**	**E**	**E**	**H**	**H**	**M**
	Critical	**E**	**H**	**H**	**M**	**L**
Reviewed by: Rick Cavil, CSP (03-13-15)	**Marginal**	**H**	**M**	**M**	**L**	**L**
	Negligible	**M**	**L**	**L**	**L**	**L**
Notes: (Field Notes, Review Comments, etc.)	**Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above)**					
Description of the work: Sediment surveying, sampling, and activated carbon amendment placement oversight will be performed in or near water. A Float Plan (provided by our subcontractor) will be filed with the SSC and TOM.	**"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely**	**RAC Chart**				
	Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible	**E=**	**Extremely High Risk**			
		H=	**High Risk**			
	Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard on AHA. Annotate the overall highest RAC at the top of AHA.	**M=**	**Moderate Risk**			
		L=	**Low Risk**			

Job Steps	Hazards	Controls	RAC
Sediment Surveying, Sampling, and Activated Carbon Placement Activities.	Drowning, cold stress	• If working in or adjacent to water where danger of drowning exists, wear the provided United States Coast Guard-approved PFDs. • Use the buddy system at all times. • Equip barge with required safety equipment (for example, fire extinguisher, first aid kit, signaling device, ring buoy with 90 feet of 3/8-inch solid-braid, polypropylene rope). • Inspect barge and safety equipment daily prior to use. • Keep buoy ring with 90-foot rope close to work area. • Keep signal device (air horn or whistle) close to work area.	M

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Job Steps	Hazards	Controls	RAC
		• Wear clothing in layers and remain dry; have spare dry clothing and blankets available should immersion in water occur.	
	Excessively hot temperatures (heat exhaustion, heat stroke, heat stress, sun exposure)	• Take frequent breaks in cooler areas. • Drink plenty of hydration replacing fluids. • Wear sunscreen, proper clothing, and sunglasses. • Review Heat Stress section of the SSHP.	M
	Sampling equipment or tools falling on or striking workers	• Hardhats and safety shoes or boots must be worn by all workers and visitors.	M
	Objects in eyes or striking hand when hammering cores or during core retrieval	• Wear safety glasses and leather gloves over nitrile gloves.	M
	Slips, trips, and falls	• Be cautious when crossing slick mud. Travel slowly, minimize equipment being carried. Rubber steel-toed boots are recommended.	M
	Hand injuries, pinch points	• When opening sample casing joints, position hands so that fingers will not be injured should the casing slip. • Keep tools clean and dry. • Wear leather gloves. • Review the AHA for sediment sampling activities.	M
	Exposure to potentially contaminated sediment	• Wear PPE as specified in the SSHP during any phase of work that requires contact with potentially contaminated sediment. • If contact with sediment occurs, personnel must perform decontamination processes.	M
	Strains and back injuries	• Two-person sampling teams will rotate duties to minimize repetitive physical stress. • Lift by using the legs, not the back, and do not twist during lift. Review online Manual Lifting training. • Limit coolers to 40 pounds for one person.	M

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Job Steps	Hazards	Controls	RAC
	Biological hazards (water work)	• Be aware of bees and wasps known to inhibit area. • Workers shall wear leather gloves in work areas that may have biological hazards such as biting or stinging insects. • Workers with known allergic reactions to stings shall have their medicine on site. • A first aid kit will be available to treat insect bites. • If scratched or bitten, immediately seek medical attention. • Review sections of SSHP applicable to biological hazards. Avoid reconnaissance of areas that cannot be accessed safely because of hidden hazards. If access is necessary, review increased PPE levels with SSC and SHM.	M

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Equipment to be used	Training Requirements/Competent or Qualified Personnel Names(s)	Inspection Requirements
Level D PPE: Hardhat, safety boots, sleeved shirt/pants, and safety glasses United States Coast Guard-approved PFD Health and safety expendables and marine vessels	• Current California Driver License. • Current California Commercial Driver License (if applicable). • 40-hour HAZWOPER (29 CFR 1910.120[e]). • Current 8-hour HAZWOPER refresher. • Current medical certifications (29 CFR 1910.120[f]).	Equipment to be inspected to be operational by responsible individuals at the beginning of activities for each day. Employees must receive training on how to properly wear, maintain, and the limitations of the PPE being used.

Acronyms/Abbreviations:

AHA – Activity Hazard Analysis
CFR – *Code of Federal Regulations*
CTO – Contract Task Order
HAZWOPER – Hazardous Waste Operations and Emergency Response
PFD – personal flotation device
PPE – Personal Protective Equipment
PPE – personal protective equipment
RAC – Risk Assessment Code
RPM – Remedial Project Manager
SHM – Program Safety & Health Manager
SSC – Site Safety Coordinator
SSHP – Site Safety and Health Plan
UST – Underground Storage Tank

IAW EM 385 01.A.13 Contractor-REQUIRED AHA "Work will not begin until the AHA for the work activity has been accepted by the GDA."
The AHA shall be reviewed and modified as necessary to address changing site conditions, operations, or competent/qualified persons.

ACTIVITY HAZARD ANALYSIS 02 – WORKING IN AND ADJACENT TO WATER

	PRINT NAME	SIGNATURE	
Supervisor Name:			**Date/Time:**
SSC Name:			**Date/Time:**
Employee Name(s):			**Date/Time:**
			Date/Time:
			Date/Time:
			Date/Time:
			Date/Time:
			Date/Time:
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			Date/Time:
			Date/Time:
			Date/Time:

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DIXON MARINE SERVICES, INC.

Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:		Overall Risk Assessment Code (RAC) (Use highest		H
Sediment sampling, work on water	SIGNATURES	Activity #	AHA #	3
NAME & DATE OF PREPARER	Mark Sutton			
NAME & DATE ACCEPTED BY GDA:				
PROJECT NAME/CONTRACT NUMBER: Navy CTO-059 HPNS	Marine Vessel Support 10137-7-100511			
TASK ORDER/DELIVERY #:				
PRIME CONTRACTOR:	KCH			
SUBCONTRACTOR:	DMS			
NAME AND DATE OF REVIEWER:	Djajiijo Bola 4/24/15,			
DATE OF INITIAL INSPECTION:				
CONTRACTOR COMPETENT PERSON:	Mark Sutton			
SITE SAFETY and HEALTH OFFICER	Shannon Mackenzie			

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligibl	M	L	L	L	L

ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)

E = EXTREMELY HIGH (PWO/OICC/ROICC)	
H = HIGH RISK (FEAD DIRECTOR)	
M = MODERATE RISK (CM or ET or PAR)	
L = LOW RISK (ET or PAR)	

Review each **"Hazard"** with identified safety **"Controls"** and determine (RAC)

Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place

"Probability" is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.

Job Steps	Hazards	Controls	RAC
Transit to Project site	Rough seas	Assess conditions at the dock and check weather condition on the bay Assess whether to stay tied to the dock or wait	H
	Fog	Assess conditions at the dock and check weather forecast assess whether to leave or wait for fog to lift based on weather forecast	M

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DIXON MARINE SERVICES, INC.

Activity Hazard Analysis (AHA)

Job Steps	Hazards	Controls	RAC
Loading equipment on boat	Overhead hazards, impact, dropping loads	Double Check Rigging Maintain eye contact with operator and use standard hand signals, hard hats, and steel-toed boots	M
Setting anchor	Pinch points for fingers	Wear protective gloves Keep hands free when deploying and use mechanical braking systems	M
	Line entanglement	Make sure feet are clear and line pays out from a uniform coil	M
Fleeting vessel on anchors	Line breaking	Stand clear as winches are paying in line. Stay out of the bite of the line	M
	Line entanglement	Housekeeping maintain clear organized deck	M
Deploying SPI equipment	Pinch Points /Crush Points	Do not get between legs of the "A" frame and equipment Maintain contact of the equipment Keep constant contact with operator while deploying	
	Slips or trips	Maintain a clear deck free of clutter	M
	Line entanglement	Maintain a clear and organized deck	M
Push core	Strain injury	Use mechanical lifting equipment to remove if stuck	M
	Fall over board	Maintain three points of contact	M
Grab Sediment Sampling	Pinch Points	Wear safety gloves	M
	Splashed with sediment	Eye Protection	M
1. Boat Operations a. Maneuvering Courses (serpentine, transition, obstacle avoidance)	1. Drowning	1. Wear personal flotation device (PFD). Know location and proper use of lifesaving devices (throw ring, throw bag, reach poles, cargo net, ladder).	M
	2. Falls Overboard	2. Wear PFD, know proper rescue procedures, and wear proper footwear to maintain balance and footing. Make sure kill switch is operational and attached to operator and instructor. Pay close attention to all boat operations during all maneuvers.	M

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DIXON MARINE SERVICES, INC.

Activity Hazard Analysis (AHA)

Job Steps	Hazards	Controls	RAC
	3. Fires/Explosions	3. Follow proper venting and starting procedures. Know proper fire suppression techniques.	L
	4. Sun/Heat	4. Wear proper clothing/ hat to limit skin exposure. Use appropriate sunscreens and drink plenty of water.	L
	5. Dehydration	5. Drink plenty of fluids	L
	6. Eye Fatigue	6. Wear proper eyewear and/or sunglasses	L
	7. Dust/Debris/Material in Eye	7. Wear proper eye protection	L
	8. Damaged/Sinking Vessel	8. Obey navigation rules and heed weather warnings. Get to safe harbor as soon as practical. Stay with the vessel until rescue. Wear personal flotation device PFD).	L
	9. Lacerations, Cuts & Abrasions to Skin	9. Inspect work area and equipment for hazardous conditions and correct before continuing work. Wear proper clothing and safety equipment (gloves, boots, hardhat). Know proper first aid treatment.	M
	10. Broken Bones, Fingers	10. Keep steering wheel and throttle as dry as possible. Be familiar with all controls.	L
2. Trailering/Launching Boats	1. Trailering Vessels	1. Drive defensively. Obey traffic laws. Perform and verify vehicle and trailer are properly connected. Verify trailer lights are operational. Do not eat, drink, smoke, use cell phones or perform others tasks that interfere with driving.	L
	2. Launching Vessels	2. Make sure boat ramp is clear of obstructions. Engage four-wheel drive when necessary. Set parking brake when trailer is lowered to proper launch depth. Lower driver's side window of the tow vehicle.	L

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DIXON MARINE SERVICES, INC.

Activity Hazard Analysis (AHA)

Job Steps	Hazards	Controls	RAC
		Use spotter if available. Make sure spotter does not stand behind vehicle on boat ramp. Be aware of wet and slippery boat ramp surface from water, algae, etc. Be aware of tension and pinch points on trailer winch when unhooking vessel.	
3. Vehicle Operations	1. Transportation	1. Drive defensively. Obey traffic laws. Perform vehicle inspections and preventative maintenance. Do not eat, drink, smoke, use cell phones or perform others tasks that interfere with driving.	L
	2. Vehicle Enters the Water	2. Stay calm, unfasten seat belt. Lower window to equalize water pressure and provide an escape route. If equipped, use automatic center punch to break window if necessary.	L
4. Using Auto-Inflatable PFD	1. General	1. Employees wearing the auto-inflatable PFD must have been trained in the use, maintenance, restrictions, care, storage, inspection, and post-deployment procedures per manufacturer's instructions.	M
	2. PFD worn improperly or improperly assembled	2. Employee shall follow manufacturer's instructions for wearing, assembling CO2 cartridge mechanism and pre-work inspection of PFDs.	L
	3. PFD damaged from storage	3. PFD must be inspected, maintained, stowed, and used in accordance with the manufacturer's instructions. PFD shall not be exposed to excessive moisture, crushing, or extreme heat while stored.	L
	4. Drowning	4. All auto-inflatable PFD users shall have basic ability to tread water and must be physically able to swim while wearing these PFDs. Persons with illnesses or injuries that temporarily or	M

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DIXON MARINE SERVICES, INC.

Activity Hazard Analysis (AHA)

Job Steps	Hazards	Controls	RAC
		permanently prevent them from being able to swim shall not use auto-inflatable PFDs for the duration of the illness or injury. All auto-inflatable PFDs must be worn at all times a drowning hazard exists.	
PPE	Injury, Illness, Exposure, Drowning	Personnel Flotation Device is "required" to be worn at all times while in a watercraft on the water. It should be of proper size and United States Coast Guard Approved. Communication equipment of some type, either a FS radio, Cell phone, SAT phone or Marine radio must be on the watercraft while in use. Warm clothing and rain gear is a good idea to carry along to help prevent hypothermia while on the water. If involved in Rx burns or wildfires an Approved Hard Hat must be wore as soon as you exit the watercraft. Use nonskid boots while traveling in the watercraft to prevent slips and falls. Make sure all fire tools are properly protected while on board the watercraft and are clear of passengers and the fuel supply. Balance of equipment and on the watercraft is extremely important to ensure a safe water experience.	M
Loading and Unloading and Fueling the Boat	Injury, Fire from fueling	Use non-skid surface, if available, while loading and unloading watercraft. Enter slowly and keep a good low center of gravity while entering the watercraft. Enter watercraft on operators command. No smoking is allowed while in watercraft if gas or any type of fuel in on board. No smoking while refueling the watercraft.	L

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DIXON MARINE SERVICES, INC.

Activity Hazard Analysis (AHA)

Job Steps	Hazards	Controls	RAC
Underway	Capsizing, Person overboard, Rough water, Collision, Fire	Be observant of other boat traffic and rocks while on the water. If needed, have a map of the lake or destination of trip onboard. All personnel must wear approved PFD while underway on the water at all times.	M
Tying up to shore, Dock Use	Damage to Boat or Motor, Lost Boat	Keep lines and anchors properly stowed. Inspect prior to use and make sure they are properly attached to the watercraft. Make sure the watercraft is securely anchored to shore	M
Emergency Procedures	Illness or Injury	Notify Superior Dispatch of an emergency via radio or cell phone (218.327.4175) or SAT phone. Treat the injury as qualified to do so. Be prepared to give the following Patient Assessment information to dispatch: Location in which injured party is: (Site name, etc.) Type of Injury Severity of Injury Plan of extraction Closest boat landing or portage The Incident Response Pocket Guide (Pink Pages) has more Health and Safety information that could be useful. Notify your Supervisor as soon as possible about the Incident and fill out the proper paper work.	M

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DIXON MARINE SERVICES, INC.

Activity Hazard Analysis (AHA)

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
R/V Walter Marie Aluminum work skiff	Authorized operator(s)	SSHO/QC Daily Site Inspections First Aid Kits All Heavy Equipment (Daily and before/after each use)

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Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	Passive sampler deployment	Overall Risk Assessment Code (RAC) (Use highest code)		**M**
CTO 059 HPS	SIGNATURES	Activity #	AHA #	**4**
PWD/OICC/ROICC OFFICE				
NAME & DATE ACCEPTED BY GDA:				
CONTRACT NUMBER:				
TASK ORDER/DELIVERY #:				
PRIME CONTRACTOR:	**KCH**			
SUBCONTRACTOR:	**Texas Tech**			
DATE OF PREPARATORY MEETING:				
NAME & DATE OF Reviewer:	Rick Cavil, CSP 04/20/2015			
CONTRACTOR COMPETENT PERSON:	Magdalena Rawkowska			
SITE SAFETY and HEALTH OFFICER	Shannon Mackenzie			

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)

E = EXTREMELY HIGH (PWO/OICC/ROICC)

H = HIGH RISK (FEAD DIRECTOR)

M = MODERATE RISK (CM or ET or PAR)

L = LOW RISK (ET or PAR)

Review each **"Hazard"** with identified safety **"Controls"** and determine (RAC)

Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place

"Probability" is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.

Job Steps	Hazards	Controls	RAC
1. Pre-deployment preparation: 1.1. Sampler preparation (SOP attached) and loading with performance reference compounds at Texas Tech laboratory.	1.1 Exposure to PCBs (Performance Reference Compounds inoculated in samplers) and organic solvents (hexane and acetonitrile).	1.1 Laboratory PPE (ANZI Z87 safety glasses or goggles for eye protection, nitrile gloves that are rated for these chemicals).	L
1.2. Travel to site	1.2 Commercial transportation and auto travel (rental car)	1.2 Avoiding distracted driving- situational awareness, no cell phone while operating vehicle	L
1.3. Assembling sampling devices	1.3 Mishandling hand tools	1.3 PPE (eye protection, nitrile gloves)	L

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Activity Hazard Analysis (AHA)

Job Steps	Hazards	Controls	RAC
2. Assistance on the boat and deployment (SOP attached) of sampling devices in designated locations at the test plot.	2. Injury, drowning on boat Exposure to PCBs from sediment through skin contact Injury from OH derrick, drowning, heat stress in sun	2. Situational awareness, personal flotation devices PPE (eye protection ANZI Z87, nitrile gloves) PFDs, sun protection via hats of shade shelter, follow APP Heat stress, hard hat when OH work is being done	M
3. Assistance on the boat and retrieval (SOP attached) of sampling devices in designated locations at the test plot.	3. Injury or drowning Exposure to PCBs through skin contact	3. Situational awareness, personal flotation devices PPE (eye protection, nitrile gloves)	M
4. Onsite PDMS sampler processing after retrieval and preservation in solvent	4. Exposure to PCBs through sediment and organic solvents (volume less than 1 mL of hexane in preloaded vials)	4. PPE (eye protection, nitrile gloves)	M

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The AHA shall be reviewed and modified as necessary to address changing site conditions, operations, or competent/qualified persons.

Activity Hazard Analysis (AHA)

Equipment to be Used	Training Requirements and Competent or Qualified Personnel Name(s)	Inspection Requirements	RAC
Field vehicle	Current HAZWOPER training (40-hour, plus 8-hour annual refresher): Dr. Danny Reible Songjing Yan (PhD student) Dr. Magdalena Rakowska FA/CPR trained TTU laboratory health and safety training	Vehicle shall be inspected for safe operation prior to use. Valid state driver's license	N/A
PPE		Inspect all PPE prior to use. Discard any gloves with holes.	
Emergency Equipment		Inspect all emergency equipment prior to use and storage in vehicle or on boat	

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Attachment 2
Navy Contractor Safety Incident Report (CSIR) Form

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☐ Initial Report

☐ Follow-up Report

☐ Final Report

Contractor Significant Incident Report (CSIR)

1. General Information

Contracting Activity/ROICC Office:

Accident Classification:

☐ Injury ☐ Fatality ☐ Environment ☐ Procedural Issues ☐ Lessons Learned

☐ Illness ☐ Property Damage ☐ Other_____

Involving:

☐ Confined Space ☐ Equip/Mrt Ver/Mat Handling (Heavy Construction Equip.) ☐ Hazardous Material

☐ Crane and Rigging ☐ Equip/Mrt Ver/Mat Handling (Material Handling)

☐ Trenching/Excavation

☐ Diving ☐ Equip/Mrt Ver/Mat Handling (Man-Lift/Elevated Platform)

☐ Waterfront/Marine Operations

☐ Demolition/Renovation ☐ Fall from Ladder ☐ Fall from Scaffold

☐ Other_____

☐ Electrical ☐ Fall from Roof ☐ Fire

2. Personal Information

Name (Last, First, MI):	**Age:**	**Sex:**

Job Title/Description:	**Employed By:**
Supervisor Name (Last, First, MI) & Title:	**Was the person trained to perform this activity/task?** ☐ **Yes** ☐ **No**
What type of training was received (OJT, classroom, etc)?	**Date of the most recent formal training and topics discussed?**

3. Witness Information

Witness #1: Name (Last, First, MI):	**Job Title/Description:**
Employed By:	**Supervisor Name (Last, First, MI):**
Witness #2: Name (Last, First, MI):	**Job Title/Description:**

Employed By:	Supervisor Name (Last, First, MI):
Additional Witnesses: ☐ Yes ☐ No ***(List any additional witnesses on a separate sheet and attach.)***	

4. Contract Information

Type of Contract:

☐ A/E ☐ BOS ☐ CLEAN ☐ Construction ☐ Design Build ☐ FSCC ☐ FSSC

☐ JOC ☐ RAC ☐ Service ☐ Other_____

Contract Number & Title:	Industrial Group & Industrial Type:
Prime Contractor Name/Address/Phone & Fax No: **Safety Manager (Last, First, MI):** **Insurance Carrier:**	**Sub Contractor Name/Address/Phone & FAX No:** **Safety Manager (Last, First, MI):** **Insurance Carrier:**

5. Accident Description

Date of Accident:	Time of Accident:	Exact Location of Accident:

Describe the accident in detail in your words: ***(Use the back of page if you need additional space)***

Direct Cause(s) of Accident:

Indirect Cause(s) of Accident:

Action(s) taken to prevent re-occurrence or provide on-going corrective actions:

Corrective Action Beginning Date:	**Anticipated Completion Date:**

Personal Protective Equipment:

☐ Available and used ☐ Available and not used ☐ Not Required

☐ Not related to Mishap ☐ Wrong PPE for job

List PPE Used:

Type of Construction Equipment (Make, Model, Serial #, VIN#) Involved:

Was Hazardous Material Spilled/Released? ☐ **Yes** ☐ **No**

Please List Hazardous Material(s) Involved:

Who provided first aid or cleanup of mishap site?

