TERMINAL 91: SUBMERGED LANDS AREA PRELIMINARY INVESTIGATION SAMPLING AND ANALYSIS PLAN

APPENDIX B: HEALTH AND SAFETY PLAN

Prepared for:

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For submittal to:

Dredged Material Management Program Agencies
US Army Corps of Engineers
US Environmental Protection Agency
Washington State Department of Ecology
Washington State Department of Natural Resources

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Health and Safety Plan Signature Page

By their signature, the undersigned certify that this health and safety plan is approved and that it will be used to govern health and safety aspects of fieldwork described in the quality assurance project plan to which it is attached.

Susan McGroddy	October 2017
Project Manager	Date

Susan McGroddy	October 2017
Corporate Health and Safety Manager	Date

Thai Do	October 2017
Field Coordinator / Health and Safety Officer	Date

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Acronyms

CFR	Code of Federal Regulations
CPR	cardiopulmonary resuscitation
DMM	discarded military munitions
EOD	Explosive Ordnance Disposal
FC	field coordinator
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSM	health and safety manager
HSO	health and safety officer
HSP	health and safety plan
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PEC	project emergency coordinator
PFD	personal flotation device
PPE	personal protective equipment
PM	project manager
QAPP	quality assurance project plan
T-91	Terminal 91
TCDD	tetrachlorodibenzo-*p*-dioxin
USCG	US Coast Guard
UXO	unexploded ordnances
WAC	Washington Administrative Code

1 Introduction

This site-specific health and safety plan (HSP) describes safe working practices for conducting field activities at potentially hazardous sites and for handling potentially hazardous materials or waste products. This HSP covers elements as specified in 29CFR1910§120 as well as Washington Administrative Code (WAC) 173-340-810. The goal of the HSP is to establish procedures for safe working practices for all field personnel.

This HSP addresses all activities associated with collection and handling of surface and subsurface sediment samples in The Port of Seattle's Terminal 91 (T-91). During site work, this HSP will be implemented by the field coordinator (FC), who is also the designated site health and safety officer (HSO), in cooperation with the corporate health and safety manager (HSM) and the project manager (PM).

All personnel involved in fieldwork on this project are required to comply with this HSP. The content of this HSP reflects the types of activities that are anticipated to be performed, knowledge of the physical characteristics of the site, and consideration of preliminary chemical data from previous investigations at the site. The HSP may be revised based on new information and/or changed conditions during site activities. Revisions will be documented in the project records.

2 Site Description and Project Scope

2.1 Site Description

T-91 is located at the north end of Elliott Bay at 2001 West Garfield Street, in Seattle, Washington). T-91 includes Piers 90 and 91, about 35 acres of adjacent water area, and about 72 acres of yard area north of the Magnolia Bridge. The terminal also includes 14 acres of open space, a 24-acre open-water park deeded to the City of Seattle, and the vacated Smith Cove Waterway, owned by the Port.

T-91 supports marine uses such as a cruise ship terminal, cargo handling facilities for high-value, high-employment commodities (e.g., fish products); a factory trawler homeport and support facility; major cold storage warehouses, distribution, and a seafood processing plant; and short- and long-term moorage for tugs, barges, and other large vessels.

2.2 Scope and Duration of Work

Sediment sampling will be conducted in two phases. The first phase will be conducted in November 2017 and will include the collection of surface sediment samples using a power grab sampling device operated by RSS (Research Support Services). The second phase will be conducted in the spring of 2018 and will include

the collection of sediment cores for sediment chemistry and geochronology cores. The sediment cores for chemical analysis will be collected using a RIC-3500 vibracoring system. The geochronology cores will be collected by divers using a hammer corer. The SAP contains the details of all the sampling protocols for both Phase 1 and Phase 2 sampling.

3 Health and Safety Personnel

Key health and safety personnel and their responsibilities are described below. These individuals are responsible for the implementation of this HSP.

Project Manager: The PM has overall responsibility for the successful outcome of the project. The PM will ensure that adequate resources and budget are provided for the health and safety staff to carry out their responsibilities during fieldwork. The PM, in consultation with the HSM, makes final decisions concerning the implementation of the HSP.

Field Coordinator/Health and Safety Officer: Because of the limited scope and duration of fieldwork, the FC and HSO will be the same individual. The FC / HSO will direct field sampling activities, coordinate the technical components of the field program with health and safety components, and ensure that work is performed according to the quality assurance project plan (QAPP). The FC / HSO will implement this HSP at the work location and will be responsible for all health and safety activities and the delegation of duties to a health and safety technician in the field, if appropriate. The FC / HSO also has stop-work authority, to be used if there is an imminent safety hazard or potentially dangerous situation. The FC / HSO or her designee shall be present during sampling and operations.

Corporate Health and Safety Manager: The HSM has overall responsibility for the preparation, approval, and revision of this HSP. The HSM will not necessarily be present during fieldwork but will be readily available, if required, for consultation regarding health and safety issues during fieldwork.

Field Crew: All field crew members must be familiar and comply with the information in this HSP. They also have the responsibility to report any potentially unsafe or hazardous conditions to the FC / HSO immediately.

UXO Technician: Although DMM are not expected to be encountered during this field work, an unexploded ordnance (UXO) Technician III will escort the sediment sampling crew and will be responsible for performing anomaly avoidance described in section 4.1.8.2 of this HSP. The UXO Technician will be qualified in accordance with DoD Explosives Safety Board (DDESB) Technical Paper (TP) 18, *Minimum Qualifications for Personnel Conducting Munitions and Explosives of Concern-Related Activities* (DDESB 2016) and implement all necessary protective measures related to

safeguarding the health and well-being of the sampling crews should DMM inadvertently be recovered.

