N30519_000012
NFD POINT MOLATE
SSIC NO. 5090.3.A

CLEAN
Central Zone

Contract No. N62474-88-D-5086

Contract Task Order 0143

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NAVAL FUEL DEPOT
POINT MOLATE

TREATMENT PONDS AREA
CHARACTERIZATION AND
INTERIM CORRECTIVE ACTION PLAN

REVISED WORK PLAN

Prepared By

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August 9, 1991

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1.0 INTRODUCTION

PRC Environmental Management, Inc., (PRC) received contract task order (CTO) 0143 from the Department of the Navy, Naval Facilities Engineering Command Western Division (WESTDIV), to perform a characterization study and implement appropriate interim corrective or remedial actions for the treatment ponds area at Naval Fuel Depot Point Molate (NFDPM) in Richmond, California. This work plan presents PRC's technical approach, including assumptions, tasks, and deliverables. It also outlines the anticipated schedule, management, staffing, and performance protocols (health and safety, sampling and analysis, and quality assurance) required to complete the CTO. A cost estimate for the proposed activities is submitted under separate cover.

1.1 BACKGROUND

NFDPM has been in operation since the early 1940s. It covers more than 300 acres in the Potrero Hills near Richmond, California along the eastern shore of San Francisco Bay. NFDPM is located approximately 1.5 miles north of the Richmond-San Raphael Bridge and approximately 2 miles northwest of the city of Richmond. NFDPM is bordered to the north, south, and east by Standard Oil Corporation (Chevron) and to the west by San Francisco Bay. The majority of land around NFDPM is used by Chevron for oil refining or oil storage. Topography at NFDPM ranges from flat reclaimed tidal marsh at sea level to steep dissected slopes nearly 500 feet above mean sea level.

NFDPM operates a wastewater treatment plant and sewage treatment facility generally referred to as the treatment ponds area. The treatment ponds area was investigated by PRC in 1990 under CTO 010 and Harding Lawson Associates (HLA) in 1973, 1981, 1984. It is a known source of petroleum contamination in subsurface soils, fill material, and shallow ground water table. Data are not available to determine if contamination from the treatment ponds area poses a threat to near shore aquatic life. However, contamination of tidal flat sediments near the treatment ponds has occurred and may be continuing. For this reason, the California Regional Water Quality Control Board (RWQCB) has requested a prioritized characterization and interim remediation of the petroleum contamination in the treatment ponds area.

The treatment ponds area consists of the existing wastewater treatment plant and a nearby sewage treatment facility. Included in the wastewater treatment plant are three settling and evaporation ponds, two oil-water separators, weir separators, a filtration system, several pump houses, and off-loading and fuel oil recovery tanks. The three settling and evaporation ponds and an off-loading tank are currently located over a former sump pond. This sump pond was used for the

containment of contaminated fuels, leaking drums, and other liquid wastes. Other materials, including up to six railroad cars full of used batteries, were disposed in the sump pond (PRC, 1991).

Liquids in the sump pond were pumped out and sent to the neighboring refineries for reprocessing. Some of the sludge and waste, including most of the batteries, were removed before the pond was filled with material excavated from the south drum lot (PRC, 1991). An undocumented quantity of sludge remained in the former sump area and the remaining sludge was tilled with the clean fill material.

The present wastewater treatment facility and settling and evaporation ponds were constructed over the sludge and fill mixture. The treatment ponds are unlined and approximately 6 feet deep. A sheet piling cutoff wall associated with the sump pond was installed in the late 1940s, and remains largely intact (HLA, 1984). The cutoff wall extends from 4.5 to 24 feet below the ground surface. It provides a partial barrier to subsurface flow toward the bay; however, the effectiveness of this cut-off wall requires further investigation.

1.2 PURPOSE

The purpose of CTO 0143 is to characterize the treatment ponds area, implement an interim corrective action(s) for it, and evaluate the necessity for alternative corrective or remedial actions. The field and laboratory activities include site surveys; monitoring well installation; soil, sediment, and ground water sampling for chemical analysis; soil sampling for physical analysis; aquifer testing; and surveying. A characterization and interim corrective actions report will document the results of the investigation and recommend alternative corrective or remedial actions to minimize the migration of petroleum hydrocarbon contaminants toward San Francisco Bay. Wastes generated during the investigation will be characterized and the Navy will arrange proper disposal.