Any blood-borne pathogen exposure, other than EMTs? ☐ **Yes** ☐ **No**

Who?

List OSHA and EM-385-1-1 standards that were violated:

Was site secured and witness statements taken immediately? ☐ Yes ☐ No *By Whom?*

6. Injury Illness/Fatality Information

Severity of Injury/Illness:

☐ Fatality ☐ Lost Workday Case Involving Days Away From Work

☐ Temporary Disabillity ☐ Recordable Workday Case Involving Restricted Duty

☐ Permanent Total Disability ☐ Other Recordable Case ☐ Recordable First Aid Case

☐ Permanent Partial Disability ☐ Non-Recordable Case ☐ No Injury

Estimated Days Lost:	Estimated Days Hospitalized:	Estimated Days Restricted Duty:

List Primary Body Part Affected:	List Other Body Part(s) Affected:

Nature of Injury/Illness for Primary Body Part (Examples: Amputation, Burn, Hernia):

Type of Accident (Examples: Fall same level, Lifting, Bitten, Exerted):

Source of Accident (Examples: Crane, Carbon Monoxide, Ladder, Welding Equipment):

7. Causal Factors *(Explain answers on supplementary sheet)*

• **Design – Design of facility, workplace, or equipment was a factor?**	☐ Yes ☐ No
• **Inspection/Maintenance – Inspection & Maintenance procedures were a factor?**	☐ Yes ☐ No
• **Persons Physical Condition – In your opinion, the physical condition of the person was a factor?**	☐ Yes ☐ No
• **Operation Procedures – Operating procedures were a factor?**	☐ Yes ☐ No
• **Job Practices – One or more job safety/health practices not being followed when the accident occurred contributed to the accident?**	☐ Yes ☐ No
• **Human Factors – One or more human factors, such as a person's size or strength contributed to the accident?**	☐ Yes ☐ No
• **Environmental Factors – Heat, cold, dust, sun, glare, etc., contributed to the accident?**	☐ Yes ☐ No
• **Chemical and Physical Agent Factors – Exposure to chemical agents, such as dust, fumes, mist, vapors, or physical agents such as noise, radiation, etc., contributed to the accident?**	☐ Yes ☐ No
• **Office Factors – Office setting such as lifting office furniture, carrying, stooping, contributed to the accident?**	☐ Yes ☐ No
• **Support Factors – Inappropriate tools/resources were provided to perform the task?**	☐ Yes ☐ No

• **PPE – Improper selection, use or maintenance of PPE contributed to the accident?**	☐ **Yes** ☐ **No**
• **Drugs/Alcohol – In your opinion, were drugs or alcohol a factor?**	☐ **Yes** ☐ **No**
• **Job Hazard Analysis – The lack of an adequate (IAW-EM-385-1-1 Sec 01.A) activity hazard analysis was a contributing factor.**	☐ **Yes** ☐ **No**
• **Job Hazard Analysis – JHA was not site specific and/or did not address the type of work/operations performed when the mishap occurred.**	☐ **Yes** ☐ **No**
• **Management – A lack of adequate supervision contributed to the accident.**	☐ **Yes** ☐ **No**
• **Management – Inadequate information was provided at pre con meeting.**	☐ **Yes** ☐ **No**

8. OSHA Information

Date OSHA was Notified:	**Date(s) of Investigation:**	**Date of citation:** ***(Attach Copy)***	**Dollar amount of Penalties:**

9. Report Preparer

Name (Last, First, MI):	**Date of Report:**
Title: **Employer:** **Phone #:**	**Signature:**

CONTRACTOR SIGNIFICANT INCIDENT REPORT (CSIR) INSTRUCTIONS
Complete Sections Appropriate to Incident (Rev. 06/02).

NOTE: THE ATTACHED CSIR FORM IS TO BE USED BY CONTRACTORS TO RECORD THE RESULTS OF THEIR ACCIDENT/INCIDENTS INVESTIGATIONS AND SHALL BE PROVIDED TO THE CONTRACTING OFFICER WITHIN THE REQUIRED TIMEFRAMES.

GENERAL. Complete a separate report for each person who was injured in the accident. A report needs to be completed for all OSHA recordable accidents, property damage in excess of $2000.00 (This amount is for record purposes only. GOV is not required to enter property damage reports into FAIR database if it is less than $10,000.00.), WHE accidents, or near miss/high visibility mishaps. Please type or print legibly. Appropriate items shall be marked with an "X" in box(es), non-applicable sections shall be marked "N/A". If additional space is needed, provide the information on a separate sheet of paper and attach to the completed form.

Mark the report:
INITIAL – If this form is being used as initial notification of a Fatality or High Visibility Mishap. The initial form is due within 4 hours of a serious accident. A form marked 'Follow-up' or 'Final' is required within 5 days.
FOLLOW-UP – If you are providing additional information on a report previously submitted.
FINAL – If you are providing a completed report and expect no changes.

SECTION 1 – GENERAL INFORMATION

CONTRACTING ACTIVITY/ROICC OFFICE - Enter the name and address of the Contracting Office administering the contract under which the mishap took place (e.g. ROICC MCBH, ROICC NORFOLK, PWC GUAM, etc.).

ACCIDENT CLASSIFICATION - INJURY/ILLNESS/FATALITY/PROPERTY DAMAGE/-PROCEDURAL ISSUES/-ENVIRONMENTAL/LESSONS LEARNED/OTHER – Mark the appropriate block(s) if the incident resulted in any of these conditions.

INVOLVING - If the mishap involved any of the conditions listed under "Involving" mark the appropriate box(es). Specific questions associated with each of these conditions are available from the Contracting Officer to assist you in your investigation. When these questions are used they shall be attached as part of this report.

SECTION 2 - PERSONAL INFORMATION

NAME - Enter last name, first name, middle initial of person involved.
AGE - Enter age.
SEX - Enter M for Male and F for Female.
JOB TITLE/DESCRIPTION - Enter the job title/description assigned to the injured person (e.g. carpenter, laborer, surveyor, etc.).
EMPLOYED BY - Enter employment company name of the person involved.
SUPERVISOR'S NAME & TITLE - Enter name and title of the immediate supervisor.
WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK? - For the purpose of this section "trained" means the person has been provided the necessary information (either formal and/or on-the-job (OJT) training) to competently perform the activity/task in a safe and healthful manner.
TYPE OF TRAINING - Indicate the specific type of training (classroom or on-the-job) that the injured person received before the accident happened.
DATE OF MOST RECENT FORMAL TRAINING/TOPICS DISCUSSED - Enter the month, day, and year of the last *formal* training completed that covered the activity/task being performed at the time of the accident. List topics that were discussed at the training identified above.

SECTION 3 - WITNESS INFORMATION

The following applies to Witness #1 and Witness #2:
WITNESS NAME - Enter last name, first name, middle initial of the witness.
JOB DESCRIPTION/TITLE - Enter the job title/description assigned to the witness (e.g. carpenter, laborer, surveyor, etc.).
EMPLOYED BY - Enter the name of the employment company of the witness.
SUPERVISORS NAME - Enter name of immediate supervisor of the witness.
ADDITIONAL WITNESSES - Provide same information, as above, for each witnesses. Use additional pages if necessary.

SECTION 4 - CONTRACTOR INFORMATION

TYPE OF CONTRACT - Mark appropriate box. A/E means architect/engineer. If "OTHER" is marked, specify type of contract on line provided.
CONTRACT NUMBER/TITLE - Enter complete contract number and tile of prime contract (e.g. N62477-85-C-0100, 184 Pearl City Hsg. Revitalization).
CONSTRUCTION INDUSTRIAL GROUP AND INDUSTRIAL TYPE – This is the type of construction that will be done at this project.

1. First, you must choose the Industrial Group. You have 4 choices to choose from: (**NOTE**! Review of the Industrial Types below and knowing what the projects scope of work is will assist you in deciding what the Industrial Group should be.)
   a. Buildings
   b. Heavy Industrial
   c. Infrastructure
   d. Light Industrial

2. Once you have chosen the Industrial Group, you now select the Industrial Type. You have multiple choices under each Group, chose the one you feel fits the project most closely because on most projects there won't be an exact match:
   a. Buildings:
      (1) Communications Ctr.
      (2) Dormitory/Hotel
      (3) High-rise Office
      (4) Hospital
      (5) Housing
      (6) Laboratory
      (7) Low-rise Office
      (8) Maintenance Facility
      (9) Parking Garage
      (10) Physical Fitness Ctr.
      (11) Restaurant/Nightclub
      (12) School
      (13) Warehouse
   b. Heavy Industrial:
      (1) Chemical Mfg.
      (2) Electrical (Generating)
      (3) Environmental
      (4) Metals Refining/Processing
      (5) Mining
      (6) Natural Gas Processing
      (7) Oil Exploration/Production
      (8) Oil Refining
      (9) Pulp and Paper
   c. Infrastructure:
      (1) Airport
      (2) Electrical Distribution
      (3) Flood Control
      (4) Highway
      (5) Marine Facilities
      (6) Navigation
      (7) Rail
      (8) Tunneling
      (9) Water/Wastewater
   d. Light Industrial:
      (1) Automotive Assembly/Mfg.
      (2) Consumer Products Mfg.
      (3) Foods
      (4) Microelectronics Mfg.
      (5) Office Products Mfg.
      (6) Pharmaceuticals Mfg.

CONTRACTOR'S NAME/ADDRESS/PHONE NUMBER

(1) PRIME - Enter the exact name (title of firm), address, phone and fax numbers of the prime contractor.
(2) SUBCONTRACTOR - Enter the exact name, address, phone and fax numbers of any subcontractor involved in the accident.

SAFETY MANAGER'S NAME

(1) PRIME - Enter the name of the prime contractor safety manager.
(2) SUBCONTRACTOR - Enter the name of the subcontractors safety manager.

INSURANCE CARRIER

(1) PRIME - Enter the exact name/title of the prime's insurance company. Policy number not required.
(2) SUBCONTRACTOR - Enter the exact name of the subcontractor's insurance company. Policy number not required.

SECTION 5 - ACCIDENT DESCRIPTION

DATE OF ACCIDENT - Enter the month, day, and year of accident.
TIME OF ACCIDENT - Enter the local time of accident in military time. Example: 14:30 hrs (not 2:30 p.m.).
EXACT LOCATION OF ACCIDENT - Enter facts needed to locate the accident scene (installation/project name, building/room number, street, direction and distance from closest landmark, etc.).
DESCRIBE THE ACCIDENT IN DETAIL. Fully describe the accident in the space provided. If property damage involved, give estimated dollar amount of damage and/or repair costs involved. If additional space is needed continue on a separate sheet and attach to this report. Give the sequence of events that describe what happened leading up to and including the accident. Fully identify personnel and equipment involved and their role(s) in the accident. Ensure that relationships between personnel and equipment are clearly specified. Ensure questions below regarding direct cause(s), indirect cause(s), and actions taken are answered. **NOTE!** Review questions in Section 7 below before completing.
DIRECT CAUSE(S) - The direct cause is that single factor which most directly led to the accident. See examples below.
INDIRECT CAUSE(S) - Indirect cause are those factors, which contributed to, but did not directly initiate the occurrence of the accident.

Examples for Direct and Indirect Cause:
1. Employee was dismantling scaffold and fell 12 feet from unguarded opening.
Direct cause: Failure to provide fall protection at elevation
Indirect causes: Failure to enforce safety requirements: improper training/motivation of employee (possibility that employee was not knowledgeable of fall protection requirements or was lax in his attitude toward safety); failure to ensure provision of positive fall protection whenever elevated; failure to address fall protection during scaffold dismantling in phase hazard analysis.

2. Private citizen had stopped his vehicle at intersection for red light when vehicle was struck in rear by contractor vehicle. (note contractor vehicles was in proper safe working condition.)
Direct cause: Failure of contractor driver to maintain control of and stop contractor vehicle within safe distance.
Indirect cause: Failure of employee to pay attention to driving (defensive driving).

ACTION(S) TAKEN TO PREVENT RE-OCCURRENCE OR PROVIDE ON-GOING CORRECTIVE ACTIONS. Fully describe all the actions taken, anticipated, and recommended to eliminate the cause(s) and prevent reoccurrence of similar accidents/illnesses. Continue on back or additional sheets of paper if necessary to fully explain and attach to the complete report form.
CORRECTIVE ACTION DATES -
(1) Beginning - Enter the date when the corrective action(s) identified above will begin.
(2) Anticipated Completion - Enter the date when the corrective action(s) identified above will be completed.
PERSONAL PROTECTIVE EQUIPMENT (PPE) - Mark appropriate box(es) and list PPE which was being used by the injured person at the time of the accident (e.g. protective clothing, shoes, glasses, goggles, respirator, safety belt, harness, etc.)
TYPE OF CONTRACTOR EQUIPMENT - Enter the Serial Number, Model Number and specific type of equipment involved in the mishap (e.g. dump truck (off highway), crane (rubber tire), pump truck (concrete), etc.).
WAS HAZARDOUS MATERIAL SPILLED/RELEASED? - Mark appropriate block and list name(s) of any reportable quantities of hazardous materials spilled/released during the mishap.
WHO PROVIDED FIRST AID OR CLEAN-UP OF MISHAP SITE? - List name(s) of individual(s) and employer, if known.
ANY BLOOD-BORNE PATHOGEN EXPOSURE, OTHER THAN EMT? - Mark appropriate block and list name(s) of individual(s) and employer, if known.
LIST OSHA AND/OR EM 385-1-1 STANDARDS THAT WERE VIOLATED. - Self explanatory.
WAS SITE SECURED AND WITNESS STATEMENT TAKEN IMMEDIATELY? - Mark appropriate block and list by whom.

SECTION 6 - INJURY/ILLNESS/FATALITY INFORMATION

SEVERITY OF INJURY/ILLNESS – Mark appropriate box.
ESTIMATED DAYS LOST - Enter the estimated number of workdays the person will lose from work. Update when final data is known.
ESTIMATED DAYS HOSPITALIZED - Enter the estimated number of workdays the person will be hospitalized. Update when final data is known.
ESTIMATED DAYS RESTRICTED DUTY - Enter the estimated number of workdays the person, as a result of the accident, will not be able to perform all of their regular duties. Update when final data is known.
BODY PART(S) AFFECTED - Enter the most appropriate primary and when applicable, secondary, etc. body part(s) affected (e.g. arm: wrist: abdomen: single eye; jaw : both elbows: second finger: great toe: collar bone: kidney, etc.).
NATURE OF INJURY/ILLNESS FOR PRIMARY BODY PART - Enter the most appropriate nature of injury/illness (e.g. amputation, back strain, dislocation, laceration, strain, asbestosis, food poisoning, heart conditions, etc.).
TYPE AND SOURCE OF INJURY/ILLNESS - Type and Source Codes are used to describe what caused the incident.
(1) TYPE Code stands for an "Action" (Example: Worker, installing conduit, lost his balance and fell five feet from a ladder. Type Code: Fell different levels".) Select the most appropriate Type of injury from the list below:

TYPE OF INJURY/ILLNESS

STRUCK BY/AGAINST	CONTACTED CONTACTED WITH (INJURED PERSON MOVING) CONTACTED BY (OBJECT WAS MOVING)
FELL, SLIPPED, TRIPPED SAME LEVEL/DIFFERENT LEVEL/NO FALL	EXERTED LIFTED, STRAINED BY (SINGLE ACTION) STRESSED BY (REPEATED ACTION)
CAUGHT ON/IN/BETWEEN	EXPOSED INHALED/INGESTED/ABSORBED/EXPOSED TO
PUNCTURED, LACERATED PUNCTURED BY/CUT BY/STUNG BY/BITTEN BY	TRAVELING IN

(2) SOURCE Code stands for an "object or substance." (Example: Worker, installing conduit, lost his balance and fell five feet from a ladder. Source Code: "Ladder".) Select the most appropriate Source of injury from the list below:

SOURCE OF INJURY/ILLNESS

BUILDING OR WORKING AREA WALKING/WORKING AREA STAIRS/STEPS LADDER FURNITURE BOILER/PRESSURE VESSEL EQUIPMENT LAYOUT WINDOWS/DOORS ELECTRICITY	DUST, VAPOR, ETC. DUST (SILICA, COAT, ETC.) FIBERS ASBESTOS GASES CARBON MONOXIDE MIST, STEAM, VAPOR, FUME WELDING FUMES PARTICLES (UNIDENTIFIED)
ENVIRONMENT CONDITION TEMPERATURE EXTREME (INDOOR) WEATHER (ICE, RAIN, HEAT, ETC.) **FIRE, FLAME, SMOTE (NOT TOBACCO)** NOISE RADIATION LIGHT VENTILATION TOBACCO SMOKE STRESS (EMOTIONAL) CONFINED SPACE	CHEMICAL, PLASTIC, ETC. DRY CHEMICAL - CORROSIVE DRY CHEMICAL - TOXIC DRY CHEMICAL - EXPLOSIVE DRY CHEMICAL - FLAMMABLE LIQUID CHEMICAL - CORROSIVE LIQUID CHEMICAL - TOXIC LIQUID CHEMICAL - EXPLOSIVE LIQUID CHEMICAL - FLAMMABLE PLASTIC WATER MEDICINE
MACHINE OR TOOL HAND TOOL (POWERED: SAW, GRINDER, ETC.) HAND TOOL (NON POWERED) MECHANICAL POWER TRANSMISSION APPARATUS GUARD, SHIELD (FIXED, MOVEABLE, INTERLOCK) VIDEO DISPLAY TERMINAL PUMP, COMPRESSOR, AIR PRESSURE TOOL HEATING EQUIPMENT WELDING EQUIPMENT	INANIMATE OBJECT BOX, BARREL, ETC. PAPER METAL ITEM, MINERAL NEEDLE GLASS SCRAP, TRASH, WOOD FOOD CLOTHING, APPAREL, SHOES
MACHINE OR TOOL HAND TOOL (POWERED: SAW, GRINDER, ETC.) HAND TOOL (NON POWERED) MECHANICAL POWER TRANSMISSION APPARATUS GUARD, SHIELD (FIXED, MOVEABLE, INTERLOCK) VIDEO DISPLAY TERMINAL PUMP, COMPRESSOR, AIR PRESSURE TOOL HEATING EQUIPMENT WELDING EQUIPMENT	INANIMATE OBJECT BOX, BARREL, ETC. PAPER METAL ITEM, MINERAL NEEDLE GLASS SCRAP, TRASH, WOOD FOOD CLOTHING, APPAREL, SHOES
VEHICLE AS DRIVER OF PRIVATELY OWNED, RENTAL VEH. AS PASSENGER OF PRIVATELY OWNED, RENTAL VEH. DRIVER OF GOVERNMENT VEHICLE PASSENGER OF GOVERNMENT VEHICLE COMMON CARRIER (AIRLINE, BUS, ETC.) AIRCRAFT (NOT COMMERCIAL) BOAT, SHIP, BARGE	ANIMATE OBJECT DOG OTHER ANIMAL PLANT INSECT HUMAN (VIOLENCE) HUMAN (COMMUNICABLE DISEASE) BACTERIA, VIRUS (NOT HUMAN CONTACT)
MATERIAL HANDLING EQUIPMENT EARTHMOVER (TRACTOR, BACKHOE, ETC.) CONVEYOR (FOR MATERIAL AND EQUIPMENT) ELEVATOR, ESCALATOR, PERSONNEL HOIST HOIST, SLING CHAIN, JACK CRANE FORKLIFT HANDTRUCK , DOLLY	PERSONAL PROTECTIVE EQUIPMENT PROTECTIVE CLOTHING, SHOES, GLASSES, GOGGLES RESPIRATOR, MASK DIVING EQUIPMENT SAFETY BELT, HARNESS PARACHUTE

SECTION 7 - CAUSAL FACTORS

Review thoroughly. Answer each question by marking the appropriate block. **NOTE!** If any answer is yes, explain in section 5 above.

