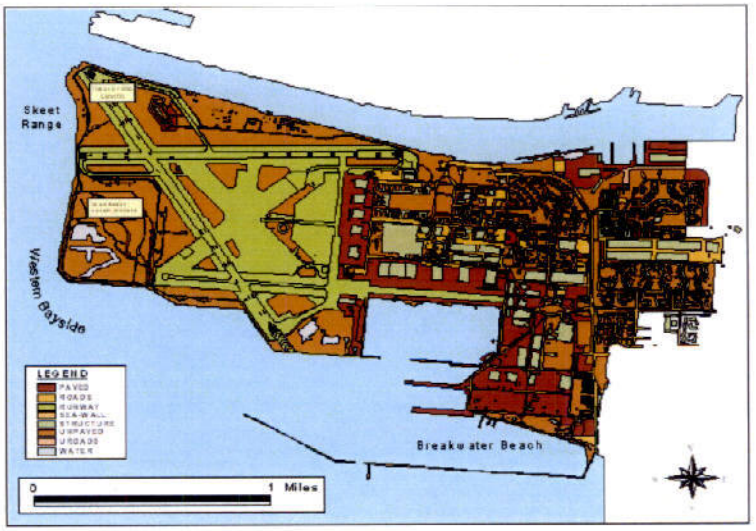
FINAL ADDENDUM 1

Offshore Sediment Study Work Plan at Oakland Inner Harbor, Pier Area, Todd Shipyard and Western Bayside

Alameda Point, Alameda, California



Prepared for

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Department of the Navy
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Program Management Office West
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CONTRACT NO. N47408-01-D-8207
Project No.: G486085

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September 19, 2006

FINAL ADDENDUM 1

OFFSHORE SEDIMENT STUDY WORK PLAN AT OAKLAND INNER HARBOR, PIER AREA, TODD SHIPYARD, AND WESTERN BAYSIDE ALAMEDA POINT ALAMEDA, CALIFORNIA

CONTRACT NO.: N47408-01-D-8207
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FINAL
OFFSHORE SEDIMENT STUDY WORK PLAN AT OAKLAND INNER HARBOR, PIER AREA, TODD SHIPYARD AND WESTERN BAYSIDE

DATED 27 MAY 2005

IS FILED AS ADMINISTRATIVE RECORD NO.
N00236.002029

Response to Agency Comments on the Draft Addendum 1, Offshore Sediment Study Work Plan at Oakland Inner Harbor, Pier Area, Todd Shipyard and Western Bayside, Alameda Point, Alameda, California, dated August 25, 2006
Alameda Point, Alameda, California

Comment No.	Comment	Response
General Comments from U.S. EPA (dated September 7, 2006)		
1	For clarity and completeness it would be helpful to include the entire paragraph for which the changes have been proposed. This addendum provides changes to the original work plan (WP) and the Sampling and Analysis Plan (SAP) both dated 2005, but without the context the changes are difficult to evaluate. Please provide the entire paragraph for which changes are being proposed to the original WP.	A column was added to the Modifications tables in both the Addendum to the Work Plan and the Addendum to the SAP that includes the complete paragraph for which changes are being proposed.
2	It is unclear whether the outfalls are beneath the pier or if they are beyond the pier as shown on Figure 3-6b. During the site visit, the outfalls were not visible, although they could have been submerged at the time. Please clarify whether subsequent site reconnaissance has clarified the location of the outfalls or if this will be done during the implementation of the work described in Draft Addendum 1. In addition, if the outfalls have not yet been located, please discuss whether the sample locations that target the outfalls (i.e., PAC 20 and 25) will be adjusted to place them at the outfalls.	During site reconnaissance on July 18, 2006, a concrete pipe structure that appears to be Outfall J was observed well under the pier. The pipe structure was photographed and GPS coordinates were derived. The pipe terminus is at the proposed sample location PAC 21. If necessary, sample locations will be adjusted in the field to place them at the Outfall once its location is confirmed. The addendum will revised to specify that sampling will be at the outfalls.
General Comments from San Francisco Bay Regional Water Quality Control Board (dated September 7, 2006)		
1	The San Francisco Bay Regional Water Quality Control Board staff reviewed the Draft Addendum 1 to the Final Offshore Sediment Study Work Plan at Oakland Inner harbor, Pier Area, Todd Shipyard, and Western Bayside, Alameda Point, Alameda, California, dated August 28, 2006 and concurs with the proposed additional sampling locations and analyses at Site 24.	The Navy appreciates your review.
General Comments from the Department of Toxic Substances Control (dated September 8, 2006)		
1	**Sample Number Discrepancy** There is a discrepancy in the number of samples that are to be collected as specified in Appendix A and as described in the text. Appendix A, Section 2.0	There are twelve sampling locations plus 2 field duplicates. The sediment core collected at each location will be

Comment No.	Comment	Response
	states that there will be 42 samples collected for analysis. However, the text in Appendix A and in 1.0 "Introduction" specifies that samples will be collected from 12 locations at four depths, with the lowest depth archived for possible future analyses. Additionally, there are two field duplicates to be collected. Thus, the total number of samples to be collected are 50 samples, with 36 samples submitted for analysis, along with the 2 field duplicates, and 12 samples archived. Additionally, the text does not indicate whether the field duplicates will be duplicate samples or duplicate locations. The Sampling and Analysis Plan (SAP) (Batelle, 2005) states that field duplicates will be collected at a frequency of one for every ten samples collected and analyzed for all critical chemical parameters. Therefore, according to the SAP, a minimum of four field duplicate samples should be collected and analyzed from the first three intervals, and one field duplicate should be collected and archived from the deepest interval. This comment regarding field duplicates is also applicable to Section A.3.2, "Field Sampling Methods."	split into 4 zones. Thus, 56 samples will be collected [(12+2)*4] and 42 samples will be analyzed [(12+2)*3]. Duplicate collocated sediment cores will be collected at two locations. The two field duplicate cores are based on the number of locations (12), not the number of samples. Each core will be subsampled by depth into four sections: 0-5cm, 5-25 cm, 25-50 cm, and 50-120 cm. The top three zones will be analyzed and the lowest depth (50-120 cm) will be archived for possible future analyses as described in the Final Work Plan (Battelle et al., 2005). Sections 1.0 and 2.4 of the SAP Addendum were revised as follows: "An additional 12 sediment cores from 12 stations (plus 2 co-located field duplicate cores creating 6 field duplicate samples) are proposed for Site 24 to address a data gap identified during the during Agency review of the Draft RI. To enable sufficient volume for the surface samples, grab samples will also be collected at these locations. This addendum (Addendum 1) describes additional sampling and

Response to Agency Comments on the Draft Addendum 1, Offshore Sediment Study Work Plan at Oakland Inner Harbor, Pier Area, Todd Shipyard and Western Bayside, Alameda Point, Alameda, California, dated August 25, 2006
Alameda Point, Alameda, California

Comment No.	Comment	Response
		analysis proposed for Site 24 in September 2006. A separate S-HASP was prepared for the additional work described in this Addendum." The following text was added to the end of in Section A.3.2: "Co-located field duplicate cores will also be collected at two stations."
2	**Sampling Method Description** Section A.2.2 ("Problem Definition/Background") states that the area past the quay wall beneath the roadway between Piers 1 and 2 will be sampled and analyzed using the sample methods described in the April 2005 SAP. A statement should be added to this paragraph indicating that an additional method that was not previously described in the April 2005 SAP is included in this Addendum due to site-specific conditions at the proposed locations.	The requested text was added to the SAP Addendum.
3	**Standard Operating Procedure (SOP) 5-200** Appendix A, section A.3.4.2.3 references Battelle SOP 5-200. Please submit a copy of this SOP to the regulatory agencies.	The referenced SOP will be submitted to agencies as an attachment to the SAP Addendum.
4	**Workplan Signature** The workplan has not been signed by a registered professional geologist or engineer. The Navy should identify the registered professional or qualified person in responsible charge for this project.	The work plan/SAP addendum were signed by the same qualified project staff that signed the original April 2005 documents. There will be no geologic logging or engineering specifications in this field work. No additional signatures are deemed necessary.
5	Please provide a reference for the Offshore Sediment Study Work Plan in the first paragraph of Section 1.0, "Introduction."	The reference (Battelle et al., 2005) was added to the Work Plan Addendum as requested.
6	Change "present" to "prevent" on page 4 in the paragraph describing the revised	The referenced text in the Work Plan

Comment No.	Comment	Response
	method for sediment core and surface grab sample collection. Additionally, insert the word "sample" after "grab" in the first sentence.	Addendum was changed as requested.
General Comments from DTSC HERD (dated September 5, 2006)		
1	HERD requests presentation of the methodology for placement of the easternmost sediment samples and the proposed use of 'Soil Benchmarks'.	The eastern most samples were placed as far east as possible at the foot of the rip-rap under the pier based on the reconnaissance survey in July 2006. The samples were placed north-south based on even coverage of the area and previous data indicating no data gaps in sediment contamination to the south. The 'Soil Benchmarks' column was removed from Table A-10a. It was an oversight, left in from the original Work Plan for the Construction debris pile at Seaplane Lagoon. Soil Benchmarks are not needed for the Site 24 sampling and analysis.
Specific Comments		
2	The majority of the modifications presented (Section 2.0, page 3 through page 5; Appendix A, Section 2.0, page 3 of 11 through 7 of 11) adequately address the determination, made during the July 10, 2006 meeting, that additional Site 24 samples were required to completely characterize the Pier Area, particularly beneath the wharf roadway. This comment is meant for the DTSC Project Manager and no response is required from the Navy or Navy contractors.	No response is required.
3	The 12 sediment sample collection locations (Figure 3-6b, page 5 and Figure A-3a) appear to encompass the likely extent of the sediment shelf under the wharf roadway. Please provide, however, a description of the method used to	The eastern most extent of sediment under the pier was determined in the site reconnaissance survey on July 18,

Comment No.	Comment	Response
	determine the eastern-most boundary of the sediment to land transition as justification for the location of the eastern-most sample locations.	2006 visually by Battelle from a kayak under the pier (the bottom was visible with the aid of a flashlight and confirmed with the kayak paddle). The distance to the pier edge was measured with a fiberglass measuring tape and coordinates derived on the pier with a Trimble GeoXT DGPS with post processing (sub meter accuracy).
4	A subset of the benchmarks proposed for sediment Contaminants of Potential Concern (COPCs) (Table A-10a) were checked and found to be reasonable selections and arithmetically correct. This comment is meant for the DTSC Project Manager and no response is required from the Navy or Navy contractors.	No response is required.
5	Soil benchmarks from the IR Site 2 (Alameda Landfill) are included in the listing which mainly outlines sediment benchmarks (Table A-10a). Please indicate the planned use of the values presented in the 'Soil Benchmark' column.	The 'Soil Benchmarks' column was removed from Table A-10a. See response to DTSC General Comment #1.
6	Depending on the sediment concentrations detected beneath the wharf roadway and the lateral extent of any elevated concentrations, it may be necessary to compare the sediment concentrations from these additional samples to protective sediment concentrations for vertebrate receptors in addition to the sediment benthic receptor benchmarks presented.	As described in Figure 1 of the Final Addendum to the Offshore Sediment Study Work Plan at Oakland Inner Harbor, Pier Area, Todd Shipyard and Western Bayside, dated August 25, 2006, if the distribution of contaminants measured at Site 24 (including the newly collected data from the sediment shelf) exceed background concentrations then potential ecological risk will be evaluated. This will include an assessment of potential risk to the

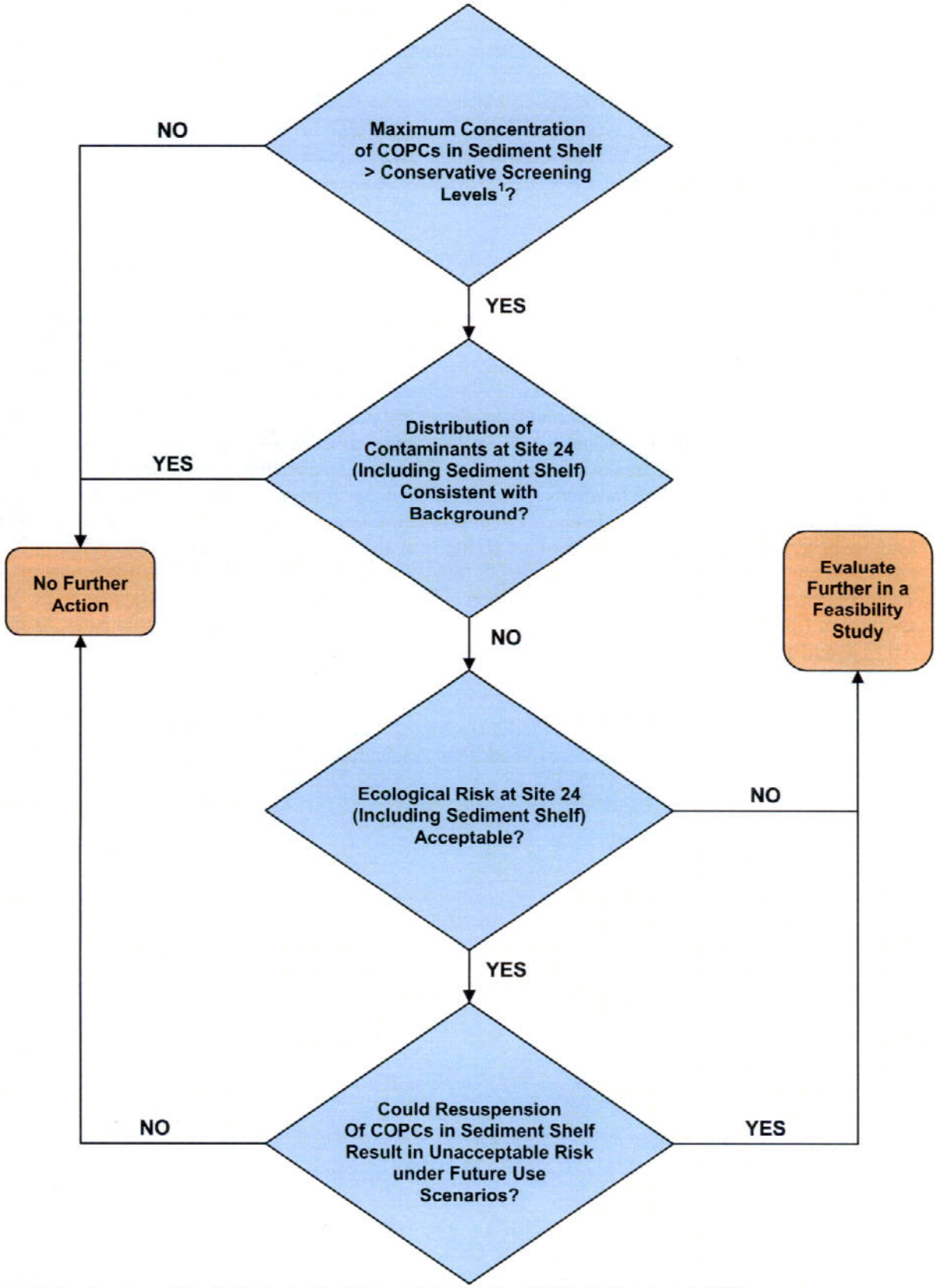
Comment No.	Comment	Response
		vertebrate assessment endpoints previously assessed. These included: (1) Sufficient rates of survival, growth and reproduction to sustain the benthic-feeding and piscivorous fish communities in offshore areas, (2) Sufficient rates of survival, growth and reproduction to sustain avian communities the area, and (3) Protection at the level of the individual for special-status bird species.

1.0 INTRODUCTION

This Final Addendum 1 to the Offshore Sediment Study Work Plan was prepared for the Base Realignment and Closure (BRAC) Program Management Office (PMO) West under Contract No. N47408-01-D-8207 in support of the Remedial Investigation (RI) at Oakland Inner Harbor (Installation Restoration [IR] Site 20) and Pier Area (Site 24) at Alameda Point in Alameda, CA. It includes revisions to the Offshore Sediment Study Work Plan (Battelle et al., 2005), as well as Addendum 1 to the Sampling and Analysis Plan (SAP) and a Site-Specific Health and Safety Plan (S-HASP). Addendum 1 to the SAP is presented as Appendix A to this Work Plan Addendum, while the S-HASP is presented as Appendix B.

