# WORK PLAN
# FOR
# SUPPLEMENTAL SITE INVESTIGATION

BP Oil Company Service Station No. 11126
1700 Powell Street
Emeryville, California

Project No. 10-061

Prepared for:

BP Oil Company
Environmental Resource Management
16400 Southcenter Parkway, Suite 301
Tukwila, Washington 98188

Prepared by:

Alisto Engineering Group
1777 Oakland Boulevard, Suite 200
Walnut Creek, California

June 3, 1993

Brady Nagle
Project Manager

Al Sevilla, P. E.
Principal

REGISTERED PROFESSIONAL ENGINEER
ALBERTO SANCHEZ SEVILLA
26392
Exp. Date 3/31/96
CIVIL
STATE OF CALIFORNIA

**WORK PLAN**
**FOR**
**SUPPLEMENTAL SITE INVESTIGATION**

**BP Oil Company Service Station No. 11126**
**1700 Powell Street**
**Emeryville, California**

**Project No. 10-061**

**June 3, 1993**

## INTRODUCTION

This work plan presents the proposed scope of work to install additional groundwater monitoring wells at BP Oil Company Service Station No. 11126, located at 1700 Powell Street, Emeryville, California. A site vicinity map and site plan are shown in Figures 1 and 2.

## PROJECT BACKGROUND

On October 20, 1992, eight soil borings were drilled at the site to depths ranging from 4 to 20 feet below grade. Four of the borings were converted into groundwater Monitoring Wells MW-1 through MW-4. Laboratory analysis detected up to 280 parts per million (ppm) total petroleum hydrocarbons as gasoline (TPH-G) and up to 0.94 ppm benzene in the soil samples collected at depths of up to 5.5 feet below grade in the vicinity of the underground fuel storage tanks and dispenser islands. Concentrations as high as 12,000 parts per billion (ppb) dissolved-phase TPH-G and 3,900 ppb benzene were detected in groundwater samples collected from all the monitoring wells at the site.

## SCOPE OF WORK

The scope of work includes: (1) drilling five soil borings for installation of four additional groundwater monitoring wells and one groundwater recovery well; (2) sampling and analysis of soil and groundwater samples; (3) and preparation of a report presenting the findings and conclusions of the investigative work.

Task 1: Acquire Permits

Alisto Engineering Group will procure the necessary drilling and groundwater monitoring well installation permits, encroachment permits, and offsite access; locate underground utilities; and schedule field activities before commencing field work.

Task 2: Drill Exploratory Soil Borings and Install Groundwater Monitoring/Recovery Wells

To investigate the lateral and vertical extent of soil and groundwater contamination, five exploratory soil borings will be drilled using a truck-mounted CME 75 drilling rig equipped with 8- and 10-inch-diameter hollow-stem augers.

Soil samples will be collected from the borings at 5-foot intervals and at significant stratigraphic changes beginning at 5 feet below grade and continuing to the total depth of the boring. The samples will be collected from a split-spoon sampler lined with stainless steel or brass tubes, and logged in the field by a qualified geologist or engineer using the Unified Soils Classification System (USCS). Each sample will also be field screened using a photo-ionization detector or combustible gas indicator to assist in selecting the samples for laboratory analysis. The samples selected for analysis will be sealed airtight with Teflon or aluminum sheeting, plastic caps, and adhesive tape, and placed immediately into a cooler containing blue or dry ice.

The wells will be installed and constructed based on site-specific hydrogeologic conditions and the nature of contamination encountered. The borings will be converted into four 2-inch-diameter groundwater monitoring wells and one 4-inch-diameter recovery well to depths of approximately 10 to 15 feet below the top of the first saturated zone. The wells will be constructed using 2- and 4-inch-diameter, Schedule 40, PVC casing with 0.010-inch perforations, and the associated filter pack. An approximately 1-foot-thick bentonite spacer will be installed above the sand pack, and the remainder of the annulus will be sealed with Portland Type I/II neat cement. The top of each well will be secured with watertight locking caps and utility boxes finished flush with grade.

Task 3: Develop, Sample, and Survey Groundwater Monitoring Wells

Well development will be performed to: (1) consolidate and stabilize the filter pack; (2) optimize well production; and (3) reduce the turbidity of subsequent groundwater samples. The proposed wells will be developed during drilling before installation of the bentonite spacer and neat cement seal. Additionally, well development will be accomplished by alternately using a surge block and submersible pump or bailer to evacuate the water and sediments. Development will continue to a maximum of 10 saturated well volumes or until the groundwater is relatively free of sediments.