(1) **DESIGN** - Did inadequacies associated with the building or work site play a role? Would an improved design or layout of the equipment or facilities reduce the likelihood of similar accidents? Were the tools or other equipment designed and intended for the task at hand?
(2) **INSPECTION/MAINTENANCE** - Did inadequately or improperly maintained equipment, tools, workplace, etc., create or worsen any hazards that contributed to the accident? Would better equipment, facility, work site or work activity inspections have helped avoid the accident?
(3) **PERSONS PHYSICAL CONDITION** - Do you feel that the accident would probably not have occurred if the employee was in "good" physical condition? If the person involved in the accident had been in better physical condition, would the accident have been less severe or avoided altogether? Was overexertion a factor?

(4) **OPERATION PROCEDURES** - Did lack of or inadequacy within established operating procedures contribute to the accident? Did any aspect of the procedures introduce any hazard to, or increase the risk associated with the work process? Would establishment or improvement of operating procedures reduce the likelihood of similar accidents?
(5) **JOB PRACTICES** - Were any of the provision of the Safety and Health Requirements Manual (EM 385-1-1) violated? Was the task being accomplished in a manner which was not in compliance with an established job hazard analysis or activity hazard analysis? Did any established job practice (including EM 385-1-1) fail to adequately address the task or work process? Would better job practices improve the safety of the task?
(6) **HUMAN FACTORS** - Was the person under undue stress (either internal or external to the job)? Did the task tend toward overloading the capabilities of the person: i.e., did the job require tracking and reacting to many external inputs such as displays, alarms, or signals? Did the arrangement of the workplace tend to interfere with efficient task performance? Did the task require reach strengths, endurance, agility, etc., at or beyond the capabilities of the employee? Was the work environment ill-adapted to the person? Did the person need more training, experience, or practice in doing the task? Was the person inadequately rested to perform safely?
(7) **ENVIRONMENTAL FACTORS** - Did any factors such as moisture, humidity, rain, snow, sleet, hail, ice, fog, cold, heat, sun temperature changes, wind, tides, floods, currents, terrain; dust, mud, glare, pressure changes, lighting, etc., play a part in the accident?
(8) **CHEMICAL AND PHYSICAL AGENT FACTORS** - Did exposure to chemical agents (either single shift exposure or long-term exposure such as dusts, fibers, (asbestos, etc.), silica, gases (carbon, monoxide, chlorine, etc.), mists, steam, vapors, fumes, smoke, other particulates, liquid or dry chemicals that are corrosive, toxic, explosive or flammable, by-products of combustion or physical agents such as noise, ionizing radiation, non-ionizing radiation (UV radiation created during welding, etc.) contribute to the accident/incident?
(9) **OFFICE FACTORS** - Did the fact that the accident occurred in an office setting or to an office worker have a bearing on its cause? For example, office workers tend to have less experience and training in performing tasks such as lifting office furniture. Did physical hazards within the office environment contribute to the hazard?
(10) **SUPPORT FACTORS** - Was the person using an improper tool for the job? Was inadequate time available or utilized to safely accomplish the task? Were less than adequate personnel resources (in terms of employee skills, number of workers, and adequate supervision) available to get the job done properly? Was funding available, utilized and adequate to provide proper tools, equipment, personnel, site preparation, etc.
(11) **PERSONAL PROTECTIVE EQUIPMENT** - Did the person fail to use appropriate personal protective equipment (gloves, eye protection, hard-toed shoes, respirator, etc) for the task or environment? Did protective equipment provided or worn fail to provide adequate protection from the hazard(s)? Did lack of or inadequate maintenance of protective gear contribute to the accident?
(12) **DRUGS/ALCOHOL** - Is there any reason to believe the person's mental or physical capabilities, judgment, etc., were impaired or altered by the use of drugs or alcohol? Consider the effects of prescription medicine and over the counter medications as well as illicit drug use. Consider the effect of drug or alcohol induced "hangovers".
(13) **JOB/ACTIVITY HAZARD ANALYSIS** - Was a written Job/Activity Analysis completed for the task being performed at the time of the accident? If one was made, did it address the hazard adequately or does it need to be updated? If none made, will one be made? These may also need to be addressed in the Corrective Actions Taken section. Mark the appropriate box. If one was made, attach a copy of the analysis to the report.
(14) **MANAGEMENT** - Did the lack of supervisor or management support play a part in the mishap? Mark the appropriate box.

SECTION - 8 OSHA INFORMATION - Complete this section if applicable

SECTION 9 - REPORT PREPARER

Providing a completed CSIR to the Contracting Officer is the PRIME CONTRACTOR'S RESPONSIBILITY. Enter the name, date of report, title, employer, phone number and signature of person completing the accident report and provide it to the Contracting Officer, or his representative, responsible for oversight of that contractor activity. **NOTE!** If prepared by other than the Prime Contractor, a person employed by the Prime Contractor must sign that they have reviewed and concur with the report and it's findings (e.g. company owner, project supervisor/foreman, Safety Officer, etc.).

Attachment 3
Float Plans

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DIXON MARINE SERVICES INC.
OCEANOGRAPHIC AND WETLAND RESTORATION
www.dixonmarineservices.com

Float Plan

Before going boating, complete this page and leave it with a reliable person who can be depended upon to notify the Coast Guard or other rescue organization, should you not return as scheduled. **Do not** file this plan with the Coast Guard.

Name of person reporting and telephone number:	Name: Chris Auer		Phone: 415.697.9131
Description of boat:	Type: Research Vessel		Color: grey
	Registration No.: CF 1543 SF		Length: 34’
	Name: R/V Walter Marie		Make: Welded Aluminum
	Other information: Work Boat with an 18’ A-Frame & Open Deck with House		
Description of engine:	Type: Yamaha Outboard		H.P.: 225
	No. of engines: 2		Fuel capacity: 125 Gallons
Survival equipment (check as appropriate:	☒ PFDs	☒ Flares	☐ Mirror
	☐ Smoke Signals	☒ Flashlight	☒ Food
	☒ Paddles	☒ Water	☐ Others
	☒ Anchor	☐ Raft or Dinghy	☐ EPIRB
Radio:	☒ Yes ☐ No	Type: (2) Icom 504	Frequency: VHF 12/78
Automobile:	License: N/A		Make/Model: N/A
	Color: N/A		Trailer License: N/A
	Where parked: 320 West Cutting Blvd Richmond, CA 94804		
Persons aboard:	**Name**	**Age**	**Address / Phone**
	Jeff Haran	38	415.819.5842
	Chris Auer	29	415.697.9131
	Kalloch Fox	33	415.717.5830
	Do any of these persons have a medical problem? ☐ Yes ☒ No		
	If yes, describe:		
Trip expectations:	Departure time / location:		11:00 / 320 Cutting Blvd 94804
	Going to:		Dry Dock in Hunters Point
	Expected return time:		12:30
	Return no later than:		13:30
	If not returned by latest time listed, call the COAST GUARD, or (local authority):		
	Coast Guard #: 503-240-9365		Local Authority #: 911

Other pertinent information:	• (3) Tri-Class Fire Extinguisher located: House, Engine Compartment, & Deck • A 20' Work Skiff with 115HP Yamaha Motor with VHF Radio will be on standby • "Buddy System" means no personnel with work alone but that everyone will work as a team for work on/over water. • Training qualification of the motorboat operator, Chris Auer, is license captain 100 ton unlimited. • The maximum weight capacity of the vessel and barge is 15,000 lbs. • The specific fall protection requirements: climbing harness on board and the "A" frame will be laid down if service is needed. • PFDs: Type 3 Industrial Work Vest • Applicable Specific Coast Guard Safety Requirements are CFR46. Chapter 1 Subchapter Q Part 160 sections .001 .040 .041 .053 .054	
Telephone Numbers:	DMS OFFICE: 415.669.7369	
	Mark Sutton: 415.760.7227	

DIXON MARINE SERVICES INC.
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Float Plan

Before going boating, complete this page and leave it with a reliable person who can be depended upon to notify the Coast Guard or other rescue organization, should you not return as scheduled. **Do not** file this plan with the Coast Guard.

Name of person reporting and telephone number:	Name: Chris Auer		Phone: 415.697.9131
Description of boat:	Type: Research Vessel		Color: grey
	Registration No.: CF 1543 SF		Length: 34’
	Name: R/V Walter Marie		Make: Welded Aluminum
	Other information: Work Boat with an 18’ A-Frame & Open Deck with House		
Description of engine:	Type: Yamaha Outboard		H.P.: 225
	No. of engines: 2		Fuel capacity: 125 Gallons
Survival equipment (check as appropriate:	☒ PFDs	☒ Flares	☐ Mirror
	☐ Smoke Signals	☒ Flashlight	☒ Food
	☒ Paddles	☒ Water	☐ Others
	☒ Anchor	☐ Raft or Dinghy	☐ EPIRB
Radio:	☒ Yes ☐ No	Type: (2) Icom 504	Frequency: VHF 12/78
Automobile:	License: N/A		Make/Model: N/A
	Color: N/A		Trailer License: N/A
	Where parked: 320 West Cutting Blvd Richmond, CA 94804		
Persons aboard:	**Name**	**Age**	**Address / Phone**
	Jeff Haran	38	415.819.5842
	Chris Auer	29	415.697.9131
	Kalloch Fox	33	415.717.5830
	Do any of these persons have a medical problem? ☐ Yes ☒ No		
	If yes, describe:		
Trip expectations:	Departure time / location:		13:30 / Dry Dock in Hunters Point
	Going to:		Parcel F South Basin
	Expected return time:		17:00
	Return no later than:		19:30
	If not returned by latest time listed, call the COAST GUARD, or (local authority):		
	Coast Guard #: 503-240-9365		Local Authority #: 911

Other pertinent information:	• (3) Tri-Class Fire Extinguisher located: House, Engine Compartment, & Deck • A 20' Work Skiff with 115HP Yamaha Motor with VHF Radio will be on standby • "Buddy System" means no personnel with work alone but that everyone will work as a team for work on/over water. • Training qualification of the motorboat operator, Chris Auer, is license captain 100 ton unlimited. • The maximum weight capacity of the vessel and barge is 15,000 lbs • The specific fall protection requirements: climbing harness on board and the "A" frame will be laid down if service is needed. • PFDs: Type 3 Industrial Work Vest • Applicable Specific Coast Guard Safety Requirements are CFR46. Chapter 1 Subchapter Q Part 160 sections .001 .040 .041 .053 .054	
Telephone Numbers:	DMS OFFICE: 415.669.7369	
	Mark Sutton: 415.760.7227	

Attachment 4
Deficiency Tracking Log

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Project Deficiency Tracking Log

Date identified	Description of deficiency	Person responsible for correction	Projected resolution date	Date actually resolved

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Attachment 5
Radiological Work Instructions

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Radiological Work Instruction for the | CH2M Hill Parcel F Pilot Study

CH2M Hill personnel will be performing a Pilot Study within Parcel F at Hunters Point Naval Shipyard in San Francisco, California.

This effort will involve the operation of watercraft along the Parcel F shoreline in order to collect samples, deploy monitoring equipment, and place a carbon amendment on the bay floor. The work is described in detail in Attachment 1, *Summary of Construction and Sampling Techniques for the Demonstration of Activated Carbon Amendments at Hunters Point Naval Shipyard, San Francisco, California.*

All Parcel F underwater areas are designated as radiologically-impacted and it is possible that the sediment may contain concentrations of radionuclides that are elevated in comparison to undisturbed background locations at the former Hunters Point Navy Station (HPNS). Therefore, the following information applies to Parcel F as identified in the Historical Radiological Assessment, Volume II (NAVSEA 2004). Radionuclides of concern which could be encountered at concentrations exceeding background during this work include radium-226, cesium-137, uranium-235, plutonium-239, and strontium-90. As a result, basic radiation survey protocols will be implemented during planned work activities bringing equipment and/or personnel in contact with potentially contaminated sediment within Parcel F. Activities to be performed by CH2M Hill personnel inside the radiologically-impacted areas include:

- Sediment and filter feeder sample collection
- Deployment and retrieval of hydrodynamic monitoring equipment near the test pilot area
- Carbon amendment placement
- Post application monitoring immediately following the initial placement of activated carbon and 6-, 12-, and 18 months post-placement

Using governing criteria as defined in Nuclear Regulatory Commission radioactive material license # 29-31396-01, California radioactive material license #7909-01, and RWP 2015-001 or equivalent, Tetra Tech EC, Inc. (TtEC) will provide basic radiation protection protocols when CH2M Hill requires access to radiologically-impacted areas referenced above by:

- Providing a radiation safety brief to field staff assigned to the project
- Providing project field staff with dosimetry
- Performing incoming equipment and material surveys.
- Providing surveillance during activities in which personnel come in contact with potentially contaminated sediment, including the retrieval of potentially contaminated equipment
- Performing radiological surveys of dry equipment and materials prior to decontamination of equipment and materials.
- Performing radiological surveys on dry sampling containers prior to being shipped for non-radiological characterization.
- Performing radiological release surveys on dry equipment and material, including temporary probe materials used for sampling purposes that are leaving the Parcel F radiological control area (RCA)

The survey activities performed under this work instruction will be conducted in accordance with the general approach and methodologies that are outlined in the Basewide Radiological Management Plan (DCN: EMAC-8823-0003-0104) and associated Standard Operating Procedures (SOPs). The survey activities will comply with the requirements of the Accident Prevention Plan/Site Safety and Health Plan (DCN: ECSD-4808-0003-0004). If elevated levels of radioactivity are identified during the performance of the work, temporary suspension of activities in the affected area will be required followed by immediate notification of the site Radiation Safety Officer Representative (RSOR). No site-specific air monitoring is required as the material and equipment being handled will not result in airborne concentrations exceeding 10 percent of the limits established in Table 1, column 3 of Appendix B of 10 CFR §§20.1001 – 20.2401.

Incoming equipment and materials will be surveyed for radioactivity prior to being placed into service within the jobsite. All alpha, beta, and gamma surveys will be conducted in accordance with SOP-001, Radiation and Contamination Surveys. The radiological surveys will be performed using a Ludlum Model 2350-1 data logger and 44-10 2" by 2" NaI detector, as well as a Ludlum Model 2360 Model data logger and a 43-68/43-89/43-93 detector, or equivalent or superior radiation instrument system.

A radiological control technician (RCT) will be present whenever potentially contaminated equipment or materials will be brought on board a vessel. The RCT will conduct radiological surveys as needed on the surfaces of any equipment or clothing which have come in contact with potentially contaminated sediment. Anchors, spuds, or other gear that contacted the sediment will require an M&E free release survey prior to the vessel leaving Parcel F. If the radiation surface concentrations exceeds the limiting Table 1 surface levels, work will be suspended temporarily and the RSOR will be notified immediately. The RSOR, in conjunction with the TtEC Radiation Safety Officer (RSO) and the Radiological Affairs Support Office (RASO) representative, will make a determination as to whether to resume work, and if implementation of additional radiological controls is warranted.

TABLE 1
RELEASE CRITERIA

Radionuclide	Radiation	Half-life (years)	Surfaces[a] (dpm/100 cm^2)		Water	Soil (pCi/g)
			Loose	Total	(pCi/L)	
Cesium-137	Beta, gamma	30.1	1,000	5,000	119	0.113[b]
Plutonium-239	Alpha, gamma	24,100	20	100	15	2.59
Radium-226	Alpha, gamma	1,599	20	100	5	1.0[c]
Strontium-90	Beta	28.78	200	1,000	8	0.331[d]
Uranium-235	Alpha, gamma	7E8	1,000	5,000	30 µg/L[e]	0.195

Notes:

[a] These limits are based on AEC *Regulatory Guide 1.86*. Limits for removable surface activity are 20 percent of these values.

[b] Limit adopted from the *Final Basewide Radiological Removal Action Memorandum – Revision 2006*.

[c] Limit is 1 picocurie per gram (pCi/g) above background per agreement with U.S. Environmental Protection Agency.

[d] State of California residential value for non-radiological landfill disposal.

[e] Limit based on EPA drinking water standards.

TETRA TECH EC, INC.

HUNTERS POINT NAVAL SHIPYARD PROJECT

Standard Operating Procedure

RADIATION AND CONTAMINATION SURVEYS

HPO-Tt-006

Revision 2

Approved By:

Erik J. Abkemeier

Erik Abkemeier, Radiation Safety Officer — 09/05/13 Date

Bill Dougherty

Bill Dougherty, Project Manager — 09/05/13 Date

Controlled Copy # 007
Issued To: Jeff Ambrose
Date: 9.9.13

REVISION HISTORY

Revision (Date)	*Rev. No*	*Prepared By*	*Description of Changes*	*Affected Pages*
April 19, 2005	0	Daryl DeLong	Issue Final	All
October 26, 2012	1	Erik Abkemeier	Project Review	All
September 5, 2013	2	Erik Abkemeier	Project Review	All

TABLE OF CONTENTS

1.0 PURPOSE

The purpose of this procedure is to specify methods and requirements for radiological surveys and documentation of acquired data.

Adherence to this procedure will provide reasonable assurance that the surveys performed have reproducible results. This guidance for control of radiation exposures provided in this procedure is in accordance with the as low as reasonably achievable (ALARA) philosophy.

This procedure will be used by Tetra Tech EC, Inc. (TtEC) personnel and its subcontractors to perform radiation and contamination surveys at Hunters Point Naval Shipyard (HPNS).

2.0 SCOPE

This procedure shall be implemented by TtEC staff and subcontractor personnel when conducting radiation or contamination surveys.

Subcontractors may use their procedures for conditions or activities not covered by this procedure following approval by TtEC and the Radiological Affairs Support Office (RASO).

3.0 MAINTENANCE

The Radiation Safety Officer (RSO) is designated the procedure owner and is responsible for updating this procedure. Approval authority rests with the Project Manager.