The sampling scheme identified at the time that the Work Plan was developed was intended to collect all additional data required to complete the RI. However, during Agency review of the Draft RI, an additional data gap was identified for Site 24. Specifically, it was determined that the sediment shelf previously described as being located adjacent to the quay wall between Piers 1 and 2 of Site 24 actually extends eastward past the quay wall beneath the roadway. As noted in the RI, the highest concentrations of several PAHs and metals were detected in 1996 adjacent to the quay wall in the vicinity of Outfalls J and K. Without further characterization of the sediments extending under the roadway it is impossible to know if the elevated concentrations measured in 1996 are confined to a small area as previously believed or actually represent a larger area of contamination. Therefore, Addendum 1 proposes the collection of sediment from an additional 12 locations (plus 2 field duplicates) from this previously uncharacterized area. Cores will be collected to a depth of 120 cm (or refusal) and the intervals subsampled will be same as those described in the Offshore Work Plan (Battelle et al., 2005), including surface (0 – 5 cm), 5-25 cm, 25-50 cm, 50-120 cm, with the lowest depth (50-120 cm) being archived for possible future analyses. The data generated will be evaluated as described in the Final Offshore Work Plan (Battelle et al., 2005) and Figure 1 of this Addendum and the results will be incorporated into the RI report for Sites 20 and 24. All field and analytical activities conducted for this investigation must be performed according to the requirements of the April 2005 SAP (Appendix A of Battelle et al., 2005) unless specifically modified in this Addendum (see Appendix A – Addendum 1 to the Sampling and Analysis Plan [SAP] for any revisions to the original SAP). A Site-Specific Health and Safety Plan (S-HASP) for this activity has been prepared as Appendix B of the Final Work Plan Addendum.

Figure 1. Decision Rule Process for Site 24



[1] Screening benchmarks are defined in Section 4 of the RI Report for IR Site 20 and IR Site 24 (Battelle et al., 2006).

2.0 MODIFICATIONS

Work Plan Section	Original Work Plan Paragraph	Change	Rationale
1.0, p.1	This draft final Offshore Sediment Study Work Plan was prepared for the Base Realignment and Closure (BRAC) Program Management Office (PMO) West under Contract No. N47408-01-D-8207 in support of the offshore evaluations at Oakland Inner Harbor (Installation Restoration [IR] Site 20) Pier Area (IR Site 24), Todd Shipyard (IR Site 28), and Western Bayside/Breakwater Beach at Alameda Point in Alameda, CA. This Work Plan proposes collection of sediment cores and surface grabs from a total of 56 stations located in Oakland Inner Harbor, the offshore portion of Todd Shipyard, Pier Area, and Western Bayside. Historical data at Breakwater Beach are sufficient; therefore, no additional data collection is proposed at that area.	The second sentence of the first paragraph is revised to read: "This Work Plan proposes collection of sediment cores and surface grabs from a total of 68 stations...."	Collection of additional sediment samples at 12 locations will provide information necessary to fill data gaps at Site 24.
1.0, p.1	This investigation is intended to address data gaps at these sites that were identified from previous investigations and to further assess whether onsite sources may have impacted sediment quality. This investigation focuses on subtidal areas. The majority of the proposed samples will be collected 75-100 ft offshore in the area expected to be most affected by onshore sources. It is proposed that sediment cores be collected from each of the sampling stations and subsampled from four depth intervals to characterize the lateral and vertical spatial extent of contamination. The top three intervals will be analyzed for selected contaminants of potential concern (COPCs), grain size, and total organic carbon (TOC) so that present and historical contaminant concentrations can be compared. The fourth depth interval will be archived at all stations except WBC-16 and WBC-17 for potential future analyses. In addition, to ensure sufficient sediment volume for the proposed analyses, surface grabs will be collected at all locations and homogenized with the surface interval (0-5 cm) of the cores. Details on the sampling methods are provided in Section 3.0 and Appendix A.	The last sentence of the second paragraph is revised to read: "Details on the sampling methods are provided in Section 3.0, Appendix A, and Addendum 1 to Appendix A." All references to Appendix A should be similarly revised throughout the document.	To ensure that the modified methods presented in the SAP Addendum 1 are noted.

Work Plan Section	Original Work Plan Paragraph	Change	Rationale
1.0, p. 1	The purpose of this Work Plan is to describe the methods that will be used to collect, analyze, and interpret the sediment and the soil test pit samples, although the field investigations will not be conducted simultaneously. Data collected will be used to support the following evaluations: • Remedial Investigation (RI) for Oakland Inner Harbor (IR Site 20) and Todd Shipyard (IR Site 28). IR Site 20 incorporates the offshore portion of IR Site 28; therefore, unless otherwise noted, references to IR Site 20 are intended to encompass both Oakland Inner Harbor and Todd Shipyard; • RI for the Pier Area (IR Site 24);	The first and second bullets of the fourth paragraph are replaced with the following text: "Remedial Investigation (RI) for Oakland Inner Harbor (IR Site 20) and Pier Area (IR Site 24);" In addition, all references to two separate RIs for Sites 20 and 24 should be similarly revised throughout the document to show that one combined report will be completed.	Based on discussions with the Navy and Agencies it was agreed that one report would be completed for these sites for cost-effectiveness.
2.3, p. 14	The Navy reserve fleet is currently docked at the piers which are leased by the Alameda Reuse and Redevelopment Agency (ARRA) to Trident Corporation. Pier 1 is the smallest and northernmost of the three piers with a berth of 1,200 ft that is designed to berth replenishment oiler and combat store ships. Pier 2 (the middle pier) has four berthing spaces with a total available space of 2,420 ft. One of these spaces is reserved for fleet operations and is left vacant. Transient vessels use this berth for loading and offloading small amounts of ordnance. The remaining three berth spaces usually accommodate a combination of destroyers and service ships. Pier 3 (the southernmost) is the largest berthing facility at Alameda with an available berth space of 2,500 ft. The USS Hornet is permanently berthed at this pier. Until 1978, the piers were periodically dredged to allow for ships to be docked and consequently, much of the historical contamination related to shipboard waste and storm drains has been removed (NEESA, 1983). However, a sediment shelf is intact along the quay wall	The next to the last sentence in paragraph three is modified to read: "However, a sediment shelf is intact along the quay wall and underneath the roadway between Piers 1 and 2 that was not accessible to dredging equipment."	To provide a more accurate description of the extent of the sediment shelf.

Work Plan Section	Original Work Plan Paragraph	Change	Rationale
	that was not assessable to the dredging equipment. It has been proposed that future reuse will consist of docking large scale ships such as ferries, cruise ships or historical landmark vessels (EDAW, 1996).		
3.2, p. 48, Table 3-3	**STEP 7: Optimize the Design for Obtaining Data** 1. A systematic grid sampling design was used to ensure a general representation of the Pier Area, to provide the ability to detect "hot spots", and to provide samples that will determine if a COPC concentration gradient away from the quay wall is evident. Additional samples were added based on professional judgment to provide more extensive representation of the sediment shelf adjacent to the quay wall, where historically the highest levels of contaminants were measured. 2. A total of 19 sediment cores are proposed as follows: a. Four samples parallel and south of Pier 3 (PA C-1 through PA C-4), where historical data are basically lacking. b. Two samples along the shelf between Piers 2 and 3 (PA C-5 and 9), and three samples down the middle of the berthing area between the piers (PA C-6 to C-8) to provide representation of the sediment, and determine if there is a trend of decreasing concentrations away from the shelf. Sample PA C-5 will be taken adjacent to outfall L. Also, one sample (PB C-10) will be taken immediately adjacent to the south side of Pier 2. c. Two samples will be taken adjacent to outfalls K and J, respectively, on the shelf between Piers 1 and 2 where historically high levels of PAHs and metals were measured (PA C-13 and 16). In addition, two samples will be taken along the northern edge of Pier 2 (PA C-11 and 12), and two samples along the Pier 1 (PA C-17 and 18), Seaplane Lagoon breakwater boundary. PA C-19 will be taken to the east of Pier 3 on the boundary with Breakwater Beach. Finally, two	Table 3-3, Step 7, #2 should be modified to state that a total of 31 sediment cores are proposed. In addition, sub-paragraph d should be added that states: "d. Twelve sampling stations will be located within the area extending eastward past the quay wall beneath the roadway between Piers 1 and 2."	The DQOs outlined in Table 3-3 apply to the additional sampling locations; therefore, they should be incorporated into the table.

Work Plan Section	Original Work Plan Paragraph	Change	Rationale
	samples will be taken in the berthing area to provide a gradient away from PA C-13 (PA C-14 and 15). 3. One sample will be taken from a reference area south of Pier 3 in the breakwater beach area to support PAH fingerprinting analysis and to characterize ambient background sediment concentrations beyond reasonable impact due to pier area contamination.		
3.3.1, p. 53	For the Pier Area, a total of 19 sediment cores are proposed as indicated in Figure 3-6. Along the eastern ledge between Piers 1 and 2, two sediment cores (PA C-16 and PA C-13) are proposed adjacent to outfalls J and K and one core (PA C-5) is proposed south of outfall K. Four samples are proposed parallel and south of Pier 3 (PA C-1 through PA C-4) where historical data are unavailable. Two samples along the quay wall between Piers 2 and 3 and three samples extending through the middle of the berthing area between the piers are recommended to provide presentation of sediment that has been dredged and also determine if a trend of decreasing concentrations exists away from the eastern shelf. Two samples are proposed along the northern side of Pier 1 near Seaplane Lagoon breakwall; another two samples are proposed within the middle of the berthing area, and two samples along the southern edge of Pier 2. One background sampling station (to be designated "REF") will be collected south of Pier 3 approximately 100 ft north of the breakwater as a reference data point to indicate conditions that have not been influenced from the pier outfall or piling-related contamination.	The first sentence of the first paragraph is revised to read: "For the Pier Area, at total of 31 sediment cores are proposed as indicated in Figures 3-6a and 3-6b" In addition, a sentence is inserted after the second sentence of the first paragraph stating: "An additional 12 stations are proposed along the sediment shelf area adjacent to and extending eastward past the quay wall beneath the roadway between Piers 1 and 2 (Figure 3-6b)"	Collection of the additional sediment samples will provide information necessary to fill data gaps at Site 24.
3.3.1, p. 53	One sediment core and one surface grab will be collected from each of 56 stations at Oakland Inner Harbor/Todd Shipyard, Pier Area, and Western Bayside. Sediments will be collected at each site using a vessel, a 5-ft Vibracore sampler, and a modified Van Veen grab sampler. The Vibracore cores (3.5 inches [8.89 cm]) will be collected in sediment to a depth of no more than 5 ft. If debris or rocks prevent sampling at the exact station	The third paragraph is modified as follows: "One sediment core and surface grab sample will be collected from each of 68 stations at Oakland Inner Harbor, Pier Area, and Western Bayside. Sediments will be collected at each	Revised method required due to site-specific conditions at proposed locations.

Work Plan Section	Original Work Plan Paragraph	Change	Rationale
	location, then cores will be relocated as close to the original location as possible so that an acceptable core sample can be collected. The cores will be collected with a pre-cleaned rigid cellulose acetate butyrate (CAB) core liner. The core length and a general description (color, texture, and odor) of the sediment type will be recorded on the sample collection form. Once sample cores are extruded from the Vibracore corer, they will be photographed and then the caps will be placed on the top and bottom of the cores and they will be stored upright on the vessel. A detailed description of field sampling methods is provided in Appendix A.	site using a vessel, a coring device, and a grab sampler. Sediment cores will be collected in sediment to a depth of no more than 5 ft. If debris, rocks, or pier pilings prevent sampling at the exact station location, then cores will be relocated as close to the originally proposed location as possible so that an acceptable core sample can be collected. A detailed description of the field sampling methods is provided in Appendix A and in Addendum 1 to Appendix A."	
3.3.1, p. 53	Table 3-5 lists the coordinates for each planned sample, and Table 3-6 presents the list of COPCs to be tested. All of the sediment cores will be analyzed for the full suite of chemicals that are likely to be associated with historical Navy operations based on previous investigations at Alameda Point including PAHs, PCB congeners/pesticides, metals, and tributyltins.	In the fourth paragraph, Table 3-5 should be changed to Table 3-5a and Table 3-5b should be inserted (Table 3-5b is added in this Addendum).	Table 3-5 defines the coordinates for each station.
3.3.1, p. 54	The field sampling effort will include: • Collection of sediment samples at 56 sediment stations; • Collection of 5 field duplicate samples;	Revise first and second bullets to say: • Collection of sediment samples at 68 sediment stations; • Collection of 7 field duplicates;	Revised to include supplemental Pier Area stations included in this Work Plan Addendum. No change to core sample depths of 0-5 cm, 25-50 cm, and 50-120 cm (archived).
3.3.1, p. 54	Sample processing will be conducted in the field on the sampling vessel. Core sediment samples will be collected by scooping sediment out of each measured segment using pre-cleaned stainless steel spoons. Sediment will be collected to within 5 mm of the core liner. All sediment from each interval will be collected and homogenized to develop a representative sample for that interval. Sediment from the top interval (0-5 cm) of the core will be homogenized with the grab sediment sample at that location. A second aliquot for grain size analysis will be collected from the 5-cm surface sample. Once	The first sentence in the last paragraph of the section should be revised to read: "Sample processing will be conducted in the field on the sampling vessel with the exception of the 12 sediment cores from the shelf between Piers 1 and 2 (i.e., PAC-20 – PAC-31) which will be processed on-shore."	Revised method required due to site-specific conditions at proposed locations.

Work Plan Section	Original Work Plan Paragraph	Change	Rationale
	homogenized sediment samples will be shipped to the appropriate laboratory.		
p. 55, Figure 3-6	See attached Figure 3-6b.	Figure 3-6 should be changed to Figure 3-6a and Figure 3-6b should be added (Figure 3-6b is added in this Addendum).	Figure 3-6b shows the supplemental sampling stations at the Pier Area that are proposed in this Work Plan Addendum.
p. 56, Table 3-5	See attached Table 3-5b.	Table 3-5 should be changed to 3-5a and Table 3-5b should be added (Table 3-5b is added in this Addendum).	Table 3-5b lists the Latitudes and Longitudes of the supplemental sampling stations at the Pier Area that are proposed in this Work Plan Addendum.