4 Hazard Evaluation and Control Measures

This section discusses potential physical and chemical hazards that may be associated with the proposed project activities and presents control measures for addressing these hazards. The activity hazard analysis (Section 4.4) lists the potential hazards associated with each site activity and the recommended site control. Confined space entry will not be necessary for this project. Therefore, hazards associated with this activity are not discussed in this HSP.

4.1 PHYSICAL HAZARDS

For this project, it is anticipated that physical hazards present a greater risk of injury than do chemical hazards.

4.1.1 Slips, trips, and falls

As with all fieldwork sites, caution should be exercised to prevent slips on slick surfaces. In particular, sampling from a boat or other floating platform requires careful attention to minimize the risk of falling down or falling overboard. The same care should be used in rainy conditions or on the shoreline where there are slick rocks. Slips can be minimized through the use of boots with good treads, made of material that does not become overly slippery when wet.

Trips are always a hazard on the uneven deck of a boat, in cluttered work areas, or in the intertidal zone where uneven substrate is common. Personnel will keep work areas as free as possible from obstacles that could interfere with walking.

Falls can also be a hazard. Personnel can avoid falls by working as far from exposed edges as possible, erecting railings, and using fall protection when working on elevated platforms. For this project, no work that would present a fall hazard is anticipated.

4.1.2 Sampling equipment

Sediment grab samplers will be deployed from the boat to collect sediment cores. Care will be taken to ensure that the samplers are safely guided over the railing and into the water. Before sampling activities begin, there will be a training session for all field personnel for the equipment that will be onboard the sampling vessel.

4.1.3 Falling overboard

Most of the sampling activities will be done from a boat. As with any work from a floating platform, there is a chance of falling overboard. Personal flotation devices (PFDs) will be worn by all personnel while working from the boat.

4.1.4 Manual lifting

Equipment and samples must be lifted and carried. Back strain can result if lifting is done improperly. During any manual handling tasks, personnel should lift with the load supported by their legs, not their backs. For heavy loads, an adequate number of people, or if possible, a mechanical lifting / handling device, will be used.

4.1.5 Heat stress, hypothermia, or frostbite

Sampling operations and conditions that might result in the occurrence of heat stress are not anticipated.

4.1.6 Weather

In general, field team members will be equipped for the normal range of weather conditions. The FC / HSO will be aware of current weather conditions and of the potential for those conditions to pose a hazard to the field crew. Some conditions that might force work stoppage are electrical storms, high winds, or high waves resulting from winds.

4.1.7 Sharp objects

Sampling operations might result in the exposure of field personnel to sharp objects on top of or buried within the sediment. If these objects are encountered, field personnel should not touch them. Also, field personnel should not dig in the sediment by hand.

4.1.8 Discarded Military Munitions

4.1.8.1 Site Background

The former Seattle Naval Supply Depot (SNSD) is a Formerly Used Defense Sites (FUDS) #F10WA012501 facility that was used during the World War II-era as a loading and offloading facility for United States (US) Navy warships. It was not an ammunition depot, and no records exist of live firing ever occurring at the site. During this period, discarded military munitions (DMM) were infrequently jettisoned overboard without documentation while ships were in port.

The site is presently operated by the Port of Seattle (POS) as Terminal 91. Terminal 91 encompasses Pier 90 and Pier 91. Pier 91 is presently used during a portion of the year as the Smith Cove Cruise Terminal. The cruise terminal is a point of embarkation for cruise trips to Alaska. During routine security sweeps by POS Police Department (PD) divers on April 22, 2010, several DMM items were discovered. These discoveries led to a series of six subsequent active US Army and Navy Explosive Ordnance Disposal (EOD) responses to the facility. Prior to these events, there is no record of encounters with DMM at the facility.

DMM was found in the sediments in April 2010 during a regular underwater inspection of the facility by the Port Police Department. In 2010, the U.S. Army Corps initiated the Piers 90 and 91 Remedial Investigation and conducted extensive mapping of the area with removal of all identified munitions. Safety protocols have been developed in this HSP to addresses the unlikely event that DMM is encountered in a sediment sample.

Possible DMM at Terminal 91 are:

- 0.50 Cal
- 20mm cartridges
- 30mm cartridges
- 40mm projectile
- 3 inch projectile
- 4 inch projectile
- 5 inch projectile

4.1.8.2 DMM avoidance

To address the unlikely hazards of encountering DMM during the sediment sampling work, a UXO Technician III will accompany the sampling crews aboard the sampling vessel. Within the portion of the site identified as the DMM Area (Map 1) based on the presence of DMM in this area during previous investigations, the UXO Technician will perform anomaly avoidance techniques at each location prior to sampling in accordance with US Army Corps of Engineers (USACE) Explosives Safety and Health Requirements Manual, EM 385-1-97 (USACE 2013). This procedure will include that the UXO Technician using a magnetometer to survey each location prior to collecting a sediment sample. If an anomaly is detected at a sediment sample location, that location will be abandoned and a new sampling location will be chosen.

When sampling is conducted outside of the DMM Area, magnetometer survey of each sampling location will not be required. The UXO Technician will be present to perform magnetometer and visual surveys on samples after collection.