4.0 RESPONSIBILITIES

Radiation Safety Officer - The RSO is responsible for the overall implementation and compliance with this procedure during all project operations. The RSO shall conduct periodic reviews, via personal observation of personnel conducting radiation and contamination surveys, to ensure adherence to the requirements of this procedure.

The RSO is responsible for the training of personnel working with radioactive materials. The RSO shall ensure that personnel are adhering to the requirements of this procedure. The RSO shall review and approve documentation generated by this procedure as well as the results of all surveys.

Radiation Safety Officer Representative (RSOR) - The Radiation Safety Officer Representative (RSOR) is responsible for ensuring that personnel performing the tasks

required by this procedure are properly assigned. The RSOR is responsible for ensuring that personnel conducting radiation and contamination surveys are familiar with the requirements of this SOP and have access to a copy of the Radiation Work Permits (RWPs). The RSOR can review the results of surveys in place of the RSO when necessary.

Radiological Task Supervisor - The RTS is responsible for assisting in the assignment of personnel that will perform the tasks required by this procedure. The RTS is responsible for the control of radioactive material, coverage of radiation workers, and to ensure that personnel under their cognizance observe proper precautions. Survey documentation will be reviewed by the Radiological Task Supervisor (RTS), or designee.

Radiological Control Technician - The Radiological Control Technician (RCT) shall be responsible for the performance of the requirements of this procedure and documentation of work performed. The RCT shall ensure compliance with this and any other referenced procedure.

5.0 DEFINITIONS AND ABBREVIATIONS

Activity - The rate of disintegration (transformation) or decay of radioactive material. The units of activity for the purpose of this procedure are disintegrations per minute (dpm) for loose and fixed surface contamination, picocuries per gram (pCi/g) for soil, or microcuries per milliliter (μCi/mL) for airborne contamination.

Contamination - Deposition of radioactive material in any place it is not desired. Contamination may be due to the presence of alpha particle, beta particle, or gamma ray emitting radionuclides.

Exposure Rate - The amount of radiation (exposure) delivered at a given point per unit time. Typical units are microroentgen per hour (μR/hr).

Fixed Contamination - Radioactive contamination that is not readily removed from a surface by applying light to moderate pressure when wiping with a paper or cloth disk swipe or masslin.

Minimum Detectable Activity (MDA) - For purposes of this procedure, MDA for removable radioactive contamination is defined as the smallest amount of sample activity that will yield a net count with a 95 percent confidence level based upon the background count rate of the laboratory counting instrument used.

Minimum Detectable Concentration (MDC) - For purposes of this procedure, MDC is the *a priori* activity level that a specific instrument and technique can be expected to

detect 95 percent of the time for portable survey instruments.

Radiation Work Permit (RWP) - A document generated in accordance with HPO-Tt-002 to provide:

- A description and scope of the work to be performed
- The existing radiological conditions in the work area
- The radiological limits of applicability for the RWP, if radiation levels exceed limits then a new RWP or a modification to the existing RWP must be made
- The protective measures to be employed during the work to protect the worker(s)
- The period of time the RWP is valid
- Special instructions to workers and RCTs during the course of work
- The proper approvals required to begin work

Radiologically Controlled Area (RCA) – An area containing radioactive materials (in excess of the levels provided in Table 1 of Standard Operating Procedure HPO-Tt-010, *Radiologically Controlled Areas – Posting and Access Control*) to which access is controlled to protect individuals from exposure to contamination and ionizing radiation.

Removable Surface Contamination - Radioactive contamination that is readily removed from a surface by applying light to moderate pressure when wiping with a paper or cloth disk swipe or masslin.

Uncontrolled Area - An uncontrolled area is any area where access is not controlled for radiological purposes.

6.0 PROCEDURE DETAILS

6.1 GENERAL

Radiation surveys are performed to identify radiation areas, measure the exposure rate, and assess the intensity and shape of those areas to determine control requirements at the worksite.

Contamination surveys are conducted to detect loose surface contamination and fixed contamination. Loose surface contamination is normally detected indirectly by a swipe sample or wipe performed on the item or surface of interest. Fixed contamination levels are measured directly.

Survey results, locations, and any unusual conditions shall be documented and described on Attachments 1 and 2, Radiation/Contamination Survey Form and Radiation/Contamination Survey Supplement, respectively.

When performing surveys, express the readings as the actual number observed. Do not report "<MDA" or "<Bkg." When background corrections are made, results may be expressed as negative numbers as applicable.

6.1.1 Discussion

Radiation and contamination surveys shall be performed on an as-needed basis. The need for performing a survey is identified by, but not limited to the following conditions:

- An RWP is needed to perform an approved job.
- A condition exists where radiological data are needed.
- An investigation is required due to abnormal conditions or indications.
- An ongoing job requires a survey to update radiological postings and/or an RWP.
- As required to support *Multi-Agency Radiation Survey and Site Investigation Manual* (MARSSIM; NUREG-1575) based survey activities.

6.1.2 Planning and Prerequisites

Instruments used to perform radiation and contamination surveys shall be operated in accordance with their operation procedure. Steps to be completed during the planning phase include the following:

- Obtain and review any site-specific survey plans [such as a Task-specific Plan (TSP), work instruction, and time-critical removal action (TCRA) Work Plan] and previous surveys performed in the area.
- Obtain appropriate survey instruments and prepare the instruments for use.
- Obtain the necessary forms, swipes, and protective clothing that will be used during the survey.

Prior to entering an area to perform a survey, each radiation detection instrument shall be:

- Battery Checked.
- Checked for obvious physical damage.
- Quantitatively response-checked daily, prior to use.
- Checked to ensure that the instrument calibration is current.

If any of the above conditions are unsatisfactory, the instrument shall be tagged out of service and not used.

6.2 PROCEDURE PROCESS

6.2.1 EXPOSURE SURVEYS

When entering posted or suspected high radiation areas, or unknown areas, the instrument range selector switch (if applicable) shall be selected to the highest range and moved down through the lower ranges until the meter indicates on scale.

Always survey a sufficient number of locations to determine average and maximum general area and contact radiation levels.

A Ludlum Model-19 or equivalent should be used for performing exposure rate surveys for gamma radiation. The instrument should be operated in accordance with the manufacturer supplied operations manual and any applicable requirements from work specific documents (i.e., work instructions or TSPs). Care should be taken to ensure that the instrument has been allowed to stabilize between individual measurements.

When performing general area exposure rate surveys, the RCT should:

- Attempt to determine the source of radiation fields.
- Record the highest level as the general area exposure rate.
- Perform contact exposure rate measurements with the detector within 1 inch of the surface to be surveyed.
- Perform surveys at approximately 1 meter (waist level) from surface to establish posting requirements for the area.
- Verify the exposure rates of known hot spots.

6.2.2 REMOVABLE CONTAMINATION SURVEYS

6.2.2.1 Removable Contamination Swipe

The following guidance shall be used unless an approved site-specific survey/work instruction directs otherwise. Specific survey instructions will be prepared and given in work specific documents (i.e., work instructions or TSPs) for radioisotopes requiring unusual sampling techniques, such as tritium (^3H).

6.2.2.2 Swipe Surveys

1. Label or number swipes, as necessary, to identify each swipe.
2. Wipe the swipes over approximately 100 square centimeters (cm^2) (16 square inches) of the surface to be sampled.
3. Apply moderate pressure.

4. Exercise care on rough surfaces so as not to tear the swipes.
5. Exercise care on wet surfaces so as not to degrade the swipes. Ensure that surfaces are not submerged in water and that cloth swipes or similar are used on wet/damp surfaces.

When surveying an area:

1. Obtain swipes from sample points, which are representative of the average and maximum contamination levels in the area, as identified during preliminary surveys. These areas could include:
    a. Areas of high traffic
    b. On and under benches or tables
    c. Beneath piping and components
    d. On accessible wall surfaces
    e. On piping and significant components
    f. Near drains, sumps, and low spots
2. Swipe floor and component surfaces, which display evidence of (potentially) contaminated water leakage.
3. Ensure contamination is not spread to clean areas when obtaining swipes.

When surveying equipment:

1. Obtain swipes on large surfaces.
2. Obtain swipes in cracks or crevices where contamination may have settled.
3. Obtain swipes on openings to internal surfaces.
4. Handle swipes in a manner that will prevent cross-contamination such as by placing each swipe in a separate envelope.

6.2.2.3 Counting Swipes

Low-background gas proportional counters should be used whenever practical. Typically a Protean WPC 1050 and/or a Tennelec Series 5 XLB gas-flow proportional alpha/beta radiation counter will be employed to count swipes. As a backup to the gas-flow proportional counters a Ludlum Model 2929/3030 scaler with a Model 43-10-1 ZnS(Ag) scintillation probe (or equivalent) may be used.

Swipes will be counted in the field with a portable instrument. If high levels are identified, the counting lab will be notified.

1. Count the swipes in accordance with the operating procedure for the instrument.
2. Record swipe results in dpm/100 cm².
3. Store/archive used swipes as radioactive material until disposal is approved by the RASO.

6.2.2.4 Removable Contamination Surveys Using Large-area Wipes (LAWs)

Large-area contamination surveys using LAWs are appropriate for monitoring the radiological cleanliness of non-contaminated areas or equipment, to track area decontamination progress, or for initially verifying that surfaces are free from contamination.

There are no specific requirements concerning the amount of area to be wiped when performing LAWs. The area wiped should be determined based on the use of the survey data and the dust loading of the LAW material.

6.2.2.5 Performing LAWs

Use masslin, oil-impregnated cloths, or equivalent media to perform LAWs. Select an appropriate collection material and method based upon the survey conditions such as wet surfaces, rough surfaces, heavily soiled area and oily and greasy surfaces.

1. Label or number the cloths, as necessary, to assist in determining the location of the sample.
2. Determine the size of the area to be sampled based on the results of the survey.
3. Wipe the collection media over the surface using moderate pressure by hand, with a masslin mop, or other approved techniques.

6.2.2.6 Evaluating LAWs

1. Allow wet swipe to dry prior to counting.
2. Scan the swipe with an appropriate field instrument (2360/43-89 or equivalent), in an area with a low background.
3. Hold the detector within ½ inch or less above the swipe and move the detector over the swipe at a maximum rate of 1 inch per second.
4. If any indication of an increased count rate is noted, pause to allow the meter reading to stabilize.
5. If the swipe reading is indistinguishable from background, consider the surveyed surface to be free from contamination. If the LAW reading is greater, conduct further surveys, using swipes over a 100 cm² area, to isolate the boundaries of the contamination.

6. Dispose of used LAW media as radioactive waste.

6.2.3 Surveys for Fixed Alpha/Beta Contamination

Fixed contamination surveys are used to obtain indications of fixed contamination levels on surface areas, pieces of equipment, or tools for characterization and/or release surveys. Fixed contamination surveys are also performed to assess if residual contamination is present and greater than the release criteria for the radionuclide(s) of concern.

A Ludlum Model-2360/43-68 or 43-37 series floor monitor or equivalent should be used for performing fixed contamination surveys for alpha and beta radiation.

6.2.3.1 Scan Surveys

1. When surveying for fixed alpha/beta contamination, the probe should be held within 1/4 inch or less from the surface being surveyed. The movement rate of the detector probe should be 1 inch per second or slower.
2. Whenever practical, 100 percent of accessible areas being surveyed should be direct scan surveyed, unless the applicable work planning document indicates otherwise.
3. Scan ranges are documented as the range from the lowest measurement to the highest measurement observed.

6.2.3.2 Static Surveys

1. Count time for conducting static measurements will be dependent upon the isotope of concern and the MDA for the instrument being used.
2. Static measurements should be performed at regions showing the highest indicated reading during the scan survey or as required by a work specific document (i.e., TSP or work instruction) or frequently enough to ensure the detection of residual activity.
3. When taking a static measurement for fixed alpha/beta contamination, the probe should be held within 1/4 inch or less from the surface being surveyed.
4. Results should be reported in units of net counts per minute (cpm) above background or dpm/100 cm^2.

The following formula should be used for converting direct probe readings from cpm to dpm/100 cm^2:

$$A_S = \frac{R_{S+B} - R_B}{\varepsilon_i \varepsilon_s \frac{W_A}{100\ cm^2}}$$

Where:

A_S = total surface activity (dpm/100 cm^2)
R_{S+B} = the gross count rate of the measurement in cpm,
R_B = the background count rate in cpm
ε_i = the instrument efficiency (counts per particle)
ε_s = the contaminated surface efficiency (particles per disintegration)
W_A = the physical area of the detector window (cm^2)

In the absence of experimentally determined surface efficiencies, ISO-7503-1 and NUREG-1507 provide conservative recommendations for surface efficiencies. ISO-7503-1recommends a surface efficiency of 0.25 for alpha emitters. NUREG-1507 provides surface efficiencies based on studies performed primarily at Oak Ridge Institute for Science and Education (ORISE). At HPNS, a surface efficiency of 0.25 will be used for alpha/beta emitters.

6.2.4 GAMMA SURVEYS

A Ludlum Model-2350-1/44-10 or equivalent should be used for gamma radiation surveys.

A single detector or an array of detectors may be used to perform gamma scans.

6.2.4.1 Scan Surveys

1. Set the audio response switch to the "on" position.
2. If a single detector is used, traverse a path at a maximum speed of approximately 0.5 meters per second and slowly move the detector assembly in a serpentine (S-shaped) pattern, while maintaining the detector approximately 10 centimeters (cm) (4 inches) from the area being surveyed.
3. If a detector array is used, it will be pushed or pulled in a straight line with the detector centers positioned approximately 30 cm apart.
4. Scan ranges should be recorded from the lowest reading to the highest reading noted.
5. If data logging is being performed, the scan data will be collected at the time interval necessary to obtain the measurements required for the survey.
6. Locations of radiation levels greater than 3 standard deviations above background shall be marked and identified for further investigations.
7. Measurement results are recorded in cpm.

6.2.4.2 Static Surveys

1. Static gamma measurements require positioning the detector assembly approximately 10 cm (4 inches) above the surface and completing a stationary 60-second survey.
2. Static measurements should be performed as required in the applicable work planning document or frequently enough to ensure the detection of residual activity.
3. Measurement results are recorded in cpm.

6.2.5 Routine Radiological Surveys

6.2.5.1 Frequency Requirements for Routine Surveys

Appropriate routine radiological surveys shall be performed at the following frequencies unless directed otherwise by the applicable work planning document or the RSO.

Exposure Rate Surveys

Surveys should be performed as frequently as necessary to ensure that radiological postings accurately reflect actual conditions during activities that have the potential to change exposure rates. Additionally, radiation surveys should be performed under the following circumstances:

- Upon initial entry into potential radiation areas after extended periods of closure.
- Daily, in the vicinity of contamination concentration points on operating high-efficiency particulate air (HEPA)-filtered ventilation units.
- Weekly, in occupied office spaces located inside radiologically controlled areas.
- Weekly, or upon entry if entries are less frequent than weekly, inside radiation areas and radioactive material storage areas.
- Weekly, along radiation area boundaries to ensure that the radiation areas do not extend beyond the posted boundaries.
- Monthly, around the Radiation Screening Yard(s) and Radiologically Controlled Areas (RCAs).
- Quarterly, around inactive RCAs .

Contamination Surveys

- Daily when in use, or once per shift in high-use situations at contamination control points, radiological change areas, or step-off pads.
- Daily, in count rooms and laboratories that are used to analyze potentially contaminated samples.
- Daily, in office spaces located inside radiologically controlled areas.
- Daily, in lunchrooms, eating areas, locker rooms, and shower areas adjacent to radiologically controlled areas.
- Weekly, for all designated lunchrooms and offices for the project.
- Weekly, or upon entry if entries are less frequent, in the areas where radioactive materials are handled or stored.
- Weekly, or upon entry if entries are less frequent, in posted contamination areas.

6.2.5.2 Identifying and Scheduling Routine Radiological Surveys

The RSO, or designee, shall identify and schedule routine surveys as required by the radiological conditions and work activities.

Routine survey schedules shall be developed using a standard system for designating surveys as follows:

Frequency of survey:

Daily	D
Weekly	W
Monthly	M
Quarterly	Q
Semiannually	S
Annually	A
Upon Entry	U

Routine survey schedules shall be submitted to, and approved by, the RSO or designee.

Routine survey tracking forms should be prepared using the approved routine survey schedules.

Changes to any routine survey schedule shall be submitted to, and approved by, the RSO or designee.

6.2.5.3 Survey Log

Completion of surveys shall be documented using the assigned survey log (see Attachment 3) for the project. This is not limited to initial surveys but includes routine surveys. Each survey shall be assigned a unique tracking number consistent with the practices of the project.

6.2.5.4 Performance of Routine Surveys

RCTs shall perform routine surveys in accordance with the RWP and the other applicable procedures.

Upon completion of a routine survey, the RCT shall initial the appropriate Survey Log.

6.2.5.5 Periodic Evaluation of Routine Surveys

Routine survey schedules (see Attachment 4) shall be reviewed and updated periodically to ensure that all areas within the project boundaries are receiving appropriate routine survey coverage.

Changes of conditions within the project area will be reported to the RSO or designee, and may require a modification of the routine radiological survey schedule and/or RWP.

6.2.5.6 Management Notification

The RSO shall be notified, in writing by the RSOR, of any failure to complete a routine survey as scheduled. The missed survey will be completed as soon as possible after the discovery that it was missed.

7.0 RECORDS

Radiation/Contamination Survey Form

Radiation/Contamination Survey Supplement

Survey Log

Routine Survey Schedule

8.0 REFERENCES

Number	*Title*
10 CFR 20	*Standards for Protection Against Radiation*
ISO-7503-1	*Evaluation of Surface Contamination*
NUREG-1507	*Minimum Detectable Concentration/Activities for Typical Radiation Survey Instruments for Various Contaminants and Field Conditions*
NUREG-1575	*Multi-Agency Radiation Survey and Site Investigation Manual*
HPO-Tt-002	*Issue and Use of Radiation Work Permits*

9.0 ATTACHMENTS

Forms provided in this section illustrate the minimum requirements for their respective subject matter. Alternative documents or electronic data logging may be used providing the information is presented in a clear and concise manner and the content meets or exceeds the information required to complete these documents.

Attachment 1. Radiation/Contamination Survey Form

Attachment 2. Radiation/Contamination Survey Supplement

Attachment 3. Survey Log
Attachment 4. Routine Survey Schedule

ATTACHMENT 1 – RADIATION/CONTAMINATION SURVEY FORM

DATE: TIME:	INSTRUMENTATION USED					
SURVEY NUMBER:	Model Inst/Det.	Serial Number	Calibration Due Date	% Efficiency	MDC/MDA (dpm/100cm^2)	Background (dpm/100cm^2)
LOCATION:						
SURVEYOR:						
REVIEWED BY:						
RSO/RTM:						
Isotopes of Concern:						
Description or drawing:						

Routine (Daily / Weekly / Monthly) ☐ Non-routine ☐	All radiation readings in µr/hr unless otherwise noted. (#) ....denotes swipe location or fixed α/β readings. #.....denotes G/A radiation readings. #/#...denotes contact / 1 meter radiation readings. *.....denotes highest radiation reading on contact. Δ.....denotes static location.

ATTACHMENT 2 - RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER:								
SURVEYOR:					LOCATION:			
Location	Exposure Rate (µR/hr)		Fixed + Removable			Removable		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/probe	Beta/Gamma dpm/probe	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
Reviewer			Date/Time:			RSO/RSOR		Date/Time:

ATTACHMENT 3 – SURVEY LOG

Project: **Location:**

Survey Number Project	#	Year	Date	Survey Description	Surveyor (Init.)