Figure 3-6b. Proposed Sampling Locations

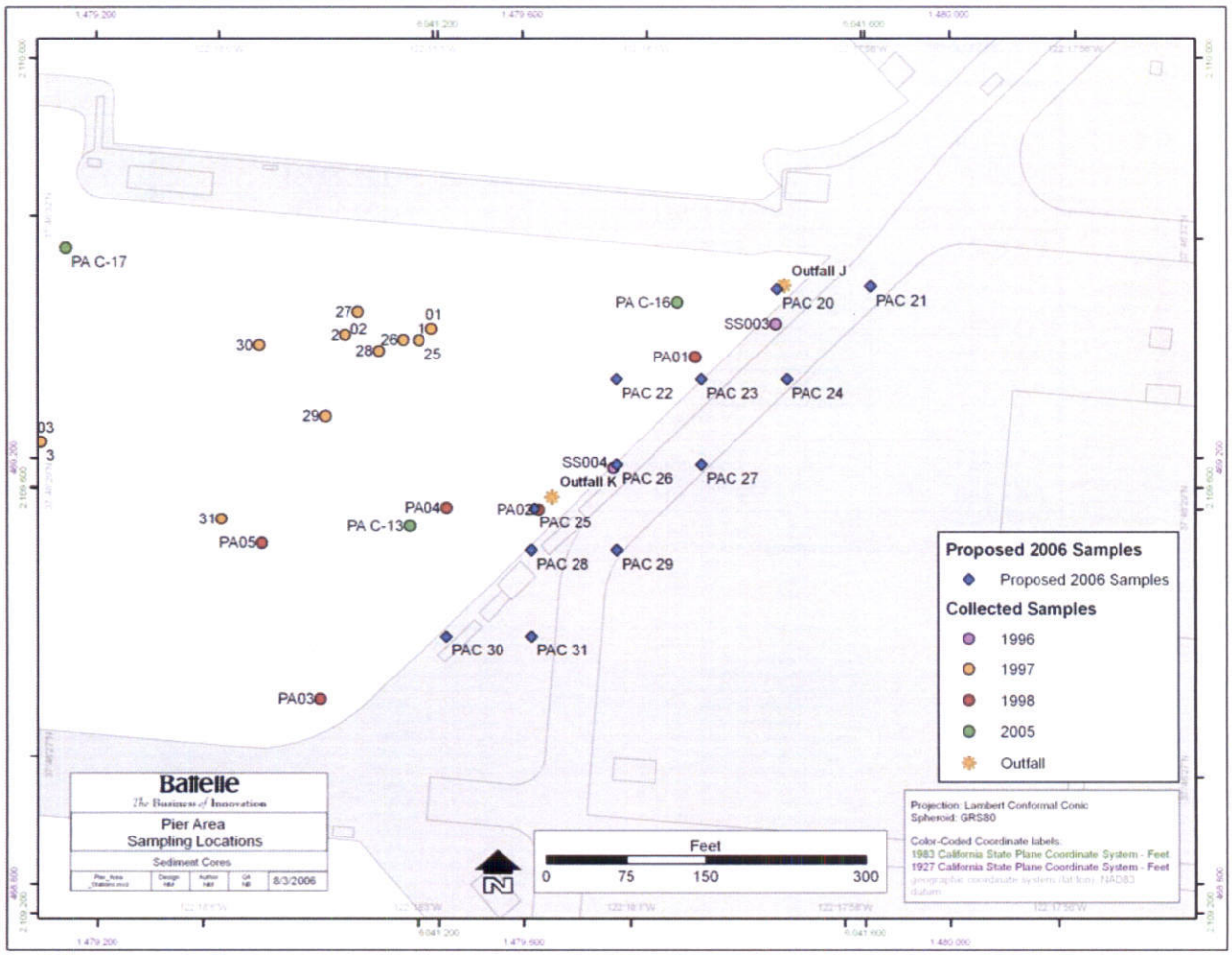


Table 3-5b. Proposed Sampling Locations for Offshore Sediment Cores

Station	Location (NAD 83)	
	Latitude	Longitude
Pier Area Sample Locations Along Sediment Shelf		
PA C-20	37.77535	-122.29981
PA C-21	37.77536	-122.29951
PA C-22	37.77511	-122.30033
PA C-23	37.77511	-122.30005
PA C-24	37.77512	-122.29977
PA C-25	37.77477	-122.30059
PA C-26	37.77489	-122.30032
PA C-27	37.77489	-122.30004
PA C-28	37.77466	-122.30059
PA C-29	37.77467	-122.30032
PA C-30	37.77444	-122.30086
PA C-31	37.77445	-122.30059

3.0 REFERENCES

Battelle, BBL, and Neptune & Co. 2005. *Final Offshore Sediment Study Work Plan at Oakland Inner Harbor, Pier Area, Todd Shipyard, and Western Bayside Alameda Point, California.* Prepared for BRAC Program Management Office West. San Diego, CA. May.

Battelle, BBL, and Neptune & Co. 2006. Remedial Investigation Report IR Site 20 (Oakland Inner Harbor) and Site 24 (Pier Area) Alameda Point, Alameda, California. Prepared for BRAC Program Management Office West. San Diego, CA. March.

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FINAL

ADDENDUM NUMBER 1

TO THE

FINAL

SAMPLING AND ANALYSIS PLAN
(Quality Assurance Project Plan and Field Sampling Plan)
FOR

OFFSHORE SEDIMENT STUDY AT OAKLAND INNER HARBOR, PIER AREA, TODD SHIPYARD, AND WESTERN BAYSIDE
(Dated April 2005)

Alameda Point, California

CONTRACT NO.: N47408-01-D-8207
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Name Date: 9/15/2006

1.0 INTRODUCTION

The Final Offshore Sediment Study Work Plan at Oakland Inner Harbor, Pier Area, Todd Shipyard, and Western Bayside, Alameda Point, CA was finalized in May, 2005 (Battelle et al., 2005) and included the Sampling and Analysis Plan (Quality Assurance Project Plan and Field Sampling Plan) as Appendix A. This Addendum (Addendum 1) to the Sampling and Analysis Plan (SAP) is to describe changes required to address data gaps recently identified for Installation Restoration (IR) Site 24 (Pier Area). These changes are necessary in order to satisfy the data quality objectives defined in the final SAP (revised herein).

The objective of the Offshore Sediment Study Work Plan at Oakland Inner Harbor, Pier Area, Todd Shipyard, and Western Bayside, Alameda Point, California (p. 1) was "to address data gaps at these sites that were identified from previous investigations and to further assess whether onsite sources may have impacted sediment quality." The sampling scheme identified at that time was intended to collect all additional data required to complete a Remedial Investigation (RI) report for Site 20 (Oakland Inner Harbor) and Site 24 (Pier Area). However, during Agency review of the Draft RI, an additional data gap was identified for Site 24. Specifically, it was determined that the sediment shelf previously described as being located adjacent to the quay wall between Piers 1 and 2 of Site 24 actually extends eastward past the quay wall beneath the roadway. As noted in the RI, the highest concentrations of several PAHs and metals were detected in 1996 adjacent to the quay wall in the vicinity of Outfalls J and K. Without further characterization of the sediments extending under the roadway, it is impossible to know if the elevated concentrations measured in 1996 are confined to a small area as previously believed or actually represent a larger area of contamination. Therefore, Addendum 1 proposes the collection of sediment from an additional 12 locations from this previously uncharacterized area. Cores will be collected to a depth of 120 cm (or refusal) and the intervals subsampled will be same as those described in the Offshore Work Plan (Battelle et al., 2005), including surface (0 – 5 cm), 5-25 cm, 25-50 cm, 50-120 cm. The lowest depth (50-120 cm) will be archived for possible future analyses as described in the Final Work Plan (Battelle et al., 2005). The data generated will be evaluated as described in the Final Offshore Work Plan (Battelle et al., 2005) and the results will be incorporated into the RI report for Sites 20 and 24.

All field and analytical activities conducted for this investigation must be performed according to the requirements of the April 2005 SAP (Appendix A of Battelle et al., 2005) unless specifically modified by Addendum 1 as outlined in Section 2 of this Addendum. Addendum 1 will be implemented in conjunction with the April 2005 SAP to which it is appended. A site-specific Health and Safety Plan (S-HASP) for this activity has been prepared as Appendix B of the Final Work Plan Addendum and delivered to the Navy Remedial Project Manager (RPM) and Health and Safety Officer (HSO) under separate cover.

2.0 MODIFICATIONS

SAP Section	Text of Original SAP[1] (April 2005)	Change	Rationale
A.1.0 Introduction	This Offshore Sediment Study Sampling and Analysis Plan (SAP) was prepared by Battelle for Base Realignment and Closure (BRAC) Program Management Office (PMO) West under Contract N47408-01-D-8207 in support of the offshore evaluation at Oakland Inner Harbor, Pier Area, Todd Shipyard, and Western Bayside at Alameda Point in Alameda, CA. The SAP also addresses onshore soil sampling at Seaplane Lagoon. The project work plan proposes collection of subsurface sediment cores and surface sediments from a combined 56 stations located in Oakland Inner Harbor, Pier Area, the offshore portion of Todd Shipyard, and Western Bayside to complete data gaps in the current data set. Data for Breakwater Beach were determined to be sufficient; therefore, no additional data collection is proposed for that area. In addition, 12 samples will be collected in three trenches at the Seaplane Lagoon construction debris pile at the direction of the Navy.	An additional 12 sediment cores from 12 stations (plus 2 co-located field duplicate cores creating 6 field duplicate samples) are proposed for Site 24 to address a data gap identified during the during Agency review of the Draft RI. To enable sufficient volume for the surface samples, grab samples will also be collected at these locations. This addendum (Addendum 1) describes additional sampling and analysis proposed for Site 24 in September 2006. A separate S-HASP was prepared for the additional work described in this Addendum.	Collection of additional sediment samples at Site 24 will provide information necessary to fill data gaps along the sediment shelf. All field and analytical activities conducted for this investigation must be performed according to the requirements of the April 2005 SAP (Appendix A of Battelle et al., 2005) as appended by Addendum 1. To ensure the safety of all field personnel, a new Health and Safety Plan was prepared for the collection of additional samples at Site 24.
A.2.1 Project and Task Organization	Figure A-1 provides a project organization chart for the proposed Remedial Investigation (RI) activities at the offshore parcels. Table A-2 provides the responsibilities and authorities of key personnel for this project. (All tables are located at the end of this document). Key personnel shown in the chart and table include the Navy Remedial Project Manager (RPM), the Navy Quality Assurance Officer (QAO), the Battelle Program Manager, the Battelle Project Manager, the Battelle	Two personnel changes have occurred since the April 2005 SAP was approved. Navy Remedial Project Manager Darren Newton is replaced by Ms. Mary Parker. Chemistry Laboratory Leader Carole Peven-McCarthy is replaced by Ms. Yixian Zhang. Figure A-1a demonstrates the current Project Organizational Structure.	The new figure presents the current staff assignments.

[1] April 2005. Draft Final Offshore Sediment Study Work Plan at Oakland Inner Harbor, Pier Area, Todd Shipyard, and Western Bayside Alameda Point, CA.

SAP Section	Text of Original SAP[1] (April 2005)	Change	Rationale
	Project QC Manager, the Battelle Site Health and Safety Officer, the Battelle Field Team Leader, the Battelle Laboratory Team Leader, and the Battelle Database Manager. The Battelle Project Manager will be responsible for maintaining the official, approved SAP and related documents.		
A.2.2 Problem Definition/ Background	Limited investigations have been conducted at the Pier Area (IR Site 24) and further characterization is required to define the nature and extent of COPCs at the site as well as identifying the source of polynuclear aromatic compounds (PAHs) in sediments. The Navy has hypothesized that creosote from the pier pilings may have contributed to the PAHs in sediments, and thus a fingerprinting analysis is necessary to isolate the PAH signature in sediment and compare it against the signature found in the pier piling, outfalls, and ambient background station. Additional core data are required to define the extent of the eastern shelf along the quay wall and determine if a concentration gradient exists from the eastern shelf through the piers. Samples are proposed along each of the piers, adjacent to the outfalls, along the quay wall, and within the gradient extending from the outfalls to support development of an RI report for the Pier Area.	During Agency review of the Draft RI it was determined that a data gap exists at Site 24 that requires further characterization. This gap is located in area extending eastward past the quay wall beneath the roadway between Piers 1 and 2 (Figure A-3a). This area will be sampled and analyzed using the sample collection methods described in the April 2005 SAP and Section A.3.2.3 of this Addendum.	Collection of the additional sediment samples will provide information necessary to fill data gaps at Site 24 along the sediment shelf. An additional method that was not previously described in the April 2005 SAP is included in this Addendum due to site-specific conditions at the proposed locations.
A.2.4 Project/Task Description	The major activities required during completion of the Offshore Sediment Study are as follows[2]: • Collect 19 sediment cores, surface sediments, and wood scrapings from piers at IR Site 24 (the Pier Area);	In order to address the data gap at Site 24, Battelle will collect 12 additional sediment cores (to 120 cm or refusal) from 12 stations (plus 2 co-located field duplicate cores creating 6 field duplicate samples) within the previously uncharacterized area that extends under the roadway between Piers 1 and 2 (Figure A-3a). To enable sufficient volume	Collection of the additional sediment samples will provide information necessary to fill data gaps at Site 24 along the sediment shelf.

[2] Only bullets that apply specifically to Site 24 are included here for brevity.

SAP Section	Text of Original SAP[1] (April 2005)	Change	Rationale
	• Process 56 sediment cores from the offshore areas into four sections: 0-5 cm, 5-25 cm, 25-50 cm, and 50-120 cm; • Analyze the top three offshore core sections (0-5 cm, 5-25 cm, and 25-50 cm) for total organic carbon (TOC), grain size, metals, PAHs, pesticides, polychlorinated biphenyls (PCBs), and tributyltin (TBT). The top core interval (0-5 cm) will be homogenized with sediments collected by surface grab at the same location to ensure sufficient volume of sediment for all analyses; • Archive the 50-120 cm sections in all cores except at stations WBC-16 and WBC-17, where all sections will be analyzed; • Determine the source of PAHs in sediments and scrapings for pilings in the Pier Area by performing fingerprinting analyses using 45 individual PAHs, including alkylated and non-alkylated forms, hopane, and TPH; Support RI report for Oakland Inner Harbor/Todd Shipyard and Pier Area, and revised Data Summary Memorandum for Western Bayside/Breakwater Beach.	for the surface samples, grab samples will also be collected at these locations. The sample locations will be adjusted, as necessary, in the field to place them at the outfall. These sediment cores will be subsampled by depth into four sections: 0-5cm, 5-25 cm, 25-50 cm, and 50-120 cm. For each of these 12 cores, analyze the 0-5cm, 5-25 cm, and 25-50 cm for TOC, Grain Size, Metals, Tributyltin, PCBs, Pesticides, PAHs, and TPH fingerprinting and archive the 50-120 cm sample.	
A.2.5.1 Data Quality Objectives	**STEP 7: Optimize the Design for Obtaining Data** 1. A systematic grid sampling design was used to ensure a general representation of the Pier Area,	DQO Steps 1 – 6 of the April 2005 SAP Table A-5 (Data Quality Objectives for Pier Area) apply to the additional samples at Site 24 and are not repeated in this addendum. Step 7	The DQOs outlined in Table A-5 apply to the additional sampling locations, therefore, these

SAP Section	Text of Original SAP[1] (April 2005)	Change	Rationale
	to provide the ability to detect "hot spots", and to provide samples that will determine if a COPC concentration gradient away from the quay wall is evident. Additional samples were added based on professional judgment to provide more extensive representation of the sediment shelf adjacent to the quay wall, where historically the highest levels of contaminants were measured. 2. A total of 19 sediment cores are proposed as follows: a. Four samples parallel and south of Pier 3 (PA C-1 through PA C-4), where historical data are basically lacking. b. Two samples along the shelf between Piers 2 and 3 (PA C-5 and 9), and three samples down the middle of the berthing area between the piers (PA C-6 to C-8) to provide representation of the sediment, and determine if there is a trend of decreasing concentrations away from the shelf. Sample PA C-5 will be taken adjacent to outfall L. Also, one sample (PB C-10) will be taken immediately adjacent to the south side of Pier 2. c. Two samples will be taken adjacent to outfalls K and J, respectively, on the shelf between Piers 1 and 2 where historically high levels of PAHs and metals were measured (PA C-13 and 16). In addition, two samples will be taken along the northern edge of Pier 2 (PA C-11 and 12), and two samples along the Pier 1 (PA C-17 and 18), Seaplane Lagoon breakwater boundary. PA C-19 will be taken to the east of Pier 3 on the boundary with Breakwater Beach. Finally, two samples will be taken in the berthing area to provide a gradient away from PA C-13 (PA C-14 and 15). 3. One sample will be taken from a reference area south of Pier 3 in the breakwater beach area to	(optimization) for the additional samples at Site 24 is as follows: A total of 12 sediment cores along the sediment shelf are proposed. The twelve sampling stations will be located within the area extending eastward past the quay wall beneath the roadway between Piers 1 and 2 (Figure A-3a).	locations should be incorporated into the table.

SAP Section	Text of Original SAP[1] (April 2005)	Change	Rationale
	support PAH fingerprinting analysis and to characterize ambient background sediment concentrations beyond reasonable impact due to pier area contamination.		
A.3.1 Sampling Process Design (Experimental Design)	The experimental design for the Offshore Sediment Study is based on the results of previous studies and the requirements of the remedial investigation. The development of the current field sampling and sample processing design, as well as the selection of COPCs and required analytical methods, are discussed in Sections 2.0 and 3.0 of the Work Plan. Station coordinates are defined in Table A-8.	Table A-8a specifies the station coordinates and required analytical methods for the 12 additional sampling stations from Site 24.	Table A-8a defines the station coordinates and the analyses to be performed at each station.
A.3.2 Field Sampling Methods	The field sampling effort will include[3]: • Collection of sediment cores and surface sediments (grab samples) at 55 sediment stations; • Collection of six field duplicate samples; • Subsampling the sediment cores by depth into four sections: 0-5 cm, 5-25 cm, 25-50 cm, and 50-120 cm; • Analyze the 0-5 cm (homogenized with the surface grab samples), 5-25 cm, and 25-50 cm core sections for TOC, grain size, PCBs, pesticides, metals, TBT, and PAHs (U.S. EPA SW-846 Method 8270C) (see Section A.3.3.1.1); • Archive the 50-120 cm core sections at all stations except at	The field sampling effort for the additional samples that will be collected for this addendum involves collection of sediment cores and surface sediment (grab samples) at 12 sediment stations at Site 24. Co-located field duplicate cores will also be collected at two stations.	Collection of the additional sediment samples will provide information necessary to fill data gaps at Site 24 along the sediment shelf.