All wells will be sampled a minimum of 72 hours after well development and installation of the neat cement seal. Before sampling, water level measurements at each well will be recorded, and the presence of free product or sheen will be observed. The wells will then be purged to allow groundwater representative of the aquifer to enter the wells. Purging will be accomplished using a bailer or pump so as not to agitate the groundwater or expose it to air. Purging will

continue until a minimum of 3 and a maximum of 10 saturated well casing volumes have been evacuated and the indicator parameters of pH, temperature, and specific conductivity, have stabilized. Stabilization of the indicator parameters will be determined when they vary no more than the following values:

- pH - 0.2 units
- Temperature - 0.5 degrees Celsius
- Specific conductivity - 10 percent

The samples will be placed in an iced cooler and transported to a state-certified laboratory for analysis. All purged water from sampling and development, as well as decontamination rinsate, will be stored onsite in Department of Transportation approved 55-gallon drums for transport and disposal.

To calculate the hydraulic gradient and groundwater flow direction of the shallow aquifer, each well will be surveyed from the top of the casing to within 0.01 foot accuracy in reference to an established benchmark or a common datum.

Task 4: Analyze Soil and Groundwater Samples

Soil and groundwater samples will be transported to a state-certified laboratory and analyzed on a standard 2 week turnaround time for total petroleum hydrocarbons as gasoline (TPH-G), and benzene, toluene, ethylbenzene, and total xylenes (BTEX) using Environmental Protection Agency (EPA) Methods 5030/8015/8020.

Additionally, water samples collected from the monitoring well near the used oil tank will be analyzed for the following:

- Total oil and grease (TOG) using EPA Method 5520 DF
- Total petroleum hydrocarbons as diesel (TPH-D) using EPA Methods 5030/8015 (modified)
- Halogenated volatile organic compounds (HVOCs) using EPA Method 8010

Task 5: Analyze Data and Laboratory Results

On completion of sample analysis, a detailed evaluation of results and available information will be conducted to assess the extent and nature of petroleum hydrocarbons in the soil and groundwater. This will include the following:

- Interpretation of geologic and hydrogeologic characteristics of the water-bearing formation and the nature of subsurface contamination.



- Preparation of an underground utility location map for determination of potential migration pathways.

- Preparation of groundwater potentiometric surface maps, hydrocarbon concentration maps, and hydrogeologic cross sections.

- Assessment of the extent of hydrocarbons in the soil and/or groundwater.

Task 6: Prepare Report

A report presenting the results, findings, conclusions, and recommendations of the supplemental investigation will be prepared for BP Oil Company for subsequent submittal to the regulatory agencies.

## SITE SAFETY PLAN

Field procedures and activities related to the site investigation will be conducted in accordance with the site specific-safety plan. The site safety plan will be developed in accordance with the applicable requirements of the California Environmental Protection Agency (Cal-EPA) and the federal and state Occupational Safety and Health Administration (OSHA and Cal-OSHA).

## IMPLEMENTATION SCHEDULE

The additional site characterization will be completed and a report submitted within 75 days after receipt of written approval of the work plan from the appropriate regulatory agencies. The estimated schedule for completion of the tasks is as follows:

| Task/Activity | Days After Work Plan Approval |
|---|---|
| - Acquire permits | 15 |
| - Drill soil borings/Install wells | 25 |
| - Development/sample wells | 30 |
| - Analyze samples | 45 |
| - Analyze data | 60 |
| - Prepare report | 75 |

This schedule may be subject to revision depending on timely receipt of information required to complete the site investigation. Any changes to the schedule will be communicated in advance to the appropriate agencies and parties involved.


SOURCE:
USGS MAP, OAKLAND WEST QUADRANGLE, CALIFORNIA.
7.5 MINUTE SERIES. 1959. PHOTOREVISED 1980.