2.0 TECHNICAL APPROACH

The technical approach presented here is based on the scope of work provided with CTO 143 and the results of site inspection field activities pertinent to the treatment ponds area performed under CTO 010. The tasks associated with the project are as follows:

Task 1.0	Review Background Information
Task 2.0	Prepare a Characterization and Interim Corrective Action Plan
Task 3.0	Implement Characterization Activities and Determine Placement of Extraction Well(s)

Task 4.0	Installation of Extraction Well and Associated Observation Wells
Task 5.0	Evaluate the Effectiveness of New and Existing Extraction Wells
Task 6.0	Determine Hydraulic Properties within the Treatment Pond Area
Task 7.0	Determine Hydraulic Influence of the Treatment Ponds
Task 8.0	Determine Tidal Influence within the Treatment Ponds Area
Task 9.0	Evaluate Interim Corrective Action and Characterization Data
Task 10.0	Recommend Alternative Corrective or Remedial Actions

Included as part of the Tasks 9.0 and 10.0 listed above is the generation of a characterization and interim corrective action report.

Section 2.1 identifies the general assumptions used in preparing this work plan. Section 2.2 describes the task activities and task-associated assumptions. Section 2.3 identifies the deliverables for the project.

2.1 GENERAL PROJECT MANAGEMENT ASSUMPTIONS

The following paragraphs describe general assumptions for the characterization study and interim corrective action plan at the NFDPM treatment ponds area.

1. The field investigation program and associated costs are based on a field season with a maximum duration of 12 weeks. Following the completion of the initial field investigation activities, additional quarterly ground water sampling from wells installed under this CTO will be addressed in a site-wide ground water monitoring plan under a separate CTO.
2. All field activities will be performed by PRC personnel or its subcontractors.
3. PRC and it's subcontractors access to NFDPM and the treatment ponds area within the depot will be coordinated with the Navy. Base activities will not cause schedule delays.
4. All field work is to be completed in accordance with the final characterization and interim corrective action plan, except for those changes resulting from negotiations with or recommendations by the Navy or regulatory agencies. It may be necessary to submit a revised schedule and associated cost estimate to implement any changes required by the Navy, RWQCB, or other agencies.

2.2 TASK DESCRIPTIONS AND ASSOCIATED ASSUMPTIONS

The following sections describe the tasks and the task-associated assumptions included in CTO 143.

Task 1.0 Review Background Information

The review of background information will include summary of previous characterization activities performed at the treatment ponds area and a review of previous corrective actions implemented at the treatment ponds area. The review will also include recommendations from previous investigations. The reviews will be summarized in the introduction of the characterization and interim corrective action plan.

Task 2.0 Prepare Characterization and Interim Corrective Action Plan

Prior to the implementation of characterization activities or corrective actions, a characterization and interim corrective action plan will be prepared. The plan will include field methods and procedures; investigative and analytical rationale; quality assurance/quality control (QA/QC) procedures; design and installation requirements for the proposed interim corrective action; and a site health and safety plan (HSP).

Task 3.0 Implement Characterization Activities and Determine Placement of Extraction Well(s)

This task will involve the implementation of chemical and physical characterization activities to determine the optimal corrective or remedial action for the treatment ponds area. As the result of previous investigations, extraction well installation is the currently recommended interim corrective action. Characterization activities, including analyses from soil borings, monitoring wells, and aquifer tests, will provide information for the optimal placement of the extraction well(s). These activities will also provide data from which alternative remedial actions may be evaluated.

Chemical Characterization Activities

Twenty-four soil borings will be drilled within the vicinity of the treatment ponds to determine the vertical and horizontal extent of hydrocarbon contamination in soils, fill material, or bedrock. These borings will require hollow stem auger (HSA) drilling methods. Core drilling will be implemented where the vertical extent of hydrocarbon contamination cannot be assessed with HSA methods due to competent strata. Most soil borings will be drilled to a depth of 25 feet, but at locations where visible evidence or field screening methods indicate hydrocarbon contamination continues deeper than 25 feet, the vertical extent of contamination will be assessed with deeper borings. Approximately five borings will be drilled to a maximum of 50 feet to determine site wide lithology.