[3] Only text related to Site 24 is included for brevity.

SAP Section	Text of Original SAP[1] (April 2005)	Change	Rationale
	stations WBC-16 and WBC-17, where all sections will be analyzed; • Subsample Pier Area sediment samples for additional PAH and TPH analyses for fingerprinting source identification; • Attempt the collection of wood scraping samples from piers at the Pier Area;		
A.3.2.1 Station Positioning	Table A-8 defines the sampling location coordinates for the offshore sampling event. Stations will be located using a Trimble GeoExplorer XT series Differential Global Positioning System (dGPS). Differential correction will be provided by either Wide Area Augmentation System (WAAS) or post-processing from the wide network or an equivalent GPS unit. Station coordinates will be recorded using the following procedures: 1. Enter the station latitude and longitude defined in Table A-8 into the dGPS instrument. 2. Follow the dGPS direction relative to magnetic course to approach selected station. 3. When within ± 2 m of the defined location, mark the location. 4. Record the station coordinates derived by the dGPS instrument. Define the latitude and longitude in units of decimal degrees (NAD 83).	The station positioning procedures required to accurately collect samples from the 12 additional stations at Site 24 are as follows: Three pier edge stations (PA C-20, -22, and -25) will be located using the GPS procedures described in Section A.3.2.1. These stations will be used as "reference points." Five stations that are just under the roadway (PA C -21, -23, -26, -28, and -30) may also be accessible by the GPD satellite signal. However, for stations located under the roadway (PA C -24, -27, -29, and -31) where satellite signal access is not possible, the following procedures will be used: 1. Establish verifiable coordinates using a known location: Enter the latitude and longitude defined in Table A-8a for the pier edge reference point (location on the pier perpendicular to the target station location under the pier) into the dGPS instrument. 2. Go to the known location: Follow the dGPS direction relative to magnetic course to approach selected reference point. 3. When within ± 2 m of the defined	Additional method required due to site-specific conditions at proposed locations.

SAP Section	Text of Original SAP[1] (April 2005)	Change	Rationale
	All necessary dGPS calibration information, including the location of a suitable reference point, will be documented in the field logbook on dGPS calibration forms. Maintenance and calibration of dGPS units is described in Sections A.3.6.1 and A.3.7.1, respectively.	location, mark the location. 4. Attach measuring tape to the pier at the reference point. 5. Measure perpendicular to the pier for the appropriate distance (Table A-8a.) 6. Mark the location. 7. Record the pier edge reference point coordinate measured by the dGPS instrument, the measured distance from the reference location to the target station, and the magnetic heading from the reference location. 8. Derive the latitude and longitude in units of decimal degrees (NAD 83) based on the known location, and the known conversion of meters to latitude and longitude.	
A.3.2.3 Sediment Core Collection	Sediment cores will be collected at each site from a vessel with an electric vibracore sampler outfitted with a 150-cm-long tube. One sediment core will be collected from each of 56 stations at Oakland Inner Harbor/Todd Shipyard (Figure A-2), Pier Area (Figure A-3), and Western Bayside (Figure A-4a/b). Sampling along the southern shore of Western Bayside (samples WBC-1, WBC-2, WBC-3, WBC-4, WBC-5, WBC-6, and WBC-7) will be timed in such a manner as to minimize impacts to populations of Least Terns foraging in the area. The Vibracore sample (8.89 cm [3.5 inch] diameter liner) will be collected in sediment to a depth of no more than 150 cm or until the Merritt Sand layer is reached. If debris or rocks prevented sampling at the exact station location, then cores will be relocated as close to the original location as possible so that an	In order to perform the additional sampling required under the roadway at the Pier Area, sediment cores will be collected at each station from a small portable barge vessel with a pneumatic or electric vibracore sampler outfitted with an approximately 150-cm-long and 10.2 cm diameter aluminum tube. The core device and sample collection tube will be lowered and raised using a compact tripod and chain hoist. One sediment core will be collected at each station along the sediment shelf adjacent to the quay wall and extending under the roadway between Piers 1 and 2 (Figure A-3b). Sampling under the roadway will take place at tide heights between approximately 1 and 4 feet MLLW. All sample processing will be conducted on-shore.	This method is required due to site-specific conditions at proposed locations.

SAP Section	Text of Original SAP[1] (April 2005)	Change	Rationale
	acceptable core sample can be taken. The cores will be collected with a pre-cleaned rigid cellulose acetate butyrate (CAB) or food-grade polyethylene core liner. The core length and a general description (color, texture, odor) of the sediment type will be recorded on the sample collection form. Once sample cores are extruded from the Vibracore corer, caps will be placed on the top and bottom of the cores which are then to be stored upright and iced on the vessel until processed. Core samples will be processed on the vessel. The top (0-5 cm) interval of the core sample will be homogenized with the grab sample. Sample labels will be placed on the cores to properly identify the sampling station. A unique sample ID will be assigned to each core, consisting of the station ID, core length, and date and time of collection. The same information will be documented on the Core Sampling Data Sheet to provide a definitive link between the sample collection information and the core.		
A.3.2.4 Surface Sediment Collection	Due to the small volume of sample collected in the vibracore 0-5 cm section, surface sediments will be co-collected at each site from the vessel with a modified stainless steel van-veen grab sampler. One grab sample will be collected from each of 56 stations at Oakland Inner Harbor/Todd Shipyard (Figure A-2), Pier Area (Figure A-3), and Western Bayside (Figure A-4a/b). Sampling along the southern shore of Western Bayside (samples WBC-1, WBC-2, WBC-3, WBC-4, WBC-5, WBC-6, and WBC-7) will be timed in such a manner as to minimize impacts to populations of Least Terns foraging in the area.	In order to address the data gap identified at Site 24, one surface grab sample will be collected from each of 12 additional stations within Site 24 located along the sediment shelf adjacent to the quay wall and extending under the roadway between Piers 1 and 2 (Figure A-3a). Sampling will occur as close as possible to the defined Station Locations (Table A-8a), but locations may be adjusted to avoid pier structures. The sample locations will be adjusted, as necessary, in the field to place them at the outfall. The sediment cores will be subsampled as described in the 2005 SAP. For the 12	Collection of the additional sediment samples, as depicted in the attached Figure A-3a, will provide information necessary to fill data gaps at Site 24 along the sediment shelf. Additional method required due to the size of the sampling platform and site-specific conditions at proposed locations.

SAP Section	Text of Original SAP[1] (April 2005)	Change	Rationale
	The grab sampler will collect either a 0.04-m^2 or a 0.1-m^2 area of sediment from 10-30 cm deep according to SOP 5-169, *Collection and at Sea Processing of Benthic Grab Samples*. If debris or rocks prevent sampling at the exact station location, then the vessel will be relocated as close to the original location as possible so that an acceptable grab sample can be taken. Upon retrieval, the sediment sample will be inspected for disturbance (e.g., excessive washing, slumping, interference of jaw closure). If deemed acceptable, the grab sample sediment depth and a general description (color, texture, odor) of the sediment type will be recorded on the sample collection form. If unacceptable, the sample will be discarded and a new one collected. Sediment samples will be processed on the vessel. Sediment will be removed from the grab with a Kynar®-lined scoop with 5-cm-high edges, avoiding the sides of the grab. Sediment will be placed into a clean stainless steel bowl and homogenized with the top (0-5 cm) interval of the co-located core sample, and then transferred to the appropriate sample containers.	additional gap-filling stations, the top 5 cm of sediment will be removed from the grab on the boat once the grab is determined to be acceptable. A Kynar®-lined scoop will be used to remove sediment from the grab, avoiding the sides of the grab. The sediment sample will be placed in a certified clean jar, labeled, and chilled. This surface sediment will be homogenized with the 0-5 cm core section during on-shore core processing and aliquotted for analysis.	
A.3.3.1.1 Processing Core Samples in the Field	Core sample processing will be conducted in the field on the sampling vessel. Sediment samples will be collected by scooping sediment out of each measured segment using pre-cleaned stainless steel spoons. Sediment will be collected to within 5 mm of the core liner, but sediment that contacts the liner wall will not be included in the sample. Sediment from each interval will be taken in its entirety to develop a representative sample for the interval. Sediment samples will be collected	Core sample processing for the additional 12 samples described in Addendum 1 will be processed on shore due to the size of the vessel required to sample at Station 24.	Additional method required due to site-specific conditions at proposed locations.

SAP Section	Text of Original SAP[1] (April 2005)	Change	Rationale
	by scooping sediment out of each measured segment into a stainless steel bowl using pre-cleaned stainless steel spoons, and homogenizing to a uniform color and consistency. Once a core segment is containerized, the next segment will be collected and processed. Sediment cores will be placed on a polyethylene-lined stationary work table in a clean area on the vessel. The cores will be cut longitudinally with an electric shear and/or clean stainless steel knife. After slicing the core liner, a clean stainless steel blade is slid between the two halves to cut completely through the sediment. The core is gently opened into two equal halves and any pieces of liner in contact with sediment are removed. The core is then partitioned into four segments: 0-5 cm, 5-25 cm, 22-50 cm, and 50-120 cm. The 0-5 cm segment will be homogenized with the grab sample. At all but two stations (WBC-16 and WBC-17), the bottom segment (50-120 cm) of the core will be archived at BDO.		
A.3.4.2.3 Polynuclear Aromatic Hydrocarbon (PAH) Analysis	For water (equipment blank) samples, a one-liter volume of sample is placed in a continuous liquid-liquid extractor, pH adjusted (if necessary), spiked with appropriate surrogates and internal standards and extracted with dichloromethane for a determined period of time. In this procedure, the extracting solvent has a higher density than that of the aqueous solution being extracted, allowing the reflux of the heavier extracting solvent to be diverted through the sample, extracting the solute, and then siphoned back into the boiling	For the additional 12 gap-filling stations at Site 24, the equipment will be extracted following Battelle SOP 5-200 (attached). Approximately 1 L of water sample will be fortified with surrogate internal standards and extracted three times with methylene chloride using separatory funnel techniques. The combined extract will be dried over anhydrous sodium sulfate and cleaned using alumina column chromatography, activated copper, and HPLC GPC. The post-HPLC extract will be concentrated to approximately 1 mL, and	Additional equipment blank water extraction and analysis procedure is required because PAH and PCB/pesticide analysis will be performed on the same equipment blank sample and by the same laboratory.

SAP Section	Text of Original SAP[1] (April 2005)	Change	Rationale
	flask. After an appropriate period of time for extracting, the extract is transferred into a K-D apparatus and concentrated to 5 mls. The sample may be further concentrated using nitrogen blowdown. This extraction procedure is explained in detail in CAS SOP EXT-3520.	fortified with a set of recovery internal standards. The extract will be qualitatively split 50:50. One half of the extract will be solvent exchanged to hexane and analyzed for PCB/pesticides by gas chromatography/electron capture detection (GC/ECD). The other half will be analyzed for PAHs by mass spectrometry (GC/MS) in the selected ion monitoring (SIM) mode. All results are reported in ng/L.	
Table A-10	See Draft SAP April 2005.	Table A-10a defines the PAH detection limits for the 12 additional Site 24 stations that will be analyzed by BDO.	The new table reflects the analysis of PAH at BDO laboratory.

Figure A-1a. Organizational Structure

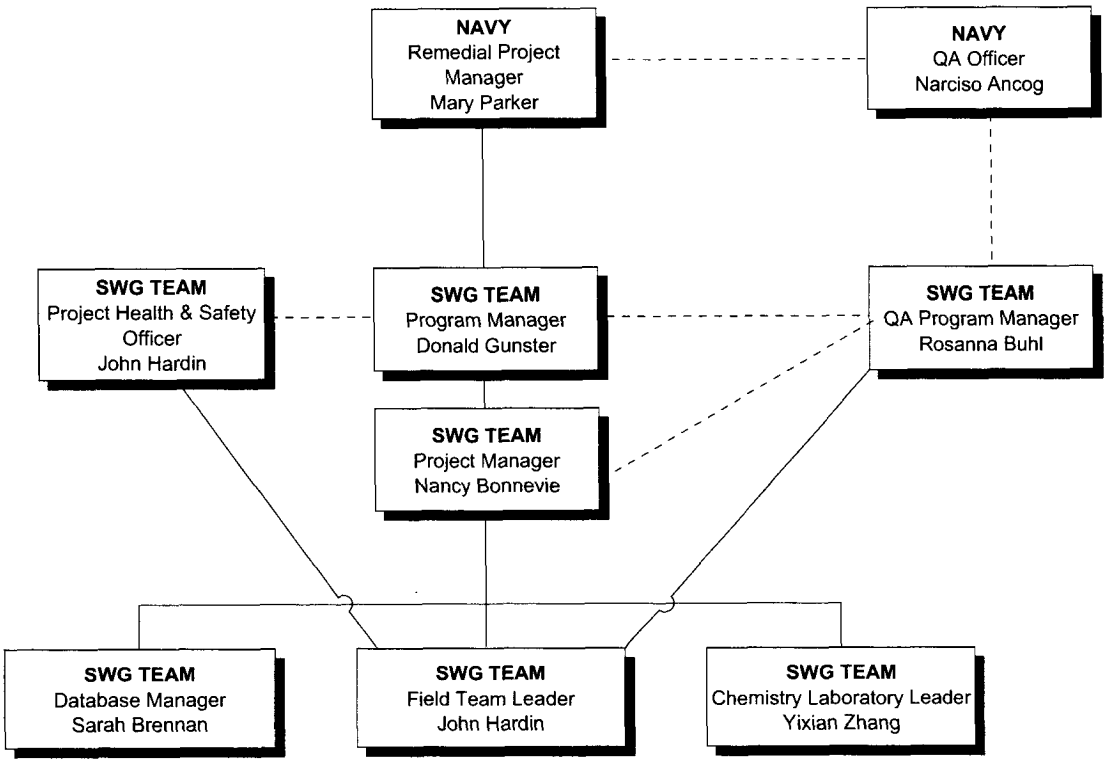


Figure A-3a. Proposed Sampling Locations

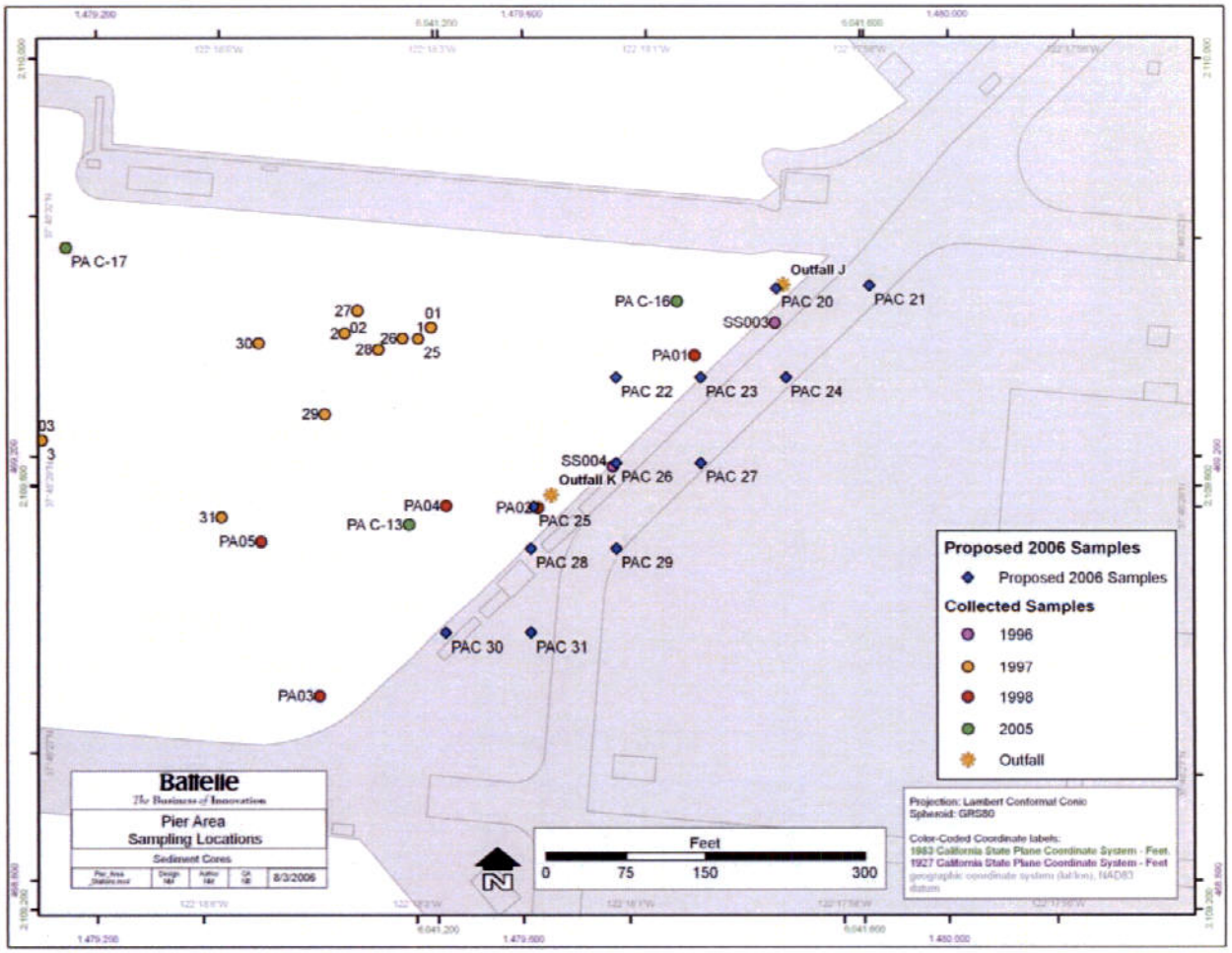


Table A-8a. Sampling Station Locations and Sample Tracking Table (coordinates in NAD 83) for Supplemental Sampling at Site 24