All samples that are successfully gathered will be brought aboard the sampling vessel and visually inspected as well as screened with a magnetometer. If a potential DMM item is found in a sediment sample, the UXO Technician will secure the DMM and immediately contact:

- Port of Seattle Police Department dispatch: (206) 787-3490

- Port of Seattle Bomb Disposal Unit, Sgt. Pat Addison: (206) 787-7690

- CPT Greg McClendon, Assistant Operations Officer, 3rd Ordnance Battalion Explosive Ordnance Disposal (EOD), US Army (Fort Lewis):
  - (619) 791-4280, cell
  - (253) 967-1971, S3 duty phone
  - (253) 548-5344, EOD team leader on duty

- Tom Mackie, Site Manager, Hazardous Waste & Toxics Reduction Program, Washington State Department of Ecology:
  - (509) 575-2803

Once notified, a representative of the 3rd Ordnance Battalion (EOD) will respond to the site to take custody of the DMM from the UXO Technician or Port of Seattle Bomb Disposal Unit personnel. The EOD representative will contact EPA per standard operating procedures to ensure that transport and disposal of the munition is lawfully permitted. The UXO Technician will not conduct disposal operations.

The Port of Seattle Bomb Disposal Unit will be notified at least two days prior to the sampling date so they can alert the Port of Seattle Police Dispatch of the work and prepare their Unit to lend assistance if needed.

Prior to starting sampling, the UXO Technician will review the DMM avoidance procedures with all essential personnel. This review will include familiarization and hazards of DMM that may be encountered and the procedures that will be followed should DMM be inadvertently brought aboard the vessel.

The UXO Technician will also perform morning safety briefings that will be required for all personnel involved in the sampling investigation. These briefings will cover expected weather for the day, normal safe practice measures to prevent accidents or injury, a review of possible DMM discovery procedures and any additional safety information needed or drawn from previously performed activities. The morning safety briefings will also include a review of emergency procedures in the unlikely event of an accident.

4.2 VESSEL HAZARDS

Because of the high volumes of vessel and barge traffic in and around T-91, precautions and safe boating practices will be implemented to ensure that the field boat does not interrupt vessel traffic. Additional potential vessel emergency hazards and responses are listed in Table 1.

Table 1. Potential vessel emergency hazards and responses

Potential Emergency or Hazard	Response
Fire or explosion	If manageable, personnel should attempt to put out a small fire with a fire extinguisher. Otherwise, personnel should call the US Coast Guard (USCG) or 911 and evacuate the area (by rescue boat or swimming) and meet at a designated area. The FC/HSO will take roll call to make sure everyone evacuated safely. Emergency meeting places will be determined in the field during the daily safety briefing.
Medical emergency or injury	At least one person with current first aid and cardiopulmonary resuscitation (CPR) training will be aboard the vessel at all times. This person will attempt to assess the nature and severity of the injury, immediately call 911, and perform CPR if necessary. Personnel should stop work and wait for medical personnel to arrive. Once the emergency has passed, the FC/HSO should fill out a site accident report.
Person overboard	All personnel aboard the sampling vessel will wear PFDs at all times. One person should keep an eye on the individual who fell overboard and shout the distance (boat lengths) and direction (o'clock) of the individual from the vessel. Personnel should stop work and use the vessel to retrieve the individual in the water.
Sinking vessel	Personnel should call the USCG immediately. If possible, personnel should wait for a rescue boat to arrive to evacuate vessel personnel. See fire or explosion (above) for emergency evacuation procedures. The FC/HSO will take a roll call to make sure everyone is present.
Lack of visibility	If navigation visibility or personal safety is compromised because of smoke, fog, or other unanticipated hazards, personnel should stop work immediately. The vessel operator and FC/HSO will assess the hazard and, if necessary, send out periodic horn blasts to mark vessel location to other vessels potentially in the area, move to a secure location (i.e., berth), and wait for the visibility to clear.
Loss of power	Personnel should stop work and call the USCG for assistance. Personnel should use oars to move the vessel towards the shoreline. Other vessel personnel should watch for potential collision hazards and notify the vessel operator if hazards exist. Personnel should secure the vessel to a berth, dock, or mooring as soon as possible.
Collision	Personnel should stop work and call the USCG for assistance. The FC/HSO and vessel operator will assess damage and potential hazards. If necessary, the vessel will be evacuated and secured until repairs can be made.

CPR – cardiopulmonary resuscitation
FC – field coordinator
HSO – health and safety officer
PFD – personal flotation device
USCG – US Coast Guard

4.3 CHEMICAL HAZARDS

Previous investigations have shown that some chemical substances are present at higher-than-background concentrations in the sampling area. For the purpose of discussing potential exposure to substances in sediments, the chemicals of concern are metals, tributyltin, dioxins and furans, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs).

4.3.1 Exposure routes

Potential routes of chemical exposure include inhalation, dermal contact, and ingestion. Exposure will be minimized by using safe work practices and by wearing

the appropriate personal protective equipment (PPE). Further discussion of PPE requirements is presented in Section 7.

Inhalation — Inhalation is not expected to be an important route of exposure for this project.

Dermal exposure — Dermal exposure to hazardous substances associated with sediments, surface water, or equipment decontamination will be controlled through the use of personal protective equipment (PPE) and adherence to detailed sampling and decontamination procedures.

Ingestion — Ingestion is not considered a major route of exposure for this project. Accidental ingestion of surface water is possible. However, careful handling of equipment and containers aboard the boat should prevent the occurrence of water splashing or spilling during sample collection and handling activities.