Reviewed/Approved By: _____ / _____

RSO/RSOR Date

ATTACHMENT 4 – ROUTINE SURVEY SCHEDULE

Survey Description	January	February	March	April	May	June	July	August	September	October	November	December
	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init
	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date
	#	#	#	#	#	#	#	#	#	#	#	#
	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init
	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date
	#	#	#	#	#	#	#	#	#	#	#	#
	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init
	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date
	#	#	#	#	#	#	#	#	#	#	#	#
	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init
	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date
	#	#	#	#	#	#	#	#	#	#	#	#
	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init	Surveyor Init
	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date
	#	#	#	#	#	#	#	#	#	#	#	#

Prepared/Submitted By: ______________________ / __________
Technician Date

Reviewed/Approved By: ______________________ / __________
RSO/Manager Date

TETRA TECH EC, INC.

HUNTERS POINT NAVAL SHIPYARD PROJECT

Standard Operating Procedure

PREPARATION OF PORTABLE RADIATION AND CONTAMINATION SURVEY METERS AND INSTRUMENTS FOR FIELD USE

HPO-Tt-007

Revision 3

Approved By:

Erik J. Abkemeier

Erik Abkemeier, Radiation Safety Officer — 09/05/13 Date

Bill Dougherty

Bill Dougherty, Project Manager — 09/05/13 Date

Controlled Copy # 007
Issued To: Jeff Ambrose
Date: 9.9.13

REVISION HISTORY

Revision (Date)	*Rev. No*	*Prepared By*	*Description of Changes*	*Affected Pages*
April 15, 2005	0	Daryl DeLong	Final Issue	All
March 4, 2011	1	Erik Abkemeier	Daily Check Logs	All
October 26, 2012	2	Erik Abkemeier	Project Review	All
September 5, 2013	3	Erik Abkemeier	Project Review	All

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1.0 PURPOSE

This procedure is used to specify the general requirements for preparing portable radiation and contamination survey meters and instruments for use at field locations. The procedures presented below will be supplemented by the specific instrument operation manuals, Tetra Tech EC, Inc. (TtEC)-approved subcontractor procedures and specific work documents (i.e. Task-specific Plans (TSPs), work instructions, and other Work Plan documents).

2.0 SCOPE

This procedure will be used by TtEC personnel and its subcontractors. This procedure is intended to provide general instructions for preparing radiation and contamination survey meters and instruments for field operations.

3.0 MAINTENANCE

The Radiation Safety Officer (RSO) is designated the procedure owner and is responsible for updating this procedure. Approval authority rests with the Project Manager.

4.0 RESPONSIBILITIES

Radiation Safety Officer – The RSO is responsible for monitoring compliance with this procedure and training personnel in the use of the radiation and contamination survey meters and instruments. The RSO will assist in the interpretation of results obtained during surveys.

Radiation Safety Officer Representative -The RSOR will also be responsible for performing periodic surveillance of the use and maintenance of instruments and ensuring that the instruments are calibrated at specified intervals, ensuring that records pertaining to the instrument are maintained on file throughout the duration of the project and copies retained in the permanent project file, and reviewing documentation generated by the use of this procedure.

Radiological Task Supervisor – The Radiological Task Supervisor (RTS) is responsible for ensuring that all personnel assigned the task of operating radiation and contamination survey meters and instruments are familiar with this procedure and are adequately trained with the specific instrument being used to perform surveys. The RTS is responsible for ensuring that a copy of this procedure is available at the job site. The RTS will also be responsible for ensuring that Radiological Control Technicians (RCTs) are qualified by training and experience to perform the requirements of this procedure, notifying the RSO of any unsafe or unusual conditions observed during

operation of the instrument, and implementation of this procedure. The RTS is responsible for ensuring that RCTs implement and use this procedure. The RTS will ensure that personnel under their cognizance observe proper precautions when using this procedure.

Radiological Control Technician – The RCT is responsible for being qualified by training and experience to perform the requirements of this procedure, notifying the RTS of any unsafe or unusual conditions observed during operation of the instrument, and implementation of this procedure.

5.0 DEFINITIONS AND ABBREVIATIONS

Acceptance Range – A range of values that describes an acceptable instrument check result. An acceptance range is typically determined by adding ± 20 percent or ± 2σ to the expected value.

Calibration Sticker – A label affixed to a properly calibrated instrument. The calibration sticker shall be applied by the calibration facility.. The calibration sticker should indicate the date through which the calibration is valid.

Chi-Square Test – A probability density function that gives the distribution of the sum of the squares of a number of independent random variables each with a normal distribution with zero mean and unit variance, that has the property that the sum of two or more random variables with such a distribution also has one, and that is widely used in testing statistical hypotheses especially about the theoretical and observed values of a quantity and about population variances and standard deviations. This test is used to evaluate the operation of an instrument, generally upon return from calibration.

Check Log – A form or series of forms which are used to document that an instrument was checked prior to usage in the field. Check logs can consist of multiple pages and must contain at least one page identifying the instrument. At least one page must also specify the parameters (source, geometry, etc.) used for the daily check. Space shall be provided to document the daily tests in the log. The log should be designed so as to clearly associate the required verifications with the signature or initials of the individual performing the check and date of each check.

Instrument Efficiency – A measure of the response (counts) obtained with a particular instrument/probe combination when exposed to a known fluence of radioactive particles. Instrument efficiency has units of counts per disintegration..

6.0 PROCEDURE DETAILS

6.1 CALIBRATION

Instrument calibrations shall be performed using measuring and test equipment and National Institute of Standards and Technology (NIST) traceable sources. Calibrations will be performed at an accredited calibration facility. Calibration will be performed in accordance with the equipment manufacturers' manuals or a subcontractor's TtEC-approved procedure. Properly calibrated instruments shall be marked with a calibration sticker and include an accompanying calibration certificate.

Calibration shall be performed annually or on a schedule consistent with the manufacturer's recommendation if more restrictive. In addition to the routine frequency of performance, calibration shall be performed under the following conditions:

- Prior to placing a new instrument into service.
- After any major repair or alteration to the instrument or detector.

6.2 GENERAL CONSIDERATIONS

Upon receipt of survey equipment from an offsite vendor, and prior to shipment to an offsite vendor, the survey equipment shall be surveyed for alpha/beta fixed and loose contamination in accordance with *HPO-Tt-012, Release of Materials and Equipment from Radiologically Controlled Areas*. If any contamination limits are exceeded, notify the RTS immediately.

Determination of instrument background, chi-square testing and instrument efficiency should be conducted in a controlled environment. This typically will consist of a secured office or lab area located in a non-impacted area and which is known to be free of contamination. Testing jigs or apparatus may be employed as necessary to ensure that consistent, reproducible geometries are used, particularly during repeated measurements.

In the event that any instrument and detector combination fails a chi-square test or daily operation check or has exceeded its annual calibration date without RSO approval, the instrument shall be put in an "out of service" condition by placing an "out of service" tag or equivalent on the instrument and detector combination, and securing in a separate area such that the instrument and detector combination cannot be issued for use. The RTS shall be notified immediately when any survey instrumentation has been placed "out of service".

Any instrument and detector combinations that have not had a daily operation check performed because daily plans do not include their use shall be secured in an area to prevent their use until operation checks have been performed.

Table 1 gives suggested geometries to use for the most common instrument types to be used at Hunters Point Naval Shipyard. Alternate geometries can be used provided that they are more appropriate for the intended usage of the instrument.

TABLE 1

SUGGESTED GEOMETRIES FOR BACKGROUND MEASUREMENTS AND SOURCE CHECKS

Measurement	Instrument/Detector Combinations	Probe Location
Exposure Rate	Ludlum Model 19 MicroR Meter or equivalent with integral NaI 1"x1" detector	contact[a]
Gamma	Ludlum Model 2221, 2350-1 or 2360 with Ludlum Model 44-10 or equivalent detector	4 inches above ground surface/source
Beta/Gamma	Ludlum Model 3 portable survey meter with Ludlum Model 44-9 G-M probe or equivalent	¼ inch above ground surface/source
Alpha/Beta	Ludlum Model 2350-1, 2360 or equivalent portable survey meter with Ludlum Model 43-37, 43-68, 43-89 or equivalent detector	¼ inch from surface/source

Notes:

[a] Field readings with exposure rate instruments are conducted at 1 meter per the Base-wide Radiological Work Plan; background determination, chi-square test and operational checks are typically performed at a more convenient distance. Geometry should be documented as appropriate on the relevant data forms and logs.

G-M – Geiger-Muller

6.3 DETERMINATION OF INSTRUMENT BACKGROUND

The determination of an instrument specific background is an optional procedure which may be employed at the discretion of the RTS. There is no regulatory requirement that necessitates the determination of background for each instrument. Instrument background determination is typically performed in a controlled environment and usually consists of a series of repeated background measurements that are statistically analyzed to obtain an expected range of valid background values. The established instrument background range can be used as a means of performing daily operation checks.

Instrument background determinations, when necessary, are considered valid for as long as the instrument has been properly maintained per the requirements of this procedure. If instrument backgrounds are required, a new background determination should be performed following each calibration.

When determining instrument background, this procedure shall be followed; however, any specific instructions for background determination in governing work-specific documents shall have precedence.

When required, background determinations will be documented on Attachment A or equivalent or as specified in the work-specific procedures. The form should include the following information at a minimum:

- Identification information (i.e. model and serial numbers) for the instrument and detector
- Conditions used for determination (geometry, radiation type, operating voltage, etc.)
- Date and time of determination
- Identification and signature or initials of technician
- Identification and signature of reviewer (typically the RTS)

The end result of a background determination should be to obtain an acceptance range for subsequent background checks.

6.4 CHI-SQUARE TEST

When chi-square tests are required by work-specific documents, this procedure shall be followed; however, any specific instructions for chi-square testing in governing work specific documents shall have precedence. When required, chi-square tests shall be performed annually (± 15 days), following calibration, or if there is reason to suspect that the instrument calibration may no longer be valid (i.e. inability to obtain a valid range of chi-square values). Chi square testing is not required to be performed on exposure rate instruments (e.g., Ludlum Model 19 or RO-20) or personnel contamination "frisking" instrument/detector combinations (e.g., Ludlum Model 3 or 177 with 44-9) unless specified in work-specific documents.

Chi-square tests shall be performed with NIST traceable sources with isotopic content appropriate to the detector being evaluated and the anticipated contaminants in the survey area. The source should be of sufficient activity to yield a counting rate of 1000 to 50,000 counts per minute (cpm). .

When required, chi-squared tests should be documented in Attachment B or equivalent or as specified in the work-specific documents. The form should include the following information at a minimum:

- Identification information (i.e. model and serial numbers) for the instrument and detector
- Conditions used for the test (geometry, radiation type, operating voltage, etc.)
- Source ID number
- Date and time of determination
- Identification and signature or initials of technician
- Identification and signature of reviewer (typically the RTS)

The chi-square test procedure will produce a chi-squared value (χ^2) which should be between 10.11 and 30.14. Failure to obtain a chi-squared value in this range indicates a problem with either the instrument or the methodology used to perform the chi-square test and requires further investigation. The RTS should be notified of the failure to assist in planning a course of action.

6.5 INSTRUMENT EFFICIENCY FOR PORTABLE INSTRUMENTS

The instrument efficiency (ε_i) is the ratio between the net count rate (in cpm) of the instrument and the surface emission rate of the efficiency check source for a specified geometry. The surface emission rate is the 2π particle fluence that is affected by both the attenuation and backscatter of the radiation emitted from the efficiency check source.

The following equation is used to calculate the instrument efficiency in counts per particle:

$$\varepsilon_i = \frac{R_{S+B} - R_B}{q_{2\pi}\left(W_A / S_A\right)}$$

Where,

R_{S+B} = the gross count rate of the efficiency check source, measured in cpm
R_B = the background count rate in cpm
$q_{2\pi}$ = the 2π surface emission rate of the calibration source (NIST traceable)
W_A = the active area of the probe window in square centimeters (cm^2)
S_A = the area of the source in cm^2

Note: This equation assumes that the dimensions of the efficiency check source are sufficient to cover the window of the instrument detector. If the dimensions of the

efficiency check source are smaller than the detector's window, set W_A equal to the dimensions of the efficiency source (i.e., set the quotient of W_A and S_A equal to 1).

Instrument efficiency shall be determined for all instruments and radiation and contamination survey meters that are to be used for alpha and beta surveys prior to use for field operations. Instrument efficiency is dependent upon energy of the incident radiation. Multiple energy-specific instrument efficiencies may be determined when isotopes with significantly varying energies are analyzed.

The equipment manufacturer's procedures shall be followed to determine the instrument efficiency for those instruments for which it is required. In instances where governing work-specific documents specify a means or expanded scope of inclusion for instrument efficiency determination, they shall have precedence.

All instrument efficiency determinations should be documented in calibration certificates provided from the manufacturer or an approved vendor or as specified in the work-specific documents. The form should include the following information at a minimum:

- Identification information (i.e. model and serial numbers) for the instrument and detector
- Conditions used for determination (geometry, radiation type, operating voltage, etc.)
- Source-specific information (ID number, surface emission rate, area),
- Detector window area
- Date and time of determination
- Identification and signature or initials of technician
- Identification and signature of reviewer (typically the RTM)

The resulting instrument efficiency should be reported in units of counts per disintegration.

6.6 OPERATION CHECK

An operation check for each instrument should be performed at the beginning of each work day that a particular instrument is used. The operations check should include the following checks at a minimum:

- Check that instrument calibration is still valid (date on sticker not yet passed)
- Check the instrument (including the probe) for physical defects (knobs, displays, cables, connectors, mylar windows, backlights, speakers, etc.)

- Check of instrument battery (per manufacturers' instructions)
- Source check (should give consistently reproducible results with same source)

Instructions for performing operation checks for specific instrument and detectors are included in Attachment C of this procedure. Failure of any of the above checks shall result in the instrument being removed from active service until the condition can be addressed. The RTS should be notified of any instrument failing an operations check for reasons other than failure of a battery check. In cases of battery check failure, the battery should be replaced and the check repeated.

The specified checks should each be performed every day and documented on a new line of the check log. A separate check log shall be maintained for each instrument type. The check log shall contain the following information at a minimum:

- Identification information (i.e., model and serial numbers) for the instrument and detector
- Conditions used for the check (geometry, radiation type, etc.)
- Source ID number
- Verification of current calibration
- Verification of physical condition
- Verification of battery check
- Verification that source check is in acceptance range
- Date of operational check
- Signature or initials of technician
- Identification and signature of reviewer (typically the RTS)

Of the required information given above, only the verifications, date and signature or initials need to be completed on a daily basis. The remaining information can be completed once and kept in the check log with the additional pages for daily checks, provided that none of the information changes. If the information changes, then a new check log should be started.

A sticker annotating that daily operation checks have been completed satisfactorily shall be affixed to each instrument. The sticker shall contain the following information at a minimum:

- Initials of technician
- Date of operational check

6.7 MAINTENANCE

Instruments shall be stored in areas, which prevent damage by movement, accumulation of moisture or dust. Detector covers shall be used for storage when practical.

Instrument maintenance (except external adjustments and cable or mylar window replacements) shall be performed by the manufacturer or an approved vendor..

7.0 RECORDS

Records that result from this procedure may include forms that document background determinations, chi-square tests, instrument efficiency, instrument calibration and check logs. Record forms shall be obtained from the attachments of this procedure or equivalent electronic versions or specified in work-specific procedures.

8.0 REFERENCES

None.

9.0 ATTACHMENTS

Attachment A, Instrument/Detector Background Form

Attachment B, Chi Square Form

Attachment C, Instrument and Detector Operational Check Procedures

FINAL

HUNTERS POINT SHIPYARD PROJECT

Standard Operating Procedure

AIR SAMPLING AND SAMPLE ANALYSIS

HPO-Tt-008

DCN: FWSD-RAC-05-1048

Revision 0

Approved By:

Radiation Safety Officer — Date: 4/15/2005

Project Manager — Date: 4/15/05

REVISION HISTORY

Revision (Date)	*Rev. No*	*Prepared By*	*Description of Changes*	*Affected Pages*
April 19, 2004	0	A. Bradford	Final Issue	All

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Radiological Task Supervisor – The Radiological Task Supervisor (RTS) shall be responsible for assisting in the assignment of personnel that will perform the tasks required by this procedure. The RTS is responsible to ensure that RCTs implement and use this procedure. The RTS will ensure personnel under their cognizance observe proper precautions when using this procedure.

Radiological Control Technician – The RCT shall be responsible for the performance of the requirements of this procedure and documentation of work performed. The RCT shall ensure compliance with this and any other referenced procedure.

5.0 DEFINITIONS AND ABBREVIATIONS

Airborne Radioactivity Area – A room, enclosure, or area in which airborne radioactive material, dispersed in the air in the form of dusts, fumes, particulates, mists, vapors, or gases, exist in concentrations:

- In excess of the derived air concentrations (DACs) specified in the Code of Federal Regulations (CFR), Title 10 Part 20, Appendix B; or
- To such a degree that an individual present in the area without respiratory protection could exceed, during the hours that the individual is present in a week, an intake of 0.6 percent of the annual limit on intake (ALI) or 12 DAC-HR.

Annual Limit on Intake (ALI) – The annual limit on intake (ALI) is the derived limit for the quantity of radioactive material taken into the body of a worker by inhalation or ingestion in a year.

Breathing Zone – That region adjacent to the worker's mouth and nostrils from which air is drawn into the lungs while he/she performs his/her assigned work. Air taken from this region will represent the air the worker is breathing while he/she works. The samples collected to assess breathing zone concentrations are normally collected from an area within 12 inches of the face.

Derived Air Concentration (DAC) – DAC is the concentration of a given radionuclide (as specified in 10 CFR 20, Appendix B) in air which, if breathed by the "reference man" for a working year (40 hours per week for 50 weeks) under the conditions of light work (inhalation rate of 1.2 cubic meters of air per hour), results in an intake of one ALI.

DAC-HR – The product of the concentration of radioactive material in air (expressed as a multiple of the DAC for each nuclide) and the time of exposure to that nuclide, in hours. Two-thousand DAC-HRs represents one ALI.

During collection and handling of air samples, caution must be used to prevent the samples from being contaminated by other sources of radioactive material.

6.1 PRECAUTIONS

Avoid unnecessary contamination of air sampling equipment through the use of plastic coverings and care in handling. Do not cover the air intakes or exhausts on air samplers.

Avoid unnecessary exposure when conducting air monitoring surveys by using as low as reasonably achievable (ALARA) practices.

Air samplers used in confined spaces may ignite explosive gases. Extreme care shall be exercised, including prior sampling of the atmosphere for explosive gas and oxygen content.

Samples should be taken in such a manner as not to contaminate the sample filter with materials that are not airborne or by sucking up loose contamination from surfaces near the sampling head. Caution should be used to minimize producing airborne material by the exhaust of the sampler.

When air sample results exceed 10 percent of the DAC value, report this information to the RTM immediately. Also, consideration should be given to isotopic analysis and area access restriction/posting in accordance with HPO-Tt-010, *Radiological Restricted Areas- Posting and Access Control.*

6.2 TYPE OF AIR SAMPLES

6.2.1 GENERAL AREA AIR SAMPLES

General area air samples provide data representative of the work area for determining if the area should be controlled as an airborne radioactivity area. Samples are normally taken over a short period of time ranging from an hour up to one or more days. This type of sample is:

- Taken on a routine basis at predetermined times and locations, as specified by the Radiation Work Permit (RWP), Task-specific Plan (TSP), or other work document
- Uses a low-volume air sampler
- Consists of a minimum of 100 cubic feet (ft^3) (2,832 liters) of air passed through the sample filter

6.3 AIR SAMPLING PROCEDURES

6.3.1 GENERAL

Sample types, number, locations and volumes will be collected as specified in an RWP, TSP or other work document.