Station	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	No. Samples for Analysis	Sections for Analysis (cm)	Archived Section (cm) BDO	TOC/Grain Size	Metals	Tributyltin	PCB/Pesticides	PAH/TPH Fingerprinting
PA C-20	37.7753323959	-122.300054443	3	0-5 5-25 25-50	50-120	CAS	CAS	CAS	BDO	BDO
PA C-21	37.775336617	-122.2997777	3	0-5 5-25 25-50	50-120	CAS	CAS	CAS	BDO	BDO
PA C-22	37.7751085091	-122.300325864	3	0-5 5-25 25-50	50-120	CAS	CAS	CAS	BDO	BDO
PA C-23	37.7751127308	-122.300049122	3	0-5 5-25 25-50	50-120	CAS	CAS	CAS	BDO	BDO
PA C-24	37.7751169519	-122.29977238	3	0-5 5-25 25-50	50-120	CAS	CAS	CAS	BDO	BDO
PA C-25	37.7748846216	-122.300597284	3	0-5 5-25 25-50	50-120	CAS	CAS	CAS	BDO	BDO
PA C-26	37.774888844	-122.300320543	3	0-5 5-25 25-50	50-120	CAS	CAS	CAS	BDO	BDO
PA C-27	37.7748930658	-122.300043802	3	0-5 5-25 25-50	50-120	CAS	CAS	CAS	BDO	BDO
PA C-28	37.7746649566	-122.300591962	3	0-5 5-25 25-50	50-120	CAS	CAS	CAS	BDO	BDO
PA C-29	37.774669179	-122.300315221	3	0-5 5-25 25-50	50-120	CAS	CAS	CAS	BDO	BDO
PA C-30	37.7744410685	-122.300863379	3	0-5 5-25 25-50	50-120	CAS	CAS	CAS	BDO	BDO
PA C-31	37.7744452915	-122.30058664	3	0-5 5-25 25-50	50-120	CAS	CAS	CAS	BDO	BDO

Table A-10a. PAH Detection Limits and Benchmarks

Analytes	Method Detection Limit	Reporting Limit	Sediment Benchmark	Sediment Benchmark Citation
Low-Molecular-Weight PAHs (µg/kg dry weight)				
2-Methylnaphthalene	0.030	0.28	70	ER-L; Long et al., 1995
Acenaphthene	0.051	0.28	16	ER-L; Long et al., 1995
Acenaphthylene	0.015	0.28	44	ER-L; Long et al., 1995
Anthracene	0.006	0.28	85.30	ER-L; Long et al., 1995
Fluorene	0.021	0.28	19	ER-L; Long et al., 1995
Naphthalene	0.036	0.28	160	ER-L; Long et al., 1995
Phenanthrene	0.123	0.28	240	ER-L; Long et al., 1995
High-Molecular-Weight PAHs (µg/kg dry weight)				
Benzo(a)anthracene	0.024	0.28	261	ER-L; Long et al., 1995
Benzo(a)pyrene	0.030	0.28	430	ER-L; Long et al., 1995
Benzo(b)fluoranthene	0.045	0.28	NVA	NA
Benzo(g,h,i)perylene	0.018	0.28	290	Freshwater ER-L, based on 14-day *C. riparius* test (U.S. EPA, 1996)
Benzo(k)fluoranthene	0.033	0.28	240	ER-L; Persaud et al., 1993
Chrysene	0.018	0.28	384	ER-L; Long et al., 1995
Dibenz(a,h)anthracene	0.030	0.28	63.4	ER-L; Long et al., 1995
Fluoranthene	0.036	0.28	600	ER-L; Long et al., 1995
Indeno(1,2,3-c,d)pyrene	0.015	0.28	78	Freshwater ER-L, based on 14-day *H. azteca* test (U.S. EPA, 1996)
Pyrene	0.045	0.28	665	ER-L; Long et al., 1995

NVA = No value available

ATTACHMENT 4

Analytical Documentation for Battelle Laboratory, Duxbury MA.

Battelle
Applied Coastal and Environmental Services
Standard Operating Procedures

for

WATER EXTRACTION FOR TRACE LEVEL SEMI-VOLATILE ORGANIC CONTAMINANT ANALYSIS

Summary of changes in this version: Cleanup procedures removed from SOP, references to separate cleanup SOPs added. SOP extraction procedure changed to reflect procedures used in EPA method 3510C. An SOP revision history log has been added (Attachment 1).

1.0 OBJECTIVE

This document describes the application and adoption of EPA SW846 Method 3510C for the isolation/extraction of semi volatile organic compounds (SVOCs) (Method 608 and Method 625) and petroleum hydrocarbon compounds from water. This method may be used together with Battelle's instrumental analysis SOPs for the analysis of a variety of SVOC compounds, including polynuclear aromatic hydrocarbons (PAH), saturated hydrocarbons (SHC), total hydrocarbons (TPH), polychlorinated biphenyls (PCB), and pesticides.

2.0 PREPARATION

2.1 APPARATUS AND MATERIALS

- Apparatus for Extraction and Extract Concentration
  - Calibrated gas-tight microliter syringes (SOP 3-172) or pipettes (draft SOP 3-181)
  - Kuderna-Danish (K-D) apparatus
    - Reservoir (250 mL or 500 mL)
    - Snyder column, three ball macro
    - Concentrator tube (10 mL or 20 mL)
  - Water bath, capable of reaching temperature of 100°C, located in fume hood
  - Nitrogen evaporation apparatus, N-Evap or equivalent, with heated water bath
  - Glass wool, muffled at 400°C for at least 4 h, cooled, stored in oven at approximately 100°C
  - Pyrex funnels (large)
- Erlenmeyer flasks (various sizes, 250 mL, 500 mL, 1 L, 2 L)
- Separatory funnel, with Teflon stopcock (various sizes, 1 L, 2L, 3L)
- Graduated cylinders (various sizes)
- Apparatus for filtering sample extracts
  - Disposable filter tubes (Applied Separations) containing a glass fiber filter. Filter tubes are rinsed with DCM prior to use.
  - 25 or 40 mL vials with Teflon lined screw caps
  - Vacuum manifold
  - Vacuum pump

2.2 REAGENTS AND STANDARDS

- Anhydrous Sodium Sulfate, reagent grade, heated to 400°C for at least four hours, cooled and stored at room temperature in a sealed glass container.
- Hydrochloric acid (HCl), 12N, trace pure, or equivalent
  - 10% HCl, 12N HCl diluted with Milli-Q water (1/10, v/v)
- Acetone, pesticide grade or equivalent
- Dichloromethane (DCM), pesticide grade or equivalent
- Surrogate Internal Standards (SIS) solutions
- Internal Standards (IS) solutions
- Target analyte spiking solutions

2.3 LABWARE PREPARATION

All reusable glassware must be cleaned according to laboratory protocols defined in SOP 5-216, glassware is then rinsed with DCM prior to contact with samples. Pre-cleaned glassware may be used as purchased.

2.4 RECORD KEEPING

Samples will be assigned unique identification numbers and logged into the Laboratory Information Management System (LIMS) according to laboratory protocols (SOP 6-007).

Analytical data will be reported on appropriate data forms included in the sample preparation records. Information to be recorded includes wet and dry weight information, dates of extraction/processing procedures, initials of laboratory personnel performing the procedures, types and amount of internal standards added to samples, and, if necessary, comments regarding individual samples.

3.0 PROCEDURES

3.1 GENERAL

Samples will be extracted in batches of 20 or fewer field samples unless otherwise stated in the project specific work plan. Quality control samples accompanying each batch may include a procedural blank (PB), laboratory control sample (LCS), matrix spike (MS), reference material (SRM) and/or field sample replicates (DUP and/or TRP). (See Section 5.0 for more detail).

The samples should be thoroughly mixed (shaken) prior to any aliquotting for chemical characterization.

Quantitative transfers will be used when transferring extracts from one container to another. All transfers, whether poured or performed using a Pasteur pipette, will be followed by rinsing the original container a minimum of two times with clean solvent.

3.2 EXTRACTION, CONCENTRATION, AND CLEANUP

Note 1: The sample will be extracted without pH adjustment, because neutral PAH, saturated hydrocarbons, PCB, and most persistent chlorinated pesticides will be extracted efficiently from water over a wide range of pH. If phenols or other pH-sensitive compounds are to be analyzed, the sample will first be extracted once with no pH adjustment, the pH adjusted as

appropriate (pH<2 with 10% HCl for phenols — other pH adjustments are project specific and will be noted in the QAPP) and extracted two more times.

3.2.1 Extraction — Separatory Funnel Technique

1. Using an appropriately-sized graduated cylinder, measure the sample and transfer it to the separatory funnel. Record the volume.

2. Fortify each sample (in the separatory funnel) with the appropriate concentration of SIS solution; SIS concentrations are determined on a project specific basis and defined in the project QAPP.

3. If the entire sample has been consumed, rinse the sample bottle with 60 mL DCM (120 mL for samples larger than 1 L). Transfer the bottle rinse to the sample in the separatory funnel. If the entire sample has NOT been consumed, add the solvent directly to the separatory funnel.

4. Seal and shake the separatory funnel vigorously for 1 - 2 minutes with periodic venting to release excess pressure.

5. Allow the organic layer to separate from the water phase for a minimum of 10 minutes. If the emulsion interface between layers is more than one-third the size of the solvent layer, the analyst must employ mechanical techniques to complete the phase separation. The optimum technique depends upon the sample and may include stirring, filtration of the emulsion through glass wool, centrifugation (USEPA 1996). Consult with the Sample Preparation Lab Supervisor regarding emulsions.

6. Collect the extract in an Erlenmeyer flask.

7. Repeat the extraction two more times using fresh portions of DCM (60 mL for 1-L samples and 120 mL for >1-L samples).

8. The three DCM extracts are combined in the Erlenmeyer flask and anhydrous sodium sulfate is added. The amount of sodium sulfate required is highly sample-specific. Add more sodium sulfate until sodium sulfate moves freely in the solvent indicating that no additional water is available. Allow the extract to sit over sodium sulfate for at least 30 minutes.

Note 2: The extract is now ready for Alumina column cleanup (SOP 5-329), if required. If Alumina cleanup is not required, all sample extracts should be concentrated; sample extracts should then be Copper treated (SOP 5-328), filtered and further cleaned by HPLC/GPC (SOP 5-191) – refer to Attachment 2 for details on sample processing.

3.2.2 Extract Concentration — K-D Technique

1. Add 3-5 boiling chips to the K-D receiver and insert a Snyder column. Pre-wet the condenser column with approximately 5-mL DCM. Place the K-D apparatus in a hot water bath maintained at 60-65 ° C (monitored by an alcohol thermometer), such that the concentrator tube is partially immersed in hot water and the entire lower rounded surface of the flask is bathed in hot water vapor. At the proper rate of evaporation, the balls of the Snyder column will actively chatter, but will not flood with condensed solvent. Continue concentration until the sample volume is reduced to approximately 10 mL. Further concentrate the extract to approximately 2 mL using nitrogen evaporation techniques.

2. Notify the Laboratory Supervisor for instructions on how to proceed if the rate of concentration significantly slows down.

Note 3: The water bath for the K-D is maintained at 60-65 ° C for concentrating DCM, 70-75 ° C for concentrating acetone, and a boiling bath is used for concentrating hexane or toluene.

3.2.3 Extract Concentration — TurboVap Technique (optional)

Optionally, TurboVap techniques may be used for concentrating the extracts rather than using the K-D technique.

1. Transfer sample extract to a 200 mL TurboVap tube with a 1 mL collection reservoir. TurboVap water bath temperature should be set at approximately 25 °C; nitrogen pressure should be approximately 3 to 5 psi (water bath temperature will vary with type of solvent used).
2. Follow the manufacturers' instructions for operation and maintenance. After initial TurboVap concentration the extract should be quantitatively transferred to a 4 mL vial (with DCM rinses), and concentrated using nitrogen evaporation techniques until the extract volume is 1-2 mL.

3.2.4 Extract Cleanup — Extract filtering

All extracts must be filtered prior to HPLC/GPC cleanup (SOP 5-191) to remove particulates. Filtering is performed using disposable filter tubes (Applied Separations) under vacuum pressure. Disposable filter cartridges should not be used if PAH compounds are on the target analyte list.

1. Setup vacuum manifold with disposable filter cartridges. Place 40 mL vials inside the manifold to collect rinse solvent.
2. Rinse the cartridge with ca. 20 mL of DCM under vacuum.
3. Remove 40 mL vials and dispose of rinse solvent in the appropriate waste stream.
4. Return the empty 40 mL vials to the vacuum manifold.
5. Transfer the extract to the filter cartridge, rinsing the original vial with DCM.
6. Rinse filter cartridge with ca. 15 – 20 mL of DCM (under vacuum).
7. Turn off the vacuum pump and relieve the pressure on the vacuum manifold.
8. Remove 40 mL vials from the vacuum manifold.
9. Extracts are now ready to be concentrated for HPLC/GPC cleanup.

3.2.5 Final Extract Handling

If no further processing is required, the sample extracts should be adjusted to the desired final extract volume (500 µL unless otherwise specified in work plan) and prepared for instrumental analysis.

1. Adjust the final extract volume using N-Evap concentration. Adjust the flow of nitrogen on the N-Evap to a gentle stream — do not allow the sample to bubble or splatter, or have a large "dimple" on the surface, as this will result in the possible loss of target analytes. A small dimple is expected on the surface of the solvent. Sample extracts should be immersed in the water bath under the N-Evap unit (see batch temperature table for appropriate water batch temperature for the solvent used – Attachment 3).

2. Spike the final extract with the appropriate recovery internal standards (RIS) as listed in the QAPP and split the extract as necessary, transferring the samples to GC vials. Submit extracts to the appropriate instrument analysis facility.

3. Extracts must be transferred to analysis in the appropriate solvent. In the case of analysis by Electron Capture Detector (ECD), the preferred solvent is hexane. If the extract is not already in hexane, concentrate the sample to approximately 200 µL under nitrogen and bring back to the original volume with hexane. Repeat this procedure three times. If Florisil Cleanup (SOP 5-327) was performed on the extracts, the extracts will already be in hexane.

4.0 CALCULATIONS

No calculations are required as part of this SOP.

5.0 QUALITY CONTROL

Samples must be extracted in batches of 20 or fewer authentic field samples. Quality control samples accompanying each batch may include a procedural blank, laboratory control sample, matrix spike, standard reference material and/or field sample duplicate.

The QC program for each project is defined in the QAPP, which will define the type and amount of internal standards/spiking solutions to be added to the samples, the specific QC samples to be processed, any modifications to the standard QC acceptance criteria, and the corrective action required if QC results do not meet those acceptance criteria.

6.0 TRAINING

The trainee must read and fully understand the policies and procedures outlined in this SOP. The trainee will then be given a demonstration of all aspects of this SOP.

Technicians may work independently once they have satisfactorily performed the following training test:

- Complete at least four LCS samples concurrently or over a period of days that meet the ≤30 RSD acceptance criteria.

When training is completed, the trainee will be issued an Initial Demonstration of Capability Certificate (SOP 2-011) The original completed training certificate and all supporting documentation will be sent to the Quality Assurance Office.