Three soil horizons are targeted at each boring: near the surface, the vadose zone, and the capillary fringe. Where visual evidence or field screening methods indicate contamination within other horizons additional samples will be collected. Target analyses for all soil samples will be extractable and purgeable total petroleum hydrocarbons (TPH), and benzene, toluene, ethylbenzene, and xylene (BTEX). At least 103 soil samples will be analyzed for extractable and purgeable TPH and BTEX. Approximately twenty-four soil samples will be analyzed for semivolatile organic compounds (SVOCs) in locations where heavy hydrocarbon fractions are encountered. Twelve field equipment rinsate blanks will be taken and analyzed for BTEX and TPH.

Sixteen monitoring wells are proposed to evaluate shallow ground water quality for the treatment ponds area. In addition, these wells provide evidence and extent of free-phase (floating) hydrocarbons, concentrations of aqueous-phase hydrocarbons, and the extent of saltwater intrusion in near shore locations. The monitoring wells will be installed with HSA drilling methods to a nominal depth of 25 feet. Monitoring wells will be constructed according to the following general specifications:

- Four-inch Polyvinyl chloride (PVC) screen and riser
- Fifteen feet of 0.010- or 0.020-inch slot screen
- Above ground or flush mount protective casing

All monitoring well locations will be surveyed both horizontally and vertically.

All ground water samples will be analyzed for purgeable and extractable TPH, BTEX, major anions, and major cations. Selected ground water samples will also be analyzed for SVOCs in locations where heavy hydrocarbons fractions are encountered.

Eight near shore sediment samples will be collected from the tidal flats immediately adjacent to the treatment ponds area. The samples will be analyzed for extractable and purgeable TPH and BTEX. These data will be used to determine the extent of hydrocarbon contamination and its relationship to the occurrence of near shore hydrocarbons to sources within the treatment ponds area.

Physical Characterization Activities

Six soil samples will be collected from the treatment ponds area and will be analyzed for grain size, moisture content, bulk density, porosity, ion exchange capacity, organic content, and atterburg limits. The results will be used in the alternative remedial action assessment.

Two shelby tube samples will be collected within the treatment ponds area. One tube will be taken in the "bay mud" sediment that underlies the fill material. One additional shelby tube will be collected in a deeper clay layer detected during the latest round of site drilling (PRC, 1991). This shelby tube will only be collected if additional borings, described in Task 3.0, confirm the existence and continuous nature of the deeper clay zone. Samples from Shelby tubes will be analyzed for permeability and the results used to assess the nature of low permeability horizons or local aquitards.

Task 3.0 Assumptions

The following assumptions were used to estimate the costs associated with Task 3.0.

1. Three soil samples will be collected per soil boring. Seventy-two soil samples will be analyzed for BTEX and purgeable and extractable TPH.
2. Twenty-four soil samples will be analyzed for SVOCs.
3. Twenty discretionary soil samples will be collected and analyzed for TPH and BTEX.
4. Three duplicate soil samples will be collected (TPH and BTEX).
5. Twelve soil sampling equipment blanks will be analyzed for BTEX and TPH.
6. Two soil borings will be completed per day.
7. Two PRC field personnel will be present for all drilling activities
8. Two 25-foot monitoring wells will be installed per day.
9. Eight near shore sediment samples will be analyzed for TPH and BTEX.
10. Sixteen ground water samples will be analyzed for purgeable and extractable TPH, BTEX, major cations, and major anions.
11. Five ground water samples will be analyzed for SVOCs
12. Six soil samples will be analyzed for moisture content, porosity, grain size distribution, bulk density, ion exchange capacity, and organic content.
13. Shelby tube samples will be analyzed for permeability.

Task 4.0 Install Extraction Well and Associated Observation Wells

The prioritized characterization and interim corrective action for the treatment ponds area necessitates a method of controlling known hydrocarbon contamination. In at least one location, floating hydrocarbons are migrating toward San Francisco Bay (PRC, 1991). The presence of this hydrocarbon suggests that the Navy extraction wells in this vicinity are ineffective or are located

incorrectly to control the migration of this specific product plume. Currently, the most appropriate interim corrective action is the installation of an additional extraction well to intercept the known product plume. Soil borings described in Task 3.0 will be used to select the most appropriate location for the extraction well. Design requirements for the extraction well have been suggested by RWQCB, and will be implemented as appropriate.