Samples will be surveyed with a portable alpha/beta survey meter before placing in envelope or baggie. If the survey indicates the presence of contamination that exceeds background, appropriate steps will be taken to determine source of contamination and secure the area.

Samples will be sent to the on-site laboratory to be analyzed, as a minimum, for gross alpha and beta-gamma and determination (if any) of the DAC.

If sample analysis indicates airborne contamination, which exceed 10 percent of a DAC, appropriate steps will be taken to determine source of contamination and secure the area, notify the RSO and RTM. The RSO will notify Radiological Affairs Support Office (RASO) upon validation of the air sample analysis.

The Air Sample Identification Record (Attachment 1) and Personal Air Monitoring Log (Attachment 2) provide examples of air sampling record sheets. Equivalent or electronic forms, which provide at a minimum the information on these forms, may be used.

Air samples will be preserved and archived after analysis.

6.3.2 GENERAL AREA AIR SAMPLING

1. Determine the requirements for air sampling prior to initiating any work activities. This may be done by reviewing the Work Plan, RWP, discussion with the RSO, RTM, RTS, and / or workers assigned to the task.
2. Test the functionality of the air sampling equipment prior to entering the work area. Check for current dates on calibration tags and recent calibration of the sampler flow meter. Any equipment not functioning properly, or with calibrations out of date will not be used. Notify the RTM of any equipment that does not function properly.
3. Gather essential supplies before entering the work area. This may include:
    - Extension cords
    - Air sample filters
    - Tongs (if necessary)
    - Additional gloves

- Sample volume
- Sample pump flow rate

14. Send the sample to the on-site counting laboratory for analysis and percent DAC determination.
15. On Attachment 1, Air Sample Identification Record (or equivalent including electronic), note the sample analysis information provided by the laboratory as soon as the data is available, including:
    - Alpha count results [microCuries per milliliters (µCi/mL)]
    - Beta count results (µCi/mL)
    - Percent DAC
16. Complete Attachment 1 by transcribing the information from the sample envelope to Attachment 1 and initialing.
17. Report any higher than normal, higher than expected, greater than 10 percent of the DAC, or trending upward results to the RSO and RTM immediately.

6.3.3 Breathing Zone Air Sampling

The following steps will be taken for breathing zone air sampling:

1. Determine the requirements for breathing zone air sampling prior to initiating any work activities. This may be done by reviewing the Work Plan, RWP, discussion with the RSO, RTM, RTS, and / or workers assigned to the task.
2. Assemble the individual breathing zone air sampler sets. Make sure that all hoses are firmly seated in the hose connectors found on the sample head and sample pump. Make sure that the sample head is not cracked or damaged in any way. Set any damaged or unusable equipment aside and notify the RTM and RSO.
3. Note the relative size of the individual to whom the sampler will be issued. It may be necessary to replace the standard length belt with a longer belt, or chain two belts together to achieve the required length. Make sure that the belt buckle is not damaged and will function properly to restrain the sampler around the worker. Set any damaged or unusable equipment aside and notify the RTM and RSO.

13. At the end of the sampling period (end of the task, or end of the shift), turn the pump OFF and note the stop time on Attachment 2, Personal Air Monitoring Log.
14. Calculate the total time that the sample pump was operating by adding together the operating periods of time.
15. Calculate the total sample volume by multiplying the operating time by sampler flow rate. The result may be in units of cfm or lpm.
16. Record the total sample volume on Attachment 2, Personal Air Monitoring Log. Note the appropriate units (cfm or lpm) on Attachment 2, Personal Air Monitoring Log.
17. Select a clean, unused sample envelope. Label the envelope with the following information:
    - Sample ID number
    - Date
    - Location
    - Worker name
    - Total sample volume (use the appropriate units – cfm or lpm)
18. Open the sample holder using caution not to remove or add to the contamination on the sample.
19. Prior to removing the sample from the holder, survey the sample using a hand-held alpha and beta contamination survey meter. Note the activity observed on the outside of the sample envelope.
20. If the sample survey indicates the presence of radioactive contamination, and the area is not already controlled as an airborne radiation area, stop work, notify the RTM, and implement appropriate controls, including postings.
21. Using caution not to knock debris or dust from the sample filter holder housing onto the air sample, remove the air sample from the holder using clean gloved hands or clean tongs.
22. Place the sample into the sample envelope using caution not to scrape or remove contamination from the surface of the sample.
23. Confirm that the information on the sample envelope matches the information in Attachment 2, Personal Air Monitoring Log.
24. Immediately send the sample to the counting laboratory for analysis and percent DAC determination.
25. On Attachment 2, Personal Air Monitoring Log, note the sample analysis information provided by the laboratory as soon as the data is available, including:

ATTACHMENT 1

AIR SAMPLE IDENTIFICATION RECORD

Project/Location:_____ Page ____ of ____

Sample ID	Date	Location	Start Time	Stop Time	Air Sampler ID	Sample Volume	Count Results α (µCi/ml)	Count Results β (µCi/ml)	%DAC	Counter ID

DAC derived air concentration
µCi/ml microcurie per milliliter
ID identification number
α alpha
β beta

TETRA TECH EC, INC.

HUNTERS POINT NAVAL SHIPYARD PROJECT

Standard Operating Procedure

SAMPLING PROCEDURES FOR RADIOLOGICAL SURVEYS

HPO-Tt-009

Revision 4

Approved By:

Erik J. Abkemeier

Erik Abkemeier, Radiation Safety Officer — 09/05/13 Date

Bill Dougherty

Bill Dougherty, Project Manager — 09/05/13 Date

Controlled Copy # 007
Issued To: Jeff Ambrose
Date: 9.9.13

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February 16, 2005	0	Lisa Bienkowski	Issued Final	All
April 25, 2006	1	Lisa Bienkowski	Updated contractor name from Tetra Tech FW, Inc. to Tetra Tech EC, Inc.	All
July 11, 2011	2	Erik Abkemeier	Delete RTM. Add RSOR	All
October 26, 2012	3	Erik Abkemeier	Project Review	All
September 5, 2013	4	Erik Abkemeier	Project Review	All

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1.0 PURPOSE

This procedure will be used by Tetra Tech EC, Inc. (TtEC) personnel and its subcontractors at Hunters Point Naval Shipyard to perform swipe sampling and sampling of various types of media including soil, sediment, solid material (such as concrete, brick, porcelain, wood), and water. This procedure also details sample packaging and transporting samples to the laboratory.

2.0 SCOPE

This procedure shall be implemented by TtEC staff and subcontractor personnel when collecting samples on field projects related to radiological surveys at HPS.

3.0 MAINTENANCE

The Program Chemist is designated as the procedure owner and is responsible for updating this procedure. Final approval authority rests with the Project Manager.

4.0 RESPONSIBILITIES

The following personnel (or their qualified designee) will be directly involved with the sampling procedures discussed herein.

Program Chemist - The Program Chemist or designee is responsible for updating this procedure as necessary. In addition, the Program Chemist will coordinate with the Radiation Task Manager (RTM) to ensure that samples are collected in conjunction with this procedure.

Radiation Safety Officer Representative (RSOR) – The RSOR is responsible for ensuring that the conditions of this procedure are complied with during project sampling operations. The RSOR shall ensure, by periodic personal observation, that samples are collected appropriately and chain-of-custody (COC) is controlled as described in this procedure. The RSOR will also ensure that Radiological Control Technicians (RCTs) are qualified by training and experience to perform the requirements of this procedure and ensure that personnel under their cognizance observe proper precautions. The RSOR will make a copy of this procedure available to the RCTs.

Radiation Safety Officer – The Radiation Safety Officer (RSO) is responsible for training personnel working with radioactive material. The RSO is responsible for the overall implementation and compliance with this procedure during all project operations. The RSO shall conduct periodic reviews, via personal observation of conducting radiation and contamination surveys, to ensure adherence to the requirements of this procedure.

Radiological Task Supervisor – The Radiological Task Supervisor (RTS) shall be responsible for assisting in the assignment of personnel that will perform the tasks required by this procedure. The RTS is responsible for the control of radioactive material samples, supervision of RCT's performing the requirements of this procedure, and to ensure that personnel under their cognizance observe proper precautions.

Radiological Control Technician – The Radiological Control Technician (RCT) shall be responsible for the performance of the radiological survey requirements of this procedure and documentation of work performed. The RCT shall ensure compliance with this and any other referenced procedure.

Soil or Sediment Sample Collector – The Soil or Sediment Sample Collector shall be responsible for collecting soil samples, and shall ensure that the soil samples collected within a Radiologically Controlled Area (RCA) (if applicable) are radiologically surveyed by an RCT prior to removing from the RCA. Note that the Soil Sample Collector may be an RCT.

5.0 DEFINITIONS AND ABBREVIATIONS

Swipe Samples – Swipe samples are materials, which after being wiped over a surface, are analyzed to determine the presence of removable radioactivity on the surface area that was wiped.

Soil Samples – Soil samples are defined as soil collected for analytical purposes. Soil samples will be collected from the top 15 centimeters (cm) of the surface, unless otherwise noted in the applicable work-planning document [e.g. a Task-specific Plan (TSP), Work Instruction or Work Plan].

Sediment Samples – Sediment samples are defined as a collection of clay, silt, sand, and/or gravel deposited by water, wind, or glaciers used for analytical purposes.

Solid Material Samples – Solid material samples are defined as pieces of concrete, brick, porcelain, wood, or any other hard material collected for analytical purposes from buildings or surrounding areas. The samples could include accumulations from ventilation systems or drain systems.

Liquid Samples – Liquid samples are defined as liquid collected for analytical purposes from sinks, drain piping, sewer systems, rinsate, groundwater, leachate, liquid investigation-derived waste, and low-point accumulation areas inside of buildings, sumps, and excavation pits.

6.0 SAMPLING PROCEDURE DETAILS

6.1 GENERAL PROCEDURES

Field instruments used for measurements required by this procedure shall be checked with standards and verified to have current calibration.

Anytime this procedure is in effect, the RSOR (or qualified designee) should ensure, by periodic personal observation, that samples are appropriately collected and controlled.

Surface scan surveys are to be performed at each location before initiating sampling. This will identify the presence of gross contamination, which will require that samples and equipment be treated as radioactive and handled in accordance with applicable license requirements. Samples will be recorded on COC documentation.

6.2 SAMPLING PROCEDURE PROCESS

Sample activities will be recorded in the field logbook as directed by the Base-wide Sampling and Analysis Plan (SAP). Sampling personnel will don a new pair of disposable nitrile gloves immediately before collecting samples at each location.

6.2.1 SWIPE SAMPLING

Swipe samples will be obtained in accordance with HPO-Tt-006, *Radiation and Contamination Surveys*. Swipe samples will be documented in the sample logbook as applicable. Sample COC records shall be completed in accordance with the Base-wide SAP.

6.2.2 SOIL SAMPLING

Because standard surface soil contamination criteria for radionuclides are applicable to the average concentration in the upper 15 cm of soil, the sampling protocol described here is based on obtaining a sample of this upper 15 cm. Special situations, such as sampling at depths greater than 15 cm, evaluating trends or airborne deposition, determining near-surface contamination profiles, and measuring non-radiological contaminants, may require special sampling procedures. These special situations will be evaluated and incorporated into TSPs as the need arises.

Samples will be collected with a hand-auger, hollow-stem auger, split-spoon sampler, disposable scoop, or equivalent. The soil removed for sampling must be sufficient to yield a sample of sufficient volume for the sample container being used. Soil samples will be collected and handled as follows:

1. Loosen the soil at the selected sampling location to a depth of approximately 15 cm, using a clean trowel or other digging instrument.
2. Remove large rocks, vegetation and foreign objects. In some cases, however, these objects may be the source of the contamination and may be collected as separate samples for characterization.
3. Place as much soil as practical into a 250-milliliter (mL)-wide mouth plastic bottle or plastic 500-mL Marinelli container.
4. If sample containers are not readily available, samples may be collected in a plastic bag for subsequent transport to the laboratory for sample preparation.
5. Tape the cap of the container in place or seal the ziplock plastic bag.
6. Label the sample container in accordance with the Base-wide SAP.
7. Document all samples collected in the sample logbook as applicable. Sample COC records shall be completed in accordance with the Base-wide SAP.
8. Transport samples to the on-site laboratory for analysis as soon as possible after sample collection. Sample packaging and shipment procedures for transporting samples to an off-site laboratory are described in Section 6.3 of this procedure.
9. Clean or decontaminated tools will be used at each sampling location. Sampling tools will be decontaminated as described in the Base-wide SAP.

6.2.3 Sediment Sampling

Several methods are available to collect sediment samples. The tools used will be appropriate to the circumstances and may include use of trowels, augers, or other hand tools. Sediment sampling will be conducted as follows:

1. A hand-auger, trowel or similar device will be used to access each sampling location. The sample collection tool will be selected based on physical limitations accessing the sample location.
2. Place as much material as practical into a 250-mL-wide mouth plastic bottle or plastic 500-mL Marinelli container.
3. Follow steps 4 through 9 of Section 6.2.2 to complete sample collection.

6.2.4 Solid Material Sampling

Several methods are available to collect solid material samples. To collect samples, solid materials may need to be broken into smaller pieces. Solid materials will be collected as follows:

1. Break up the material into small enough pieces to fill a 250-mL-wide mouth plastic bottle or plastic 500-mL Marinelli container.
2. Follow steps 4 through 9 of Section 6.2.2 to complete sample collection.

6.2.4.1 Pipe and Drain Line Sampling

Pipe and drain line sampling is conducted to assess residual radioactivity that may be inside of drain lines or materials within sanitary sewer and storm drain systems.

1. Since the type of material found inside drain lines varies, there is no specific method identified to collect these samples. Samples may be collected using a plumber's snake, swabs, scraper, trowel, etc.
2. As much material as possible should be collected and placed into a 250-mL-wide mouth plastic bottle or plastic 500-mL Marinelli container
3. Follow steps 4 through 9 of Section 6.2.2 to complete sample collection.

6.2.4.2 Ventilation Sampling

Ventilation sampling will be performed to identify if the system is impacted and assess the residual radioactivity that may be present.

1. If visible dust is present inside the ventilation system, use a masslin cloth to accumulate the material into a pile. (If no visible dust is present, collect a swipe sample as discussed in HPO-Tt-006, *Radiation and Contamination Surveys*.)
2. Using a flat utensil such as a piece of paper or scraper carefully place as much material as possible into a 250-mL-wide mouth plastic bottle or plastic 500-mL Marinelli container.
3. Follow steps 4 through 9 of Section 6.2.2 to complete sample collection.

6.2.5 WATER SAMPLING

Water samples will be collected as follows:

1. Collect water using any of the following sampling equipment: disposable bailer, pump, coliwassa-type tube sampler, or equivalent. Care will be taken to avoid collection of bottom sediment or vegetation.
2. Fill completely a 250-mL-wide mouth plastic bottle, plastic 500-mL Marinelli container or two liter plastic bottles.
3. Follow steps 5 through 9 of Section 6.2.2 to complete sample collection.

6.3 SAMPLE PACKAGING AND TRANSPORT

Samples will be delivered for analysis to an on-site laboratory via a box, cooler, or similar container (ice is not required if only radiological analysis will be performed) along with the completed COC. Upon arrival at the on-site laboratory, the sampler will sign the "Relinquished By" on the COC, and the laboratory manager will sign the "Received By" on the COC. The white copy of the COC will be submitted with the final analytical report of data from the on-site laboratory to the TtEC project chemist, the pink and yellow copies will be maintained by the on-site laboratory for their project files, and the manila copy will be submitted to the TtEC project chemist. A duplicate of the manila copy may also be kept in the TtEC project file on site.

Samples may be sent for off-site analysis, as described in the SAP and applicable work planning documents. A new COC will be generated by the laboratory manager for samples designated for off-site laboratory analysis. Samples designated for transport off site will be packaged in accordance with applicable Department of Transportation (DOT) and International Air Transport Association (IATA) procedures. At a minimum, sample containers will be placed in a box, cooler, or similar container for shipment and packaged with bubble wrap or other materials as necessary to prevent container breakage.

For samples transported by an off-site laboratory courier, two custody seals will be taped across the lid of the box or cooler: one seal in the front and one seal in the back. The appropriate section(s) of the COC will be completed by the assigned courier. The box/cooler and the top two copies (white and pink) of the COC will then be released to the courier for transportation to the laboratory.

For samples shipped via a commercial carrier, the COC will include the airbill number, and the "Received By" box will be labeled with the commercial courier's name. The top two copies (white and pink) of the COC will be sealed in a resealable bag and then taped to the inside of the sample cooler lid or placed inside the box. The yellow copy of the COC will be maintained by the on-site laboratory and the manila copy will be submitted to the TtEC project chemist. A duplicate of the manila copy may also be kept in the TtEC project file on site. The box/cooler will be taped shut with strapping tape as necessary. Two custody seals will be taped across the lid: one seal in the front and one seal in the back. The pouch for the airbill will be placed on the box/cooler and secured with clear tape. The airbill will be completed for priority overnight delivery and placed in the pouch. If multiple boxes/coolers are being shipped, then the original airbill will be placed on the box/cooler with the COC, and copies of the airbill will be placed on the other boxes/coolers. The number of packages should be included on each airbill (1 of 2, 2 of 2). Saturday deliveries should be coordinated in advance with the designated off-site laboratory and placement of "Saturday Delivery" stickers on each box and/or cooler to be shipped should be confirmed with the commercial courier prior to release. Prepared packages will also be surveyed prior to shipment.

7.0 RECORDS

Sample collection records will include field logbooks and COCs. These records will be completed and maintained in accordance with the Base-wide SAP.

8.0 REFERENCES

Number	*Title*
HPO-Tt-006	*Radiation and Contamination Surveys*

9.0 ATTACHMENTS

None.

FINAL

HUNTERS POINT SHIPYARD PROJECT

Standard Operating Procedure

RADIOLOGICALLY CONTROLLED AREAS - POSTING AND ACCESS CONTROL

HPO-Tt-010

DCN: FWSD-RAC-05-1282

Revision 0

Approved By:

Radiation Safety Officer — Date: 6/9/2005

Project Manager — Date: 6/9/05

REVISION HISTORY

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Radiological Control Technicians – The RCT shall be responsible for the performance of the requirements of this procedure and documentation of work performed. The RCT shall ensure compliance with this and any other referenced procedure.

5.0 DEFINITIONS AND ABBREVIATIONS

Airborne Radioactivity Area – A room, enclosure or area in which radioactive material is dispersed in air in the form of dusts, fumes, particulates, mists, vapors, or gases, and the concentration of the dispersed radioactive materials is in excess of:

- The derived air concentrations (DACs) specified in Table 1, Column 3 of Appendix B, Title 10 Part 20 of CFR.
- Concentrations such that an individual present in the area without respiratory protective equipment could exceed, during the hours the individual is present in a week, an intake of 0.6 percent of the annual limit on intake (ALI).

Annual Limit on Intake (ALI) – The derived limit for the amount of radioactive material taken into the body of an adult worker by inhalation or ingestion in a 1-year period. ALI is the smaller value of intake of a given radionuclide by the reference man that would result in a committed effective dose equivalent of 5 rems (0.05 sievert [Sv]) or a committed dose equivalent of 50 rems (0.5 Sv) to any individual organ or tissue. (ALI values for intake by ingestion and by inhalation of selected radionuclides are given in Table 1, Columns 1 and 2 of Appendix B of 10 CFR 20.) One ALI is equivalent to 2,000 DAC-hrs.

