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**NAVAL FUEL DEPOT POINT MOLATE
SHORELINE/LANDFILL INVESTIGATIONS
AND QUARTERLY GROUNDWATER SAMPLING
FIELD WORK PLAN/SAMPLING ANALYSIS PLAN
REVISED ADDENDUM
TASK 2 SEDIMENT SAMPLING**

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FINAL
FIELD WORK PLAN/SAMPLING ANALYSIS PLAN
SHORELINE/LANDFILL INVESTIGATIONS AND
QUARTERLY GROUNDWATER SAMPLING
TASK 2, SEDIMENT SAMPLING
ADDENDUM

DATED 13 APRIL 1994

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FINAL
FIELD WORK PLAN/SAMPLING ANALYSIS PLAN
SHORELINE/LANDFILL INVESTIGATIONS AND
QUARTERLY GROUNDWATER SAMPLING

DATED 27 JANUARY 1994

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1.0 INTRODUCTION

Under Contract Task Order (CTO) 0248, PRC Environmental Management, Inc. (PRC) is conducting follow-up remedial investigation (RI) and site investigation (SI) activities at installation restoration (IR) sites at Naval Fuel Depot (NFD) Point Molate in Richmond, California. Baseline characterization of the near-shore environment (soil and sediment) is included in CTO 0248.

This revised addendum to the NFD Point Molate Shoreline/Landfill Investigations and Quarterly Groundwater Sampling Final Field Work Plan/Sampling Analysis Plan (FWP/SAP) (PRC 1994a) presents PRC's technical approach to field activities required to complete sediment sampling under Task 2, the Shoreline Investigation in CTO 0248. This revised addendum is based on a teleconference call between PRC, the Regional Water Quality Control Board San Francisco Bay Region (RWQCB), and the Navy on April 19, 1994. Minutes from this teleconference call are included in Appendix A. This addendum revises the first addendum (PRC 1994b) to the Final FWP/SAP and includes changes to sampling methods, locations, and required analyses contained in the Final FWP/SAP. The Final FWP/SAP should be referenced for quality control/quality assurance (QA/QC) protocol and procedures, including sample handling, analytical procedures, and data evaluation and reporting.

Additionally, a teleconference call was held on December 29, 1993 between PRC (PRC 1993a) and RWQCB to discuss the sediment sampling effort proposed in the Draft FWP/SAP (PRC 1993b). PRC and RWQCB agreed that a preliminary site visit (attended by PRC and RWQCB) was necessary to perform preliminary visual inspection (site reconnaissance) of the sediments within the intertidal zone and discuss appropriate sampling strategies.

The site reconnaissance was performed on February 8, 1994. During this reconnaissance, PRC collected four preliminary sediment samples which were submitted by RWQCB for laboratory analyses. These samples were collected at two of the 12 transects (stations) identified in the Final FWP/SAP. PRC has evaluated the resulting data and has proposed changes to the sediment sampling effort via this addendum. Changes to the sediment sampling effort will include more sampling locations within the intertidal zone, additional analyses under the Phase I sampling effort, and the addition of one sampling station (transect) as an offsite location.

2.0 TECHNICAL APPROACH AND FIELD METHODOLOGY

Sediment samples will be collected according to this revised addendum to the Final FWP/SAP. Samples will be collected in near-shore (intertidal zone) tidal flats along the entire length of NFD Point Molate's shoreline; including one location outside the facility boundary to assess ambient sediment quality. The offsite location was chosen to assess sediment quality at an area that has not been affected by facility operations. These sediment data will be used in a baseline evaluation of physical, chemical, and biological characteristics of intertidal sediments.

The sediment sampling program will be completed in two phases. Phase I will incorporate spatial consideration to sample locations to assess the horizontal and vertical extent of contamination within the intertidal zone. Phase I will include collection of samples at two depth intervals (0- to 2-feet, and 2- to 4-feet) at increasing distance from the shoreline (beach front). Data obtained during Phase I sampling will be used to (1) define areas for additional sampling under Phase II, as necessary; and/or (2) select specific sample locations (hot spots) where follow-up Phase II analyses may be performed. The extent and nature of potential contamination within near-shore sediments may then be evaluated (under Task 7 Baseline Sediment Quality Evaluation) and baseline sediment quality determined.

The following sections discuss the anticipated effort under each sampling phase.