4.3.2 Chemical hazards

Metals and tributyltin — Exposure to metals may occur via ingestion or skin contact. As mentioned above, neither is likely as an exposure route. Metal fumes or metal-contaminated dust will not be encountered during field and sample handling activities. Large amounts of sediment would need to be ingested for any detrimental effects to occur. Momentary skin contact allows little, if any, opportunity for the passage of any of the metals into the body. Field procedures require the immediate washing of sediments from exposed skin.

Polycyclic aromatic hydrocarbons — Exposure to PAHs may occur via ingestion or skin contact. The most important human health exposure pathway for this group of chemicals, inhalation, is not expected to occur at this site. Animal studies have shown that PAHs can cause harmful effects on skin, body fluids, and ability to fight disease after both short- and long-term exposure, but these effects have not been documented in people. Some PAHs may reasonably be expected to be carcinogens. Large amounts of sediment would need to be ingested for any detrimental effects to occur. Momentary skin contact allows little, if any, opportunity for the passage of any of the compounds into the body. Field procedures require the immediate washing of sediments from exposed skin.

Polychlorinated biphenyls — Prolonged skin contact with PCBs may cause acne-like symptoms known as chloracne. Irritation to eyes, nose, and throat may also occur. Acute and chronic exposure can damage the liver and cause symptoms of edema, jaundice, anorexia, nausea, abdominal pains, and fatigue. PCBs are a suspected human carcinogen. Skin absorption may substantially contribute to the uptake of PCBs. Large amounts of sediment would need to be ingested for any detrimental effects to occur. Momentary skin contact allows little, if any, opportunity for the passage of any of these compounds into the body. Field procedures require the immediate washing of sediments from exposed skin.

Dioxins/furans — Prolonged skin contact with dioxins/furans may cause acne-like symptoms known as chloracne. Other effects to the skin, such as red skin rashes, have been reported to occur in people following exposure to high concentrations of 2,3,7,8- tetrachlorodibenzo-*p*-dioxin (TCDD). Acute and chronic exposure can damage the liver, result in an increase in the risk of diabetes and abnormal glucose tolerance, and may increase the risk for reproductive and developmental effects. 2,3,7,8-TCDD is a possible human carcinogen, and a mixture of dioxins/furans with six chlorine atoms (four of the six chlorine atoms at the 2, 3, 7, and 8 positions) is a probable human carcinogen. Skin absorption may substantially contribute to the uptake of dioxins/furans. Large amounts of sediment would need to be ingested for any detrimental effects to occur. Momentary skin contact allows little, if any, opportunity for the passage of any of the compounds into the body. Field procedures require the immediate washing of sediments from exposed skin.

4.4 ACTIVITY HAZARD ANALYSIS

The activity hazard analysis summarizes the field activities to be performed during the project, outlines the hazards associated with each activity, and presents controls that can reduce or eliminate the risk of the hazard occurring. Table 2 presents the activity hazard analysis for sampling from a boat and scuba diving.

Table 2. Activity hazard analysis

Activity	Hazard	Control
Sampling from a boat	falling overboard	Use care in boarding and departing from vessel. Wear a PFD.
	skin contact with contaminated sediments or liquids	Wear modified Level D PPE.
	DMMs	Risk will be evaluated by UXO technician and Port Police will dispose of DMM.
	back strain	Use appropriate lifting techniques when transporting equipment and supplies to or from the boat or seek help.

PFD – personal flotation device
PPE – personal protective equipment
UXO – unexploded ordnance

5 Work Zones and Shipboard Access Control

During sampling and sample handling activities, work zones will be established to identify where sample collection and processing are actively occurring. The intent of the zone is to limit the migration of sample material out of the zone and to restrict access to active work areas by defining work zone boundaries.

5.1 WORK ZONE

The work zone on the boat will encompass the area where sample collection and handling activities are performed. The work zone in the sample processing area will include the immediate area surrounding the samples and the jar labeling area. Only persons with appropriate training, PPE, and authorization from the FC / HSO will be allowed to enter the work zone while work is in progress.

5.2 DECONTAMINATION STATION

A decontamination station will be set up, and personnel will clean soiled boots or PPE prior to leaving the work zone. The station will have the buckets, brushes, soapy water, rinse water, or wipes necessary to clean boots, PPE, or other equipment leaving the work zones. Plastic bags will be provided for expendable and disposable materials. If the location does not allow for the establishment of a decontamination station, the FC / HSO will provide alternatives to prevent the spread of contamination.

Decontamination of the boat will also be completed at the end of each work day. Cockpit and crew areas will be rinsed down with site water to minimize the accumulation of sediment.

5.3 ACCESS CONTROL

Boat security and access control will be the responsibility of the FC / HSO and boat captain. Boat access will be granted only to essential project personnel and authorized visitors. Any security or access control problems will be reported to the PM or appropriate authorities.

6 Safe Work Practices

Following common sense rules will minimize the risk of exposure or accident at the work site. The general safety rules listed below will be followed onsite:

- Do not climb over or under obstacles of questionable stability.
- Do not eat, drink, smoke, or perform other hand-to-mouth transfers in the work zone.
- Work only in well-lighted spaces.
- Never enter a confined space without the proper training, permits, and equipment.
- Make eye contact with equipment operators when moving within the range of their equipment.
- Be aware of the movements of shipboard equipment when not in the operator's range of vision.

- Get immediate first aid for all cuts, scratches, abrasions, or other minor injuries.
- Use the established sampling and decontamination procedures.
- Always use the buddy system.
- Be alert to your own and other workers' physical condition.
- Report all accidents, no matter how minor, to the FC / HSO.
- Do not do anything dangerous or unwise even if ordered by a supervisor.