The preliminary design requirements for an oil recovery system will be based on an initial pump test conducted on the new extraction well. In addition to the extraction well, approximately four observation wells may be necessary. These wells will be used to monitor the effectiveness of the extraction well. Ground water monitoring wells installed during Task 3.0 may also be used as observation wells if appropriate. Observation wells will be installed using methods discussed in Task 3.0.

Task 4.0 Assumptions

The following assumptions were used to estimate the costs associated with Task 4.0.

1. The oil recovery system design will be based the results of an initial pump test.
2. A solicited bid will be required to install the oil recovery system.
3. Oil and water discharge generated by this task will be temporarily containerized and will ultimately be treated using the existing wastewater treatment system.

Task 5.0 Evaluate the Effectiveness of New and Existing Extraction Wells

This task is designed to evaluate the effectiveness of the new and existing extraction wells. The new extraction well will be operated in accordance to the preliminary design requirements outlined in Task 4.0. During this operation, specific observation wells will be monitored to assess the ability of the well to create an effective capture zone.

Well yield tests will be conducted on existing extraction wells using the oil recovery equipment present at each well location. The data from the existing extraction wells and the new extraction well will be used to evaluate the extraction system.

Task 5.0 Assumptions

The following assumptions were used to estimate the costs associated with Task 5.0.

1. The existing extraction wells be operable.
2. The new and existing extraction wells will be tested for a minimum of 48 hours.
3. Oil and water discharge generated from the tests will be temporarily containerized and will ultimately be treated using the existing wastewater treatment system.

Task 6.0 Determination of Hydraulic Properties within the Treatment Ponds Area

A determination of hydraulic parameters within the treatment ponds area will be necessary to assess the migration rates, direction, and extent of aqueous contaminants moving toward San Francisco Bay. Additionally, these parameters can be used as a design basis for a ground water extraction system, and if necessary, for selected alternative remedial actions.

The determination of these properties will involve aquifer tests. Specific locations for these tests will be chosen following sitewide assessment of lithologic variability in soil borings (Task 3.0). The performance of aquifer tests will be largely affected by the heterogenous nature of fill material throughout the treatment ponds area. This heterogeneity may bias the test data and subsequently bias the data analysis and interpretation.

Task 6.0 Assumptions

The following assumptions were used to estimate the costs associated with Task 6.0.

1. Oil and water discharge generated as a result of the aquifer tests will be temporarily containerized and will ultimately be treated using the existing wastewater treatment system.
2. One 72 hour and one 48 hour pump test will be conducted.

Task 7.0 Determine Hydraulic Influence of the Treatment Ponds

PRC will evaluate the hydraulic influence of the unlined treatment ponds and the cut-off wall on the water table. Water levels will be monitored in wells adjacent to the treatment ponds during pump-induced drawdown and during static water level conditions to assess potential "mounding" effects caused by the unlined ponds. Three observation well locations will be chosen based on water level anomalies and spatial distribution along the length of the cut-off wall.

A visual inspection will be conducted to assess the hydraulic influence and effectiveness of the cut-off wall. This inspection will require excavation using a backhoe or similar earthmoving equipment. The inspection will be conducted in trenches excavated adjacent to the wall to determine its overall integrity (such as corrosion and mechanical stability), and depth below ground surface.

Task 7.0 Assumptions

The following assumptions were used to estimate the costs associated with Task 7.0.

1. Trenching will require the use of a subcontractor.
2. The subcontractor will provide all necessary equipment.
3. The excavated soils will be replaced and compacted upon completion of trenching operation.
4. The subcontractor will provide decontamination equipment.
5. Decontamination water will be containerized and disposed of by the existing wastewater treatment facility.

Task 8.0 Determine Tidal Influence Within the Treatment Ponds Area

Tidal influence will be monitored to assess the potential effects of salt water intrusion on ground water quality. In addition, a model of time-lapse effects between bay tidal changes and near shore ground water level fluxuations will be developed.

Tidal monitoring will require the installation of a staff gauge and water level data loggers in near shore wells. Monitoring will be conducted over a 24-hour period, during which salinity and specific conductance will be measured every 2 hours. The data from ground water inorganic analyses will also be evaluated to assess salt water intrusion in ground water.

Task 8.0 Assumptions

The following assumptions were used to estimate costs associated with Task 8.0.

1. All equipment and personnel will be provided by PRC.

Task 9.0 Evaluate Interim Corrective Action and Characterization Data

This task includes the compilation and evaluation of data resulting from field activities, and integration of this information into the characterization and interim corrective action report. Chemical and physical characterization data, hydraulic properties data, and the evaluation of the interim corrective action chosen during Task 4.0 will be evaluated and used to assess the need or feasibility of alternative corrective actions within the treatment ponds area.

Task 10.0 Recommend Alternative Corrective or Remedial Actions

The compilation and evaluation of data performed in Task 9.0 will provide the basis for recommendation of alternative corrective or remedial actions within the treatment ponds area. These recommendations will also be included in the characterization and interim corrective action report.

3.0 SCHEDULE AND SUBMITTALS

1. The contractor shall submit 10 copies of the draft characterization and interim corrective action plan for review within 30 calendar days following the award of this CTO.
2. The contractor shall submit 10 copies of the final characterization and interim corrective action plan for Navy's approval within 14 calendar days following receipt of the Navy's comments on the draft characterization and interim corrective action plan.
3. The contractor shall commence field work within 10 days following Navy's approval of the final characterization and interim corrective action plan.
4. The contractor shall submit 10 copies of the draft characterization and interim corrective action report for review within 180 calendar days following Navy's approval of the final characterization and interim corrective action plan.
5. The contractor shall submit 10 copies of the final characterization and interim corrective action report within 21 calendar days following receipt of the Navy's comments on the draft characterization and interim corrective action report.
6. The final completion date for CTO 0143 project tasks will be 01 June, 1992 or ten (10) months following award of CTO 0143.

4.0 PROJECT MANAGEMENT

This project will be managed by Mr. David West of PRC. Mr. West will communicate with the Navy's EIC on a regular basis and as required by the progress of the project. He will discuss technical, financial, schedule, and administrative issues affecting the project. Management responsibilities will include monitoring budget and schedule status, coordinating meetings and other activities between appropriate parties, and overseeing technical activities. Mr. West will also be responsible for coordinating all discipline team functions associated with the project.

5.0 STAFFING

The quality assurance/quality control (QA/QC) for all tasks will be performed by senior level staff. Project management and technical oversight will be performed by staff with experience in RI/FS procedures and knowledge of applicable local, state, and federal regulations, criteria, and

guidelines. Technical support for specific tasks will be provided by staff members including hydrogeologists, environmental scientists and engineers, geologists, toxicologists, and certified industrial hygienists. Clerical staff will provide administrative support.

6.0 HEALTH AND SAFETY

All work on this project will be performed in accordance with the PRC Comprehensive Long-Term Environmental Action Navy (CLEAN) Health and Safety Program, dated October 24, 1989. Subcontractors will be provided with copies of this document and be required to sign an acknowledgement form stating that they are familiar with the contents of the plan.

7.0 SAMPLING AND ANALYSIS

All sampling and analysis activities conducted during this project will be performed according to the procedures specified in the characterization and interim corrective action plan prepared under this CTO. Significant deviations from these procedures will be documented in the characterization and interim corrective action report prepared under this CTO.

8.0 QUALITY ASSURANCE

All PRC work on this contract will be performed in accordance with PRC's CLEAN Quality Control Management Plan dated January 17, 1990. Activities defined in this work plan may be subjected to a system audit conducted by the QA staff to check adherence to the QC management plan. Audit results will be included in the appropriate monthly status report.

9.0 REFERENCES

Harding Lawson and Associates, 1984. Concept Study, Oil Spill Prevention at Point Molate Fuel Depot, Naval Supply Center, Oakland, California. HLA, May 6, 1984.

PRC, 1991. Site Inspection, Draft Summary Report, Point Molate Naval Fuel Depot, Richmond, California, PRC Environmental Management, Inc., April 5, 1991.