Analysts must also demonstrate annual proficiency in the method. Section 2.5.3 of SOP 2-011 (Staff Training) outlines the acceptable performance procedures. When annual training is completed, the analyst will be issued a Demonstration of Ongoing Capability Certificate (SOP 2-011).

7.0 SAFETY

As part of the above training program, the analyst will be made aware of the particular safety concerns of this procedure, including:

- Use of protective eyewear and clothing
- Proper use of fume hoods
- Location and use of laboratory safety devices; eyewashes, emergency showers, fire extinguishers, fire blankets, and first aid kits, as well as MSDS sheets.

8.0 REFERENCES

U.S. EPA SW-846 Manual, Method 3510C, Revision 3, December 1996

ATTACHMENTS

Attachment 1. SOP Revision history
Attachment 2. Sample processing flow chart
Attachment 3. N-Evap water batch temperature guide

APPROVALS

	Name	Date
Author	[signature]	4/13/2005
Technical Reviewer	[signature]	4/13/05
Quality Systems Manager	[signature]	4-14-05
Laboratory Manager	[signature]	April 15, 2005

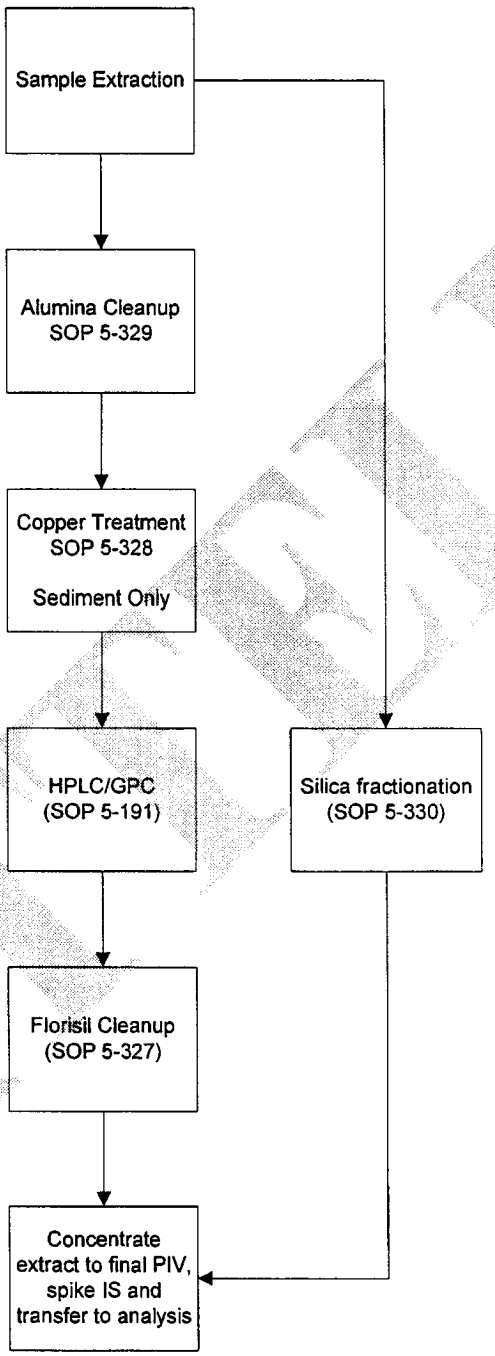
Attachment 1

Summary of Changes to SOP

Version	Summary of Changes
02	This SOP defines the method as applicable to SVOCs in general, not only for petroleum analysis. Clarification of and quick-reference for the alumina extract cleanup step.
03	This SOP includes clarifications of the alumina and activated copper preparation and cleanup steps, and the organization of the SOP has been improved.
04	Section 3.3 (extraction and clean-up procedures); Section 5.0 (Quality Control), and Section 6.0 (Training) were updated. The Training Certificate (Attachment 1) was removed.
05	Cleanup procedures removed from SOP, references to separate cleanup SOPs added. SOP extraction procedure changed to reflect procedures used in EPA method 3510C. An SOP revision history log has been added (Attachment 1).

ATTACHMENT 2

Sample Processing Flow Chart



ATTACHMENT 3

N-Evap Water Bath Temperature Guide

Solvent	Boiling Point	Bath Temp	Rate (mL/min)	Time (min/200 mL)
DCM	40°C	37°C	0.40 ml	25 min
Hexane	69°C	67°C	0.36 ml	28 min
Freon	48°C	45°C	0.48 ml	21 min
Pentane	36°C	32°C	0.42 ml	24 min
Methanol	65°C	63°C	0.25 ml	40 min
Acetone	56°C	37°C	0.35 ml	28 min

FINAL

SITE 24 OFFSHORE SEDIMENT STUDY
SITE-SPECIFIC HEALTH AND SAFETY PLAN
ALAMEDA POINT
ALAMEDA, CALIFORNIA

CONTRACT NO.: N47408-01-D-8207
PROJECT NO: G486085

Prepared for

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September 14, 2006

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FINAL

SITE-SPECIFIC HEALTH AND SAFETY PLAN

Field Sampling Activities at Site 24 (Pier Area) at Alameda Point, Alameda, California

Project Number:	G486085
Project Manager:	Nancy Bonnevie
Site Safety Officer:	John Hardin
Date of Issue:	September 14, 2006

Authorization: Bernard Himmelsbach 9/15/06

Bernard Himmelsbach
Battelle Health & Safety Officer

Date

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CONTENTS

APPENDICES

TABLES

ACRONYMS AND ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
APR	Air Purifying Respirator
BBP	blood-borne pathogens
BTEX	benzene, toluene, ethylbenzene, and xylene
Cal-OSHA	California Occupational Safety and Health Administration
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CNS	central nervous system
COPEC	chemical of potential ecological concern
CPR	cardiopulmonary resuscitation
GI	gastrointestinal
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSO	Site Health and Safety Officer
IR	Installation Restoration
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PPE	personal protective equipment
ppm	parts per million
RI	Remedial Investigation
S-HASP	Site-Specific Health and Safety Plan
STEL	short-term exposure limit
TBT	tributyltin
TLV	threshold limit value
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TWA	time-weighted average
USCG	U.S. Coast Guard
UV	ultraviolet

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1.0 INTRODUCTION

This Site-Specific Health and Safety Plan (S-HASP) delineates the basic safety requirements for field sampling activities to be performed at the former Alameda Naval Station in late summer of 2006. Sample collection will be conducted at IR Site 24 in support of a remedial investigation (RI) report for Installation Restoration (IR) Sites 20 and 24. This S-HASP was prepared in compliance with the requirements of the California Occupational Safety and Health Administration (Cal-OSHA) standard for Hazardous Waste Operations and Emergency Response (Title 8 California Code of Regulations [CCR], GISO 5192). This S-HASP should be used in conjunction with Addendum 1 for the Sampling and Analysis Plan (Quality Assurance Project Plan and Field Sampling Plan), Offshore Sediment Study at Oakland Inner Harbor, Pier Area, and Western Bayside, Alameda Point, Alameda, California (Battelle et al, 2005 and 2006).

The provisions set forth in this S-HASP apply to all Navy contractors and subcontractors (field personnel). Subcontractors may elect to modify these provisions, but only to upgrade or increase safety activities. This S-HASP may not thoroughly address all hazards associated with any specialized subcontractor operations; in this situation, subcontractors shall be responsible for developing their own Health and Safety Plans and procedures to adequately address their scope of operations at this site.

This S-HASP addresses the expected potential hazards that may be encountered for this project. If unanticipated changes in site or working conditions occur which are not addressed by this plan, addenda shall be provided.

1.1 Site Location and Background

The former Alameda Naval Air Station (Alameda Point) is located on the western end of Alameda Island, in Alameda, California. Alameda Island lies along the eastern side of San Francisco Bay, adjacent to the city of Oakland. The base is approximately 2 miles in length and 1 mile in width, and occupies 2,634 acres. Approximately 1,526 acres of Alameda Point are land and 1,108 acres are ocean.

IR Site 24, referred to as the Pier Area, is located along the southern edge of Alameda Point. The site consists of three piers located within the breakwall of Breakwater Beach and is currently being used to dock naval ships including the USS Hornet, which is permanently docked at Pier 3 as a naval museum. The Navy began actively using the piers, which are constructed with concrete pilings/footings and walkways, in 1943. A single layer of treated wood pilings spaced every 1.5 m and extending 0.61 m from the piers runs along the perimeter of the piers and quay walls. Piers 2 and 3 were routinely used to berth nuclear-powered surface ships as well as occasional nuclear-powered submarines. Three storm-sewer outfalls lead into IR Site 24. System lines J and K discharge into the eastern end between Piers 1 and 2, and line L discharges between Piers 2 and 3. Sewer lines leading to Outfalls K and L have been replaced with polyvinyl chloride piping in 1991 and line J was cleaned and inspected in 1991. A Remedial Investigation (RI) report was prepared for this area in March, 2006. During the Agency review period, it was determined that the sediment shelf adjacent to the quay wall between Piers 1 and 2 extends eastward under the roadway. This area has not previously been investigated; therefore, additional data are required to address the data gap.

1.2 Scope of Work

The primary objective of this field sampling effort is to fill data gaps associated with sediments located in the area under the pier/roadway between Piers 1 and 2, near Outfalls J and K. The field program will implemented over 2 continuous days by the end of September 2006. Sediment samples will be collected for the following purposes:

- To determine lateral and spatial extent of sediment contamination; and
- To analyze for contaminants of potential ecological concern (COPECs) in sediment.

The field sampling effort will include:

- Collection of sediment cores and surface sediments (grab samples) at 12 sediment stations from the sediment shelf adjacent to and underneath the roadway extending between Piers 1 and 2;
- Collection of two field duplicate samples;
- Subsampling the sediment cores by depth into four sections: 0-5 cm, 5-25 cm, 25-50 cm, and 50-120 cm;
- Analyze core sections from 0-5 cm (homogenized with the surface grab samples), 5-25 cm, and 25-50 cm for polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), total organic carbon (TOC), grain size, polychlorinated biphenyls (PCBs), pesticides, metals, and tributyltin (TBT) (U.S. EPA SW-846 Method 8270C) (see Section A.3.3.1.1); and
- Archive the 50-120 cm core sections at all stations.

Data collected during this investigation will be included in RI report for IR Sites 20 and 24 in order to evaluate potential risks to ecological receptors that are exposed to contaminated sediment.

2.0 PROJECT SAFETY AUTHORITY

Personnel responsible for project safety are the Project Manager and the Site Health and Safety Officer (HSO) or his/her designee.

The Project Manager is responsible for the provisions and submittal of this plan, and for advising the HSO on health and safety matters. The Project Manager has the authority to provide for the auditing of compliance with the provisions of this plan, suspension or modification of work practices, and administration of disciplinary actions for individuals whose conduct does not meet the requirements set forth herein. The Project Manager may elect to give the HSO authority to administer disciplinary actions for individuals whose conduct does not meet the requirements set forth herein.

The HSO is responsible for the dissemination of the information contained in this plan to all personnel assigned to the project, and to the responsible representative of each Navy subcontractor firm working on the project. The senior field team member may also be designated as the HSO. As such, he or she is responsible for maintaining, performing or providing the following as necessary:

- Verification of medical surveillance program examinations, and 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training for all potentially exposed on-site personnel;
- Daily tailgate discussion of the site safety plan. Documentation of tailgate safety meetings in field notebook;
- Documentation of all accidents or S-HASP violations;
- Establishing emergency communications with all potential response organizations prior to the start of site work; and,
- Implementation of Decontamination/Contamination Reduction Procedures (see Section 9.0).

- On-site air monitoring as required.

The HSO or his/her designee has the authority to suspend work any time he or she determines that the health and safety practices at the site are inadequate. In such cases, the HSO also shall inform the Project Manager of individuals whose conduct is not consistent with the requirements of the plan.

The HSO has the responsibility to check in with the facility, Battelle, and/or Navy safety contact each day before commencing field operations. The HSO will disseminate any new information provided to the field team during tailgate safety meetings.

3.0 MEDICAL SURVEILLANCE

Any field personnel engaged in project operations that expose them to hazardous wastes, hazardous substances, or any combination of hazardous wastes or hazardous substances shall be participants in a Medical Surveillance program. The Medical Surveillance program is performed by and under the direct supervision of a qualified physician, preferably board certified in occupational medicine. Field personnel must be medically evaluated and cleared for use of respiratory protection devices and protective clothing for working with hazardous materials by the examining physician(s). The medical clearance shall be current within one year through at least the last day of field operations. The applicable requirements under the Cal-OSHA standards for HAZWOPER (Title 8 CCR, GISO 5192) and the Respiratory Protection Program (Title 8 CCR, GISO 5144) will be observed.

All field personnel shall bring proof of medical clearance from an approved source to the job site for inspection before beginning work. The HSO will be responsible for reviewing the proof of medical clearance in accordance with the requirements described above and documenting this review in the field notes before those persons can commence work.

4.0 SAFETY/ORIENTATION TRAINING

This section presents the general and site-specific training requirements for this project in accordance with regulatory, client, and/or Battelle requirements. All field personnel shall bring proof of required training to the job site for inspection before beginning work. Training shall be provided by a qualified person and must cover certain content requirements. The HSO will be responsible for reviewing the proof of training in accordance with the requirements described below and documenting this review in the field notes before those persons may begin work.

4.1 General Training Requirements

General training requirements that apply to field personnel on this project are described below. All field staff meet or exceed the minimum requirements as defined below and are 40 hour HAZWOPER trained.

4.1.1 HAZWOPER

Field personnel engaged in project operations that potentially expose them to hazardous wastes, hazardous substances, or any combination of hazardous wastes or hazardous substances shall have satisfied the following training requirements. These requirements must be satisfied in accordance with the CAL OSHA standard for HAZWOPER (Title 8 CCR, GISO 5192):

- Initial 40-hour HAZWOPER training; and,
- Annual 8-hour HAZWOPER refresher training current within one year.

In addition, the HSO and any other field personnel supervising hazardous waste workers must have completed the following training:

- One-time only 8-hour HAZWOPER Supervisor training.

4.1.2 First Aid

At least two personnel on every field team shall have current first aid training including adult cardio-pulmonary resuscitation (CPR) and blood-borne pathogens (BBP) training. The HSO is CPR/First Aid/BBP trained as well as one member of each field team, both of which will be on-site at all times. Current training for the purposes of this S-HASP is as follows: (1) first aid training current within three years, (2) adult CPR current within one year, and (3) BBP training current within one year.

4.1.3 Respirator Training and Fit-Testing

It is not anticipated that any respirator training or fit testing will be required for the Alameda Point sediment sampling activities due to the fact that sampling is taking place underwater. However, if respirators are required, then team members shall have Air Purifying Respirator (APRs) and fit-testing current within one year. Fit testing shall be performed on the make, model, and size of the full-face APR to be worn for any required task.

4.2 Site-Specific Training

All potential field personnel will review this S-HASP before commencing work as part of the site-specific safety training for this project. The HSO will review the S-HASP before field operations begin and will conduct daily tailgate safety meetings to bring up appropriate health and safety concerns and discuss any changes in field conditions. Field personnel will certify their review by signing a HASP training record form (Appendix A) or signing the field notebook after the tailgate safety meeting. The Project Manager is responsible for distributing this S-HASP to appropriate personnel and verifying review by obtaining signed review forms or copies of field notes. Signed review forms or copies of field notes will be placed in project files and in field personnel medical files.

Whenever a change of conditions on-site occurs that may affect safety, the HSO or his/her designee will conduct a tailgate safety meeting if appropriate. Changing site conditions that may affect safety include the following:

- Change of field personnel;
- Change in work activity;
- Change in weather conditions; and,
- Visitors on site.

All training sessions, safety meetings, and safety briefings will be documented by the HSO or his/her designee in the field notebook, or on Tailgate Safety Meeting Record forms (Appendix B). Documentation will include a brief description of topics addressed and the signatures of all training attendees.

4.3 Navy Subcontractor Documentation

Navy subcontractor employees shall maintain proof of qualification and completion of all required training onsite. This information can be satisfied by either: (1) an employer's certification statement including a summary report of all required training and medical surveillance completion dates for each individual, or (2) individual training certificates and medical clearance reports for each individual.

5.0 HAZARD ASSESSMENT

This section discusses the identification of general, task, or activity-specific and site-specific hazards associated with planned field activities for this project. Physical, chemical, and biological hazards are addressed separately. A job hazard analysis was performed for boat operation, water safety, and sediment sampling (Appendix C). The job hazard analyses identifies the potential hazards associated with each activity and includes a description of the control measures to be implemented, a list of equipment with any applicable inspection, and training requirements.