7 Personal Protective Equipment and Safety Equipment

Appropriate PPE will be worn as protection against potential hazards. In addition, a PFD will be required for all personnel when working aboard the boat. Prior to donning PPE, personnel will inspect their PPE for any defects that might render the equipment ineffective.

Fieldwork will be conducted in Level D or modified Level D PPE, as discussed in Sections 7.1 and 7.2. Situations that would require PPE beyond modified Level D are not anticipated. Should the FC / HSO determine that PPE beyond modified Level D is necessary, the HSM will be notified and alternative PPE selected.

7.1 Level D Personal Protective Equipment

Individuals performing general activities in which skin contact with contaminated materials is unlikely will wear Level D PPE. Level D PPE includes the following:

- Cotton overalls or lab coats
- Chemical-resistant steel-toed boots
- Chemical-resistant gloves
- Safety glasses

7.2 Modified Level D Personal Protective Equipment

Individuals performing activities in which skin contact with contaminated materials is possible but inhalation risks are not expected will be required to wear an impermeable outer suit. The type of outerwear will be chosen according to the types of chemical contaminants that might be encountered. Modified Level D PPE includes the following:

- Impermeable outer garb, such as rain gear or waders
- Chemical-resistant steel-toed boots
- Chemical-resistant outer gloves

7.3 SAFETY EQUIPMENT

In addition to the above-identified PPE, basic emergency and first aid equipment will also be provided. Equipment for the field team will include:

- A copy of this HSP
- First aid kit adequate for the number of personnel in the field crew
- Emergency eyewash

The FC / HSO will ensure that the safety equipment is available. Equipment will be checked daily to ensure its readiness for use.

8 Monitoring Procedures for Site Activities

A monitoring program that addresses the potential site hazards will be implemented. For this project, air, dust, and noise monitoring will not be necessary. The sampled media will be wet and will not pose a dust hazard, and equipment emitting high-amplitude (>85 dBA) sound will be not be used. Because sampling is occurring outdoors on a boat, air monitoring is not anticipated to be necessary.

For this project, the monitoring program will include all individuals monitoring themselves and their co-workers for signs of potential physical stress or illness. All personnel will be instructed to look for and inform each other of any deleterious changes in their physical or mental conditions during the performance of all field activities. Examples of such changes are as follows:

- Headaches
- Dizziness
- Nausea
- Symptoms of heat stress
- Blurred vision
- Cramps
- Irritation of eyes, skin, or respiratory system
- Changes in complexion or skin color
- Changes in apparent motor coordination
- Increased frequency of minor mistakes
- Excessive salivation or changes in papillary response
- Changes in speech ability or speech pattern
- Shivering

- Blue lips or fingernails

If any of these conditions develop, work will be halted immediately and the affected person(s) evaluated. If further assistance is needed, personnel at the local hospital will be notified, and an ambulance will be summoned if the condition is thought to be serious. If the condition is the direct result of sample collection or handling activities, procedures will be modified to address the problem.

9 Decontamination

Decontamination is necessary to prevent the migration of contaminants from the work zone(s) into the surrounding environment and to minimize the risk of exposure of personnel to contaminated materials that might adhere to PPE. The following subsections discuss personnel and equipment decontamination. The following supplies will be available to perform decontamination activities:

- Wash buckets
- Rinse buckets
- Long-handled scrub brushes
- Clean water sprayers
- Paper towels
- Plastic garbage bags
- Alconox® or similar decontamination solution

9.1 MINIMIZATION OF CONTAMINATION

The first step in addressing contamination is to prevent or minimize exposure to existing contaminated materials and the spread of those materials. During field activities, the FC / HSO will enforce the following measures:

Personnel

- Do not walk through areas of obvious or known contamination.
- Do not handle, touch, or smell contaminated materials directly.
- Make sure PPE has no cuts or tears prior to use.
- Fasten all closures on outer clothing, covering with tape if necessary.
- Protect and cover any skin injuries.
- Stay upwind of airborne dusts and vapors.
- Do not eat, drink, chew tobacco, or smoke in the work zones.

Sampling equipment and boat

- Place clean equipment on a plastic sheet or aluminum foil to avoid direct contact with contaminated media.
- Keep contaminated equipment and tools separate from clean equipment and tools.
- Clean boots before entering the boat.

9.2 PERSONNEL DECONTAMINATION

The FC / HSO will ensure that all site personnel are familiar with personnel decontamination procedures. Personnel will perform decontamination procedures, as appropriate, before eating lunch, taking a break, or leaving the work location. Decontamination procedures for field personnel include:

1. Rinse off the outer suit if it is heavily soiled.
2. Wash and rinse outer gloves and boots with water.
3. Remove and inspect outer gloves and discard them if damaged.
4. Wash hands if taking a break.
5. Don necessary PPE before returning to work.
6. Dispose of soiled, disposable PPE before leaving for the day.

9.3 SAMPLING EQUIPMENT DECONTAMINATION

Before use at each sampling location, shovels and trowels will be rinsed in site water to dislodge and remove any sediment and ensure that they are cleared of all debris before use. Stainless steel spoons and bowls will be decontaminated before each sample is collected.

9.4 VESSEL DECONTAMINATION

Most sampling will be conducted from a boat. Care will be taken to minimize the amount of sediment spilled on the vessel. The vessel deck will be hosed off regularly to remove sediment from the cockpit and crew areas to minimize slipping hazards and the transport of sediment on boots through work zones.