As Low As Reasonably Achievable (ALARA) – An approach to radiation protection for the control and management of exposure (both individual and collective) to the workforce and the general public; thus ensuring a level of exposure as low as social, technical, economic, practical, and public policy considerations permit. The ALARA program is structured to increase worker awareness of exposure reduction techniques and the associated benefits of that reduction.

Contaminated Area – Any area where removable surface contamination levels exceed 20 percent of the contamination limits provided in Table 1 (Attachment 1).

Derived Air Concentration (DAC) – The concentration of a given radionuclide in air which, if breathed for a working year of 2,000 hours under conditions of light work (inhalation rate of 1.2 cubic meters of air per hour), results in an intake of one ALI. DAC values are given in Table 1, Column 3, of Appendix B of 10 CFR 20 (1-92), Standards for Protection Against Radiation.

Fixed Contamination –Surface contamination exceeding the contamination limits

- Comply with all radiation protection instructions and postings.
- Refrain from eating, drinking, smoking or chewing while in a RCA.
- Perform jobs or tasks in such a manner that minimizes the creation or spread of contamination.
- Ensure that tools and equipment are surveyed prior to removing the items from a RCA.
- Refrain from loitering in radiation areas.
- Wear dosimetry in a manner required by the RWP.
- Perform a personal contamination survey upon exit from a RCA.
- Immediately report the loss, damage or unexpected exposure of dosimetry to the RTM.
- Notify the RTS of any wounds, sores or rashes before entering any area where contamination exists.
- Exit immediately if a wound occurs in a RCA, notify the RCT and seek first aid.
- Follow any additional requirements dictated by the RSO, RTM, RTS or RCT.

6.1.2 SIGNAGE

All posted areas will be designated an RCA. Additional restricted areas (such as a CA, RA, RMA, ARA) may be posted within an RCA, as necessary, to identify additional precautions that may be required.

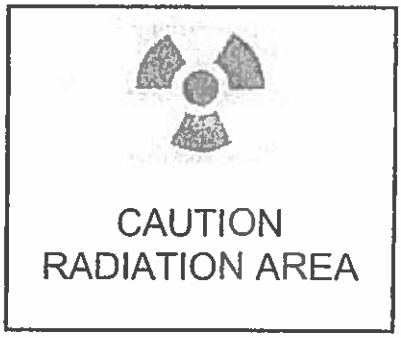
Signs identifying radiological hazards shall be posted on all entrances and accessible sides of the barrier surrounding the identified RCA. Signs identifying radiological hazards shall be firmly attached to the barrier or entrances with materials that will withstand the effects of adverse weather and normal use conditions. If signs with the exact wording are not readily available, alternative phrases may be used as long as the same requirements are clearly communicated by the posting. Signs will be identified in English and Spanish.

Each posted area shall also be posted "Radiation Work Permit (RWP) Required for Entry", and "TLD or Film Badge Required for Entry." If signs with these exact words are not readily available, alternative phrases may be used as long as the same requirements are clearly communicated by the posting.

alternative phrases may be used as long as the same requirements are clearly communicated by the posting.

6.2.3 Establishing and Posting Radiation Areas

Radiation protection personnel shall post radiation areas with signs bearing the radiation symbol and the words "CAUTION, RADIATION AREA."



If an entire room or most of a room is at or above the 2 milliroentgen per hour (mR/hr) level, a sign should be placed on each entrance door to the room. If the area to be posted is not a room, the area at or above the 2 mR/hr level shall be bounded by signs fastened to stanchions, posts or other sturdy structures. The signs will be positioned such that they are conspicuous when the area is approached from any accessible direction. If a posting is placed on a door in a manner that would prevent the posting from being observed if the door is propped open, an additional posting shall be placed in the doorway.

A single entry/exit point shall be established to access the radiation area. Access into radiation areas shall be limited to radiation workers wearing dosimetry that are signed-in on an approved RWP.

6.2.4 Establishing and Posting Contaminated Areas

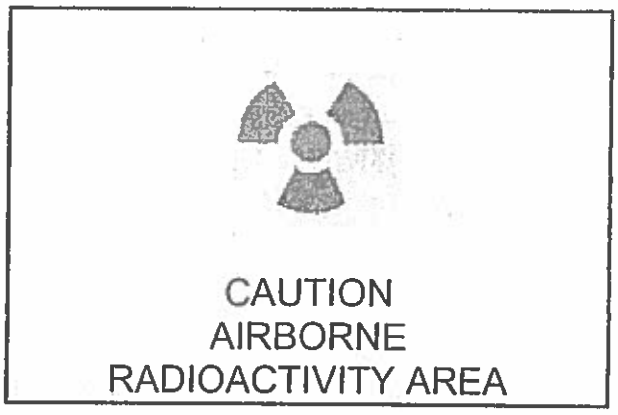
6.2.4.1 Removable Surface Contamination

Radiation protection personnel shall post any contaminated area with a sign or signs bearing the radiation symbol and the words "CAUTION, CONTAMINATED AREA."

Maintaining the airborne activity below these limits will eliminate any posting requirements.

To verify that the limits for airborne radioactivity are not exceeded, air sampling will be performed continuously during each work activity. The results of the air samples are compared with the limits above to verify that the limits are not exceeded. If the limits are exceeded, immediately contact the RTM or designee.

Radiation protection personnel shall post any Airborne Radioactivity Area or room with a sign or signs bearing the radiation symbol and the words "CAUTION, AIRBORNE RADIOACTIVITY AREA."



When posting a room, a sign should be placed on each entrance door to the room. If the area to be posted is not a room, the area containing the airborne radioactivity shall be bounded by signs fastened to stanchions, posts or other sturdy structures. The signs will be positioned such that they are conspicuous when the area is approached from any accessible direction.

6.2.6 Establishing and Posting Underground Radioactive Materials Areas

The entrance to any area (normally outside areas) shall be posted to indicate the presence of identified underground items that are known to contain radioactive materials such as pipelines, tanks, cribs, covered ponds, covered ditches, catch basins, inactive burial grounds and sites of known, covered, spills.

TABLE 1

CONTAMINATION LIMITS TABLE

Isotope	Surface Contamination (dpm/100 cm^2)[a] Structures	Soil[b] Contamination (pCi/g)	
		Outdoor Worker	Residential
^{241}Am	23.9	5.67	1.87
^{137}Cs	5,000	0.13[c]	0.13[c]
^{60}Co	5,000	0.0602	0.0361
^{239}Pu	24.7	14.0	2.59
^{226}Ra	100	2.0[d]	2.0[d]
^{90}Sr	1,000	42.3	0.331
^{232}Th	6.49	19.0	3.1
^{3}H	5,000	4.23	2.28
^{235}U	86.6	0.417	0.205

Notes:

[a] These limits are based on 25 mrem/y, using NRC Reg. Guide 1.86 or DandD Version 2.2, whichever is lower. Limits for removable surface activity are 20 percent of these values.

[b] EPA Preliminary Remediation Goals for soil

[c] Decay-corrected Preliminary Remediation Goal for industrial reuse provided by EPA Region IX.

cm^2 – square centimeters
dpm – disintegrations per minute
EPA – U. S. Environmental Protection Agency
mrem/y – millirem per year
NRC – Nuclear Regulatory Commission
pCi/g – picocurie per gram

FINAL

HUNTERS POINT SHIPYARD PROJECT

Standard Operating Procedure

CONTROL OF RADIOACTIVE MATERIAL

HPO-Tt-011

DCN: FWSD-RAC-05-1401

Revision 0

Approved By:

Radiation Safety Officer — Date: 7/05/2005

Project Manager — Date: 7/5/05

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Radiological Task Manager – The Radiological Task Manager (RTM) is responsible for ensuring that all personnel assigned the tasks of control and tracking of RAM are familiar with this procedure, adequately trained in the use of this procedure and have access to a copy of this procedure. The RTM is responsible for ensuring that the conditions of this procedure are complied with during all project operations. Additionally, the RTM is responsible for ensuring that Radiological Control Technicians (RCTs) are qualified by training and experience to perform this procedure and for training RCTs in the performance of this procedure. The RTM is also responsible for maintaining an inventory of their samples maintained at HPS.

Radiological Task Supervisor – The Radiological Task Supervisor (RTS) shall be responsible for assisting in the assignment of personnel that will perform the tasks required by this procedure. The RTS is responsible for ensuring that RCTs implement and use this procedure. The RTS will ensure that personnel under their cognizance observe proper precautions when using this procedure.

Radiological Control Technician – The RCT shall be responsible for the performance of the requirements of this procedure and documentation of work performed. The RCT shall ensure compliance with this and any other referenced procedure.

5.0 DEFINITIONS AND ABBREVIATIONS

Container – Any package or barrier which is used to enclose RAM so that it can be easily handled and contained. Examples of containers include drums, roll-off boxes, conex boxes, fiber, metal, wooden or cardboard boxes, plastic or glass jars, metal cans, bags (ziplock or open top), plastic sheeting or any other package that meets the requirements of this definition.

Control - In relation to handling of RAM, control is defined as having physical custody, being in the immediate vicinity of, or in line-of sight of the RAM. Control also refers to being responsible for the securing of RAM to prevent unauthorized access.

Mixed Waste – Waste that contains a hazardous waste component and a RAM component.

Radioactive Material (RAM) – For purpose of activities at HPS, RAM is defined as any material (e.g. soil, demolition debris, etc.), solid samples or swipes, or equipment (tools, instruments, etc.), that has a radioactive component (fixed or removable) at or above the levels specified in Table 6-1.

Radioactive Materials Area (RMA) – Any designated area where Ram is stored or used. Posting of an RMA is not required if the RAM is stored inside a posted contaminated area or airborne radioactivity area.

6.1.2 IDENTIFICATION OF RADIOACTIVE MATERIAL

Determination of whether or not to classify material or equipment as RAM waste is accomplished by surveying and/or sampling the material or equipment. In the absence of survey data, material originating from impacted areas or RCAs shall be classified as RAM and handled accordingly until proven otherwise by instrument survey or laboratory analysis.

6.1.3 MIXED WASTE

Mixed waste may be encountered or generated during remediation or decontamination activities at HPS. If the radiological and chemical components in the waste can be easily separated by physical means, this shall be done to allow for each component to be handled separately. Work to be performed at HPS shall be conducted to minimize mixed waste. Chemicals used for chemical decontamination activities shall be selected to minimize the creation of mixed waste. When it is impossible to segregate hazardous and radioactive components of materials or equipment designated for disposal, then the item(s) must be handled as a mixed waste. Applicable precautions and guidance for handling both RAM and hazardous material must be used for mixed wastes.

6.2 STORAGE OF RADIOACTIVE MATERIAL

Radioactive material must be stored in a posted area as specified below to communicate the material hazard present to personnel that may encounter the material. Posting will be done in accordance with HPO-Tt-010, *Radiologically Restricted Areas – Posting and Access Control*. RAM waste shall be containerized, whenever possible, or otherwise protected and stored in pre-authorized areas determined concurrently by the Radiological Affairs Support Office (RASO) and the Remedial Project Manager. Control must be maintained over all RAM to minimize personnel exposure and the spread of contamination. Requirements for containerizing, posting, and control of RAM are given below.

6.2.1 CONTAINERIZING

To the greatest extent possible, RAM waste should be containerized for storage. To facilitate containerization, equipment that can be disassembled should be broken down into the smallest number of components practical. Sharp edges or projections should be blunted, taped or otherwise secured to ensure that the package will maintain integrity during subsequent handling operations.

If object size does not allow for disassembly and containerization is not possible, then a plastic covering can be used to minimize the potential for the spread of contamination.

For bulk items, such as soil stockpiles, where containerization is not practicable, the materials will be placed on and covered with an impervious material, such as Herculite, to prevent the spread of the material.

6.3.1 CONTAINER/STOCKPILE INVENTORY

A running inventory of materials in a container will be kept on the container. Stockpile inventories will be kept in the TtFW site trailer. Inventories of material in a container or stockpile will be kept on the Stockpile/Container Inventory Log Sheet, or equivalent, (Attachment 1). The log sheet will be updated as material is added to containers or stockpiles.

6.3.2 REPORTING

TtFW shall receive weekly inventory updates from its subcontractors updating the amount of RAM waste maintained by them. These reports should indicate that the location and status for all RAM waste has been verified and accounted for. In addition, the reports will include the following information for new RAM waste:

- Point of origin
- Storage location
- Removal Date
- Waste description
- Isotope and activity (If known)
- Other hazardous constituents (If known)
- Quantity or volume
- Waste packaging dates
- Any additional comments

TtFW will maintain a master RWI of all RAM waste at HPS. The RWI for the project will be updated weekly by the RSO. The RSO will produce an inventory report weekly, using the Hunters Point Radioactive Waste form (Attachment 2) for distribution to RASO.

6.4 DISPOSITION OF RADIOACTIVE MATERIAL

Disposition of RAM collected during remediation, surveys, or generated through site activities will either be disposal or reduction in volume by decontamination. The considerations for these two activities are discussed below.

6.4.1 DECONTAMINATION

In some instances, it may be possible to reduce the volume of RAM by decontaminating items contaminated with RAM to levels at which the item no longer needs to be classified as RAM. The guidance for determining if decontamination is appropriate and for actually performing decontamination is given in HPO-Tt-016, *Decontamination of Equipment, Material and Tools*.

ATTACHMENT 1

STOCKPILE/CONTAINER INVENTORY LOG SHEET

Stockpile/Container ID # Page of

Description of Item	Item ID #	Date	Time (24 hr)	Dose Rate/Activity	Initials

FINAL

HUNTERS POINT SHIPYARD PROJECT

Standard Operating Procedure

RELEASE OF MATERIALS AND EQUIPMENT FROM RADIOLOGICALLY CONTROLLED AREAS

HPO-Tt-012

DCN: ECSD-RAC-05-1340

Revision 1

Approved By:

Erik J. Altenaier

Radiation Safety Officer — Date: 4/14/11

Project Manager — Date: 4/14/11

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June 20, 2005	0	E Forrer	Issued Final	All
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1.0 PURPOSE

The purpose of this procedure is to specify the radiological survey requirements for releasing materials and equipment from radiologically controlled areas (RCAs).

2.0 SCOPE

This procedure will be used by Tetra Tech EC, Inc. (TtEC) personnel and its subcontractors to release materials from RCAs.

3.0 MAINTENANCE

The Radiation Safety Officer (RSO) is designated the procedure owner and is responsible for updating this procedure. Approval authority rests with the Project Manager.

4.0 RESPONSIBILITIES

Radiation Safety Officer – The RSO is responsible for the overall implementation and compliance with this procedure during all project operations. The RSO will assist in the interpretation of results obtained during surveys. The RSO shall conduct periodic reviews to ensure adherence to the requirements of this procedure.

The RSO is responsible for the training of personnel performing work detailed by this procedure.

Radiological Safety Officer Representative – The Radiological Safety Officer Representative (RSOR) is responsible for ensuring that all personnel assigned the task of performing surveys in support of unconditionally releasing materials from controlled areas are familiar with this procedure, trained in the use of this procedure, and have access to a copy of this procedure. The RSOR is responsible for ensuring Radiological Task Supervisors (RTSs) are implementing this procedure for work performed under their cognizance. The RSOR ensures that the Radiological Control Technicians (RCTs) performing activities governed by this procedure are implementing this procedure. The RSOR will review survey data and approve the unconditional release of materials and equipment from RCAs. The RSOR will notify the RSO of any unsafe or unusual conditions observed during performance of this procedure.

Radiological Task Supervisor – The RTS is responsible for assisting in the assignment of personnel that will perform the tasks required by this procedure. The RTS is responsible for the control of radioactive material, coverage of radiation workers, and to ensure that personnel under their cognizance observe proper precautions. The RTS is responsible for notifying the RSOR of any unsafe or unusual conditions observed during performance and implementation of this procedure.

Radiological Control Technician – The RCT is responsible for the performance of the requirements of this procedure and documentation of work performed. The RCT shall ensure compliance with this and any other referenced procedure. The RCT is responsible for notifying the RTS of unsafe or unusual conditions.

5.0 DEFINITIONS AND ABBREVIATIONS

Contamination – Deposition of radioactive material in any place it is not desired. Contamination may be due to the presence of alpha particle, beta particle or gamma ray emitting radionuclides.

Fixed Surface Contamination – Radioactive contamination that is not readily removed from a surface by applying light to moderate pressure when wiping with a paper or cloth disk swipe or masslinn.

Radiologically Controlled Area (RCA) – An area containing radioactive materials (in excess of the levels provided in Table 1 of Standard Operating Procedure HPO-Tt-010, *Radiologically Controlled Areas – Posting and Access Control*) to which access is controlled to protect individuals from exposure to contamination and ionizing radiation.

Release for Unrestricted Use – The authorization to remove or reuse equipment and/or material from a RCA. Such authorization will be based on review of survey data confirming that the material and/or equipment being released does not exhibit radiation levels exceeding those in Table 5-1.

Removable Surface Contamination – Radioactive contamination that is readily removed from a surface by applying light to moderate pressure when wiping with a paper or cloth disk swipe or masslinn.

6.0 PROCEDURE DETAILS

6.1 GENERAL

Materials and equipment will be released from RCAs based on surveys for fixed and removable contamination. Surveys for fixed and removable surface contamination shall

be conducted and documented in accordance with HPO-Tt-006, *Radiation and Contamination Surveys.*

6.2 LIMITATIONS

This procedure shall not be used for personnel surveys. Personnel will be surveyed in accordance with HPO-Tt-022, *Personnel Protective Equipment, Monitoring, And Decontamination.*

6.3 RELEASE PROCEDURE

6.3.1 MATERIAL HISTORY

Upon receipt of an item presented for release from RCAs, the history of the item should be determined. This determination should include if possible:

- The current and past use of the item.
- The location(s) in which the item was used or stored.
- If the item was in an area where radioactive material was used or stored.

This history will be used, if applicable, to evaluate the potential for contamination to be present on inaccessible surfaces of the item.

6.3.2 CONTAMINATION SURVEYS

All accessible surfaces will be surveyed for removable and fixed surface contamination in accordance with HPO-Tt-006, *Radiation and Contamination Surveys.*

Swipes will be taken on all accessible surfaces of the material and equipment. Swipes collected for removable surface contamination shall be analyzed with low-background gas proportional counters. Typically a Protean IPC 9025 and/or a Tennelec Series 5 XLB gas-flow proportional alpha/beta radiation counter will be employed to count swipes for the release of materials and equipment. As a backup to the gas-flow proportional counters, a Ludlum Model 2929 scaler with a Model 43-10-1 ZnS(Ag) scintillation probe (or equivalent) may be used.

Scan surveys will be conducted on all accessible surfaces of the material or equipment. Whenever practical, 100 percent of the accessible area will be scanned for alpha, beta, and gamma.

Following scan surveys, static survey measurements will be collected. The number of static surveys will be determined by:

- The size and history of the item

- Preliminary results of the swipe and scan surveys
- If an increase in the audible and/or digital/analog count rate was detected
- If during the survey, the RCT determines that there may be fixed activity present

6.3.3 Inaccessible Surfaces

If items have inaccessible surfaces that may have been exposed to contamination, or if it is unknown if they have been exposed to contamination, the items should be disassembled as completely as possible to facilitate release surveys. Items with inaccessible surfaces will not be released from an RCA, unless evaluated and documented by the RSO or designee in conjunction with RASO.