5.1 Physical Hazards

General physical hazards present during field sampling activities could include the following:

- Impact and abrasion hazards from working with hand tools;
- Falling objects such as tools or equipment;
- Overhead obstructions, particularly while underneath the roadway;
- Falls from elevations;
- Tripping over hoses, pipes, tools, equipment or uneven terrain;
- Slipping on wet or oily surfaces;
- Entanglement or injury from rotating equipment or energized parts;
- Exposure to noise generated by motors and pumps;
- Insufficient or faulty protective equipment;
- Insufficient or faulty operations, equipment, or tools; and,
- Persons falling overboard hazards: hypothermia/sea life/undertow/riptide.

Other site-specific hazards may include any of the following:

- Trip, slip, and fall hazards from walking and/or kneeling on potentially uneven, steep, and/or slippery terrain;
- Head injuries from striking overhead obstructions, particularly while underneath the roadway;
- Hypothermia from exposure to potentially cool air temperatures and windy conditions;
- Sunburn, windburn; and,
- Damage to eyes from sun exposure (ultraviolet [UV] radiation).

Safety precautions for general and site-specific hazards are addressed in Table 5-1 and Section 7.0 of this S-HASP.

5.2 Chemical Hazards

Chemicals that have been detected in shoreline areas and are therefore potentially present in sediments include metals, low- and high-molecular-weight PAHs, benzene, toluene, ethylbenzene, and xylene (BTEX), TPH, organotins, PCBs, pesticides (including DDx compounds, *alpha-* and *gamma*-chlordane, and dieldrin). For ease of reference, the potential hazards expected and protective measures used to promote worker safety are provided in Table 5-1. A list of historical chemicals or constituents occurring at the site along with their toxicological properties is presented in Table 5-2. More details regarding specific chemicals expected to be present are provided in the following sections.

Table 5-1. Hazards and Protective Measures for Alameda Point Sampling Activities

Potential Hazards	Methods to Ensure Worker Safety
Injuries Caused by Tripping or Falling	Regular job site reconnaissance will be conducted to identify, and eliminate if practicable the hazards. Sturdy steel-toed rubber or neoprene boots with non-slip soles should be worn when working on or around vessels and docks.
Lifting, Manual Labor	The HSO or designee will identify ergonomic factors and will develop measures to prevent injury. Proper lifting techniques and warm-up will be used before strenuous tasks. Special hand protection will be required where indicated.
Marine Operations	Coordination with facility personnel, establishment of communications, and implementation of water safety requirements/measures will be used to ensure worker safety. Staff will be made aware of shark hazards and potential for undertow/rip tide. All field members participating in the boat operations are required to wear life preservers (U.S. Coast Guard [USCG] Type III) while the vessel is in operation.
Overhead Obstructions	The sampling will be conducted in a manner to minimize time spent under the pier and to maximize headspace. In addition, all field personnel will wear proper personal protective equipment (PPE) such as hard hats and safety glasses.
Skin and Eye Irritation from Contact with Chemicals	Workers will wear proper PPE dependent on the task (see Section 8.0), especially when collecting sediments.
Solar Radiation	Protective clothing, eyewear, or sun block will be worn.
Weather	If lightning or thunder is seen or heard, then all personnel will cease sampling and seek shelter at the boathouse until the threat of lightning strikes passes.
Cold Stress/ Hypothermia	Appropriate foul weather gear will be worn when necessary. This includes waterproof or resistant boots, insulated leather gloves and rain gear.
Biohazard or Infectious Materials	Gloves are to be worn when handling materials that are biohazard or infectious (including bodily fluids in the event of an accident). Wash hands thoroughly after handling these materials and prior to eating or drinking. Do not eat or drink in areas where these materials are handled or stored. Disinfect work surfaces to prevent spread of contamination. Disinfect any wounds or cuts and prevent recontamination by using appropriate PPE. Seek medical attention as needed.
Stinging Insects such as Wasps and Bees	The HSO will identify areas where workers could contact stinging insects and will determine actions needed to rectify the problem. Workers will not be allowed to work near insects where an unreasonable risk is present. Inquire if any workers are allergic.

Table 5-2. Toxicological Properties of Chemical Compounds Potentially Present in Alameda Point Sediments

Class/Compounds (examples)	Principal Routes of Entry	Acute Exposure Effects/Symptoms	Chronic Exposure Effects/Symptoms
ORGANIC COMPOUNDS			
Aromatic Hydrocarbons			
Benzene	Inh, Ing, Skin	Central nervous system (CNS) depression; skin, eyes and upper respiratory tract irritation	Carcinogen, blood change leukemogenic
Ethylbenzene	Inh, Ing, Skin	Skin, eyes, nose and throat irritation	Skin rash
N-hexane	Inh, Ing, Skin	CNS depression; eyes and nose irritation	Skin irritation peripheral neuropathy
Toluene	Inh, Ing, Skin	CNS depression; skin, eyes, and respiratory tract irritation	Dermatitis
Xylene	Inh, Ing, Skin	Dizziness; nose, throat, skin, and eye irritation; olfactory changes; irritant; poison; distortion; hallucination; CNS effects	Cardiac arrhythmia
Petroleum Distillates			
Gasoline, Diesel	Inh, Skin, Ing	Anesthesia, dizziness, headache, nausea, vomiting, sleepiness, fatigue, disorientation, depression, unconsciousness, respiratory tract irritation, sore throat, cough	Dermatitis, headache, mood shifts, CNS effects, fatigue
Semivolatile Organic Compounds			
Polycyclic Aromatic Hydrocarbons (as PAHs)	Skin, Inh, Ing	Irritant to skin, vomiting, photosensitization, headache	As a class overall, can be considered mutagenic and tumorigenic with several compounds known carcinogens; also causes liver damage
INORGANIC COMPOUNDS			
Metals			
Chromium (VI)	Skin, Inh, Ing	Skin, respiratory tract irritation, dermatitis, skin ulceration	Carcinogen, lung and skin effects, nasal septum perforation
Chromium (III)	Skin, Inh, Ing	Skin, respiratory tract irritation	Lung disease
Lead	Inh, Ing	Gastrointestinal (GI) distress, kidney failure	Neuropathy, CNS anemia
Nickel	Skin, Inh, Ing	Skin, nasal irritation, respiratory tract irritation	Carcinogen, lung, GI system disease
Zinc	Inh, Ing	Metal fume fever, skin irritation	GI system effects, dermatitis

Ing = ingestion.
Inh = inhalation.
Skin = skin absorption.

5.2.1 Polynuclear Aromatic Hydrocarbons

PAHs are present in coal tar, petroleum hydrocarbons, and other sources and are used in a variety of industrial products. Some PAHs are recognized human carcinogens. Exposure by any route to PAHs and other recognized human carcinogens shall be maintained at the absolute practicable minimum level. Sampling will involve the collection of wet sediments using a grab sampler; therefore, the exposure to volatile organic compounds and PAHs should be minimal. Furthermore, previous sediment samples collected at Alameda Point indicate that PAH levels are generally below ambient levels in San Francisco Bay and proper use of PPE and personal hygiene practices will prevent exposure.

5.2.2 Polychlorinated Biphenyls

PCBs, also referred to as Aroclors, are synthetic industrial products that have been commonly used as cooling fluids and electrical insulators. PCBs are common contaminants of oily-type waste and are found around railroad tracks and in industrial areas and dumps. PCBs are recognized environmental pollutants and human carcinogens. Work involving contact with PCBs exceeding 100 µg/g (i.e., parts per million [ppm]) may require special medical evaluation and approval of the HSO. Historical concentrations of PCBs found in Alameda Point sediments were considerably below this concentration.

PCBs are skin absorbable and appropriate precautions shall be implemented. Handling of samples that may be contaminated with PCBs shall be performed wearing appropriate PPE (gloves and safety glasses).

In addition, precautions should be implemented to prevent inhalation of dusts that may be contaminated with PCB's. Process samples that are suspected to contain PCBs are to be stored and handled in well-ventilated areas and hands are to be washed with soap and water after sample processing.

Although the Occupational Safety and Health Administration (OSHA) has not set standards for each specific PCB, occupational exposures for chlorodiphenyl 42% chlorine and 54% chlorine are defined in 29 Code of Federal Regulations (CFR) 1910.1000, Table Z-1. Limits for air contaminants are 1 mg/m^3 and 0.5 mg/m^3.

5.2.3 Petroleum Hydrocarbons

Petroleum hydrocarbons such as gasoline and diesel fuel may include a wide range of substances, some of which may pose substantive human health hazards. The aromatic volatile petroleum hydrocarbons including BTEX compounds are generally of greater concern, in part because they are more likely to exist in the worker's breathing zone. In moderate exposures, BTEX compounds all produce similar acute effects including headache, narcosis, and anesthesia. Table 5-2 summarizes the exposure criteria and health effects of BTEX. Among the aromatic volatile petroleum hydrocarbons, benzene is the primary substance of concern because of its status as a known carcinogen and association with leukemia and aplastic anemia in chronic exposure situations.

The permissible exposure limits (PELs) set by the OSHA and the American Conference of Governmental Industrial Hygienists' (ACGIH) threshold limit values (TLVs) for airborne exposure are provided in Table 5-3 for BTEX. Even high concentrations (ppm to percent level) of volatile organic compounds are not reasonably expected to present airborne concentrations at or approaching OSHA PELs or ACGIH TLVs considering the volume of sediments to be sampled and processed during field activities. Furthermore, all work will be conducted in open-air conditions. Considering the relative volatility of each compound and the open working conditions, these compounds are not reasonably expected to present inhalation exposures of concern to worker health and safety.

Table 5-3. OSHA PELs and ACGIH TLVs for Selected Volatile Organic Compounds

Compound	OSHA PELs		ACGIH TLVs	
	TWA[(a)] (ppm)	STEL[(b)] (ppm)	TWA[(a)] (ppm)	STEL[(b)] (ppm)
Benzene	1.0	5.0	0.5	2.5
Toluene	100	150	50	–
Ethylbenzene	100	125	100	125
Xylene (*o-*, *m-*, *p-* isomers)	100	150	100	150

(a) **TWA**: Time-weighted average is the employee's average airborne exposure in any 8-hour work shift of a 40-hour workweek, which shall not be exceeded.

(b) **STEL**: Short-term exposure limit is the employee's 15-minute TWA airborne exposure which shall not be exceeded at any time during a workday.

Petroleum hydrocarbons can also be absorbed through the skin if contact with highly contaminated sediments is made. Dermal exposures will be controlled through the use of PPE as described in Section 8.0.

5.2.3.1 Explosion and Fire

The types of hydrocarbons potentially expected to be present (gasoline and diesel fuel) are not expected to generate vapors at explosive concentrations during any of the tasks to be performed. All work will be conducted in open-air conditions. Therefore, the potential for vapors to reach explosive concentrations is minimal and vapor monitoring will not be necessary.

5.2.4 Heavy Metals

A variety of heavy metals may be encountered as contaminants in sediments. Some metals are highly toxic; other are also recognized human carcinogens. As these materials are not volatile unless heated to extremely high temperatures, control by proper use of PPE and personal hygiene practices will prevent significant exposure. Sampling will involve the collection of wet sediments using grab samplers under ambient temperatures; therefore, the exposure to volatile metals should be negligible.

5.2.5 Unidentified Chemicals

Chemicals not previously identified or considered may be present in Alameda Point sediments. Exposure to unidentified chemicals by any route shall be maintained at the absolute practicable minimum level to prevent casual contact with chemicals. Control by proper use of PPE and personal hygiene practices will prevent significant exposure.

Considering the small volume of sampling media to be disturbed, the type of media (wet sediments), the historical concentrations in shoreline areas of the site and the open working conditions of all field operations, significant inhalation exposures at or approaching OSHA or ACGIH exposure limits are not reasonably expected. However, skin or dermal absorption of the contaminants potentially present in sediments is considered a potential route of entry and will be controlled through the use of PPE (i.e., chemical-resistant gloves, wet suits, and booties) as described in Section 8.0 of this S-HASP. Ingestion is not considered a significant route of entry for these chemicals on this project. However, the use of PPE and standard safety procedures (no eating or drinking in operations areas) will minimize the potential for ingestion of sediment-associated contaminants.

5.3 Biological Hazards

Multiple biological hazards may be present at the Alameda Point site and are identified in Table 5-1 along with control measures to be implemented. Field personnel shall carefully review this section.

Work in shallow bayous may expose personnel to a variety of aquatic hazards. Project personnel shall not wade barefoot while performing project work. Appropriate footwear includes boots or waders. Free swimming is prohibited.

Samples that are retrieved as part of the sample acquisition process may contain organic materials that contain biohazard/infectious materials (such as partially decomposed animal or vegetative materials, or parasites). Gloves should be worn when handling these materials. Additionally, any open wound or punctures should be covered to prevent infection. All areas should be disinfected as needed to prevent the spread of potentially hazardous materials and to prevent the contamination of samples. In the event that someone receives a cut, puncture, or abrasion, appropriate first aid should be administered to prevent infection.

5.4 Task-Specific Hazards

The following tasks have specific hazards and control measures that are described below.

5.4.1 Boat Operation

A site-specific boat operation plan has been prepared for sampling activities on this project. The hazard analyses that will be performed for boating activities are presented in Appendix C. Each day when boat operation is anticipated, notification will be given to a designated person upon departure and return from work.

5.4.2 Work Over or Near Water

When working over or near water, there is a potential for employees to fall in and the danger of drowning exists. Work within 15 feet of unobstructed access to water shall be performed in accordance with the requirements given below. Except where employees are protected by continuous guardrails, safety belts, or nets, or work along beaches or similar shorelines, all personnel shall meet the following requirements:

- Personnel will use the buddy system at all times.
- Swimming shall be prohibited for personnel, unless necessary to prevent injury or loss of life.
- All personnel shall wear a United States Coast Guard Type III work vest of the type approved for special conditions.
- The boat shall be supplied and equipped with the following:
  - — Anchor
  - — Fire extinguisher
  - — One life preserver per person
  - — First Aid Kit

Persons shall refer to Appendix C for safety requirements when chartering or operating a small craft.

5.4.3 Working Underneath the Roadway

A portion of this work will be conducted while underneath a road structure, raising the potential for injuries from striking overhead obstructions. To reduce these hazards, all work underneath the roadway will take place at tide heights between approximately 1 and 4 feet MLLW. In addition, personnel shall wear appropriate PPE (including hard hats and safety glasses) at all times.

6.0 AIR MONITORING AND CONTROL MEASURES

No area air monitoring is planned because inhalation exposures of concern are not reasonably anticipated for any of the project activities to be performed (see Section 5.2 of this S-HASP).

7.0 GENERAL PROJECT SAFETY REQUIREMENTS

7.1 General Safety Precautions

The project operations shall be conducted with the following minimum safety requirements employed:

- Smoking will not be permitted on project property or on board watercraft.
- Eating and drinking will be restricted to areas that are designated.
- Wearing loose clothing around operating machinery (i.e., engines, etc.) will be prohibited; loose hair shall be appropriately secured.
- Closed toe and heel shoes with steel toe and shank and good traction appropriate for walking on uneven surfaces will be worn.
- Hard hats, long-sleeve shirts, long pants and sunscreen will be worn as appropriate to prevent sunburn/windburn.
- Layers of clothing are recommended to prevent hypothermia.
- All personnel shall be required to wash or wipe hands and face before eating or drinking.
- Gross decontamination and removal of all personal protective equipment shall be performed prior to exiting the process /docking area /Boat House located in Seaplane Lagoon.
- The HSO and all field employees will be responsible to identify and alert other field team members to physical hazards present at the site.

Additional safety precautions for specific operations are described in Section 8.0 of this S-HASP.

7.2 Symptoms of Chemical Exposure

Field operations personnel shall inform each other of non-visual symptoms that may indicate chemical exposure such as:

- Headaches;
- Dizziness;
- Difficulty breathing;
- Nausea;
- Vomiting;
- Blurred vision;
- Cramps;

- Irritation of eyes, skin, or respiratory tract;
- Changes in complexion or skin discoloration;
- Changes in apparent motor coordination;
- Changes in personality or demeanor;
- Excessive salivation or changes in papillary response; and,
- Changes in speech ability or pattern.