10 Disposal of Contaminated Materials

Contaminated materials that may be generated during field activities include PPE, decontamination fluids, and excess sample material. These contaminated materials will be disposed of as an integral part of the project.

10.1 PERSONAL PROTECTIVE EQUIPMENT

Gross surface contamination will be removed from PPE. All disposable sampling materials and PPE, such as disposable coveralls, gloves, and paper towels used in the sample processing, will be placed in heavyweight garbage bags. Filled garbage bags will be placed in a normal refuse container for disposal as solid waste.

10.2 EXCESS SAMPLE MATERIALS

At each sampling location, excess sediment collected will be returned to the collection location.

11 Training Requirements

Individuals who perform work at locations where potentially hazardous materials and conditions may be encountered must meet specific training requirements. It is not anticipated that hazardous concentrations of contaminants will be encountered in sampled material, so training will consist of site-specific instruction for all personnel and the oversight of inexperienced personnel by an experienced person for one working day. The following subsections describe the training requirements for this fieldwork.

11.1 PROJECT-SPECIFIC TRAINING

In addition to Hazardous Waste Operations and Emergency Response (HAZWOPER) training, field personnel will undergo training specifically for this project. All personnel must read this HSP and be familiar with its contents before beginning work. Personnel will acknowledge reading the HSP by signing the Field Team Health and Safety Plan Review Form (Attachment 2). The completed form will be kept in the project files.

The boat captain and FC / HSO or a designee will provide project-specific training prior to the first day of fieldwork and whenever new workers arrive. Field personnel will not be allowed to begin work until project-specific training has been completed and documented by the FC / HSO. Training will address the HSP and all health and safety issues and procedures pertinent to field operations. Training will include, but not be limited to, the following topics:

- Activities with the potential for chemical exposure
- Activities that pose physical hazards, and actions to control the hazard
- Ship access control and procedure
- Use and limitations of PPE
- Decontamination procedures
- Emergency procedures

- Use and hazards of sampling equipment
- Location of emergency equipment
- Vessel safety practices
- Emergency evacuation and emergency procedures

11.2 DAILY SAFETY BRIEFINGS

The FC / HSO or a designee and the boat captain will present safety briefings before the start of each day's activities. These safety briefings will outline the activities expected for the day, update work practices and hazards, address any specific concerns associated with the work location, and review emergency procedures and routes. The FC / HSO or designee will document safety briefings in the logbook.

11.3 FIRST AID AND CPR

At least one member of the field team must have first-aid and cardiopulmonary resuscitation (CPR) training. The diver and dive tender will also be trained in first-aid and CPR as required by the Research Support Services' Safe Practices Manual for Diving Operations (Attachment 1). Documentation of which individuals possess first-aid and CPR training will be kept in the project health and safety files.

12 Medical Surveillance

A medical surveillance program conforming to the provisions of 29CFR1910§120(f) will not be necessary for field team members because the field team members do not meet any of the four criteria outlined in the regulations for the implementation of a medical surveillance program:

- Employees who are or may be exposed to hazardous substances or health hazards at or above permissible exposure levels for 30 days or more per year (1910.120(f)(2)(I)
- Employees who must wear a respirator for 30 days or more per year (1910.120(f)(2)(ii))
- Employees who are injured or become ill due to possible overexposures involving hazardous substances or health hazards from an emergency response or hazardous waste operation (1910.120(f)(2)(iii))
- Employees who are members of HAZMAT teams (1910.120(f)(2)(iv))

As described in Section 8, employees will monitor themselves and each other for any deleterious changes in their physical or mental condition during the performance of all field activities.

13 Reporting and Record Keeping

Each member of the field crew will sign the HSP review form (see Attachment 2). If necessary, accident/incident report forms and Occupational Safety and Health Administration (OSHA) Form 200s will be completed by the FC/HSO.

The FC/HSO or a designee will maintain a health and safety field logbook that records health-and-safety-related details of the project. Alternatively, entries may be made in the field logbook, in which case a separate health and safety field logbook will not be required. The logbook must be bound and the pages must be numbered consecutively. Entries will be made with indelible blue ink. At a minimum, each day's entries must include the following information:

- Project name or location
- Names of all personnel
- Weather conditions
- Type of fieldwork being performed

The individual maintaining the entries will initial and date the top or bottom of each completed page. Blank space at the bottom of an incompletely filled page will be lined out. Each day's entries will begin on the first blank page after the previous workday's entries.

14 Emergency Response Plan

As a result of the hazards and the conditions under which operations will be conducted, the potential exists for an emergency situation to occur. Emergencies may include personal injury, exposure to hazardous substances, fire, explosion, or release of toxic or non-toxic substances (i.e., spills). OSHA regulations require that an emergency response plan be available to guide actions in emergency situations.

Onshore organizations will be relied upon to provide response in emergency situations. The local fire department and ambulance service can provide timely response. Field personnel will be responsible for identifying emergency situations, providing first aid, if applicable, notifying the appropriate personnel or agency, and evacuating any hazardous area. Shipboard personnel will attempt to control only very minor hazards that could present an emergency situation, such as a small fire, and will otherwise rely on outside emergency response resources.

The following subsections identify the individual(s) who should be notified in case of emergency, provide a list of emergency telephone numbers, offer guidance for particular types of emergencies, and provide directions for getting from any sampling location to a hospital.

14.1 PRE-EMERGENCY PREPARATION

Before the start of field activities, the FC / HSO will ensure that preparation has been made in anticipation of emergencies. This preparation includes the following:

- Meeting with equipment handlers concerning emergency procedures to be followed in the event of an injury
- Conducting a training session informing all field personnel of emergency procedures, locations of emergency equipment and their use, and proper evacuation procedures
- Conducting a training session (led by senior staff responsible for operating field equipment) to apprise field personnel of operating procedures and specific risks associated with field equipment
- Ensuring that field personnel are aware of the existence of the emergency response plan in the HSP and ensuring that a copy of the HSP accompanies the field team

14.2 PROJECT EMERGENCY COORDINATOR

The FC / HSO will serve as the project emergency coordinator (PEC) in the event of an emergency. She will designate a replacement for times when she is not available or is not serving as the PEC. The designation will be noted in the logbook. The PEC will be notified immediately when an emergency is recognized. The PEC will be responsible for evaluating the emergency situation, notifying the appropriate emergency response units, coordinating access with those units, and directing onboard interim actions before the arrival of emergency response units. The PEC will notify the HSM and the PM as soon as possible after initiating an emergency response action. The PM will have responsibility for notifying the client.

14.3 EMERGENCY RESPONSE CONTACTS

All personnel must know whom to notify in the event of an emergency situation, even though the FC / HSO has primary responsibility for notification. Table 3 lists the names and phone numbers for emergency response services and individuals.

Table 3. Emergency response contacts

Contact	Telephone Number
Emergency Numbers	
Ambulance	911
Police	911
Fire	911
Harborview Medical Center	206.323.3074
US Coast Guard Office Emergency General information	 206.286.5400 206.442.5295 UHF Channel 16
National Response Center	800.424.8802
US Environmental Protection Agency	908.321.6660
Washington State Department of Ecology Northwest Region Spill Response (24-hour emergency line)	206.649.7000
Port of Seattle Police Dispatch	206.787.5401
Project Management Emergency Contacts	
Susan McGroddy, Project Manager	206.812.5421
Mike Johns, Corporate Health and Safety Manager	206.812.5418
Thai Do, Field Coordinator/Health and Safety Officer	206.812.5407

14.4 RECOGNITION OF EMERGENCY SITUATIONS

Emergency situations will generally be recognizable through observation. An injury or illness will be considered an emergency if it requires treatment by a medical professional and cannot be treated with simple first-aid techniques.

14.5 DECONTAMINATION

In the case of evacuation, decontamination procedures will be performed only if doing so does not further jeopardize the welfare of site workers. If an injured individual is also heavily contaminated and must be transported by emergency vehicle, the emergency response team will be informed of the type of contamination. To the extent possible, contaminated PPE will be removed but only if doing so does not exacerbate the injury. Plastic sheeting will be used to reduce the potential for spreading contamination to the inside of the emergency vehicle.

14.6 FIRE

Field personnel will attempt to control only small fires. If an explosion appears likely, personnel will follow evacuation procedures specified during the training session. If a fire cannot be controlled with the onboard fire extinguisher that is part of the required safety equipment, personnel will either withdraw from the vicinity of the fire or evacuate the site as specified during the training session.

14.7 PERSONAL INJURY

In the event of serious personal injury, including unconsciousness, possibility of broken bones, severe bleeding or blood loss, burns, shock, or trauma, the first responder will immediately do the following:

- Administer first aid, if qualified.
- If not qualified, seek out an individual who is qualified to administer first aid, if time and conditions permit.
- Notify the PEC of the incident, the name of the individual, the location, and the nature of the injury.

The PEC will immediately do the following:

- Notify the boat captain and FC / HSO, and the appropriate emergency response organization.
- Assist the injured individual.
- Follow the emergency procedures for retrieving or disposing of equipment and leave the site and proceed to the predetermined land-based emergency pick-up.
- Designate someone to accompany the injured individual to the hospital.
- If a life-threatening emergency occurs (i.e., injury in which death is imminent without immediate treatment), the FC / HSO or boat captain will call 911 and arrange to meet the emergency responder at the nearest accessible location or dock. For injuries or emergencies that are not life-threatening (e.g., broken bones, minor lacerations), the PEC will follow the procedures outlined above and proceed to the Harbor Island Marina or to an alternative location if that would be more expedient.
- Notify the HSM and the PM.

If the PEC determines that emergency response is not necessary, he or she may direct someone to decontaminate and transport the individual by vehicle to the nearest hospital. Directions describing the route to the hospital are provided in Section 14.10.

If a worker leaves the site to seek medical attention, another worker should accompany them to the hospital. When in doubt about the severity of an injury or exposure, always seek medical attention as a conservative approach and notify the PEC.

The PEC will be responsible for completing all accident / incident field reports, OSHA Form 200s, and other required follow-up forms.

14.8 Overt Personal Exposure or Injury

If an overt exposure to toxic materials occurs, the first responder to the victim will initiate actions to address the situation. The following actions should be taken, depending on the type of exposure.

14.8.1 Skin contact

- Wash / rinse the affected area thoroughly with copious amounts of soap and water.
- If eye contact has occurred, rinse eyes for at least 15 minutes using the eyewash that is part of the onboard emergency equipment.
- After initial response actions have been taken, seek appropriate medical attention.

14.8.2 Inhalation

- Move victim to fresh air.
- Seek appropriate medical attention.

14.8.3 Ingestion

- Seek appropriate medical attention.

14.8.4 Puncture wound or laceration

- Seek appropriate medical attention.

14.9 Spills and Spill Containment

No bulk chemicals or other materials subject to spillage are expected to be used during this project. Accordingly, no spill containment procedure is required for this project.

14.10 Emergency Route to the Hospital

The name, address, and telephone number of the hospital that will be used to provide medical care is as follows:

Harborview Medical Center
325 9th Avenue
Seattle, WA
(206) 323-3074

Directions from T-91 to Harborview Medical Center (Figure 1) are as follows:

- From 16th Ave N, turn right toward Elliott Ave W
- Turn left onto Elliott Ave W

- Turn left onto W Mercer Pl
- Slight right onto Mercer St
- Take the ramp to I-5 S
- Keep right at the fork, follow signs for I-5 S and merge onto I-5 S
- Take exit 165A toward James Street
- Merge onto 6th Ave
- Turn left onto James St
- Turn right onto 9th Ave
- Destination is on the right.

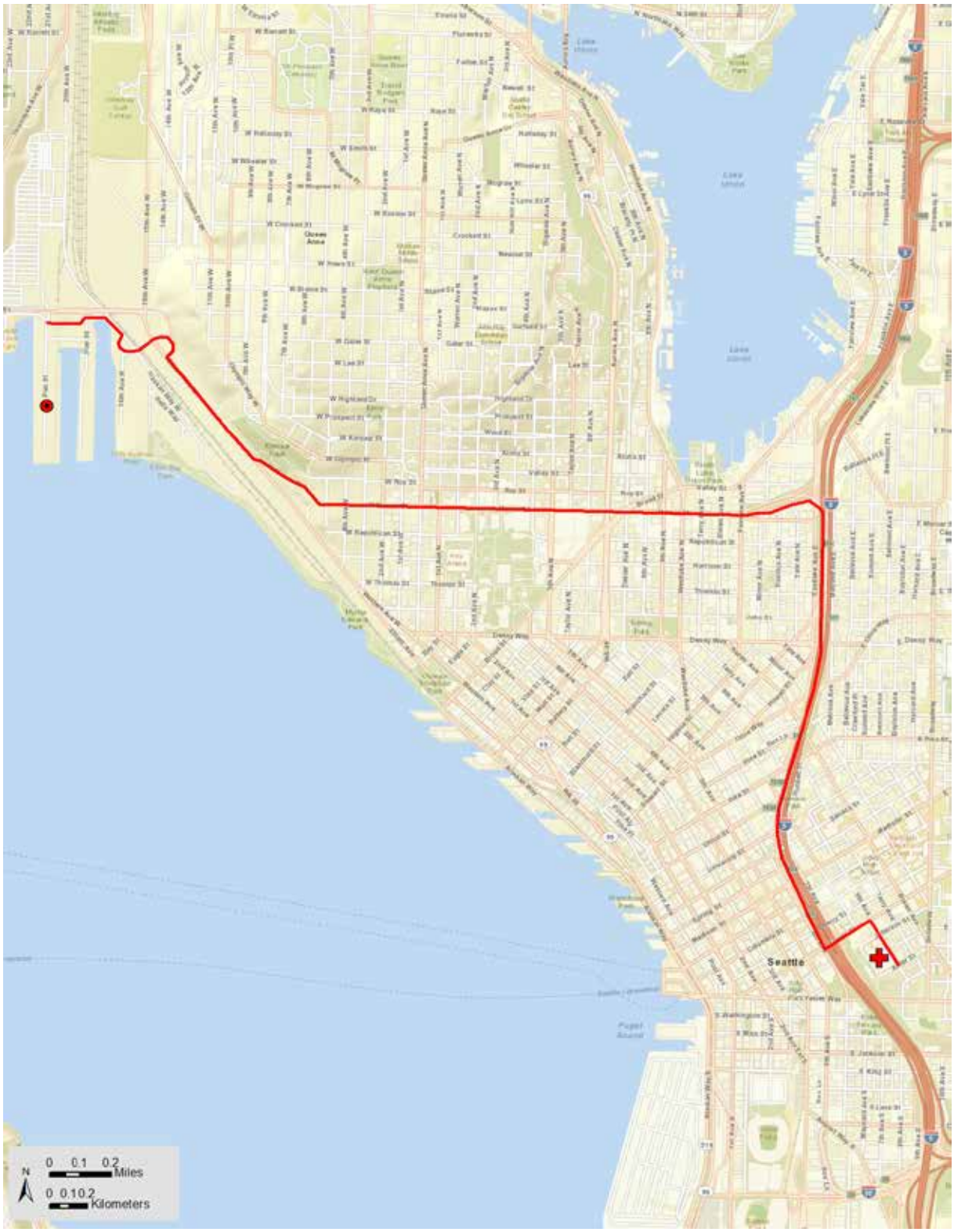

Figure 1. Directions to Harborview Medical Center from Terminal 91

15 References

PSEP. 1997. Recommended guidelines for sampling marine sediment, water column, and tissue in Puget Sound. Final Report. Prepared for the U.S. Environmental Protection Agency, Seattle, Washington, and the Puget Sound Water Quality Action Team, Olympia, WA.

USACE. 2013. EM 385-1-97 Change 1, Explosives Safety and Health Requirements Manual. 12 April

Attachment 1. Field Team Health and Safety Plan Review

I have read a copy of the health and safety plan, which covers field activities that will be conducted to investigate potentially contaminated areas in T-91. I understand the health and safety requirements of the project, which are detailed in this health and safety plan.

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