6.3.4 Release of Material and Equipment

The following steps shall be taken for release of material and equipment:

1. If the results of the swipe, scan and static surveys do not exceed the limits of Table 5-1 then the material may be released for unrestricted use.
2. If the swipe, scan or static survey results indicate contamination, which exceeds the limits of Table 5-1, the material shall be secured and managed in accordance with HPO Tt-011, *Control of Radioactive Material*. Material that cannot be released for unrestricted use will be evaluated for decontamination in accordance with HPO-Tt-016, *Decontamination of Equipment and Tools,* or packaged for disposal.
3. Results of the swipe, scan and static surveys shall be documented in accordance with HPO-Tt-006, *Radiation and Contamination Surveys*.
4. If the equipment and/or materials are being returned to a vendor or removed from the Hunters Point Shipyard, a completed Attachment 1 – Unconditional Release of Equipment or Materials Form – or copy of the Radiation/Contamination Survey and Supplement form (Attachments 1 and 2 from HPO-Tt-006, *Radiation and Contamination Surveys)* with the statement "Equipment or materials have been surveyed and found to be within acceptable surface contamination levels for unconditional release as required by AEC Guide 1.86" written or stamped on the Radiation/Contamination Survey Form or equivalent will accompany the equipment and/or material.

TABLE 5-1

RELEASE LIMITS FOR MATERIALS AND EQUIPMENT

Radiation Type	Release Limits[1] (Fixed) (dpm per 100 cm^2)	Release Limits[1] (Removable) (dpm per 100 cm^2)
Alpha (α) Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100	20
Beta (β-) Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1000	200
Beta-Gamma (β-γ) Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.	5,000	1,000

Notes:

[1] These limits are based on AEC Regulatory Guide 1.86 (AEC, 1974)

AEC – Atomic Energy Commission
cm^2 – square centimeters
dpm – disintegrations per minute

7.0 REFERENCES

Number	*Title*
AEC Regulatory Guide 1.86	*Termination of Operating Licenses for Nuclear Reactors*
HPO-Tt-006	*Radiation and Contamination Surveys Procedure*
HPO-Tt-10	*Radiologically Controlled Areas – Posting and Access Control*
HPO-Tt-011	*Control of Radioactive Materials*
HPO-Tt-016	*Decontamination of Equipment and Tools*
HPO-Tt-022	*Personnel Protective Equipment, Monitoring, and Decontamination*

8.0 ATTACHMENTS

Attachment 1 – Unconditional Release of Equipment or Materials Form.

ATTACHMENT 1

UNCONDITIONAL RELEASE OF EQUIPMENT OR MATERIALS FORM

Survey #:	Date:
Description of equipment or materials:	

SURVEY EQUIPMENT:

Model No:	S/N:	Background:	Eff:	Cal Due Date:
Model No:	S/N:	Background:	Eff:	Cal Due Date:
Model No:	S/N:	Background:	Eff:	Cal Due Date:

CONTAMINATION LEVELS:

	dpm/100 cm^2 $\beta\gamma$	Maximum Removable
	dpm/100 cm^2 α	Maximum Removable
	dpm/100 cm^2 $\beta\gamma$	Maximum Fixed
	dpm/100 cm^2 α	Maximum Fixed

This is to certify that the above described equipment or materials have been surveyed and found to be within acceptable surface contamination levels for unconditional release as required by Nuclear Regulatory Guide 1.86.

Radiological Control Technician:	Date/Time:
Disposition of equipment or materials:	
Reviewed By:	Date:

Appendix B
Response to Navy ROICC and RPM Comments

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N62473-09-D-2622/0059 - KCH

PARCEL F Activate Carbon amendments Pilot Study Monitoring
ACCIDENT PREVENTION PLAN - April 2015 Submittal

HUNTERS POINT NAVAL SHIPYARD, SAN FRANCISCO, CALIFORINA

ROICC SF Bay Comments - April 2015

Reference: (a) EM 385-1-1, Sept 2008/August 2011

Page	Section/Paragraph	Comment	Responses to Comments:
1-1	Signature Sheet	Signature page does not show the APP was approved by the Contractor. This is in non-compliance to reference Appendix A (1)(b), "Plan must be approved, by company/corporate officers authorized to obligate the company." Also, per Appendix 1(c), Provide plan concurrence of other applicable corporate and project personnel.	Noted, our policy is to sign only the final document once all comments are addressed.
v.		The AHA 2 Field note indicates SSC. Provide Acronyms and Abbreviations.	That was a holdover from another document, revised to note SSHO.
2-1	2.2	Provide Contract CTO number to Contract Number.	The requested information was added.
2-2	2-6/ last sentence	Update current schedule timeline for work to be conducted by future subcontractors. Add seven work days for each new AHA submittal for review/acceptance or up to 10-15 days for non-expedited review.	The schedule has been revised as requested.
3-1	3.0/2nd	Provide written safety program goals, objective and accident experience goals for the contract. Ref (a) Appendix A, Section 3.	Current text within Section 2.5 states our accident experience as a Joint Venture on this contract, which complies with the requirement.
4-1	4.1/1st	Delete "through their task order managers"	The KCH Health and Safety Program has designated the task order managers as the person responsible for the implementation of the health and safety program. This designation complies with the Navy contract. Text was not revised.

Page	Section/Paragraph	Comment	Responses to Comments:
6-1	6.0	List requirement for mandatory training and other requirements per Reference (a), Appendix A, Sections 6(b),(c) and (d), or reference SSHP specific sections.	A list of required mandatory training and other requirements are included in Section 4 of SSHP and the APP has a reference to the appropriate section in the SSHP.
7-1	7.0/1st	Change visual inspections of work areas to a daily job-site safety/health inspection. Keep records as proof of inspector's training/qualifications, when inspections will be conducted, procedures for documentation, deficiency tracking system, and follow-up procedures.	The APP states these are daily inspections as well as safety and Section 5.0 of the SSHP, which is referenced, states our process for documenting and tracking noted deficiencies.
9-10	9.26	Provide summary of the Float Plan. Update current schedule timeline to include up to 10 – 15 work days for Float Plan and AHA review/ROICC acceptance.	A summary of the float plan has been added and the schedule has been updated as requested.
Appendix A-SSHP	1.3	Include reference of work procedure in accordance to the current approved work plan.	Text has been added to include reference of work procedure in accordance to the current approved work plan.
4-3	4.2.3	Contractor employees shall be trained by the basewide Radiological Safety Contractor.	The APP includes text stating that contractor employees shall be trained by the basewide Radiological Safety Contractor.
7-14	7.12	2nd bullet, state the dose limits.	This is covered in the RAD Work plan as prepared and given to KCH by TetraTech, the basewide Radiological Safety Contractor. It has been added as Attachment 5 in the SSHP.
11-1, 13-2	11.0, 13.1.3	Notify the Navy Caretaker Site Office for spill release. Provide Spill Plan. Add CSO contact information.	The only potential spill item would be fuel from the boat on the bay, which has been included in the subcontractor's AHA.
Figures		Add figure(s) to better delineate work areas.	Figure 4 has been updated to clearly show the pilot study area and sampling location within the South Basin in Parcel F.
Figure 5		Include driving direction to the Hospital Route Map.	Figure 5, is now Figure 6 and has been revised to included driving directions to the Hospital.
AHA 01		Biological hazards – include insect repellent as recommended control. Specify type of PPE for face protection.	Language added as a precaution. KCH does not anticipate face protection needed for work on water.

Page	Section/Paragraph	Comment	Responses to Comments:
AHA 02		Competent Person(s) to include specific job hazards for each activity – Sediment Surveying, Sampling, and Activated Carbon Placement. List marine work Competent Person.	Each subcontractor AHA specifies their competent person. For our general tasks under AHA 1 and 2, our SSHO is the competent person.
General		Update ROICC Representative cell phone to (510) 502-5051.	The ROICC has been added to the Emergency Contacts List.
New AHA		Handling of IDW.	Generation of IDW for these field events is not anticipated; therefore, an AHA is not needed.
-End of Comment			

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NAVY AND MARINE CORPS PUBLIC HEALTH CENTER
ENVIRONMENTAL PROGRAMS DEPARTMENT

Accident Prevention Plan and
Site Safety and Health Plan Review

Location: San Francisco, CA

Command: Former Hunters Point Naval Shipyard

Site(s): Parcel F

Work Description: Activated Carbon Amendments Pilot Study Monitoring

Document Date: April 2015

Contract No./Contract Task Order: N62473-09-D-2622/CTO 0059

EP Document No: 15-048

Prepared for: NAVFAC SW BRAC PMO/Danielle Janda (RPM)

Prepared by: CH2M HILL Kleinfelder, A Joint Venture (KCH)

Received: 3 April 2015

Date Comments Provided: 15 April 2015

Reviewed by: Mr. Bob Hayes, MS, CIH, (757) 953-0937;
harold.hayes@med.navy.mil; DSN: 377

Accident Prevention Plan and Site Safety and Health Plan Review

Ref: (a) 29 CFR 1910.120 (Hazardous Waste Operations and Emergency Response)
(b) 29 CFR 1926.65 (Hazardous Waste Operations and Emergency Response)
(c) Department of the Navy Environmental Restoration Program Manual (August 2006)
(d) U. S. Army Corps of Engineers, Safety and Health Requirements Manual, EM 385-1-1 (current edition)

The Navy and Marine Corps Public Health Center (NMCPHC) has completed a review of the draft Accident Prevention Plan (APP), Site Safety and Health Plan (SSHP) and Activity Hazard Analyses (AHAs) for the Activated Carbon Amendments Pilot Study Monitoring at Parcel F, Former Hunters Point Naval Shipyard, San Francisco, CA. The document has been reviewed and compared to the requirements of references (a) through (d).

No.	Topic/Issue	Comment	Recommendation	Contractor Response
1	APP/SSHP Approval and Signature	The Signature Page for the APP/SSHP has not been signed and dated.	Ensure the final version of the APP/SSHP has been signed and dated by all required project and corporate parties and accepted by the NAVFAC SW RPM prior to the start of any field work. For future submittals, it is recommended that the draft APP/SSHP be signed and dated, indicating that principal/key project staff have reviewed the document for completeness and accuracy.	Only the final document is signed, once all comments have been addressed and accepted by reviewers. We will submit the final signed copy before work starts.
2	Project Responsibilities and Lines of Authority	The following comments are provided: a. Who is the designated project Competent Person (CP)? The SSHO duties do not include serving as the project CP. b. The CP is not listed on the AHAs provided for review. c. The NMCPHC Reviewer could not find a project Lines of Authority (LOA)/ Organizational Chart.	The following recommendations are provided: a. Designate the project CP. Per reference (d) this role is typically assigned to the project SSHO; if so, add the CP title and responsibilities for the SSHO in Section 2 and ensure the CP is listed on all project AHAs. b. In Section 2 of the SSHP provide a project LOA/Organizational Chart.	a. The SSHO shall serve as the overall site competent person where AHAs do not identify a task specific person. Language has been added to the roles section in the APP and SSHP. b. CP will be added to all AHAs. c. A chart showing lines of authority was inadvertently left out of the submittal. It will be added.

No.	Topic/Issue	Comment	Recommendation	Contractor Response
3	Radiological Hazards	The following comments are provided: a. Radiological hazards are not listed in Table 4, Contaminants of Concern. b. Will project PPE, as currently identified, be sufficient protection against potential radiological hazards, contact and employee contamination? c. NMCPHC did not review the APP and SSHP for radiological safety. It should be noted that NMCPHC did not see any mention of, or reference to, any existing project radiological safety plan/procedure. Is there one? Is a radiological safety plan required?	The following recommendations are provided: a. Add specific radiological hazards and contaminants (isotopes, radiation type: alpha, beta or gamma emitters) to Table 4. b. Assess/evaluate project PPE requirements to determine level of effectiveness against radiological hazards to be encountered. Modify PPE requirements as necessary to ensure maximum employee protection from both PCBNs and radiological hazards. b. Contact the NAVFAC RASO to determine if a project radiological plan is required. At a minimum, ensure the APP and SSHP have been forwarded to RASO for review.	a. This is because there are no records or data showing this in the sediments. It is a basic sitewide requirement and implemented by a specific site contractor. We are required to comply. b. Yes. PPE for radiological hazards for this site is nitrile gloves and glasses, which are included in the standard PPE requirements for this project. c. See responses a and b.
4	Subcontractors Not Identified	Subcontractors for many project tasks have not been identified.	Ensure all project subcontractors are identified for each task in the final APP/SSHP submitted to NAVFAC SW BRAC RPM for acceptance/approval. Ensure all key subcontractor staff are also included on the project LOA/Organizational Chart and are listed on the Emergency Contact Listing.	Agreed, still under procurement. KCH was directed to submit APP draft prior to securing all subcontractors by client.
5	Missing AHAs	Only two AHAs were submitted for review, both related to work to be performed by the contractor. According to the APP three of the five tasks identified will be performed by subcontractors; however, these AHAs are missing and as such could not be reviewed by NMCPHC.	Ensure all subcontractor AHAs have been developed, reviewed, approved and included in the final APP/SSHP submitted to NAVFAC SW BRAC RPM for acceptance/approval.	Agreed, they are being submitted as each subcontractor is procured. ROICC personnel will review as part of the final submittal.

No.	Topic/Issue	Comment	Recommendation	Contractor Response
6	Working On/Over Water/Float Plan Requirements	The following comments are provided:	The following recommendations are provided:	
		a. The AHAs for work on/over water were missing.	a. Provide the AHAs for work on/over water. See Comment/Recommendation #5.	a. AHA 2 was for all water tasks.
		b. The Float Plan, identified as being in Attachment 3 of the SSHP, was missing.	b. Provide the Float Plan in Attachment 3 of the SSHP. Ensure the Float Plan and any related procedures have been reviewed and approved by the NAVFAC SW BRAC RPM/Safety prior to finalizing the APP/SSHP and prior to implementation/use.	b. The float plan has been received, and has been submitted for review to the RPNM and ROICC. The float plan has been to the final APP.
		c. What type of personal flotation device (PFD) will be worn?	c. Specify in the PPE section and the AHAs the specific type of PFD that will be worn.	c. All PFDs will be United States Coast Guard (USCG)-approved models.
		d. What is the length of the vessel to be used and is it open cockpit or have a cabin?	d. Specify the length and type of vessel (boat/skiff) that will be used. Review the requirements for working boats and skiffs as found in Section 19.F and related sections of reference (d) and ensure the vessel meets these requirements.	d. The vessel is an R/V Walter Marie that is 34 feet long with an 18-foot A-Frame and open deck with house.
		e. What are the fire extinguisher requirements for the vessel and barge?	e. Specify the fire extinguisher requirements for the vessel and barge to be used and ensure proper fire extinguishers are on-board, full/operational, properly inspected, and meet all operating requirements for fire extinguishers.	e. They will meet USCG requirements for size of vessel. Three units are on the craft, house, engine compartment, and deck area.
		f. There is no mention of having a rescue skiff on standby and available in the event of a water emergency.	f. Review and implement rescue skiff requirements as found in reference (d) for work on/over water.	f. A rescue boat is not anticipated as being needed. The boat will be equipped with emergency throw rope and ring. However, Dixon Marine will have a 20-foot work skiff on standby at the dock.
		g. What is meant by using the "buddy system" for work on/over water?	g. Clearly explain the "buddy system" as it will pertain to work on/over water.	g. No one is permitted to work alone over the water.

No.	Topic/Issue	Comment	Recommendation	Contractor Response
		h. What are the training/qualifications of the motorboat operators?	h. Ensure vessel/boat operators meet all U.S. Coast Guard, State of California and Section 19.F.05 of reference (d) training and qualification requirements. Maintain verification of qualification and training for motorboat operators as part of the project file and list qualified motorboat operators on the applicable AHAs.	h. All operators will meet and have a current qualified boat operator's safety credential meeting USCG and State of California requirements. The captain is licensed for 100 ton unlimited.
		i. What are the specific U.S. Coast Guard safety requirements applicable for the vessel and barge to be used?	i. Identify and list specific U.S. Coast Guard operational/safety standards/requirements applicable to the vessels and barge that will be used and ensure the vessels and barges meet these standards/ requirements.	i. The applicable specific USCG Safety Requirements are CFR46 Chapter 1 Subchapter Q Part 160 sections .001, .040, .041, .053, and .054.
		j. What is the maximum weight/occupancy capacity of the vessel and barge to be used?	j. Know and include in the APP/SSHP the maximum weight/occupancy capacity of the vessel and barge and ensure these limits are not exceeded.	j. The maximum weight capacity of the vessel and barge is 15,000 pounds and the occupancy capacity is 7 people.
		k. What are the specific fall protection requirements that will be in-place on the vessel/barge?	k. Specify the fall protection requirements that will be in-place on the vessel/barge, as indicated in Section 7.11.2 of the SSHP.	k. The specific fall protection requirements are climbing harness will be available and the "A" frame will be laid down if service is needed.
7	Emergency Information	The following comments are provided: a. The Emergency Action Plan (EAP) does not discuss potential emergencies related to working on/over water (man overboard, abandon ship, vessel/barge fires, vessel/barge sinking) and specific actions and responses necessary in order to effectively and safely perform rescues and responses.	The following recommendations are provided: a. Modify the EAP to include identification and discussion of potential emergencies and responses for situations such as man overboard, abandon ship, vessel/barge fires, vessel/barge sinking. Include discussion of availability and manning of a rescue skiff.	a. The EAP for over water is addressed in the Float Plan. A reference to this will be added to the APP and Section 13.4 of the SSHP.

No.	Topic/Issue	Comment	Recommendation	Contractor Response
		b. U.S. Coast Guard Emergency Response numbers, as well as specific Navy Emergency Response numbers for vessel emergencies, is not listed in Section 13 of the SSHP.	b. Include on the Emergency Contact Listing the U.S. Coast Guard Emergency Response numbers, as well as specific Navy Emergency Response numbers for vessel emergencies.	b. Those numbers will be added.
		c. How frequently will potential vessel/barge emergencies be practiced/drilled?	c. Identify the practice/drilling frequency for emergencies associated with vessel/barge operations and ensure applicable organizations responsible for responding to such emergencies are included in the drills.	c. The project duration is relatively short, so there are not any actual drills planned, but a thorough review of the procedures will be conducted by the SSHO.
		d. How will vessel/barge operators and personnel maintain communication with rescue personnel and a rescue skiff?	d. Discuss methods of communication that vessel/barge operators and personnel will use to effectively communicate with rescue personnel and the rescue skiff.	d. Communications will be via radio and cell phone. A rescue skiff is not anticipated as necessary for this shallow water sheltered bay inlet.
		e. Section 13.1.5 of the EAP in the SSHP states that the Emergency Response Plan (ERP) is explained in full in Section 12.2 of the APP. This section does not exist in the APP. What is the difference between the ERP mentioned and the EAP presented in Section 13.1.5?	e. Provide a complete discussion ERP as indicated in Section 13.1.5 of the EAP, and explain why there is a separate EAP and ERP and the situations each will be applicable.	e. That reference was from an older plan for a larger project, and has been deleted.
		f. Why is wildland fire prevention included in the EAP if this project involves work over water? Is this applicable?	f. Evaluate if the wildland fire prevention section is applicable and if not, remove it.	f. This section is still applicable because of potential field vehicle parking areas.
		g. Only the route map and address to the nearest medical facility have been provided. Where are the specific written directions to the medical facility?	g. Provide detailed driving directions to the nearest medical facility. Include the driving directions in the EAP/ERP and with the route map provided. Also include the medical facility address on the route map.	g. The route will be driven prior to start of fieldwork to ensure no road changes are or have occurred. Then the written directions will be added once confirmed. This area in San Francisco is frequently undergoing road repairs and rerouting.




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