7.3 Cold Stress

Adverse climate conditions such as cold weather are important considerations in planning and conducting site operations. The largest danger regarding cold stress is hypothermia, which occurs when the body's core temperature drops below 96.8°F. Conditions that could induce such a drop are immersion in low-temperature water and exposure to extremely cold ambient temperatures. Signs and symptoms of a low body core temperature are shivering, a lower mental alertness, less ability to make rational decisions, and loss of consciousness. Clinical signs of cold stress are listed in Table 7-1.

Table 7-1. Cold Stress Symptoms and First Aid

Core Temperature	Clinical Signs
98.6°F	Normal oral temperature
96.8°F	Metabolic rate increases in an attempt to compensate for heat loss
95.0°F	Maximum shivering
93.2°F	Victim conscious and responsive, with a normal blood pressure
91.4°F	Severe hypothermia below this temperature
89.6°F – 84.2°F	Progressive loss of consciousness; muscular rigidity increases; pulse and blood pressure difficult to obtain; respiratory rate decreases

7.4 Hypothermia

There is also a potential for hypothermia from exposure to potentially cool air temperatures, windy conditions, and low water temperatures. The signals of hypothermia include shivering, numbness, glassy stare, reduction of rational decision-making, apathy, weakness, impaired judgment, or a loss of consciousness. To care for workers that have hypothermia, the following steps should be taken:

- Gently move the person to a warm place.
- Remove any wet clothing from the person and dry the person.
- Warm the person SLOWLY by wrapping them in blankets or by putting dry clothing on the person.
- Hot water bottles and chemical hot packs may be used when the person is first wrapped in a towel or blanket.
- DO NOT WARM PERSON TOO QUICKLY, such as immersing him or her in warm water. Rapid warming can cause dangerous heart rhythms.

8.0 PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

PPE consists of standard safety equipment required on the site and special safety equipment required for specific tasks or activities. Navy contractors and subcontractors (field personnel) will provide their own PPE. All field personnel are expected to come to work with proper safety equipment as specified in this S-HASP; equipment will be supplied by their respective employers. In addition, all field personnel entering the site shall comply with any task-specific safety requirements.

The level of equipment required at the site will depend on the activities being performed. This level may be revised as conditions change as determined by the HSO. The PPE selection will be determined based on its potential use, and the manufacturer's permeation and degradation properties for the contaminants being worked with. A description of the proposed initial PPE for all fieldwork at this site and for sample collection activities is presented below.

The complete list of required protective clothing for all fieldwork at Alameda Point consists of the following:

- Safety glasses;
- Leather work boots with steel toe and shank;
- Long pants;
- Short-sleeved shirt or short-sleeved T-shirt;
- Hard hat (as required for coring or other overhead operations);
- Personal flotation device;
- Protective gloves-leather and/or chemical resistant;
- Disposable gloves (e.g., latex or nitrile) must be worn when in direct contact with sediments;
- Ear plugs (as required); and
- Rubber over-the-sock boot with steel toe and shank (optional in place of leather work boot described above).

9.0 DECONTAMINATION/CONTAMINATION REDUCTION PROCEDURES

Boots, gloves, outer clothing (rubber bibs and coats) and other equipment can become contaminated by direct exposure to potentially contaminated sediments. Decontamination of PPE will consist of washing PPE with soap and water to remove sediment. These activities will occur on the watercraft to prevent the transport of contaminants off the site unless in an approved container or other approved method. A decontamination station will be designated, configured, and secured at the site if appropriate. Contaminated disposable PPE or clothing will be placed in appropriate storage or disposal receptacles and removed from the site within 90 days to a proper disposal facility. All decontamination fluids and solids will be controlled and contained in appropriate containers and removed from the site within 90 days to a proper disposal facility.

10.0 EMERGENCY RESPONSE PROCEDURES

Project personnel shall carefully review the aforementioned procedures. This section describes emergency equipment to be taken into the field and site-specific procedures to be followed in case of an emergency.

10.1 Emergency Equipment

First aid and BBP kits will be taken into the field each day during sampling and related field activities. To assure immediate access to first aid and BBP supplies, kits will be provided for each field team if these teams will be working in separate locations. Portable fire extinguishers shall be available in all areas where gas powered pumps or engines will be used.

10.2 General Emergency Procedures

In the event of a fire, explosion, physical injury or illness due to physical or chemical exposure, the appropriate parties should be contacted using the phone numbers listed at the end of this section. In addition to notifying the Alameda Point Contact, the HSO or designee shall notify the Battelle Health and Safety Officer (Bernard Himmelsbach) and the Project Manager (Nancy Bonnevie) as soon as possible after appropriate emergency services have been notified and appropriate measures taken to protect people, environment, and property. Weather radios, two-way radios, and/or cell phones shall be in working condition and available on all watercraft used for field sampling activities. As noted in Section 5.4.2, personnel will use the buddy system at all times. In the case of any aquatic emergency, the US Coast Guard will be contacted on Channel 16 of a Marine VHF Radio. In the case of non aquatic related emergencies, the phone system 911 emergency system will be used. Alameda is not an active base, and there is no Navy Marine Safety Officer on duty.

10.3 BBP Control Plan

All personnel should be aware of the potential to transmit disease from contact with body fluids. Personnel should assume that all bodily fluids are potentially infectious and use appropriate precautions. Only those trained in First Aid and Bloodborne Pathogen (OSHA 1910.) are qualified and required to provide first aid assistance and clean up of bodily fluids. Non-qualified staff may assist on a voluntary basis only. The vessel will be equipped with a bloodborne pathogen (BBP) Kit containing a quart of household bleach, empty spray bottle, disposable gloves, disposable towels, and red plastic (biohazard) bags for disposal.

Controls to be considered are as follows:

- Use of the victim's hand to control initial bleeding;
- Use of available protective gear (e.g. nitrile, gloves) to prevent contact;
- Wash promptly after contact with body fluids;
- Use barrier mask while giving CPR;
- Decontaminate any area contaminated with bodily fluids with a 10:1 solution of water to bleach as soon as possible.

10.4 Medical Emergency Procedures

For injuries or illness other than very minor cuts or scrapes, a physician's attention is required. **For treatment of potentially life-threatening injury or illness, call 911 for assistance**.

For treatment of minor injuries or illness, personnel should be transported to Alameda Hospital. Directions to the hospital from the site are indicated on a map provided in Appendix D.

Emergency Telephone Numbers

Alameda Hospital – Emergency		911
Alameda Hospital – Emergency Care		(510) 523-4357
Alameda Hospital – Main Number		(510) 522-3700
Ambulance		911
Police		911
Police – Alameda		(510) 337-8340
Fire Department		911
NAS Alameda Base Contact (Doug DeLong)		(510) 772-8832
NAS Alameda Base Caretaker Office (Doug DeLong)		(510) 772-8832
Coast Guard Emergency Number		(415) 399-3547
Vessel Assists		VHF Ch. 16 & 68
Navy RPM – Mary Parker		(619) 532-0945
California Office of Emergency Services		(800) 852-7550
EPA Region 9, Environmental Emergencies		(415) 744-2000
OSHA Region 9		(415) 744-6670
RCRA Hotline		(800) 424-9346
U.S. Department of Transportation		(415) 744-3115
EPA National Response Center		(800) 424-8802
National Poison Control Referral Center		(800) 222-1222
California Office of Emergency Services		(800) 852-7550
		(916) 262-1621
California DTSC		(916) 255-2002
California EPA		(916) 445-3846
California OSHA		(213) 736-3041
California Department of Fish and Game		(310) 590-5132
TOXLINE		(301) 496-1131
CHEMTREC		(800) 424-9300
Battelle Duxbury Office		(781) 934-0571
Battelle Project Manager –Nancy Bonnevie		(781) 952-5384
Battelle Health and Safety Officer – B.F. Himmelsbach	(Office)	(614) 424-4302
	(Cellular)	(614) 348-3408
Back Up HSO - John Hardin	(Office)	(760) 476-1415
	(Cellular)	(760) 310-5679

11.0 REFERENCES

Battelle. 2005. *Final Offshore Sediment Core Work Plan for Oakland Inner Harbor, Pier Area, Todd Shipyard, and Western Bayside, Alameda Point, California.* "Appendix A, Sampling and Analysis Plan for the Offshore Sediment Core Work Plan." Prepared by Battelle, BBL, Inc., and Neptune and Company for Southwest Division, Naval Facilities Engineering Command, San Diego, CA.

Battelle,BBL, Inc., and Neptune and Company. 2006. *Final Addendum 1 to the Final Offshore Sediment Study Work Plan at Oakland Inner Harbor, Pier Area, Todd Shipyard, and Western Bayside, Alameda Point, Alameda, California,* Appendix A, Addendum 1, Sampling and Analysis Plan for the Offshore Sediment Core Work Plan." Prepared by Battelle, BBL, Inc., and Neptune and Company for Navy, BRAC PMO West.

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APPENDIX A

Site-Specific Health and Safety Training Record Forms

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SITE-SPECIFIC HEALTH AND SAFETY PLAN (S-HASP)
TRAINING RECORD

S-HASP Title/Revision No. Site-Specific Health and Safety Plan for IR Site 24 at Alameda Point

_____	G486085
Site Health and Safety Officer	Project Number

I have read the S-HASP presented herein and fully understand the material covered. I understand that I am responsible for compliance with the requirements of this HASP and I agree to abide by the same. I also had the opportunity to discuss the information presented in the HASP, and to ask any questions about the information that I want clarified. I understand that this record will become a permanent part of my employee health and safety training file.

Date	Print Name	Signature

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APPENDIX B

Tailgate Safety Meeting Record Form

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TAILGATE SAFETY MEETING RECORD FORM

DAILY TAILGATE SAFETY MEETING FORM

Date:_____ Time:_____

Project Number:_____

Project Name: _____

Specific Location: _____

Type of Work:_____

_____

Chemicals Present:_____

SAFETY TOPICS DISCUSSED

Protective Clothing/Equipment: _____

_____

Hazards of Chemicals Present: _____

_____

Physical Hazards: _____

_____

Special Hazards: _____

_____

Other Topics: _____

_____

ATTENDEES

Name (printed)	Signature

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APPENDIX C

Activity Hazard Analysis for Boat Operation and Water Safety

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Table C-1. Activity Hazard Analysis for Boat Operation, Water Safety, and Sediment Sampling

PRINCIPAL STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
Identify the principal steps involved and the sequence of work activities	*Analyze each principal step for potential hazards*	*Develop specific controls for each potential hazard*
1. Engine start-up. 2. Engine operation.	1. & 2. Possible fire hazard. Running out of fuel during operation or engine failure.	1. & 2. Cut engine while fueling. Check oil and fuel prior to leaving dock. The following procedures will be followed in the event of engine failure: • If at anchor, or tied to a pier or dock, remain so. • If not at anchor, and in shallow water such as the work site in Alameda, approaching shore, or approaching another object, drop the main anchor. • When not in danger of running aground, ashore, or an object, inspect the mechanical system and attempt to repair. • If the mechanical/electrical system is not repairable, the captain will call Vessel Assist via VHF Radio or cell phone and arrange service or towing. • If vessel assist is not available, call the US Coast Guard on Channel 16 and arrange assistance.
3. Boat handling and hazards associated with working on or near water.	a. Slip and fall hazards including falling overboard.	a. The following procedures will be followed to avoid slip and fall hazards: • Use handholds when necessary, • Wear sturdy steel-toed boots with non-slip soles, • Wear an approved U.S. Coast Guard Type III life preserver, • Personnel will use buddy system at all times.

Table C-1. Activity Hazard Analysis for Boat Operation, Water Safety, and Sediment Sampling, Continued

PRINCIPAL STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
	b. Collisions with other vessels, objects, and the bottom. c. Stranding (run aground) on mudflat.	b. Be aware of surroundings and other vessels operating in the area. c. Pay attention to tidal conditions.
4. Hazards associated with working underneath the roadway.	a. Striking overhead obstructions.	a. The following procedures will be followed to avoid striking overhead obstructions: • Work will take place at tide heights that allow reasonable and safe working conditions which are expected to be tide heights between approximately 1 and 4 MLLW. • All personnel will wear appropriate PPEs (hard hats, PFDs, and steel toed boots).
5. Sediment and sampler handling.	a. Improper operation.	a. Sampler shall only be operated by experienced users or under the close supervision of experienced users.
	b. Lifting, manual labor.	b. Proper lifting techniques will be used before strenuous tasks. Special hand protection is required when necessary.
	c. Skin and eye irritation from contact with chemicals.	c. Proper PPE will be worn depending on task (e.g. hard hats, gloves, rubber boots, safety glasses).
	d. Biohazard or infectious material.	d. The following procedures will be followed to avoid contact or infection by biohazard or infections material: • Protective and disposable gloves will be worn when handling materials that may be biohazardous or infectious.

Table C-1. Activity Hazard Analysis for Boat Operation, Water Safety, and Sediment Sampling, Continued

PRINCIPAL STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
		• Hands will be washed thoroughly prior to eating food and at the end of work periods. • Work surfaces will be washed and decontaminated with soap. • Wounds or cuts will be disinfected.
	e. Aquatic hazards.	e. The following procedures will be followed to avoid aquatic hazards: • Free swimming will be prohibited. • Appropriate PPE (e.g. gloves, foul weather gear, boots) will be worn when working with sediment samples. • Staff will be made aware of life vest and life ring locations for use in accidental or emergency water contact.
5. General.	a. Solar radiation.	a. Protective clothing, eyewear or sun block will be worn if warranted by solar conditions.
	b. Weather (e.g., lightning or thunder is seen or heard).	b. Staff will cease sampling and seek shelter onshore until the threat has passed.
	c. Cold stress or hypothermia.	c. Appropriate foul weather gear will be worn when necessary, such as waterproof/water resistant boots, gloves and rain gear.
	d. Stinging insects.	d. The HSO will inquire if any workers are allergic and will identify areas where workers could contact stinging insects.

Table C-1. Activity Hazard Analysis for Boat Operation, Water Safety, and Sediment Sampling, Continued

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
List equipment to be used in the work activity 1. USCG Type III life jackets. 2. GPS/depth finder. 3. Anchor and tie-lines. 4. Fire extinguisher. 5. Extra fuel. 6. Radio/cell phone/horn. 7. Tools. 8. First Aid Kit. 9. Grab sampler	*List inspection requirements for the work activity* 1. Check for wear and operation of buckles. 2 - 9. Check prior to leaving dock to assure operation and good working condition. 6. The vessel radios will monitor Channel 16 and 68 (emergency channels), and the appropriate local working channel (to be determined on-site and coordinated with the security operations at the work site).	*List training requirements, including hazard communication* 1. Boat operator shall have experience operating similar vessels under similar conditions.

Source: Engineer Manual 385-1-1, Safety and Health Requirements Manual, U.S. Army Corps of Engineers, September 3, 1996.

APPENDIX D

Hospital Location Map

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Hospital Information

Alameda Hospital
2070 Clinton Avenue
Alameda, CA
EMERGENCY CARE PHONE: (510) 523-4357
MAIN PHONE: (510) 522-3700

Summary: 3.4 miles (8 minutes)

Mile	Instruction	Mileage
0.0	Depart Seaplane Lagoon on (W) Atlantic Ave (East)	1.2
1.2	Turn RIGHT (South) onto SR-260 [Webster St]	0.6
1.8	Turn LEFT (East) onto SR-61 [Central Ave]	1.3
3.1	Turn RIGHT (South) onto Chestnut St	0.2
3.3	Turn LEFT (East) onto Clinton Ave	0.1
3.4	**Arrive Alameda Hospital: 2070 Clinton Ave, Alameda, CA 94501, PHONE: (510) 522-3700**	

The location of the hospital is shown in the following figure.

Mile	Instruction	Mileage
0.0	Depart Seaplane Lagoon on (W) Atlantic Ave (East)	1.2
1.2	Turn RIGHT (South) onto SR-260 [Webster St]	0.6
1.8	Turn LEFT (East) onto SR-61 [Central Ave]	1.3
3.1	Turn RIGHT (South) onto Chestnut St	0.2
3.3	Turn LEFT (East) onto Clinton Ave	0.1
3.4	**Alameda Hospital: 2070 Clinton Ave, Alameda, CA 94501**	

APPENDIX E – BATTELLE STANDARD OPERATING PROCEDURES FOR RADIATION MONITORING

THIS APPENDIX WAS NOT INCLUDED IN THE DOCUMENT.

PER RPM, THIS SAMPLING WAS NOT IN ANY RADIOLOGICAL AREAS AND IS UNNECESSARY FOR INCLUSION IN THE DOCUMENT.