2.1 PHASE I SEDIMENT SAMPLING

Thirteen sampling stations have been designated along the fuel depot shoreline. These stations will be located at areas of historical hydrocarbon seepage into San Francisco Bay, stormwater discharge locations, and unbiased (locations unaffected by facility operations) sampling locations. At each station, a transect has been laid out perpendicular to the shoreline. Samples will be collected along each transect at increasing distances from the beach front. Distances vary according to the extent of the intertidal zone; however, the maximum distance at any transect location from which samples will be collected will be limited to 400 feet. Data collected beyond this distance will not be considered conclusive; that is, it would be difficult to determine the source (Navy or non-Navy) of contamination beyond this distance. Other potential hydrocarbon sources near NFD Point Molate include Chevron Refinery fuel loading facilities. Table 1 summarizes the distances for sample locations along each transect. Locations of sediment sampling transects are shown on Plate 1 (see Final FWP/SAP), except for transect 13, which has been added as an offsite station. It will be located just north of the facility property boundary.

TABLE 1

TASK 2 SHORELINE INVESTIGATION
 PHASE I SEDIMENT SAMPLING DISTANCES PER TRANSECT

Transect	Extent of Intertidal Zone (ft) ^A	Samples Location (Distance from Shoreline, ft.)	Total No. of Phase I Samples ^B
T1	250	250, 50, 20, 10	8
T2	175	175, 100, 50, 10	8
T3	50	50, 10	4
T4	300	300, 50, 10	6
T5	150	150, 50, 10	6
T6	100	100, 50, 10	6
T7	10	10	2
T8	100	100, 50, 10	6
T9	100	100, 50, 10	6
T10	450	400, 200, 100, 50, 10	10
T11	550	400, 200, 100, 50, 10	10
T12	600	400, 200, 100, 50, 10	10
T13	400	400, 10	4
TOTAL			86

A: Based on extent of low tide measured on February 7, 1994 by PRC; previous observations by RWQCB on December 10, 1993 indicated further intertidal extent at some transects; sampling locations may be modified during actual sample collection.

B: Includes two depth intervals, 0- to 2-feet and 2- to 4-feet.

At each sampling location along the transect, a hand-driven 2-inch by 4-foot core sampler will be driven to a 4-foot depth. The sampling locations will be identified (marked) by driving a 2-inch by 2-inch by 6-foot long wood stake into the sediment at the point of collection. Following sample collection, the core barrel will be carried back to the shoreline where the core (sediment) will be extruded, divided into two 2-foot samples, individually composited, and transferred into appropriate sample jars. Compositing will be completed as quickly as possible in a pre-cleaned stainless steel mixing bowl. The sampling container will then be labeled with appropriate sample designations and placed in a cooler. Field notes will be completed in a field log book documenting the sample designation, description of sediment, time and date of collection, and other pertinent notes regarding the sample, such as the presence of obvious hydrocarbon sheen.

A precleaned core sampler will be used at each sampling location, and the core barrel and associated equipment will be decontaminated between locations. Decontamination of all sampling equipment will be completed in accordance with the methods discussed in Section 5.7 of the Final FWP/SAP.

In summary, two sample intervals at up to five sample locations along each of 13 transects, approximately 86 discrete samples, will be collected under the Phase I program. This number does not include QA/QC samples.

All samples collected under the Phase I program will be analyzed for TPH extractable. Other analyses, including total recoverable petroleum hydrocarbons (TRPH), volatile organic analyses (VOAs), semivolatile organic analyses (SVOAs), metals, organic lead, total organic carbon (TOC), pesticides/polychlorinated biphenyls (PCBs) and grain size distribution will be conducted at specific sample locations. TRPH, VOAs, SVOAs, metals, TOC, and organic lead analyses will be completed at the proximal (close) and distal (distant) sampling locations at four transects. SVOAs will also be collected at intermediate sampling locations at these transects. This will characterize both worst-case conditions (based on known areas of chronic non-episodic hydrocarbon seepage from sources areas) and areas expected to not be influenced by facility operations (an offsite transect). These four transects are as follows:

<u>Transect No.</u>	<u>Potential Influence</u>
3	Known oily water discharge in stormwater outfall during heavy rain events
9	Chronic hydrocarbon seepage (diesel fuel) related to paleochannel located near the sandbag area
10	Area of known hydrocarbon seepage (bunker fuel) from the former sump pond within the Treatment Ponds Area
13	None - transect will be located north of NFD Point Molate facility property boundary (offsite transect)

Pesticides/PCBs will only be collected at the proximal and distal sampling locations at transect 2. Grain size distribution will be assessed at two sampling locations which will be determined in the field. TPH extractable analysis is required at each sampling location (and depth). This analysis requires one 250 mL glass jar. Where analyses in addition to TPH extractable are required, a second 125 mL glass sample jar will be filled with sediment specifically for VOA and TOC analyses. The geotechnical analysis (grain size distribution) will be collected inside a brass sleeve (see Phase II Sediment Sampling). Table 2 provides an analytical summary at each transect under Phase I. Sediment analyses, bottle requirements, and holding times for both Phase I and II are summarized in Table 3.

2.2 PHASE II SEDIMENT SAMPLING

Phase II sediment sampling is contingent on the evaluation of Phase I data. If Phase I data provide conclusive justification to eliminate or limit additional analyses under Phase II, then this recommendation will be made. In any case, the Phase II sampling effort will be limited to the maximum number of analyses (samples) shown on Table 3. Any analyses or additional sample locations beyond this scope cannot be accommodated under the CTO 0248 budget. If additional analyses or sample locations are required, they will be included under future investigations.

Sample locations marked along each transect during Phase I will be used as reference points for determining Phase II sample locations. Sampling methods will be similar or identical to Phase I methods except for geotechnical and sediment toxicity analyses. Geotechnical analyses will be collected with the core barrel loaded with four 2-inch by 6-inch brass sleeves. The brass sleeves will then be extruded, capped, taped, and labeled.

TABLE 2

TASK 2 SHORELINE INVESTIGATION

PHASE I ANALYTICAL SUMMARY PER TRANSECT

TRANSECT NUMBER	SAMPLING DISTANCES (FT. FROM SHORELINE)	SAMPLING DEPTHS (FT. BELOW SURFACE)	ANALYSES	NO. SAMPLES PER TRANSECT
1	250	0-2, 2-4	TPH extractable	8
	100	0-2, 2-4	TPH extractable	
	50	0-2, 2-4	TPH extractable	
	10	0-2, 2-4	TPH extractable	
2	175	0-2, 2-4	TPH extractable, Pest/PCBs	8
	100	0-2, 2-4	TPH extractable, Grain Size Distribution**	
	50	0-2, 2-4	TPH extractable	
	10	0-2, 2-4	TPH extractable, Pest/PCBs	
3	50	0-2, 2-4	TRPH*, TPHext, VOA, SVOAs, Metals, Organic Pb*, TOC	4
	10	0-2, 2-4	TRPH*, TPHext, VOA, SVOAs, Metals, Organic Pb*, TOC	
4	300	0-2, 2-4	TPH extractable	8
	50	0-2, 2-4	TPH extractable	
	10	0-2, 2-4	TPH extractable	
5	150	0-2, 2-4	TPH extractable	6
	50	0-2, 2-4	TPH extractable	
	10	0-2, 2-4	TPH extractable	
6	100	0-2, 2-4	TPH extractable	6
	50	0-2, 2-4	TPH extractable	
	10	0-2, 2-4	TPH extractable	
7	10	0-2, 2-4	TPH extractable	2
8	100	0-2, 2-4	TPH extractable	6
	50	0-2, 2-4	TPH extractable	
	10	0-2, 2-4	TPH extractable	
9	100	0-2, 2-4	TRPH*, TPHext, VOA, SVOAs, Metals, Organic Pb*, TOC	6
	50	0-2, 2-4	TPH extractable, SVOA	
	10	0-2, 2-4	TRPH*, TPHext, VOA, SVOAs, Metals, Organic Pb*, TOC	
10	400	0-2, 2-4	TRPH*, TPHext, VOA, SVOAs, Metals, Organic Pb*, TOC	10
	200	0-2, 2-4	TPH extractable	
	100	0-2, 2-4	TPH extractable, SVOA	
	50	0-2, 2-4	TPH extractable	
	10	0-2, 2-4	TRPH*, TPHext, VOA, SVOAs, Metals, Organic Pb*, TOC	
11	400	0-2, 2-4	TPH extractable	10
	200	0-2, 2-4	TPH extractable	
	100	0-2, 2-4	TPH extractable, Grain Size Distribution	
	50	0-2, 2-4	TPH extractable	
	10	0-2, 2-4	TPH extractable	
12	400	0-2, 2-4	TPH extractable	10
	200	0-2, 2-4	TPH extractable	
	100	0-2, 2-4	TPH extractable	
	50	0-2, 2-4	TPH extractable	
	10	0-2, 2-4	TPH extractable	
13	400	0-2, 2-4	TPHext, VOA, SVOAs, Metals, Organic Pb*, TOC	4
	10	0-2, 2-4	TPHext, VOA, SVOAs, Metals, Organic Pb*, TOC	

Total=88

* Organic lead and TRPH to be collected in the 0-to 2-foot interval only.

** Exact location of these samples to be determined in the field.

TABLE 3

TASK 2 SHORELINE INVESTIGATION
 PHASE I/PHASE II SEDIMENT SAMPLING AND ANALYSES SUMMARY

PHASE I

Analysis	Analytical Method	Bottle Requirements*	Holding Times (days)	Total No. of Samples
CHEMICAL ANALYSES				
TRPH	EPA 418.1	250 mL glass	7	6
TPH Extractable + Hydrocarbon Fingerprinting	EPA 8015 Modified (LUFT Manual)	250 mL glass	10/40**	66
CLP VOAs	EPA CLP Organic SOW	125 mL glass	7	16
CLP SVOAs	EPA CLP Organic SOW	250 mL glass	7	20
CLP Metals	EPA CLP Inorganic SOW	250 mL glass	***	16
Organic Lead	LUFT Manual	250 mL glass	10/40	6
CLP Pesticides/PCBs	EPA CLP Organic SOW	250 mL glass	10	4
TOC	EPA 9060	125 mL glass	5	16
Grain Size Distribution	ASTM D422-83	2 X 6 in. brass		2

PHASE II

Analyses	Analytical Method	Bottle Requirements	Holding Times (days)	Maximum No. of Samples****
CHEMICAL ANALYSES				
CLP SVOAs	EPA CLP Organic SOW	250 mL glass	7	6
Sulfide	EPA 9030	125 mL glass	7	6
pH	EPA 9045	125 mL glass	2	6
CEC	EPA 9080/81	125 mL glass	6 months	6
TOC	EPA 9060	125 mL glass	5	6
Microbial Plate Count	APHA,AWWA,WPCF 9215 B Modified	250 mL glass	1	6
BOD	EPA 405.1 Modified	250 mL glass	1	6
GEOTECHNICAL ANALYSES				
Grain Size Distribution	ASTM D422-83	2 X 6 in. brass sleeve		6
Total Solids		2 X 6 in. brass sleeve		6
Total Volatile Solids		2 X 6 in. brass sleeve		6
Conductivity		2 X 6 in. brass sleeve		6
SEDIMENT TOXICITY ANALYSES				
PCC Toxicity Bioassay	Solid Phase Toxicity Test	13 L plastic (3.5 gal)		6

* Where multiple analyses are required, VOAs and TOC will be collected in one 125 mL jar; Other analyses collected in two 250 mL jars

** Extraction/analyses of extracts

*** Mercury (Hg) - 26 days
 All other metals - 6 months

**** Number of samples/analyses depends on results of Phase I

Sediment toxicity will be assessed under the Phase II effort through the performance of a solid phase toxicity test. This test will target the brackish water arthropod species Eloustrias. A 10-day acute test will be performed. Due to the larger volumes of sediment required for toxicity analyses (13 liters), these samples will be collected with a pre-cleaned shovel or trowel. If the sample depth requirements for the toxicity analyses is greater than two feet below surface, then several core barrel drives may be required to collect the same volume of sediment (due to the likelihood of near-surface collapse of unconfined sediment).

3.0 DECONTAMINATION PROCEDURES, QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) FIELD SAMPLES, AND SAMPLE HANDLING PROCEDURES

Decontamination procedures, QA/QC field samples, and sample handling procedures generally follow the Final FWP/SAP with the following exceptions.

Decontamination of the 4-foot by 2-inch inner diameter core barrel will be completed between collection of each sediment sample. The core barrel will be immersed in Liquinox® or Alconox® cleaning solution and potable water and a bristle brush will be used to remove any residual sediment left in the core barrel. A second wash in Liquinox® or Alconox® will be completed, followed by a double-rinse with potable water. Finally, the core barrel will be rinsed with deionized water.

Equipment blanks will be obtained for QA/QC purposes by collecting deionized ultra-filtered (DIUF) water poured through the core barrel into appropriate sample containers.

The sample numbering scheme follows the sample numbering template in the Final FWP/SAP with the following exception. For sediment sampling, the activity codes and site codes listed in the Final FWP/SAP have been changed. Sediment samples will be identified by transect location, distance from the shoreline, and depth. For example, T09-50 (0.0-2.0) is a sediment sample collected at transect 9, at a distance of 50 feet from the shoreline, and at a depth of 0.0 to 2.0 feet.

Sample labeling, documentation, containerization and preservation, shipment, and chain of custody procedures will follow those presented in the Final FWP/SAP.

4.0 REFERENCES

- PRC. 1993a. Teleconference Minutes Prepared For December 29, 1993 Conference Call Between PRC and RWQCB Regarding: Task 2 Shoreline Assessment Sediment Sampling Effort. Prepared for Naval Facilities Engineering Command, Western Division, San Bruno, California. January 13.
- PRC. 1993b. Naval Fuel Depot Point Molate, Shoreline/Landfill Investigations And Quarterly Groundwater Sampling, Draft Field Work Plan/Sampling Analysis Plan. Prepared for Naval Facilities Engineering Command, Western Division, San Bruno, California. November 3.
- PRC. 1994a. Naval Fuel Depot Point Molate, Shoreline/Landfill Investigations And Quarterly Groundwater Sampling, Final Field Work Plan/Sampling Analysis Plan. Prepared for Naval Facilities Engineering Command, Western Division, San Bruno, California. January 27.
- PRC. 1994b. Naval Fuel Depot Point Molate, Shoreline/Landfill Investigations And Quarterly Groundwater Sampling, Final Field Work Plan/Sampling Analysis Plan, Addendum, Task 2 Sediment Sampling. Prepared for Naval Facilities Engineering Command, Western Division, San Bruno, California. April 13.

APPENDIX A

**MINUTES FOR APRIL 19, 1994
CONFERENCE CALL WITH PRC, RWQCB, NAVY**

APPENDIX A

NFD POINT MOLATE CTO 0248 SHORELINE INVESTIGATION APRIL 19, 1994 CONFERENCE CALL WITH WESTDIV, PRC, AND RWQCB TELECONFERENCE MINUTES Prepared April 26, 1994

Participants: Gina Kuthuria - RWQCB
Bobbie Smith - RWQCB
Lou Ocampo - WESTDIV
David West - PRC
Jeff Reichmuth - PRC

I. Sediment Sampling Reference Transect

- RWQCB indicated that the off-site sediment sampling locations (Transect 13 - Reference Transect) proposed in the field work plan (FWP) addendum would not be appropriate for comparison to on-site sediment sample data since off-site sediments in the vicinity of the facility may be impacted by facility operations.
- WESTDIV and PRC stated that although contamination detected at a reference transect could not conclusively be attributed to off-site activities, off-site data may be useful in establishing lateral gradients. Consequently, the reference transect will be retained.

II. Total Petroleum Hydrocarbons (TPH) Analysis Versus Total Recoverable Petroleum Hydrocarbons (TRPH) Analysis

- RWQCB stated that a TRPH analysis combined with a total organic carbon (TOC) analysis would provide a better indication of the entire range of fuel contamination in beach sediments than TPH analyses. RWQCB was particularly concerned with the TPH analysis not detecting weathered fuel or fuel constituents with carbon chains longer than 40 (tar or asphalt range). Furthermore, RWQCB stated that bioassay data is typically correlated to TOC data.
- PRC stated that it would be extremely difficult to accurately distinguish naturally occurring organics from fuels using RWQCB's recommended analyses and that TRPH would not define the type of fuel (the chromatographic range) present in the sample. In addition, PRC stated that weathered fuel would be detected under a TPH analysis. If weathered fuel chromatograms do not clearly match chromatograms for fuel standards, the weathered fuel will be reported as an "other fuel" in the TPH analysis. PRC also stated that fuels currently and historically stored at the facility do not contain carbon chains longer than C₄₀, and biological or other natural attenuation processes would not produce carbon chains longer than those present in the original fuel.

In addition, PRC indicated that bioassays should evaluate the survival rates of organisms exposed to sediments (or sediment rinsate) with known fuel contamination, not sediments exhibiting high TOC. PRC stated that comparing survival rates to TOC concentrations would not be appropriate given the large fraction of naturally occurring organic matter in sediment samples (TOC in all sediment samples will likely be almost entirely comprised of naturally occurring organic matter).

- WESTDIV and PRC agreed to conduct TRPH and TOC analyses at the proximal and distal sampling locations at three transects (Transects 3,9, and 10). This data will be compared to TPH data to help establish a correlation between these analyses. Semivolatile organic compounds (SVOCs) analyses were also added at mid-distances at these transects to help determine contamination gradients.

III. Other Analyses Modifications

- RWQCB stated that volatile contaminants are rarely detected in beach sediments and, therefore, TPH-purgeable analysis may be eliminated. Cost savings from eliminating this analysis will be appropriated for additional TRPH, TOC, and SVOCs analyses.
- At RWQCB's request, conductivity rather than salinity analyses will be conducted.
- At RWQCB's request, two grain-size distribution analyses originally planned under Phase 2 will be conducted under Phase 1. This information will be used to determine the type of organisms to be evaluated under bioassays.

IV. Budget Considerations

- WESTDIV stated that funding for new contract task orders (CTOs) and CTO modifications is limited due to CLEAN contract limitations.
- PRC indicated that both Phase 1 and 2 work may be completed within CTO budget constraints; however, modifications to planned Phase 2 activities may not be accommodated.