N

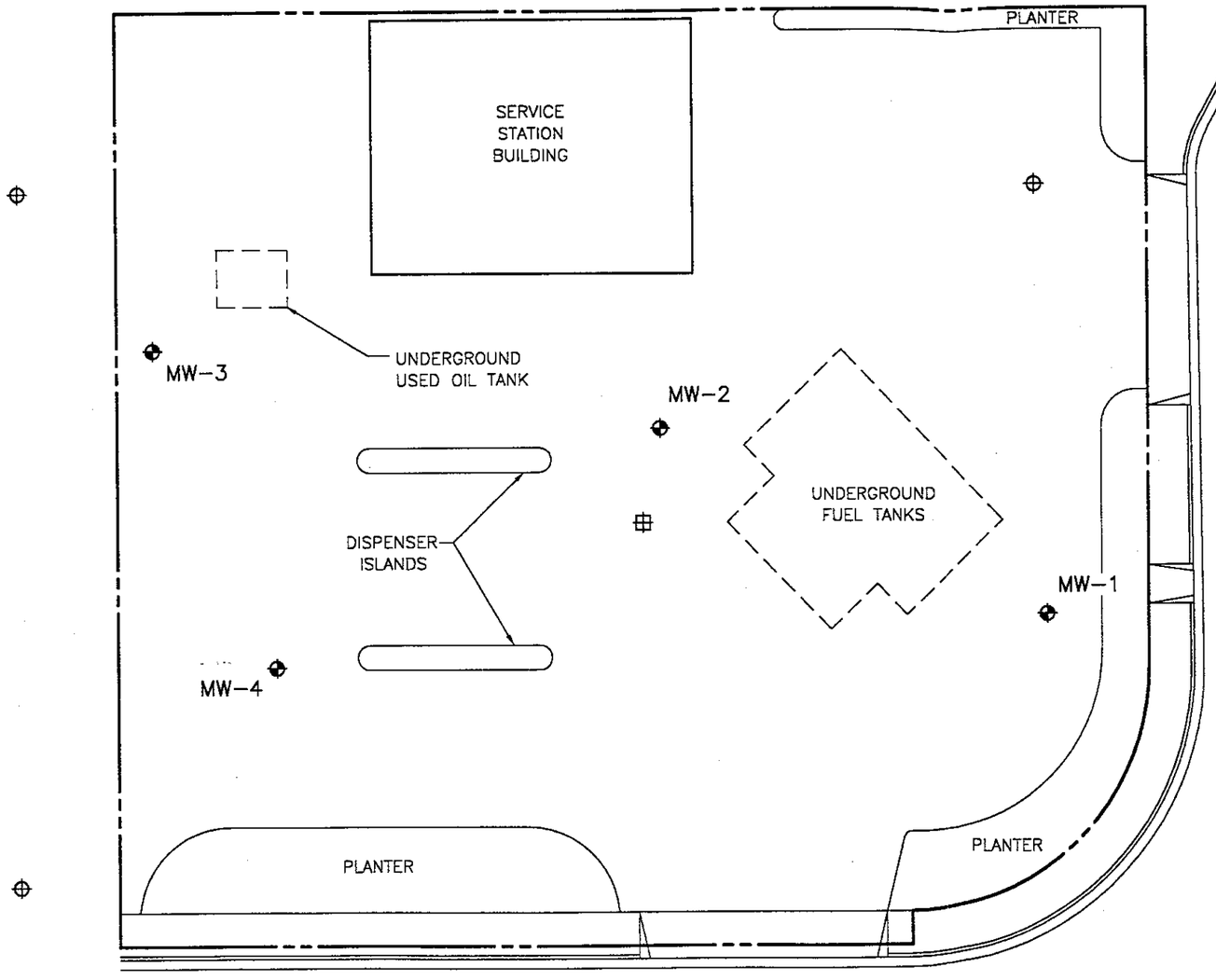
# FIGURE 1

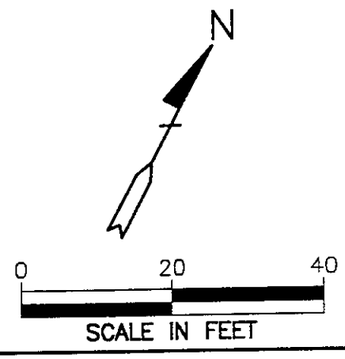
## SITE VICINITY MAP

BP OIL SERVICE STATION NO. 11126
1700 POWELL STREET
EMERYVILLE, CALIFORNIA

ALISTO PROJECT NO. 10-061

ALISTO ENGINEERING GROUP
CONCORD, CALIFORNIA




## LEGEND

- GROUNDWATER MONITORING WELL
- PROPOSED GROUNDWATER MONITORING WELL
- PROPOSED GROUNDWATER RECOVERY WELL

**FIGURE 2**

PROPOSED MONITORING WELL LOCATIONS

BP OIL SERVICE STATION NO. 11126
1700 POWELL STREET
EMERYVILLE, CALIFORNIA

PROJECT NO. 10-061

ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA