BP OIL

BP Oil Company
Environmental Resources Management
Building 13, Suite N
295 SW 41st Street
Renton, Washington 98055-4931
(206) 251-0667

April 22, 1994

Mr. Eddy So
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, CA 94612

RE: BP OIL FACILITY #11126
1700 Powell Street
Emeryville, California

Dear Mr. So:

Attached please find our **SUPPLEMENTAL SITE INVESTIGATION - DATED April 22, 1994** for the above referenced facility.

Please call me at (206) 251-0689 with questions regarding this submission.

Respectfully,

Scott T. Hooton
Group Leader

STH:cj ERM11126

cc: Ms. Susan Hugo, Alameda County Health Care Service Agency, 80 Swan Way, Room 200, Oakland, CA 94621

Mr. Al Sevilla, Alisto, 1777 Oakland Blvd., Suite 200, Walnut Creek, CA 94596

Site file

SUPPLEMENTAL SITE INVESTIGATION REPORT

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

Project No. 10-061

April 1994

SUPPLEMENTAL SITE INVESTIGATION REPORT

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

Project No. 10-061-02

Prepared for:

BP Oil Company
Environmental Resources Management
295 S.W. 41st Street
Building 13, Suite N
Renton, Washington

Prepared by:

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

April 8, 1994

Brady Nagle
Project Manager

Al Sevilla, P.E.
Principal

REGISTERED PROFESSIONAL ENGINEER
ALBERTO SANCHEZ SEVILLA
26392
Exp. Date 2/28/96
CIVIL
STATE OF CALIFORNIA

TABLE OF CONTENTS

1.0 INTRODUCTION

BP Oil Company retained Alisto Engineering Group to conduct a supplemental site investigation at BP Oil Company Service Station No. 11126, 1700 Powell Street, Emeryville, California.

1.1 Purpose and Scope of Work

This work was performed to assess the nature and extent of petroleum hydrocarbons in the subsurface soil and groundwater at the site, and to develop the appropriate courses of action to comply with applicable laws and regulations.

The tasks performed during the investigation included the following:

- Drilled and logged five exploratory soil borings and collected soil samples.
- Installed groundwater Monitoring Wells MW-5 through MW-9.
- Developed and surveyed the monitoring wells and collected groundwater samples.
- Evaluated soil and groundwater samples for specific hydrocarbon constituents.
- Evaluated data and analytical results.
- Prepared this report presenting the findings.

The above tasks and related field and sampling activities were performed in accordance with a work plan submitted to the Alameda County Health Care Services Agency (ACHCSA) and the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB).

1.2 Site Location and Description

BP Oil Company Service Station No. 11126 is on the northwest corner of the intersection of Powell Street and Christie Avenue, Emeryville, California. A site vicinity map is shown in Figure 1. The site is an operating service station with three underground fuel storage tanks and one underground used oil tank. Figure 2 shows the layout of the site and the locations of former and existing underground fuel storage tanks and dispenser islands. The properties in the immediate vicinity of the site are a mixture of industrial and commercial developments.

1.3 Project Background

On April 24, 1989, one 550-gallon used oil underground tank was removed from the site. Soil samples collected from beneath the tank and sidewalls contained up to 340 parts per million (ppm) total oil and grease (TOG), 27 ppm total petroleum hydrocarbons as diesel (TPH-D), and 9.6 ppm total petroleum hydrocarbons as gasoline (TPH-G). The existing used oil tank was installed approximately 20 feet south of the former tank. Soil samples collected before

installing the existing tank, contained up to 10,000 ppm TOG and 370 ppm TPH-D (Kaprealian Engineering, Inc., 1989).

In 1993, BP Oil Company installed Monitoring Wells MW-1 through MW-4 as part of a preliminary site investigation. Laboratory analysis detected TPH-G at concentrations of up to 280 ppm and benzene at concentrations of up to 0.94 ppm in the soil samples collected at depths of up to 5.5 feet below grade in the immediate vicinity of the underground fuel storage tanks and dispenser islands. Dissolved-phase TPH-G at concentrations of up to 12,000 parts per billion (ppb) and benzene at concentrations of up to 3,900 ppb were detected in groundwater samples collected from all the monitoring wells at the site (Alisto Engineering Group, 1993).

1.4 Potential Offsite Sources

The area surrounding the site was historically used for industrial purposes before being developed into a shopping center. The following is a brief description of past land uses that may indicate potential offsite sources of petroleum hydrocarbons in the subsurface soil and groundwater. Figure 3 shows the location of adjacent properties and potential offsite sources of petroleum hydrocarbons and other contaminants described on the following page.

Former Pabco Products Inc.: The property currently occupied by the BP Oil service station was historically used by Pabco Products, Inc. (formerly Parafine Companies Inc.), which manufactured paints, roofing, and floor coverings. Oil was stored in aboveground steel tanks at that time. The manufacturing plant was northeast of the BP Oil site, and the aboveground storage tanks were to the east. Review of historical aerial photographs indicates that the Pabco Products, Inc. facility was demolished by 1964.

Former Auto Freight Depot: The former depot was on the southeast corner of the intersection of Powell Street and Shellmound Road, approximately 450 feet west of the BP Oil service station.

Former Truck Repair Shop: The former repair shop was south of the former Auto Freight Depot and approximately 480 feet east-southeast of the BP Oil site. Diesel and gasoline were stored in aboveground storage tanks at this site.

Pacific Intermountain Express Truck Terminal (PIE): The former truck terminal was approximately 440 feet southwest of the BP Oil site. The terminal was in operation from 1944 to 1986, when Powell Street Plaza, a commercial development, was built. Aboveground petroleum storage tanks were reported to be onsite in 1944 by the Properties Department of PIE. In 1972, an underground gasoline storage tank was replaced under the supervision of the Environmental Protection Agency (EPA). The soil was visibly contaminated but no remedial action was requested by the EPA at that time. In July 1986, eight underground tanks containing diesel, gasoline, motor oil, used oil, gear oil, and grease were removed from the site (Blymyer Engineers, Inc., 1989).

There are at least 21 groundwater monitoring and recovery wells installed at this site. Free product at thicknesses of up to 1.08 feet was observed in six wells in April 1993 (PES Environmental, Inc., 1993).

2.0 FIELD METHODS

The procedures and methods used during field activities are as described in the following sections:

2.1 Drilling and Sampling

Drilling permits were acquired from the Alameda County Flood Control and Water Conservation District and an encroachment permit was acquired from the City of Emeryville, copies of which are presented in Appendix A. On September 2 and 3, 1993, Borings MW-5 through MW-9 were drilled at the site to a depth of up to 14 feet below grade. Drilling was performed by Soils Exploration Services of Vacaville, California, using a CME 75 drilling rig equipped with 8- and 10-inch-diameter hollow-stem augers. Drilling and soil sampling procedures are presented in Appendix B.

Boring logs were prepared using the Unified Soils Classification System. They include a description of soil characteristics such as color, moisture, and consistency. The boring logs are presented in Appendix C.

2.2 Monitoring Well Installation and Construction

On September 2 and 3, 1993, the five soil borings were converted into Monitoring Wells MW-5 through MW-9 in accordance with the field procedures for groundwater monitoring well installation presented in Appendix B. Monitoring Wells MW-5 through MW-8 were constructed using 2-inch-diameter, flush-threaded, Schedule 40, polyvinyl chloride blank casing and 0.010-inch slotted casing. Monitoring Well MW-9 was constructed using 4-inch-diameter, flush-threaded, Schedule 40, polyvinyl chloride blank casing and 0.010-inch slotted casing. The slotted casing was installed from approximately 3-1/2 to 14 feet below grade in each well. Well construction details are included on the boring logs presented in Appendix C.

2.3 Monitoring Well Development and Sampling

Well development and sampling procedures were conducted in accordance with the guidelines of the ACHCSA and RWQCB. Field procedures for groundwater monitoring well development and sampling are presented in Appendix D. Wells were developed on September 8, 1993, by removing at least 10 casing volumes, and until groundwater was relatively free of sediment, by using a bailer.

Monitoring Wells MW-1 through MW-9 were sampled on September 12 and 13, 1993. The wells were purged of at least 3 well casing volumes before sample collection and while monitoring pH, specific conductivity, and temperature.

The samples were then transported in an iced cooler to a state-certified laboratory following proper chain of custody procedures. Field observations during well development and sampling are presented in the sampling forms in Appendix E.

2.4 Groundwater Level Monitoring and Well Surveying

The wells were surveyed to the top of each well casing in reference to an established benchmark with an elevation of 8.11 feet above mean sea level. On September 12, 1993, the depth to groundwater in the wells was measured from the top of the casing to the nearest 0.01 foot, using an electronic sounder. The survey data and relative groundwater elevation measurements are presented in Table 1. The well elevation survey map is included in Appendix D, and a graphical interpretation of the groundwater gradient beneath the site is shown in Figure 4.

3.0 SITE GEOLOGY AND HYDROGEOLOGY

The BP Oil site is in Emeryville, California, to the east of San Francisco Bay. Emeryville is situated in the Coastal Range geomorphic province, characterized by northwesterly-trending mountains and valleys. San Francisco Bay occupies a Pliocene structural depression that has been flooded several times by Pleistocene glacial cycles. The San Francisco Bay Area is underlain by Late Pliocene-Early Pleistocene alluvial sediment. The upper 500 feet of this coarse, poorly-sorted sediment is derived mainly from the Sacramento-San Joaquin drainage system. The recent sediment load in this system has been greatly increased by hydraulic mining and farming. Bay mud, the youngest deposit in San Francisco Bay, is a soft, unconsolidated sediment generally consisting of 90 percent clay and silt-size detritus and is prevalent in the area (Page, Ben M., 1966).

The site is on a reclaimed portion of the upper subaqueous silty clay zone of San Francisco Bay (USGS Topographic Map, 1913). Soil types encountered in the borings generally consisted of imported fill material of sand, silt, clay, and manmade debris to approximately 13 feet below grade underlain by silty clay to the total depth of each boring. The site is approximately 8 feet above mean sea level. The topography of the surrounding area slopes gently to the west, toward San Francisco Bay.

Hydrogeologic cross sections were prepared using boring logs created during this and previous investigative activities. The selected cross sections are shown in Figure 5. Soil encountered in the borings does not appear to be contiguous across the site.

During drilling and sampling, groundwater was encountered and stabilized at approximately 6.5 feet below grade. Groundwater elevations in all the wells, measured on September 12, 1993, were used to develop the groundwater potentiometric surface maps shown in Figure 4. The groundwater gradient as interpreted from these measurements ranges from 0.005 to 0.025 foot per foot across the site in a general southwesterly direction.

4.0 ANALYTICAL METHODS

Pace, Inc., a state-certified analytical laboratory, analyzed the soil and groundwater samples using standard test methods of the U.S. Environmental Protection Agency EPA and the California Department of Health Services.

Selected soil and groundwater samples were analyzed for the following:

- TPH-G using EPA Methods 5030/8015
- Benzene, toluene, ethylbenzene, and total xylenes (BTEX) constituents using EPA Methods 5030/8020

Additionally, the water sample collected from the monitoring well near the used oil tank was analyzed for the following:

- Total oil and grease (TOG) using the LUFT Method (SM5520)
- Total petroleum hydrocarbons as diesel (TPH-D) using EPA Methods 3510/8015
- Halogenated volatile organic compounds (HVOCs) using EPA Method 8010

The laboratory results are summarized in Tables 1 and 2, and the official laboratory reports and chain of custody records are included in Appendix F. Isoconcentration contour maps of TPH-G and benzene in the groundwater are shown in Figures 6 and 7.

5.0 DISCUSSION OF RESULTS

The following are the results of field activities and laboratory analysis of the soil and groundwater samples collected during this investigation:

- Saturated soil conditions encountered during drilling and sampling were noted at approximately 6.5 feet below grade, and the depth to groundwater measured in the monitoring wells was approximately 7 feet below grade.
- Soil types encountered in the borings generally consisted of sand, silt, clay, and manmade debris used as fill material during the land reclamation of San Francisco Bay to approximately 13 feet below grade underlain by silty clay.
- Analysis of soil samples collected from Borings MW-5 and MW-9 at 4.5 feet below grade detected up to 4,600 ppm TPH-G and 76 ppm benzene.
- Free product at a thickness of 0.08 foot was observed in Monitoring Well MW-9. A product recovery canister was installed in MW-9 on October 25, 1993.
- Groundwater elevation data indicate a gradient ranging from 0.005 to 0.025 foot per foot in a southwesterly direction across the site.

- Dissolved-phase petroleum hydrocarbons were detected in groundwater samples collected from six of the nine wells at concentrations of up to 4,500 ppb TPH-G and 3,400 ppb benzene.

- Chemical analysis of the groundwater sample collected from Monitoring Well MW-3, near the used oil tank, detected 2,100 ppb TPH-D. TOG and HVOCs were not detected above the reported detection limits.

- The lateral extent of the dissolved-phase hydrocarbon plume appears to be defined except to the northeast and southeast of the BP Oil site.

- Review of past uses of the BP Oil site and adjacent properties indicates other potential sources of petroleum hydrocarbons in the soil and groundwater in the general vicinity of the site.

REFERENCES

Alisto Engineering Group, 1993. Preliminary Site Assessment Report. January.

Blymyer Engineers, Inc., 1989. Subsurface Investigation of Pacific Intermountain Express Truck Terminal, Emeryville, California.

Kaprealian Engineering, Inc., 1989. Soil Sampling Report. Mobil Service Station #10-LTV, 1700 Powell Street, Emeryville, California. May 10.

Page, Ben M., 1966. Geology of the Coastal Ranges of California. In Geology of Northern California. California Division of Mines and Geology, Bulletin 190, pp. 255-276.

PES Environmental, Inc., 1993. Recommended Scope of Work for Investigation and Remediation Program - Powell Street Plaza (Former Pacific Intermountain Express Truck Terminal), Emeryville, California. August 2.

TABLES

TABLE 1 - SUMMARY OF RESULTS OF GROUNDWATER SAMPLING
BP OIL COMPANY SERVICE STATION NO. 11126
1700 POWELL STREET, EMERYVILLE, CALIFORNIA

ALISTO PROJECT NO. 10-061

WELL ID	DATE OF SAMPLING/ MONITORING	CASING ELEVATION (a) (Feet)	DEPTH TO WATER (Feet)	PRODUCT THICKNESS (Feet)	GROUNDWATER ELEVATION (b) (Feet)	TPH-G (ppb)	TPH-D (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	TOG (ppb)	HVOC (ppb)	LAB
MW-1	11/04/92	7.76	4.96	—	2.80	5300	—	1100	480	ND<0.5	1500	—	—	PACE
MW-1	10/12/93	7.76	5.26	—	2.50	3600	—	970	71	100	550	—	—	PACE
MW-2	11/04/92	8.56	5.88	—	2.68	12000	—	3900	1300	ND<0.5	2300	—	—	PACE
QC-1 (c)	11/04/92	8.56	5.88	—	2.68	12000	—	3200	980	ND<0.5	1900	—	—	PACE
MW-2	10/12/93	8.56	6.29	—	2.27	4500	—	3400	180	230	940	—	—	PACE
MW-3	11/04/92	8.25	6.38	—	1.87	200	690	1.6	ND<0.5	ND<0.5	1.1	ND<5000	ND (d)	PACE
MW-3	10/12/93	8.25	5.84	—	2.41	270	2100	5.0	0.7	ND<0.5	2.6	ND<5000	ND (d)	PACE
QC-1 (c)	10/12/93	8.25	5.84	—	2.41	150	—	5.6	0.6	ND<0.5	1.6	—	—	PACE
MW-4	11/04/92	8.12	6.66	—	1.46	340	—	4.5	ND<0.5	4.3	ND<0.5	—	—	PACE
MW-4	10/12/93	8.12	6.87	—	1.25	160	—	5.8	1.4	0 8	2.7	—	—	PACE
MW-5	10/12/93	7.69	6.01	—	1.68	—	—	—	—	—	—	—	—	—
MW-5	10/13/93	—	—	—	—	2300	—	160	10	ND<0.5	26	—	—	PACE
MW-6	10/12/93	8.52	6.59	—	1.93	63	—	ND<0.5	ND<0.5	ND<0.5	ND<0.5	—	—	PACE
MW-7	10/12/93	7.61	6.14	—	1.47	ND<50	—	ND<0.5	ND<0.5	ND<0.5	0.7	—	—	PACE
MW-8	10/12/93	8.60	5.86	—	2.74	ND<50	—	ND<0.5	ND<0.5	ND<0.5	ND<0.5	—	—	PACE
MW-9 (e)	10/12/93	8.08	5.66	0.08	2.48	—	—	—	—	—	—	—	—	—
QC-2 (f)	11/05/92	—	—	—	—	ND<50	—	ND<0.5	ND<0.5	ND<0.5	ND<0 5	—	—	PACE
QC-2 (f)	10/12/93	—	—	—	—	ND<50	—	ND<0.5	ND<0.5	ND<0.5	ND<0.5	—	—	PACE

ABBREVIATIONS:

TPH-G	Total petroleum hydrocarbons as gasoline
TPH-D	Total petroleum hydrocarbons as diesel
B	Benzene
T	Toluene
E	Ethylbenzene
X	Total xylenes
TOG	Total oil and grease
HVOC	Halogenated volatile organic compounds
ppb	Parts per billion
ND	Not detected above reported detection limit
—	Not analyzed/measured
Pace	Pace, Inc.

NOTES:

(a) Top of casing elevations surveyed relative to an established benchmark with an elevation of 8.11 feet above mean sea level.

(b) Groundwater elevations in feet above mean sea level.

(c) Blind duplicate.

(d) Various detection limits; see laboratory report.

(e) Not sampled due to presence of free product.

(f) Travel blank.

TABLE 2 - SUMMARY OF RESULTS OF SOIL SAMPLING AND ANALYSIS
BP OIL COMPANY SERVICE STATION NO. 11126
1700 POWELL STREET, EMERYVILLE, CALIFORNIA

ALISTO PROJECT NO. 10-061

WELL ID	SAMPLE DEPTH (Feet)	DATE OF SAMPLING	TPH-G (ppm)	TPH-D (ppm)	B (ppm)	T (ppm)	E (ppm)	X (ppm)	HVOC (ppm)	TOG (ppm)	LAB
MW-1	4	10/20/92	32	---	0.94	1.8	0.53	2.2	---	---	PACE
MW-2	5	10/20/92	2.6	---	0.019	0.13	0.06	0.3	---	---	PACE
MW-3	7	10/20/92	ND<1.0	ND<5.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND (a)	ND<50	PACE
MW-4	5.5	10/20/92	280	---	0.42	0.58	3.8	1.6	---	---	PACE
MW-5	4.5	09/02/93	2.5	---	0.087	0.0059	0.0067	0.028	---	---	PACE
MW-6	4.5	09/02/93	ND<1.0	---	ND<0.005	ND<0.005	ND<0.005	ND<0.005	---	---	PACE
MW-7	4.5	09/03/93	ND<1.0	---	ND<0.005	ND<0.005	ND<0.005	ND<0.005	---	---	PACE
MW-8	5	09/03/93	ND<1.0	---	ND<0.005	ND<0.005	ND<0.005	ND<0.005	---	---	PACE
MW-9	4.5	09/03/93	4600	---	76	330	130	420	---	---	PACE

ABBREVIATIONS:

TPH-G	Total petroleum hydrocarbons as gasoline
TPH-D	Total petroleum hydrocarbons as diesel
B	Benzene
T	Toluene
E	Ethylbenzene
X	Total xylenes
HVOC	Halogenated volatile organic compounds
TOG	Total oil and grease
ppm	Parts per million
---	Not analyzed
PACE	Pace, Inc.
ND	Not detected above reported detection limit

NOTES:

(a) Various detection limits; see laboratory reports.

FIGURES

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

N

0 1000' 2000'

FIGURE 1

SITE VICINITY MAP

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

PROJECT NO. 10--061

ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA

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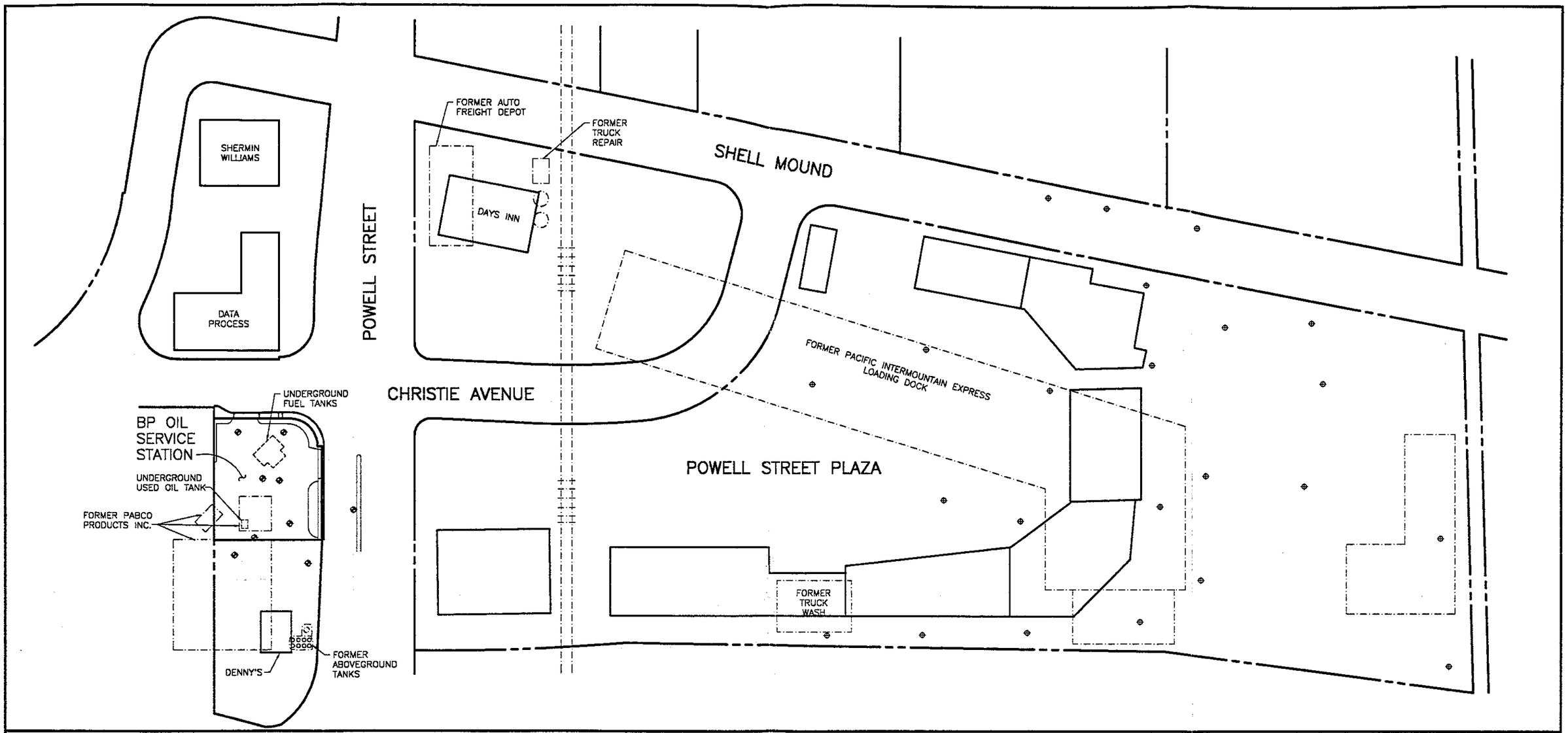

LEGEND

- ◆ WELLS INSTALLED DURING INVESTIGATION OF BP OIL SERVICE STATION NO. 11126 1700 POWELL STREET, EMERYVILLE, CA.
- ◆ WELLS INSTALLED DURING INVESTIGATION OF PACIFIC INTERMOUNTAIN EXPRESS SITE
- – – – FORMER STRUCTURES

N

0 120 240

SCALE IN FEET

FIGURE 3

POTENTIAL OFFSITE SOURCES MAP

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

PROJECT NO. 10-061

ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA

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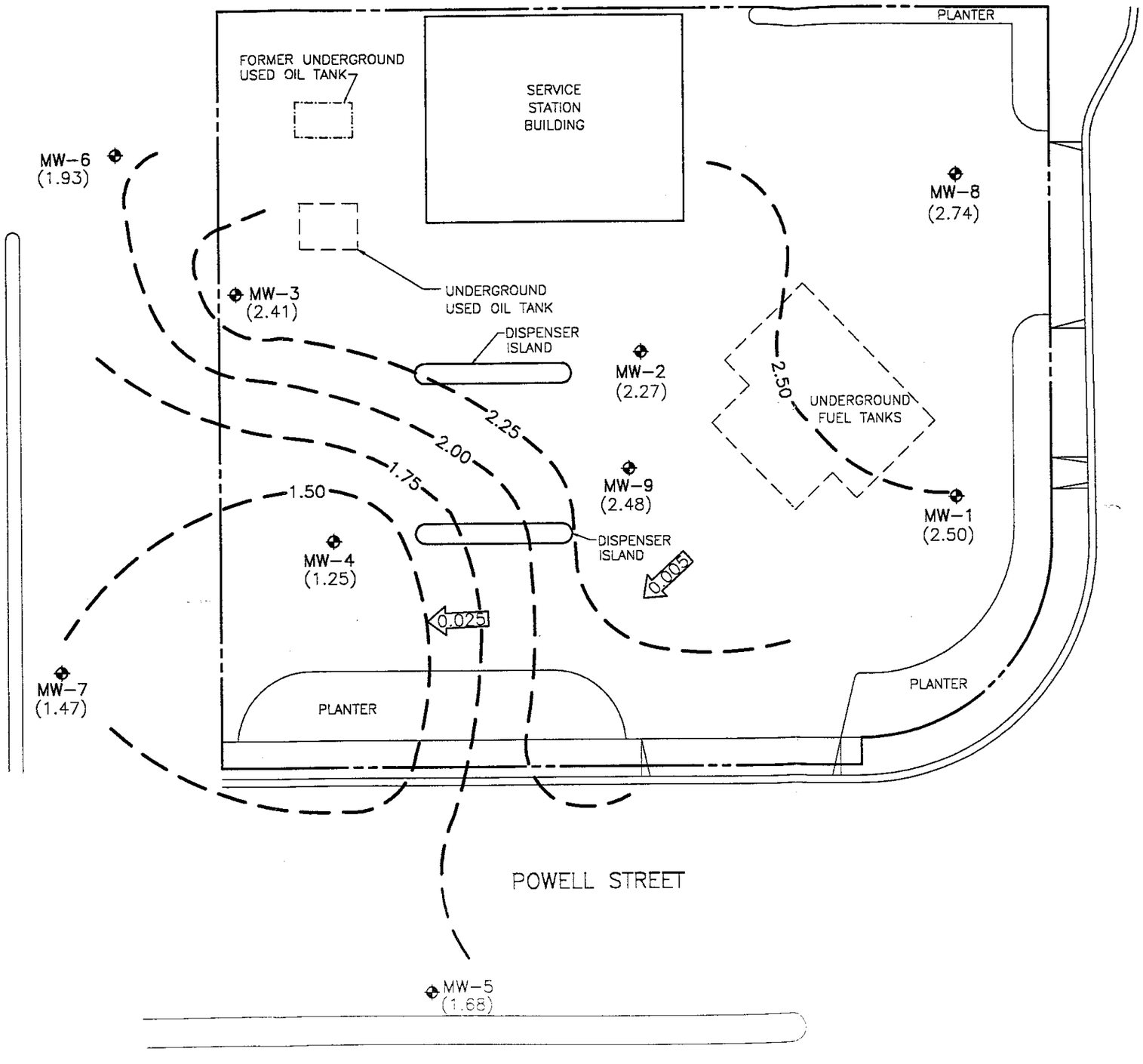


N

0 20 40

SCALE IN FEET

LEGEND

- ⊕ GROUNDWATER MONITORING WELL
- (2.74) GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL
- 2.50 GROUNDWATER ELEVATION CONTOUR IN FEET ABOVE MEAN SEA LEVEL (CONTOUR INTERVAL–0.25 FOOT)
- 0.005 CALCULATED GROUNDWATER GRADIENT DIRECTION AND MAGNITUDE IN FOOT PER FOOT

FIGURE 4

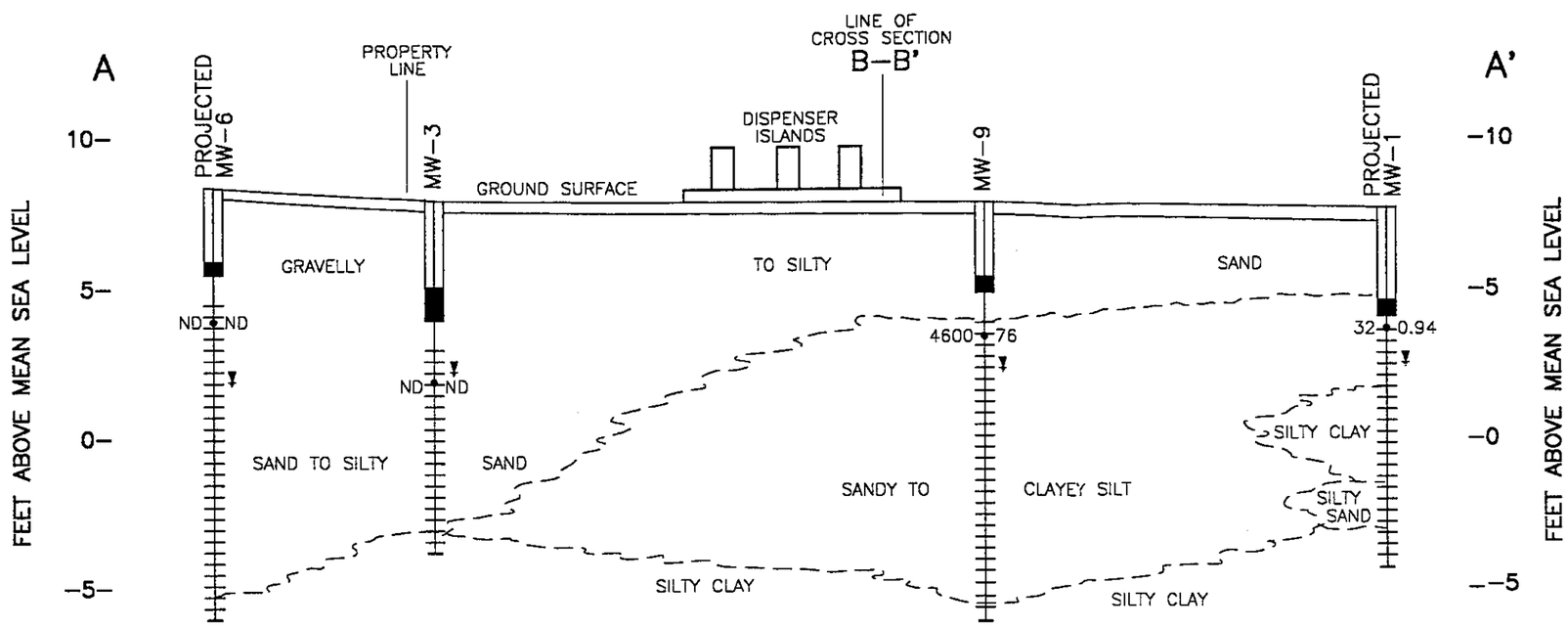
POTENTIOMETRIC GROUNDWATER ELEVATION CONTOUR MAP

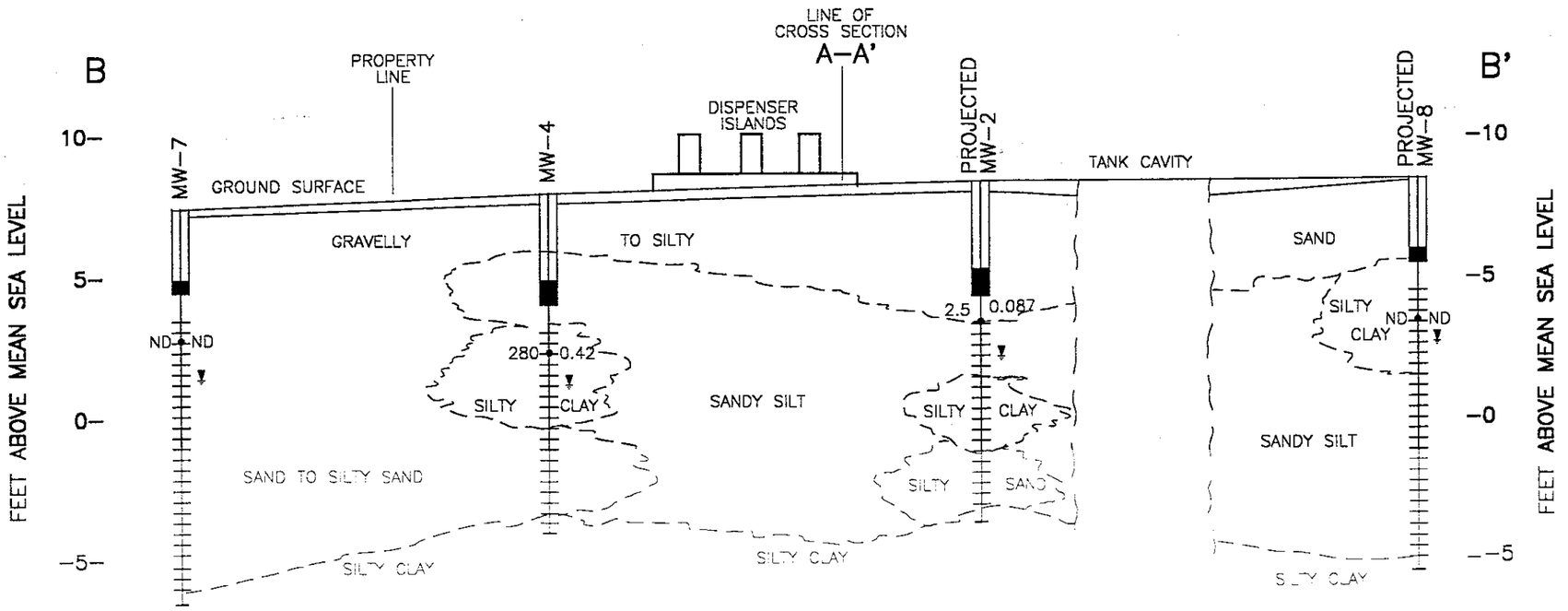
OCTOBER 12, 1993

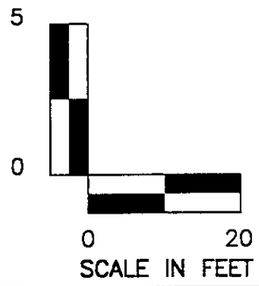
BP OIL SERVICE STATION NO. 11126
1700 POWELL STREET
EMERYVILLE, CALIFORNIA

PROJECT NO. 10–061

ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA







LEGEND

- GROUNDWATER MONITORING WELL SHOWING SEAL, BENTONITE AND SCREENED INTERVAL
- GEOLOGIC CONTACT
- 4600 • SOIL SAMPLE AND TOTAL PETROLEUM HYDROCARBONS AS GASOLINE CONCENTRATION IN PARTS PER MILLION
- • 76 SOIL SAMPLE AND BENZENE CONCENTRATION IN PARTS PER MILLION
- ND NOT DETECTED ABOVE REPORTED DETECTION LIMIT
- ▼ GROUNDWATER ELEVATION AS MEASURED ON OCTOBER 12, 1993

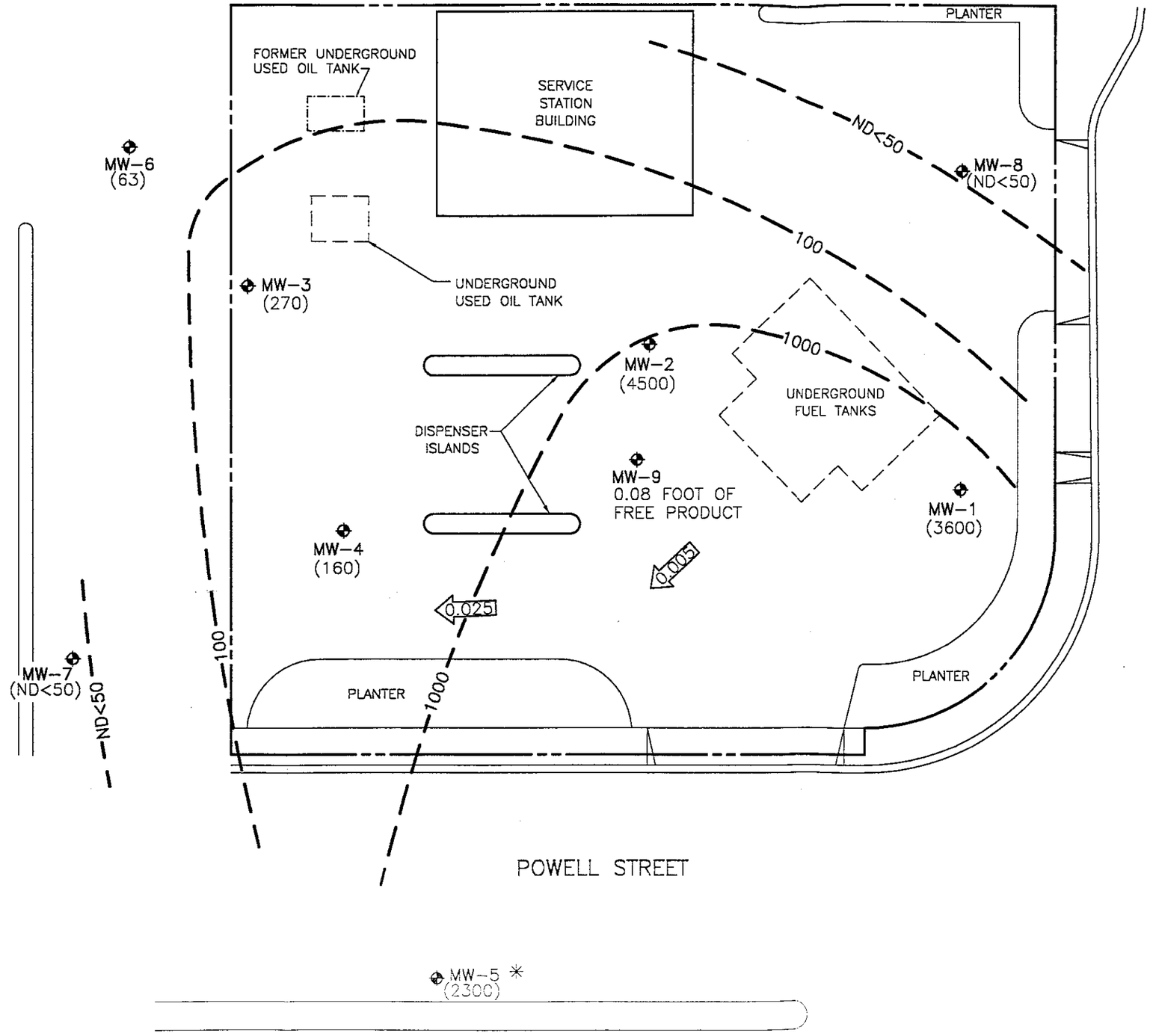
FIGURE 5

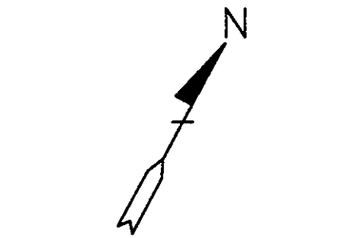
HYDROGEOLOGIC CROSS SECTIONS A–A' AND B–B'

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

PROJECT NO. 10–061

ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA





LEGEND

- ◆ GROUNDWATER MONITORING WELL
- (4500) TOTAL PETROLEUM HYDROCARBONS AS GASOLINE CONCENTRATION IN PARTS PER BILLION
- 1000 TOTAL PETROLEUM HYDROCARBONS AS GASOLINE ISOCONCENTRATION CONTOUR IN PARTS PER BILLION
- 0.005 CALCULATED GROUNDWATER GRADIENT DIRECTION AND MAGNITUDE IN FOOT PER FOOT
- * SAMPLED ON OCTOBER 13, 1993

FIGURE 6

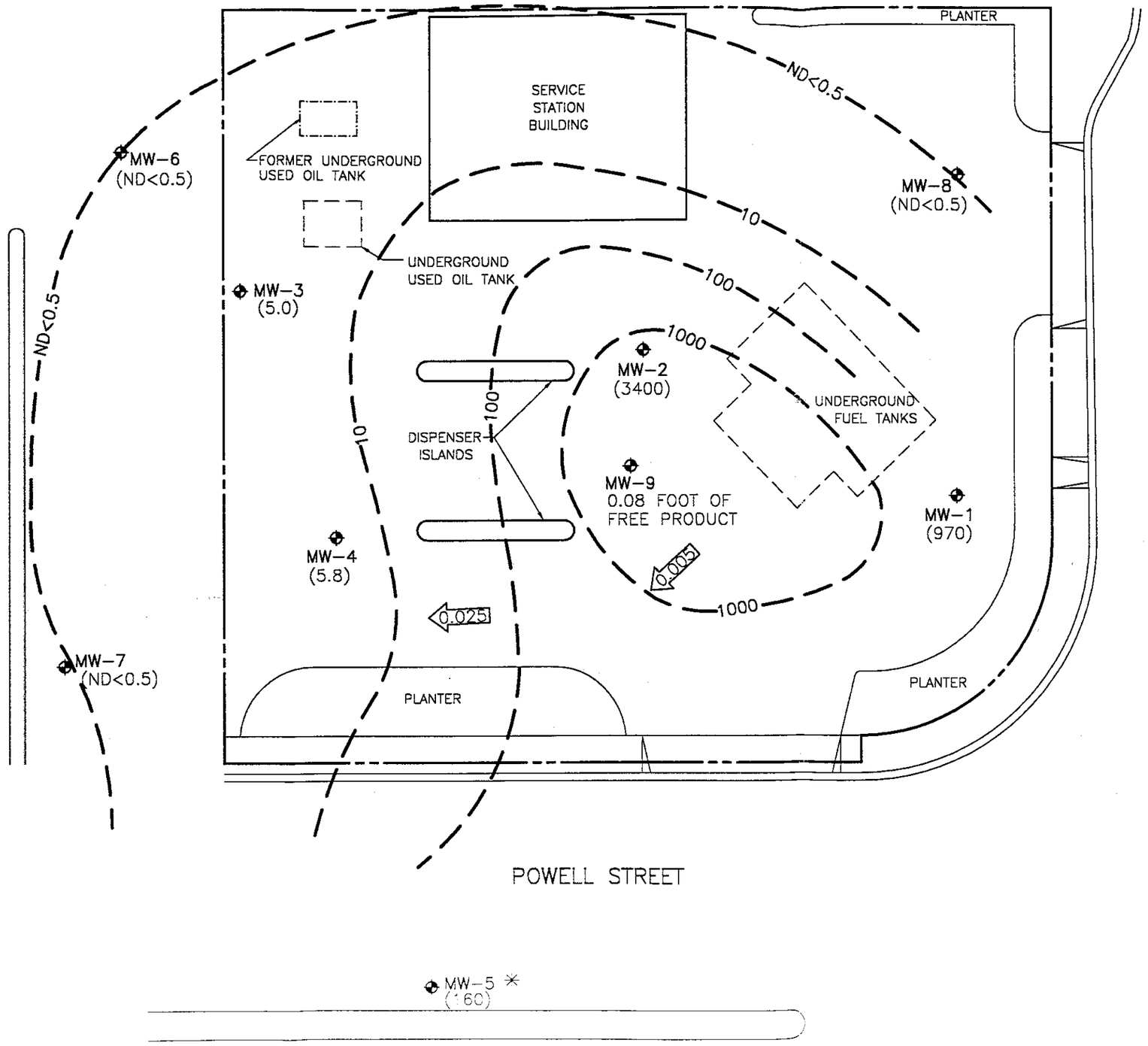
TOTAL PETROLEUM HYDROCARBONS AS GASOLINE ISOCONCENTRATION MAP

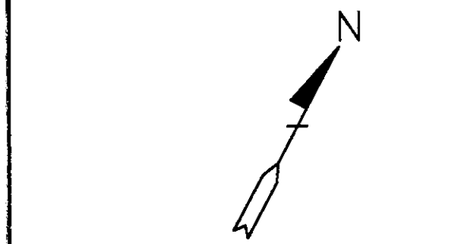
OCTOBER 12, 1993

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

PROJECT NO. 10-061

ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA





LEGEND

- ◆ GROUNDWATER MONITORING WELL
- (3400) BENZENE CONCENTRATION IN PARTS PER BILLION
- 1000 BENZENE ISOCONCENTRATION CONTOUR IN PARTS PER BILLION
- 0.005 CALCULATED GROUNDWATER GRADIENT DIRECTION AND MAGNITUDE IN FOOT PER FOOT
- ✳ SAMPLED ON OCTOBER 13, 1993

FIGURE 7

BENZENE ISOCONCENTRATION CONTOUR MAP

OCTOBER 12, 1993

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

PROJECT NO. 10-061

ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA

10020F-11.DWG 12-28-93 RKW 1:20

APPENDIX A

PERMITS

ZONE 7 WATER AGENCY

5997 PARKSIDE DRIVE PLEASANTON, CALIFORNIA 94588 VOICE (510) 484-2600
FAX (510) 462-3914

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT 1700 Powell St.
Emeryville CA

CLIENT
Name BP Oil Company
Address 16400 Southcenter (301) Voice
City Tukwila CA Zip 98188

APPLICANT
Name Ted Moise
Alisto Fax 295-1823
Address 1777 Oakland blvd. 200 Voice 295-1650
City Walnut Creek CA Zip 94596

TYPE OF PROJECT
Well Construction
- Cathodic Protection ___
- Water Supply ___
- Monitoring ✓

Geotechnical Investigation
- General ___
- Contamination ___
- Well Destruction ___

PROPOSED WATER SUPPLY WELL USE
Domestic ___ Industrial ___ Other ___
Municipal ___ Irrigation ___

DRILLING METHOD:
Mud Rotary ___ Air Rotary ___ Auger ✓
Cable ___ Other ___

DRILLER'S LICENSE NO. C57-610487

WELL PROJECTS
- Drill Hole Diameter 8 in.
- Casing Diameter ~~2~~ 4 in.
- Surface Seal Depth ~5 ft.
- Maximum Depth 25 ft.
- Number 5

GEOTECHNICAL PROJECTS
- Number of Borings ___
- Hole Diameter ___ in.
- Maximum Depth ___ ft.

ESTIMATED STARTING DATE 5/21/93
ESTIMATED COMPLETION DATE ___

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE Ted Moise Date 4/21/93

FOR OFFICE USE

PERMIT NUMBER 93210
LOCATION NUMBER ___

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well Projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

(B.) WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

E. WELL DESTRUCTION. See attached.

Approved Wyman Hong
Wyman Hong
Date 27 Apr 93

91992

PERMIT TO EXCAVATE IN CITY STREETS

DEPARTMENT OF PUBLIC WORKS
CITY OF EMERYVILLE
12TH FLOOR
2200 POWELL ST., EMERYVILLE, CA 94608
(9-87 THIS SUPERCEDES ALL PREVIOUS FORMS)

NO. 93-8-2

DATE 8-11-93

COMPANY Alisto Engineering Group Ted Moise

ADDRESS 1777 Oakland Blvd Suite 200 Walnut Creek, CA 94596 PHONE (510) 295-1650

LOCATION OF WORK 1700 Powell St. Emeryville, CA

PLANNED DATE OF COMMENCEMENT 8/20/93

PLANNED DATE OF COMPLETION 8/20/93

DESCRIPTION OF WORK Install groundwater monitoring well.

☒ 24 HR. NOTICE PRIOR START OF WORK

☐ PLAN REQUIRED

☐ MONUMENTS TO BE REPLACED

REMARKS

NOTE: IF SUBCONTRACTOR IS TO DO WORK, PROOF OF ADEQUATE INSURANCE MUST BE PRESENTED PRIOR TO START OF WORK OR THIS PERMIT IS VOID.

Juan C. Arauz

(For) CITY ENGINEER

APPENDIX B

FIELD PROCEDURES FOR DRILLING AND SAMPLING AND GROUNDWATER MONITORING WELL INSTALLATION

FIELD PROCEDURES
FOR
DRILLING AND SAMPLING
AND GROUNDWATER MONITORING WELL INSTALLATION

Soil Boring Drilling Procedures

The soil borings were drilled using 8- and 10-inch-diameter, continuous-flight, hollow-stem augers. To avoid cross-contamination, drilling equipment in contact with potentially contaminated material was decontaminated by steam cleaning before and after each use. Decontamination fluids were placed into properly-labeled Department of Transportation approved drums for disposal.

Soil Sampling Procedures

During drilling, samples were collected beginning at 5 feet below grade and terminating at the total depth of each boring. Before and after each use, the sampler was washed using a phosphate-free detergent followed by tap water and deionized water rinses. Soil sampling was accomplished using a California-modified split-spoon sampler lined with appropriately-sized brass tubes. A 140-pound slide hammer falling 30 inches was used to advance the sampler 18 inches ahead of the hollow-stem augers into undisturbed soil, and blow counts were recorded for every 6 inches of penetration to evaluate the consistency of the soil.

After retrieval from the augers, the sampler was split, the sample tubes removed, and a soil sample was selected for possible chemical analysis. The sample was retained within the brass tube, and both ends were immediately covered with Teflon sheeting and polyurethane caps. The caps were sealed with tape and labeled with the following information: Alisto Engineering project number, boring number, sample depth interval, sampler's initials, and date of collection. The soil sample was immediately placed in a waterproof plastic bag and stored in an ice chest containing blue or dry ice. Possession of the soil samples was documented from the field location to the state-certified analytical laboratory by using a chain of custody form.

Soil samples and drill cuttings, when appropriate, were described by Alisto Engineering personnel using the Unified Soils Classification System, and field estimates of soil type, color, moisture, density, and consistency were noted on the boring logs. The logs were reviewed by a civil engineer registered in the State of California.

Groundwater Monitoring Well Installation

Construction of the groundwater monitoring wells was based on the stratigraphy in the soil borings. The well construction materials were introduced into the boring through the hollow-stem augers to centralize the well casing and minimize the possibility of native material entering the annular space of the well.

The 2- and 4-inch-diameter polyvinyl chloride well casing consisted of 0.010-inch slotted casing from the bottom of the boring to a depth interval above the highest anticipated water level, and solid casing was installed from the top of the slotted casing to approximately

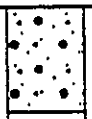
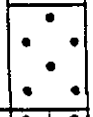
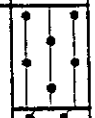
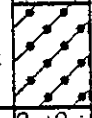
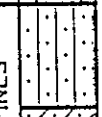
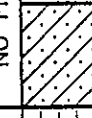
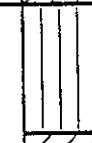
1 foot above grade. The casings, fittings, screens, and other well construction components were steam cleaned before installation.

The annular space surrounding the screened portion was backfilled with No. 2/12 Lonestar sand (filter pack) to approximately 1 foot above the top of the screened section. An approximately 1-foot-thick interval of bentonite pellets was added to the annulus above the filter pack and hydrated with approximately 5 gallons of deionized water to minimize intrusion of well seal into the filter pack. The remaining annulus was sealed with a neat cement grout to the surface. A traffic-rated utility box was installed around the top of the well casing and set in concrete. An expanding, watertight well cap and lock were installed on the top of the well casing to secure the well from surface fluid and tampering.

APPENDIX C

BORING LOGS AND WELL CONSTRUCTION DETAILS

GEOLOGIC LEGEND

COARSE-GRAINED SOILS	GRAVELS more than 1/2 of coarse fraction > No. 4 Sieve	LITTLE OR NO FINES		GW	Well-graded gravels, gravel-sand mixtures, little or no fines
				GP	Poorly-graded gravels, gravel-sand mixtures
		APPRECIABLE NO FINES		GM	Silty gravels, gravel-sand-silt mixtures
				GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS more than 1/2 of coarse fraction < No. 4 Sieve	LITTLE OR NO FINES		SW	Well-graded sands, gravelly sands, little or no fines
				SP	Poorly-graded sands, gravelly sands, little or no fines
		APPRECIABLE NO FINES		SM	Silty sands, sand-silt mixtures
				SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS	SILTS AND CLAYS Liquid limit < 50			ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
				CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays

SYMBOL LEGEND:

 Cement

 Sand

 Bentonite Pellets

 Driven Interval of Soil Sample

 Sample preserved for possible analysis

 Stabilized water level

 Groundwater level encountered during drilling

LEGEND TO BORING LOGS

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

PROJECT NO. 10-061

GEO-LEG DWG 10-13-93 RKW 1=1

ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA

LOG OF BORING B-2/MW-1

SEE SITE PLAN

ALISTO PROJECT NO: 10-081 DATE DRILLED: 10/20/92

CLIENT: BP Oil Company

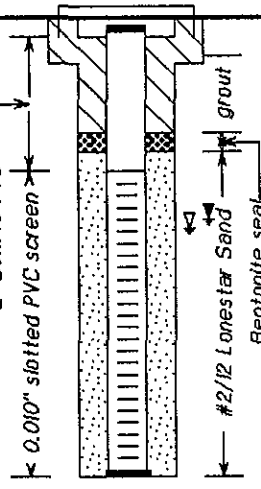
LOCATION: 1700 Powell Street, Emeryville, California

DRILLING METHOD: Hollow-stem Auger (8")

DRILLING COMPANY: Great Sierra Exploration CASING ELEVATION: 7.78 ' MSL

LOGGED BY: Ted Moise APPROVED BY: Al Sevilla

BLOWS/6 IN.	PID VALUES	WELL DIAGRAM	DEPTH feet	SAMPLES	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
						SW	3" Asphalt. gravelly SAND: brown/green, damp, very loose; medium- to very coarse-grained sand; abundant rounded gravel to 1".
9	47					ML	sandy SILT: gray/blue, damp, soft; abundant very fine-grained sand; minor clay.
1,1,1			5			CL	silty CLAY: dark gray, wet, very soft; abundant silt; very fine- to medium-grained sand; minor rounded gravel to 1".
						SM	silty SAND: blue/gray, wet, very loose; very fine- to fine-grained sand; minor clay.
2,3,3			10			CL	silty CLAY: blue/green, wet, medium firm; minor very fine-grained sand.
			15				
			20				
			25				
			30				



Groundwater Monitoring Well MW-1 was installed in Soil Boring B-2. Soil Boring B-2 was drilled within 3 feet of Soil Boring B-1. Soil classification/contacts, PID readings, and blow counts presented on this boring log were copied from Soil Boring B-1.

ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA

LOG OF BORING B-3/MW-2

SEE SITE PLAN

ALISTO PROJECT NO: *10-081* DATE DRILLED: *10/20/92*

CLIENT: *BP Oil Company*

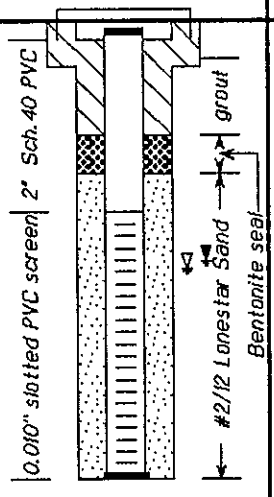
LOCATION: *1700 Powell Street, Emeryville, California*

DRILLING METHOD: *Hollow-Stem Auger (8")*

DRILLING COMPANY: *Great Sierra Exploration* CASING ELEVATION: *8.56 ' MSL*

LOGGED BY: *Ted Moise* APPROVED BY: *Al Seville*

BLOWS/6 IN.	PID VALUES	WELL DIAGRAN	DEPTH feet	SAMPLES	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
						SW	3" Asphalt. gravelly SAND: brown, damp, loose; fine- to very coarse-grained sand; gravel to 1"; minor fines.
1,3,3	288		5			ML	sandy SILT: black, moist to wet, medium firm; very fine- to medium-grained sand; minor clay.
1,3,3						CL	silty CLAY: gray, wet, medium firm; minor very fine- to fine-grained sand; minor angular gravel to 1/2".
5,3,4			10			SM	silty SAND: gray, wet, loose; very fine- to medium-grained sand; minor clay.
4,3,4						CL	silty CLAY: blue/green, wet, medium firm; minor silt; rootlets.
			15				
			20				
			25				
			30				



ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA

LOG OF BORING B-4/MW-3

SEE SITE PLAN

ALISTO PROJECT NO: 10-061 DATE DRILLED: 10/20/92

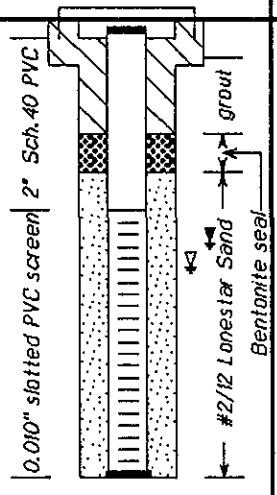
CLIENT: BP Oil Company

LOCATION: 1700 Powell Street, Emeryville, California

DRILLING METHOD: Hollow-Stem Auger (8")

DRILLING COMPANY: Great Sierra Exploration CASING ELEVATION: 8.25 ' MSL

LOGGED BY: Ted Moise APPROVED BY: Al Sevilla

BLOWS/6 IN.	PID VALUES	WELL DIAGRAM	DEPTH feet	SAMPLES	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
						SW	3" Asphalt. gravelly SAND: tan, damp, loose; medium- to very coarse-grained sand; gravel to 1". Concrete in cuttings.
50/5"			5			SM	silty SAND: black, wet, loose; very fine- to medium-grained sand; abundant silt; minor gravel to 1/2".
4,8,8	0.2						
3,4,5			10				
4,3,4						CL	silty CLAY: blue/green, damp, medium firm; minor silt; rootlets.
			15				
			20				
			25				
			30				

ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA

LOG OF BORING B-5/MW-4

SEE SITE PLAN

ALISTO PROJECT NO: *10-061* DATE DRILLED: *10/20/92*

CLIENT: *BP Oil Company*

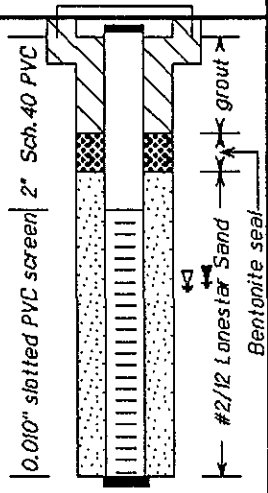
LOCATION: *1700 Powell Street, Emeryville, California*

DRILLING METHOD: *Hollow-Stem Auger (8")*

DRILLING COMPANY: *Great Sierra Exploration* CASING ELEVATION: *8.12 ' MSL*

LOGGED BY: *Ted Moise* APPROVED BY: *Al Sevilla*

BLOWS/6 IN.	PID VALUES	WELL DIAGRAN	DEPTH feet	SAMPLES	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
						SW	gravelly SAND: tan, damp, loose; fine- to very coarse-grained sand; rounded gravel to 3/4".
						ML	sandy SILT: brown, damp, soft; minor angular gravel to 1"; minor clay.
3,2,3	3.2		5			CL	silty CLAY: gray/brown, damp, soft; minor very fine- to medium-grained sand.
5,8,8						SM	silty SAND: gray, wet, loose; very fine- to medium-grained sand; abundant silt; minor clay.
4,4,6			10			CL	CLAY: blue/green, damp, medium firm; minor silt.
			15				
			20				
			25				
			30				



ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA

LOG OF BORING MW-5

SEE SITE PLAN

ALISTO PROJECT NO: *10-061-02* DATE DRILLED: *09/02/93*

CLIENT: *BP Oil Company*

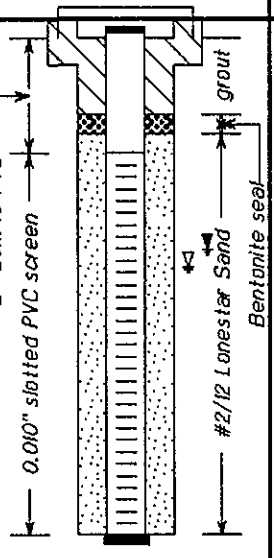
LOCATION: *1700 Powell Street, Emeryville, California*

DRILLING METHOD: *Hollow-Stem Auger (8")*

DRILLING COMPANY: *Solls Exploration Srv.* CASING ELEVATION: *7.69 ' MSL*

LOGGED BY: *Ted Moise* *APPROVED BY: Al Sevilla*

BLOWS/6 IN.	PID VALUES	WELL DIAGRAN	DEPTH feet	SAMPLES	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
							9" Asphalt, 2' Roadbase with red brick.
2,3,4	12		5			CL	silty CLAY: gray/green, moist, medium firm; minor fine-grained sand; rootlets present.
						SC	clayey SAND: black, wet, very loose; very fine- to fine-grained sand; abundant fines.
2,1,3			10			CL	silty CLAY: black, soft.
1,1,2						SC	clayey SAND: black, very loose.
						CL	silty CLAY: black/gray, very soft; minor shell fragments.
			15				
			20				
			25				
			30				



ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA

LOG OF BORING MW-6

SEE SITE PLAN

ALISTO PROJECT NO: *10-061-02* DATE DRILLED: *09/03/93*

CLIENT: *BP Oil Company*

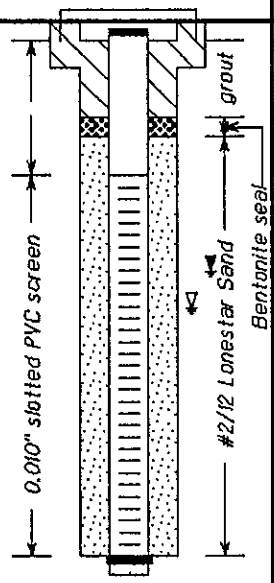
LOCATION: *1700 Powell Street, Emeryville, California*

DRILLING METHOD: *Hollow-Stem Auger (8")*

DRILLING COMPANY: *Great Sierra Exploration* CASING ELEVATION: *8.52 ' MSL*

LOGGED BY: *Ted Maise* APPROVED BY: *Al Sevilla*

BLOWS/6 IN.	PID VALUES	WELL DIAGRAN	DEPTH feet	SAMPLES	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
			0				4" Asphalt.
						SW	gravelly SAND: brown, damp, loose; very fine- to very coarse-grained sand; abundant rounded and angular gravel to 1" diameter.
4,4,7	0		5				SAND: gray/green, damp, loose; very fine- to coarse-grained sand; minor angular gravel to 1/2".
5,6,8			10				Same: black, wet, loose.
3,3,6							fine SAND at 13 feet.
						CL	silty CLAY: black, medium firm.
			15				
			20				
			25				
			30				



ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA

LOG OF BORING MW-7

SEE SITE PLAN

ALISTO PROJECT NO: 10-061-02 DATE DRILLED: 09/03/93

CLIENT: BP Oil Company

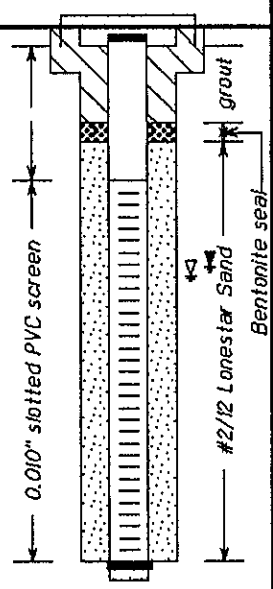
LOCATION: 1700 Powell Street, Emeryville, California

DRILLING METHOD: Hollow-Stem Auger (8")

DRILLING COMPANY: Great Sierra Exploration CASING ELEVATION: 7.61 ' MSL

LOGGED BY: Ted Moise APPROVED BY: Al Sevilla

BLOWS/6 IN.	PID VALUES	WELL DIAGRAN	DEPTH feet	SAMPLES	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
						SP	4" Asphalt.
							gravelly SAND: brown, damp, loose; fine- to medium-grained sand; concrete blocks and bricks.
7,7,5	17		5				SAND: gray, damp, loose; fine- to medium-grained sand.
8,7,2			10				Same: black, wet.
2,3,7						CL	silty CLAY: gray/blue, medium firm.
			15				
			20				
			25				
			30				



ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA

LOG OF BORING MW-8

SEE SITE PLAN

ALISTO PROJECT NO: 10-061-02 DATE DRILLED: 09/03/93

CLIENT: BP Oil Company

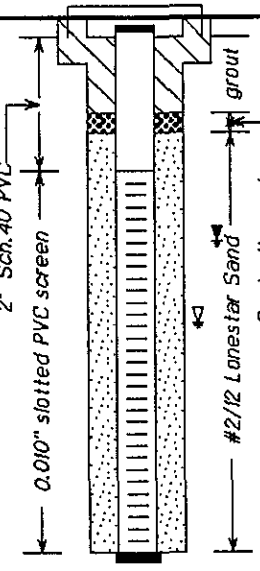
LOCATION: 1700 Powell Street, Emeryville, California

DRILLING METHOD: Hollow-Stem Auger (8")

DRILLING COMPANY: Soils Exploration Srv. CASING ELEVATION: 8.60 ' MSL

LOGGED BY: Ted Moise APPROVED BY: Al Sevilla

BLOWS/6 IN.	PID VALUES	WELL DIAGRAN	DEPTH feet	SAMPLES	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
						SM	2" Asphalt
							silty SAND: gray, loose, damp.
3,4,6	0		5			CL	silty CLAY: gray/blue, damp, medium firm.
4,5,5			10			ML	sandy SILT: black, wet, medium firm; very fine-grained sand.
7,7,9						CL	silty CLAY: gray/green, stiff; organics present.
			15				
			20				
			25				
			30				



ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA

LOG OF BORING MW-9

SEE SITE PLAN

ALISTO PROJECT NO: *10-061-02* DATE DRILLED: *09/03/93*

CLIENT: *BP Oil Company*

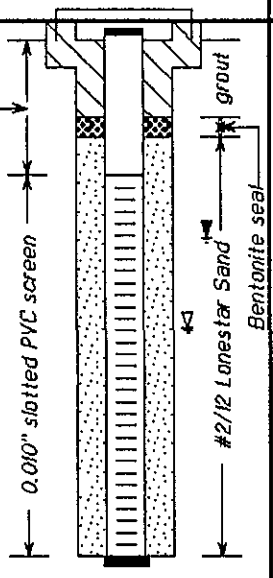
LOCATION: *1700 Powell Street, Emeryville, California*

DRILLING METHOD: *Hollow-Stem Auger (10")*

DRILLING COMPANY: *Soils Exploration Srv.* CASING ELEVATION: *8.08 ' MSL*

LOGGED BY: *Ted Maise* *APPROVED BY: Al Sevilla*

BLOWS/6 IN.	PID VALUES	WELL DIAGRAM	DEPTH feet	SAMPLES	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
			0			SM	3" Asphalt
							silty SAND: brown, loose, damp; very fine- to very coarse-grained sand; minor angular gravel to 3/4" diameter.
4,6,4	188		5			ML	sandy SILT: gray/green, moist, medium firm; very fine- to fine-grained sand.
3,3,5			10				clayey SILT: brown/gray, wet, medium firm; minor very fine- to medium-grained sand.
			15			CL	silty CLAY: blue/green, medium firm.
			20				
			25				
			30				



APPENDIX D

FIELD PROCEDURES FOR GROUNDWATER MONITORING WELL DEVELOPMENT AND SAMPLING, AND ELEVATION SURVEY MAP

FIELD PROCEDURES
FOR
GROUNDWATER MONITORING WELL DEVELOPMENT AND SAMPLING

Groundwater Monitoring Well Development

The groundwater monitoring wells were developed to consolidate and stabilize the filter pack to optimize well production and reduce the turbidity of subsequent groundwater samples. Well development was accomplished by alternately using a surge block and pump to evacuate the water and sediments a minimum of 72 hours after installation of the cement seal. Development continued until the groundwater was relatively free of sediments and/or pH, electrical conductivity, and temperature parameters stabilized. Well development fluids were placed into properly-labeled Department of Transportation approved drums for disposal.

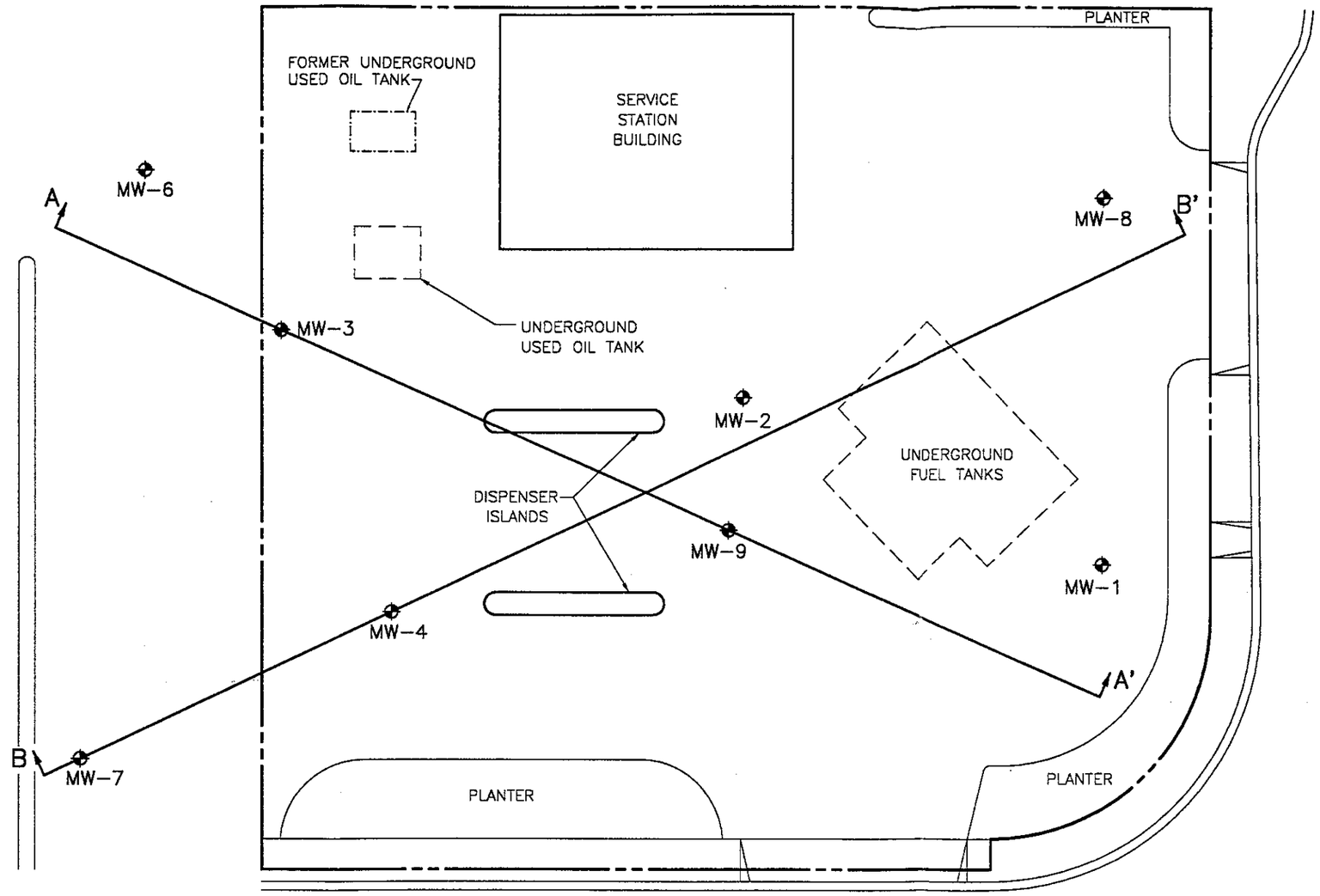
Groundwater Level Measurement

Before groundwater sampling activities, the groundwater level in each well was measured from the permanent survey reference point at the top of the well casing. Groundwater in each well was monitored for free-floating product or sheen. The depth to groundwater was measured to an accuracy of 0.01 foot from the top of the polyvinyl chloride well casing using an electronic sounder.

Groundwater Monitoring Well Sampling

To ensure that the groundwater sample was representative of the aquifer, the wells were purged of 3 casing volumes and the above parameters stabilized before sample collection. Purging was accomplished using a pump.

The groundwater samples were collected using a disposable bailer, and carefully transferred into appropriate clean, glass, laboratory-supplied containers. The sampling technician wore nitrile gloves at all times during purging and well sampling. The samples were clearly labeled with well number, site identification, date and time of collection, and sampler's initials, and transported in an iced cooler to a state-certified laboratory following proper preservation and chain of custody protocol.



N

0 20 40

SCALE IN FEET

LEGEND

◈ GROUNDWATER MONITORING WELL

A—A' LINE OF HYDROGEOLOGIC CROSS SECTION

FIGURE 2

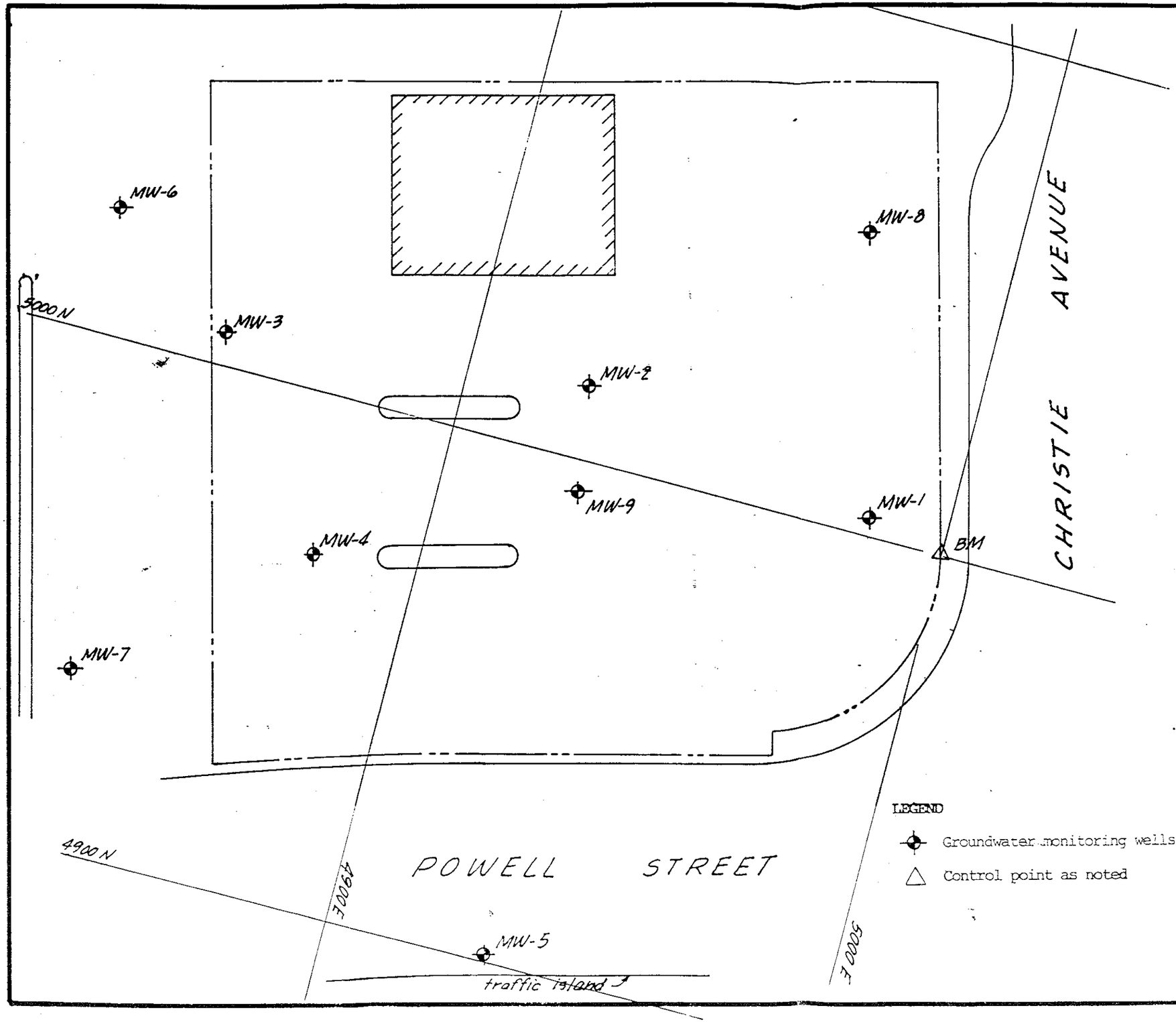
SITE PLAN

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

PROJECT NO. 10-061

ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA

10061SA.DWG 12/28/93 KKW 1:20



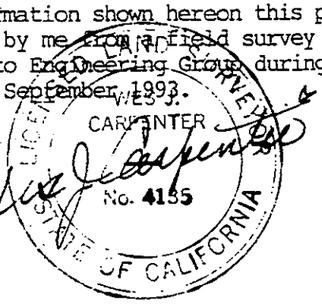
WELL	N	E	ELEV
MW-1	5003.72	4984.65	7.76
MW-2	5014.18	4924.24	8.56
MW-3	5006.43	4852.21	8.25
MW-4	4968.13	4879.97	8.12
MW-5	4901.81	4932.08	7.69
MW-6	5025.10	4826.08	8.52
MW-7	4935.87	4838.99	7.61
Mw-8	5057.73	4970.63	8.60
MW-9	4994.11	4927.07	8.08
BM	5000.00	5000.00	8.11

BENCHMARK

5/8" rebar and cap at property line return.

Elevation 8.11

The information shown hereon this plat was done by me from a field survey for Alisto Engineering Group during the month of September, 1993.



LEGEND

- Groundwater monitoring wells
- △ Control point as noted

BP Oil Service Station No. 11126
Powell St. at Christe Ave.
Emeryville, California

PROJECT NO. 10-061

APPENDIX E

WELL DEVELOPMENT AND WATER SAMPLING FIELD SURVEY FORMS

ALISTO ENGINEERING GROUP
GROUNDWATER MONITORING

Client: BP
Alisto Project No: 10-061-02-001
Service Station No: 11126

Date: 9/8/93
Field Personnel: LCB
Site Address: Emeryville, CA

FIELD ACTIVITY:

___Groundwater Monitoring
___Groundwater Sampling
X Well Development

QUALITY CONTROL SAMPLES:

NS
___ QC-1 Sample Duplicate (Well ID)
___ QC-2 Trip Blank
___ QC-3 Rinsate Blank

Well ID	Well Diam	Order Measured/ Sampled	Total Depth	Depth to Water	Depth to Product	Product Thick-ness	Comments
MW-5	2"	1	13.70	5.85	Ø	Ø	
MW-6		2	13.25	6.50			
MW-7		3	13.72	6.04			
MW-8		4	13.65	5.71			
MW-9	4"	5	13.85	5.36	~~sheen~~ 5.35	~~sheen~~ .01	FP

Notes:

FORM: FS2/121592

ALISTO ENGINEERING GROUP
Groundwater Development and Sampling Form

Client: BP
Alisto Project No: 10061
Service Station No: 11126

Date: 9/8/93
Field Personnel: LCB
Address: Emeryville, CA

Well ID: MW-5 Field Activity: X Well Development ___Well Sampling ___Product Bailing

Casing Diameter:
- X 2 Inch (0.16 Gal/foot)
- ___3 Inch (0.37 Gal/foot)
- ___4 Inch (0.65 Gal/Foot)
- ___4.5 Inch (0.83 Gal/foot)
- ___6 Inch (1.47 Gal/foot)

Purge Method:
- X Pump (dispos. Poly Tubing)
- ___Disposable Bailers
- ___Other
- ___1.66 PVC Standard Bailer
- ___3.50 PVC Standard Bailer

Well Data:
- ___Depth to Product
- ___Product Thickness
- ___Depth to Water

Sampling Method:
- ___Disposable Bailer
- ___Pump

Decontamination Method:
- X Triple Rinse (Liquinox)
- ___ Steam Cleaned

Calculated Purge Volume

13.70	- 5.85	= 7.85 ft	X .16 Gal/Ft	= 1.26 Gal	X 10	= 12.60
Total Depth of Well	Depth to Water	Water Column	Conversion Factor	Casing Vol	Vols to Purge	Total Volume

Well Development/Sampling Parameters

Time	Temp °F	pH	Cond. (umhos/cm)	Purge Vol (Gal)	Comments/ Turbidity	Analysis Required	Container Type	Preserv
1402	74.4	7.87	X1000 1.49	3	DRK Grey	TPH-G/BTEX	VOA	HCL
1412	76.0	7.91	.95	6		TPH-Diesel	Amber Liter	Solvent Rinsed
1422	76.9	7.59	1.05	8		EPA 601	VOA	
1432	77.3	7.33	1.60	10		TOG 5520BF	Amber Liter	H_2SO_4
1445	77.6	7.27	1.57	12.75	Lt. Grey			

Begin 1352 Stop 1445

FORM: FS3/121592

ALISTO ENGINEERING GROUP
Groundwater Development and Sampling Form

Client: BP
Alisto Project No: 10-061
Service Station No: 11126

Date: 9/8/93
Field Personnel: LCB
Address: Emeryville, CA

Well ID: MW-6 Field Activity: X Well Development ___Well Sampling ___Product Bailing

Casing Diameter:

X 2 Inch (0.16 Gal/foot)
___3 Inch (0.37 Gal/foot)
___4 Inch (0.65 Gal/Foot)
___4.5 Inch (0.83 Gal/foot)
___6 Inch (1.47 Gal/foot)

Purge Method:

X Pump (dispos. Poly Tubing)
___Disposable Bailers
___Other
___1.66 PVC Standard Bailer
___3.50 PVC Standard Bailer

Well Data:

Ø Depth to Product
Ø Product Thickness
6.50 Depth to Water

Sampling Method:

___Disposable Bailer
___Pump

Decontamination Method:

X Triple Rinse (Liquinox)
___ Steam Cleaned

Calculated Purge Volume

13.25 (Total Depth of Well) - 6.50 (Depth to Water) = 6.75 ft (Water Column) X .16 (Conversion Factor) Gal/Ft = 1.08 Gal (Casing Vol) X 10 (Vols to Purge) = 10.80 (Total Volume)

Well Development/Sampling Parameters

Time	Temp °F	pH	Cond. (umhos/cm)	Purge Vol (Gal)	Comments/ Turbidity	Analysis Required	Container Type	Preserv
1150	80.5	6.96	X1000 1.66	2	DRK. Grey	TPH-G/BTEX	VOA	HCL
1155	80.4	7.19	1.68	4	↓	TPH-Diesel	Amber Liter	Solvent Rinsed
1200	80.1	7.17	1.66	6	↓	EPA 601	VOA	
1210	79.7	7.13	1.64	8	Lt Grey	TOG 5520BF	Amber Liter	H_2SO_4
1225	79.5	7.09	1.61	11	↓			

Begin 1145 Stop 1225

FORM: FS3/121592

ALISTO ENGINEERING GROUP
Groundwater Development and Sampling Form

Client: BP
Alisto Project No: 10-061
Service Station No: 11126

Date: 9/8/93
Field Personnel: LCB
Address: Emeryville, CA

Well ID: MW-7 Field Activity: X Well Development ___Well Sampling ___Product Bailing

Casing Diameter:

X 2 Inch (0.16 Gal/foot)
___3 Inch (0.37 Gal/foot)
___4 Inch (0.65 Gal/Foot)
___4.5 Inch (0.83 Gal/foot)
___6 Inch (1.47 Gal/foot)

Purge Method:

X Pump (dispos. Poly Tubing)
___Disposable Bailers
___Other
___1.66 PVC Standard Bailer
___3.50 PVC Standard Bailer

Well Data:

0 Depth to Product
0 Product Thickness
6.04 Depth to Water

Sampling Method:

1 Disposable Bailer
___Pump

Decontamination Method:

X Triple Rinse (Liquinox)
___ Steam Cleaned

Calculated Purge Volume

13.72 (Total Depth of Well) - 6.04 (Depth to Water) = 7.68 ft (Water Column) X .16 Gal/Ft (Conversion Factor) = 1.23 Gal (Casing Vol) X 10 (Vols to Purge) = 12.30 (Total Volume)

Well Development/Sampling Parameters

Time	Temp °F	pH	Cond. (umhos/cm)	Purge Vol (Gal)	Comments/ Turbidity	Analysis Required	Container Type	Preserv
1238	76.8	7.25	X1000 2.48	2	DRK. Grey	TPH-G/BTEX	VOA	HCL
1246	77.7	7.53	1.48	4		TPH-Diesel	Amber Liter	Solvent Rinsed
1254	77.3	7.11	2.64	7		EPA 601	VOA	
1302	77.5	7.20	2.54	9		TOG 5520BF	Amber Liter	H_2SO_4
1310	77.3	7.16	2.51	12.50	Lt. Grey			

Begin 1230 Stop 1310

FORM: FS3/121592

ALISTO ENGINEERING GROUP
Groundwater Development and Sampling Form

Client: BP
Alisto Project No: 10-061
Service Station No: 11126

Date: 9/8/93
Field Personnel: LCB
Address: Emeryville, CA

Well ID: MW-8 Field Activity: X Well Development ___Well Sampling ___Product Bailing

Casing Diameter:
X 2 Inch (0.16 Gal/foot)
___3 Inch (0.37 Gal/foot)
___4 Inch (0.65 Gal/Foot)
___4.5 Inch (0.83 Gal/foot)
___6 Inch (1.47 Gal/foot)

Purge Method:
X Pump (dispos. Poly Tubing)
___Disposable Bailers
___Other
___1.66 PVC Standard Bailer
___3.50 PVC Standard Bailer

Well Data:
0 Depth to Product
0 Product Thickness
5.71 Depth to Water

Sampling Method:
___Disposable Bailer
___Pump

Decontamination Method:
X Triple Rinse (Liquinox)
___ Steam Cleaned

Calculated Purge Volume

13.65 (Total Depth of Well) - 5.71 (Depth to Water) = 7.94 ft (Water Column) X .16 Gal/Ft (Conversion Factor) = 1.27 Gal (Casing Vol) X 10 (Vols to Purge) = 12.70 (Total Volume)

Well Development/Sampling Parameters

Time	Temp °F	pH	Cond. (umhos/cm)	Purge Vol (Gal)	Comments/ Turbidity	Analysis Required	Container Type	Preserv
1322	78.1	7.76	X1000 1.64	3	DRK. Grey	TPH-G/BTEX	VOA	HCL
1328	76.5	7.56	1.48	5	↓	TPH-Diesel	Amber Liter	Solvent Rinsed
1334	77.2	7.45	1.53	8	↓	EPA 601	VOA	
1340	76.6	7.41	1.55	11	Lt. Grey	TOG 5520BF	Amber Liter	H_2SO_4
1347	76.3	7.36	1.53	12.75	↓			

Begin 1315 Stop 1347

FORM: FS3/121592

ALISTO ENGINEERING GROUP
Groundwater Development and Sampling Form

Client: BP
Alisto Project No: 10-061
Service Station No: 11126

Date: 9/8/93
Field Personnel: LCB
Address: Emeryville, CA

Well ID: MW-9 Field Activity: X Well Development ___Well Sampling ___Product Bailing

Casing Diameter:
___2 Inch (0.16 Gal/foot)
___3 Inch (0.37 Gal/foot)
X 4 Inch (0.65 Gal/Foot)
___4.5 Inch (0.83 Gal/foot)
___6 Inch (1.47 Gal/foot)

Purge Method:
X Pump (dispos. Poly Tubing)
___Disposable Bailers
___Other
___1.66 PVC Standard Bailer
___3.50 PVC Standard Bailer

Well Data:
Ø Depth to Product
Ø Product Thickness
___Depth to Water

Sampling Method:
___Disposable Bailer
___Pump

Decontamination Method:
X Triple Rinse (Liquinox)
___ Steam Cleaned

Calculated Purge Volume

13.85	-	5.36	=	8.49 ft	X	.65 Gal/Ft	=	5.52 Gal	X	10	=	55.20
Total Depth of Well		Depth to Water		Water Column		Conversion Factor		Casing Vol		Vols to Purge		Total Volume

Well Development/Sampling Parameters

Time	Temp °F	pH	Cond. (umhos/cm)	Purge Vol (Gal)	Comments/ Turbidity	Analysis Required	Container Type	Preserv
1457	75.2	7.92	X1000 1.08	11	clear, FP	TPH-G/BTEX	VOA	HCL
1509	74.8	7.60	1.10	22		TPH-Diesel	Amber Liter	Solvent Rinsed
1521	74.4	7.52	1.12	33		EPA 601	VOA	
1533	74.1	7.45	1.10	44		TOG 5520BF	Amber Liter	H_2SO_4
1545	75.5	7.40	1.07	55.2				

Begin 1445 Stop 1545

Slow Producer! dry @ 35 gal.

FORM: FS3/121592

ALISTO ENGINEERING GROUP
GROUNDWATER MONITORING

Client: BP
Alisto Project No: 10-06
Service Station No: 11126

Date: 10/12/93
Field Personnel: LCB
Site Address: Emeryville, Ca

FIELD ACTIVITY:

__ Groundwater Monitoring
X Groundwater Sampling
__ Well Development

QUALITY CONTROL SAMPLES:

MW-3 QC-1 Sample Duplicate (Well ID)
X QC-2 Trip Blank
__ QC-3 Rinsate Blank

Well ID	Well Diam	Order Measured/ Sampled	Total Depth	Depth to Water	Depth to Product	Product Thick-ness	Comments
MW-1	2"	4	11.62	5.26	Ø	Ø	
MW-3		8	12.08	6.29			
MW-2		5	11.91	5.84			
MW-4		6	11.06	6.87			
MW-5		1	13.70	6.01			
MW-6		2	13.25	6.59			
MW-7		3	13.72	6.14			
MW-8		7	13.65	5.86			
MW-9	4"	9	13.85	5.66	5.58	.08	FP

Notes:

Did not Sample MW-9 due to presence of FP - Bailed out ~~about~~ about 5 gal TF & .06 gal of FP.

FORM: FS2/121592

ALISTO ENGINEERING GROUP

Groundwater Monitoring Well Development/Sampling Field Survey Form

Client: BP
Alisto Project No: 10-061
Service Station No: 11126

Date: 10/12/93
Field Personnel: LCB
Address: Emeryville, Ca

Well ID: MW-1 Field Activity: ___Well Development X Well Sampling ___Product Bailing

Casing Diameter:
X 2 Inch (0.16 Gal/foot)
___3 Inch (0.37 Gal/foot)
___4 Inch (0.65 Gal/Foot)
___4.5 Inch (0.83 Gal/foot)
___6 Inch (1.47 Gal/foot)

Purge Method:
X Pump (dispos. Poly Tubing)
___Disposable Bailers
___Other
___1.66 PVC Standard Bailer
___3.50 PVC Standard Bailer

Well Data:
Ø Depth to Product
Ø Product Thickness
5.26 Depth to Water

Sampling Method:
X Dispos. Bailer
___Pump

Decontamination Method: X Triple Rinse (Liquinox) ___ Steam Cleaned

Calculated Purge Volume

11.62 (Total Depth of Well) - 5.26 (Depth to Water) = 6.36 (Water Column) ft x .16 (Conversion Factor) Gal/Ft = 1.02 (Casing Vol) Gal x 3 (Vols to Purge) = 3.06 (Calculated Purge Volume)

Well Development/Sampling Parameters

Time	Surged (Min)	Temp °F	pH	Cond. (umhos /cm)	Purge Vol (Gal)	Comments		Analysis Required	Container Type	Preserv.
				X1000						
1413		76.0	7.68	1.04	.75	clear	X	TPH-G/BTEX	VOA	HCL
1416		75.8	7.60	.82	1.50			TPH-Diesel	Amber Liter	
1419		75.5	7.56	.81	2.00			EPA 601	VOA	
1421		75.2	7.51	.81	2.50			TOG 5520BF	Amber Liter	H_2NO_3
1425		75.0	7.47	.79	3.25	↓				

Comments:
Begin 1410 Stop 1425 Sampled 1430

ALISTO ENGINEERING GROUP

Groundwater Monitoring Well Development/Sampling Field Survey Form

Client: BP
Alisto Project No: 10-061
Service Station No: 11126

Date: 10/12/93
Field Personnel: LCB
Address: Emeryville, CA

Well ID: MW-2 Field Activity: ___Well Development X Well Sampling ___Product Bailing

Casing Diameter:
X 2 Inch (0.16 Gal/foot)
___3 Inch (0.37 Gal/foot)
___4 Inch (0.65 Gal/Foot)
___4.5 Inch (0.83 Gal/foot)
___6 Inch (1.47 Gal/foot)

Purge Method:
X Pump (dispos. Poly Tubing)
___Disposable Bailers
___Other
___1.66 PVC Standard Bailer
___3.50 PVC Standard Bailer

Well Data:
Ø Depth to Product
Ø Product Thickness
5.84 Depth to Water

Sampling Method:
X Dispos. Bailer
___Pump

Decontamination Method: X Triple Rinse (Liquinox) ___ Steam Cleaned

Calculated Purge Volume

11.91 (Total Depth of Well) - 5.84 (Depth to Water) = 6.07 ft (Water Column) X .16 Gal/Ft (Conversion Factor) = .97 Gal (Casing Vol) X 3 (Vols to Purge) = 2.91 (Calculated Purge Volume)

Well Development/Sampling Parameters

Time	Surged (Min)	Temp °F	pH	Cond. (umhos /cm)	Purge Vol (Gal)	Comments		Analysis Required	Container Type	Preserv.
				X1000						
1435		75.9	7.59	.82	.75	Lt. Brown	X	TPH-G/BTEX	VOA	HCL
1437		75.9	7.40	.84	1.50			TPH-Diesel	Amber Liter	
1439		75.7	7.36	.83	2.25			EPA 601	VOA	
1441		75.5	7.33	.82	3.00			TOG 5520BF	Amber Liter	H_2NO_3
1443		75.3	7.29	.80	3.25	↓				

Comments:
Begin 1433 Stop 1443 Sampled 1458

ALISTO ENGINEERING GROUP

Groundwater Monitoring Well Development/Sampling Field Survey Form

Client: BP
Alisto Project No: 10-061
Service Station No: 11126

Date: 10/12/93
Field Personnel: LCB
Address: Emeryville, Ca

Well ID: MW-3 Field Activity: ___Well Development X Well Sampling ___Product Bailing

Casing Diameter:
X 2 Inch (0.16 Gal/foot)
___3 Inch (0.37 Gal/foot)
___4 Inch (0.65 Gal/Foot)
___4.5 Inch (0.83 Gal/foot)
___6 Inch (1.47 Gal/foot)

Purge Method:
X Pump (dispos. Poly Tubing)
___Disposable Bailers
___Other
___1.66 PVC Standard Bailer
___3.50 PVC Standard Bailer

Well Data:
Ø Depth to Product
Ø Product Thickness
6.29 Depth to Water

Sampling Method:
X Dispos. Bailer
___Pump

Decontamination Method: X Triple Rinse (Liquinox) ___ Steam Cleaned

Calculated Purge Volume

12.08 (Total Depth of Well) - 6.29 (Depth to Water) = 5.79 ft (Water Column) X .16 Gal/Ft (Conversion Factor) = .93 Gal (Casing Vol) X 3 (Vols to Purge) = 2.79 (Calculated Purge Volume)

Well Development/Sampling Parameters

Time	Surged (Min)	Temp °F	pH	Cond. (umhos /cm) X1000	Purge Vol (Gal)	Comments		Analysis Required	Container Type	Preserv.
1603		77.6	7.56	2.02	.50	Brown-Grey	X	TPH-G/BTEX	VOA	HCL
1606		77.3	7.46	2.14	1.00			TPH-Diesel	Amber Liter	
1609		76.9	7.43	2.12	1.50			EPA 601	VOA	
1612		76.6	7.43	2.11	2.25			TOG 5520BF	Amber Liter	H_2NO_3
1615		76.3	7.41	2.11	3.00					

Comments:
Begin 1600 Stop 1615 Sampled 1625

QC-1 dup. taken from this well.

ALISTO ENGINEERING GROUP

Groundwater Monitoring Well Development/Sampling Field Survey Form

Client: BP
Alisto Project No: 10-061
Service Station No: 11126

Date: 10/12/93
Field Personnel: LCB
Address: Emeryville, CA

Well ID: MW-4 Field Activity: ___Well Development X Well Sampling ___Product Bailing

Casing Diameter:
X 2 Inch (0.16 Gal/foot)
___3 Inch (0.37 Gal/foot)
___4 Inch (0.65 Gal/Foot)
___4.5 Inch (0.83 Gal/foot)
___6 Inch (1.47 Gal/foot)

Purge Method:
X Pump (dispos. Poly Tubing)
___Disposable Bailers
___Other
___1.66 PVC Standard Bailer
___3.50 PVC Standard Bailer

Well Data:
Ø Depth to Product
Ø Product Thickness
6.87 Depth to Water

Sampling Method:
X Dispos. Bailer
___Pump

Decontamination Method: X Triple Rinse (Liquinox) ___ Steam Cleaned

Calculated Purge Volume

11.06	- 6.87	= 4.19 ft X	.16 Gal/Ft	= .67 Gal X	3	= 1.91
Total Depth of Well	Depth to Water	Water Column	Conversion Factor	Casing Vol	Vols to Purge	Calculated Purge Volume

Well Development/Sampling Parameters

Time	Surged (Min)	Temp °F	pH	Cond. (umhos /cm)	Purge Vol (Gal)	Comments		Analysis Required	Container Type	Preserv.
1508		78.7	7.33	X1000 1.37	.50	Grey-Brown	X	TPH-G/BTEX	VOA	HCL
1511		78.4	7.30	1.33	1.00			TPH-Diesel	Amber Liter	
1514		78.2	7.26	1.31	1.50			EPA 601	VOA	
1520		77.7	7.23	1.30	2.00	↓		TOG 5520BF	Amber Liter	H_2NO_3

Comments: Begin 1505 Stop 1520 Sampled 1525

ALISTO ENGINEERING GROUP

Groundwater Monitoring Well Development/Sampling Field Survey Form

Client: BP
Alisto Project No: 10-061
Service Station No: 11126

Date: 10/13/93
Field Personnel: LB
Address: Emeryville, CA

Well ID: MW-5 Field Activity: ___Well Development ___Well Sampling ___Product Bailing

Casing Diameter:
X 2 Inch (0.16 Gal/foot)
___3 Inch (0.37 Gal/foot)
___4 Inch (0.65 Gal/Foot)
___4.5 Inch (0.83 Gal/foot)
___6 Inch (1.47 Gal/foot)

Purge Method:
X Pump (dispos. Poly Tubing)
___Disposable Bailers
___Other
___1.66 PVC Standard Bailer
___3.50 PVC Standard Bailer

Well Data:
Ø Depth to Product
Ø Product Thickness
6.01 Depth to Water

Sampling Method:
X Dispos. Bailer
___Pump

Decontamination Method: X Triple Rinse (Liquinox) ___ Steam Cleaned

Calculated Purge Volume

13.70 (Total Depth of Well) - 6.01 (Depth to Water) = 7.69 ft (Water Column) X .16 Gal/Ft (Conversion Factor) = 1.23 Gal (Casing Vol) X 3 (Vols to Purge) = 3.69 (Calculated Purge Volume)

Well Development/Sampling Parameters

Time	Surged (Min)	Temp °F	pH	Cond. (umhos /cm)	Purge Vol (Gal)	Comments	Analysis Required	Container Type	Preserv.
				X1000					
1003		77.6	7.54	2.01	1	Clear	X TPH-G/BTEX	VOA	HCL
1006		77.4	7.62	1.49	2	Lt. Grey	TPH-Diesel	Amber Liter	
1009		77.1	7.59	1.46	3	↓	EPA 601	VOA	
1015		76.7	7.54	1.43	4	↓	TOG 5520BF	Amber Liter	H_2NO_3

Comments:
Begin 1000 Stop 1015 Sampled 1030

ALISTO ENGINEERING GROUP

Groundwater Monitoring Well Development/Sampling Field Survey Form

Client: BP
Alisto Project No: 10-061
Service Station No: 11126

Date: 10/12/93
Field Personnel: LCB
Address: Emeryville, CA

Well ID: MW-6 Field Activity: ___Well Development X Well Sampling ___Product Bailing

Casing Diameter:
___2 Inch (0.16 Gal/foot)
___3 Inch (0.37 Gal/foot)
X 4 Inch (0.65 Gal/Foot)
___4.5 Inch (0.83 Gal/foot)
___6 Inch (1.47 Gal/foot)

Purge Method:
X Pump (dispos. Poly Tubing)
___Disposable Bailers
___Other
___1.66 PVC Standard Bailer
___3.50 PVC Standard Bailer

Well Data:
Ø Depth to Product
Ø Product Thickness
6.59 Depth to Water

Sampling Method:
X Dispos. Bailer
___Pump

Decontamination Method: X Triple Rinse (Liquinox) ___ Steam Cleaned

Calculated Purge Volume

13.25 (Total Depth of Well) − 6.59 (Depth to Water) = 6.66 ft (Water Column) × .16 Gal/Ft (Conversion Factor) = 1.07 Gal (Casing Vol) × 3 (Vols to Purge) = 3.21 (Calculated Purge Volume)

Well Development/Sampling Parameters

Time	Surged (Min)	Temp °F	pH	Cond. (umhos /cm)	Purge Vol (Gal)	Comments		Analysis Required	Container Type	Preserv.
				X1000						
1332		78.6	7.20	1.83	.75	Lt. Grey	X	TPH-G/BTEX	VOA	HCL
1334		78.4	7.21	1.77	1.50	↓		TPH-Diesel	Amber Liter	
1336		77.7	7.17	1.73	2.25			EPA 601	VOA	
1338		77.4	7.15	1.72	3.25			TOG 5520BF	Amber Liter	H_2NO_3
1340										

Comments: Begin 1330 Stop 1340 Sampled 1345

ALISTO ENGINEERING GROUP

Groundwater Monitoring Well Development/Sampling Field Survey Form

Client: BP
Alisto Project No: 10-061
Service Station No: 11126

Date: 10/12/93
Field Personnel: LCR
Address: Emeryville, CA

Well ID: MW-7 Field Activity: ___Well Development X Well Sampling ___Product Bailing

Casing Diameter:
X 2 Inch (0.16 Gal/foot)
___3 Inch (0.37 Gal/foot)
___4 Inch (0.65 Gal/Foot)
___4.5 Inch (0.83 Gal/foot)
___6 Inch (1.47 Gal/foot)

Purge Method:
X Pump (dispos. Poly Tubing)
___Disposable Bailers
___Other
___1.66 PVC Standard Bailer
___3.50 PVC Standard Bailer

Well Data:
Ø Depth to Product
Ø Product Thickness
6.14 Depth to Water

Sampling Method:
X Dispos. Bailer
___Pump

Decontamination Method: X Triple Rinse (Liquinox) ___ Steam Cleaned

Calculated Purge Volume

13.72 (Total Depth of Well) - 6.14 (Depth to Water) = 7.58 ft (Water Column) X .16 Gal/Ft (Conversion Factor) = 1.21 Gal (Casing Vol) X 3 (Vols to Purge) = 3.63 (Calculated Purge Volume)

Well Development/Sampling Parameters

Time	Surged (Min)	Temp °F	pH	Cond. (umhos /cm) X1000	Purge Vol (Gal)	Comments		Analysis Required	Container Type	Preserv.
1351		76.7	7.34	2.30	.75	Lt. Grey	X	TPH-G/BTEX	VOA	HCL
1354		76.5	7.54	1.63	1.50			TPH-Diesel	Amber Liter	
1357		76.2	7.50	1.61	2.25			EPA 601	VOA	
1400		75.9	7.50	1.59	3.00			TOG 5520BF	Amber Liter	H_2NO_3
1403		75.7	7.48	1.59	3.75	↓				

Comments:
Begin 1348 Stop 1403 Sampled 1408

ALISTO ENGINEERING GROUP

Groundwater Monitoring Well Development/Sampling Field Survey Form

Client: BP
Alisto Project No: 10-061
Service Station No: 11126

Date: 10/12/93
Field Personnel: LCB
Address: Emeryville, Ca

Well ID: MW-8 Field Activity: ___Well Development X Well Sampling ___Product Bailing

Casing Diameter:
X 2 Inch (0.16 Gal/foot)
___3 Inch (0.37 Gal/foot)
___4 Inch (0.65 Gal/Foot)
___4.5 Inch (0.83 Gal/foot)
___6 Inch (1.47 Gal/foot)

Purge Method:
X Pump (dispos. Poly Tubing)
___Disposable Bailers
___Other
___1.66 PVC Standard Bailer
___3.50 PVC Standard Bailer

Well Data:
Ø Depth to Product
Ø Product Thickness
5.86 Depth to Water

Sampling Method:
X Dispos. Bailer
___Pump

Decontamination Method: X Triple Rinse (Liquinox) ___ Steam Cleaned

Calculated Purge Volume

13.65 (Total Depth of Well) − 5.86 (Depth to Water) = 7.79 ft (Water Column) × .16 Gal/Ft (Conversion Factor) = 1.25 Gal (Casing Vol) × 3 (Vols to Purge) = 3.75 (Calculated Purge Volume)

Well Development/Sampling Parameters

Time	Surged (Min)	Temp °F	pH	Cond. (umhos /cm)	Purge Vol (Gal)	Comments		Analysis Required	Container Type	Preserv.
				X1000						
1538		75.5	7.46	1.54	.75	clear	X	TPH-G/BTEX	VOA	HCL
1541		75.5	7.46	1.33	1.50			TPH-Diesel	Amber Liter	
1544		75.2	7.43	1.31	2.25			EPA 601	VOA	
1547		75.0	7.39	1.31	3.00			TOG 5520BF	Amber Liter	H_2NO_3
1550		75.1	7.36	1.29	3.75	↓				

Comments:
Begin 1535 Stop 1550 Sampled 1555

APPENDIX F

FIELD PROCEDURES FOR CHAIN OF CUSTODY DOCUMENTATION, OFFICIAL LABORATORY REPORTS, AND CHAIN OF CUSTODY RECORDS

FIELD PROCEDURES
FOR
CHAIN OF CUSTODY DOCUMENTATION

Samples collected were properly handled in accordance with the California Department of Health Services guidelines. Each sample was properly labeled in the field, and immediately stored in a cooler and preserved with blue or dry ice for transport to a state-certified laboratory for analysis.

The official chain of custody record accompanied the samples, and included the site and sample identification, date and time of sample collection, analysis requested, and the name and signature of the sampling technician. When transferring possession of the samples, the transferee signed and dated the chain of custody record.

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REPORT OF LABORATORY ANALYSIS

Mr. Ted Moise
Alisto Engineering Group
1777 Oakland Blvd. , Ste. 200
Walnut Creek, CA. 94596

September 23, 1993
PACE Project Number: 430907502
Reissue of original mailed
September 16, 1993.

Client Reference: BP Station # 11126

PACE Sample Number:			70 0147123	
Date Collected:			09/02/93	
Date Received:			09/07/93	
Client Sample ID:			MW-5-4.5'	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			(LB)	09/10/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	2500	09/10/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	09/10/93
Benzene	ug/kg wet	5.0	87	09/10/93
Toluene	ug/kg wet	5.0	5.9	09/10/93
Ethylbenzene	ug/kg wet	5.0	6.7	09/10/93
Xylenes, Total	ug/kg wet	5.0	28	09/10/93

REPORT OF LABORATORY ANALYSIS

September 23, 1993
PACE Project Number: 430907502

Client Reference: BP Station # 11126

PACE Sample Number:			70 0147131	
Date Collected:			09/02/93	
Date Received:			09/07/93	
Client Sample ID:			MW-6-4.5'	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	09/11/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	09/11/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	09/11/93
Benzene	ug/kg wet	5.0	ND	09/11/93
Toluene	ug/kg wet	5.0	ND	09/11/93
Ethylbenzene	ug/kg wet	5.0	ND	09/11/93
Xylenes, Total	ug/kg wet	5.0	ND	09/11/93
EXTRACTABLE FUELS EPA 3550/8015				
Extractable Fuels, as Diesel	mg/kg	5.0	ND	09/10/93
Date Extracted			09/08/93	09/09/93

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REPORT OF LABORATORY ANALYSIS

September 23, 1993
PACE Project Number: 430907502

Client Reference: BP Station # 11126

PACE Sample Number:			70 0147140	
Date Collected:			09/03/93	
Date Received:			09/07/93	
Client Sample ID:			MW-7-4.5'	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	09/11/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	09/11/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	09/11/93
Benzene	ug/kg wet	5.0	ND	09/11/93
Toluene	ug/kg wet	5.0	ND	09/11/93
Ethylbenzene	ug/kg wet	5.0	ND	09/11/93
Xylenes, Total	ug/kg wet	5.0	ND	09/11/93

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REPORT OF LABORATORY ANALYSIS

September 23, 1993
PACE Project Number: 430907502

Client Reference: BP Station # 11126

PACE Sample Number:			70 0147158	
Date Collected:			09/03/93	
Date Received:			09/07/93	
Client Sample ID:			MW-8-5.0'	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	09/11/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	09/11/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	09/11/93
Benzene	ug/kg wet	5.0	ND	09/11/93
Toluene	ug/kg wet	5.0	ND	09/11/93
Ethylbenzene	ug/kg wet	5.0	ND	09/11/93
Xylenes, Total	ug/kg wet	5.0	ND	09/11/93

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REPORT OF LABORATORY ANALYSIS

September 23, 1993
PACE Project Number: 430907502

Client Reference: BP Station # 11126

PACE Sample Number:			70 0147166	
Date Collected:			09/03/93	
Date Received:			09/07/93	
Client Sample ID:			MW-9-4.5'	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	09/11/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	200000	4600000	09/11/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	09/11/93
Benzene	ug/kg wet	1000	76000	09/11/93
Toluene	ug/kg wet	1000	330000	09/11/93
Ethylbenzene	ug/kg wet	1000	130000	09/11/93
Xylenes, Total	ug/kg wet	1000	420000	09/11/93

These data have been reviewed and are approved for release.

Darrell C. Cain
Regional Director

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Mr. Ted Moise
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FOOTNOTES
for pages 1 through 6

September 23, 1993
PACE Project Number: 430907502

Client Reference: BP Station # 11126

(LB) Low boiling point components are present in sample.
MDL Method Detection Limit
ND Not detected at or above the MDL.

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REPORT OF LABORATORY ANALYSIS

Mr. Ted Moise
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QUALITY CONTROL DATA

September 23, 1993
PACE Project Number: 430907502

Client Reference: BP Station # 11126

EXTRACTABLE FUELS EPA 3550/8015
Batch: 70 24421
Samples: 70 0147131

METHOD BLANK:

Parameter	Units	MDL	Method Blank
Extractable Fuels, as Diesel	mg/kg	5.0	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Extractable Fuels, as Diesel	mg/kg	5.0	33.3	89%	89%	0%

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Client Reference: BP Station # 11126

PURGEABLE FUELS AND AROMATICS
Batch: 70 24411
Samples: 70 0147115, 70 0147123, 70 0147131, 70 0147140, 70 0147158
70 0147166

METHOD BLANK:

Parameter	Units	MDL	Method Blank
TOTAL FUEL HYDROCARBONS, (LIGHT):			-
Purgeable Fuels, as Gasoline (EPA 8015M	ug/kg wet	200	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020M)			-
Benzene	ug/kg wet	1.0	ND
Toluene	ug/kg wet	1.0	ND
Ethylbenzene	ug/kg wet	1.0	ND
Xylenes, Total	ug/kg wet	1.0	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Purgeable Fuels, as Gasoline (EPA 8015M	ug/kg wet	200	1000	90%	92%	2%
Benzene	ug/kg wet	1.0	40.0	104%	110%	5%
Toluene	ug/kg wet	1.0	40.0	102%	109%	6%
Ethylbenzene	ug/kg wet	1.0	40.0	105%	112%	6%
Xylenes, Total	ug/kg wet	1.0	120	106%	112%	5%

Mr. Ted Moise
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FOOTNOTES
for pages 8 through 9

September 23, 1993
PACE Project Number: 430907502

Client Reference: BP Station # 11126

MDL	Method Detection Limit
ND	Not detected at or above the MDL.
RPD	Relative Percent Difference

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B.P. OIL COMPANY

16400 Southcenter Parkway, Suite 301, Tukwila, WA 98188

CHAIN OF CUSTODY

№ 0401

☑ Novato, CA, 11 Digital Drive, 94949
Phone: (415) 883-6100 Fax: (415) 883-2673

☐ Huntington Beach, CA, 5702 Bolsa Avenue, 92649
Phone: (714) 892-2565 Fax: (714) 890-4032

Consultant's Name: Alisto Engineering Group	Consultant Project #: 10-061	Page 1 of 1
Address: 1777 Oakland Blvd. Suite 200 Walnut Creek 94595		
Project Contact: Ted Morse	Phone #: (510) 295-1650 Fax #: (510) 295-1823	Consultant Work Order #: F937603
Sampled by (print): Ted Morse	Sampler's Signature: Ted Morse	B.P. Site Location #: 11126
Shipment Method: Airbill #:	Shipment Date:	B.P. Site Location: 1200 Powell St. Emeryville

TAT: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☑ Standard (10 day)

Sample Condition as Received
Temperature ° C: _____
Cooler #: _____
Inbound Seal Yes No
Outbound Seal Yes No

Sample Description	Collection Date/Time	Matrix Soil/Water	Prsv	# of Cont	PACE Sample #	TPH/GAS/BTEX EPA 8015/8020	TPH/Diesel EPA 8015	TRPH EPA 418.1	HVOC 8010									COMMENTS
MW-5-4.5'	9/2/93	Soil		1	14712.3	✓												
MW-6-4.5'	9/2/93			1	14713.1	✓	✓											
MW-7-4.5'	9/3/93			1	14714.0	✓												
MW-8-5'	↓	↓		1	14715.8	✓												
MW-9-4.5'	↓	↓		1	14716.6	✓												

Relinquished by/Affiliation	Date	Time	Accepted by/Affiliation	Date	Time
Ted Morse	9/7	1310	Elizabeth Howe	9/7	1310
Elizabeth Howe	9/7	1600	Dan Burton / PACE	9/7	1600

Additional Comments: F/4

Distribution: White - Original Yellow - B.P. Oil Pink - Lab Goldenrod - Consultant Field Staff

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REPORT OF LABORATORY ANALYSIS

Alisto Engineering Group
1777 Oakland Blvd., Ste. 200
Walnut Creek, CA 94596

October 22, 1993
PACE Project Number: 431013515

Attn: Mr. Bill Howell

Client Reference: BP Station # 11126

PACE Sample Number:			70 0172551	
Date Collected:			10/12/93	
Date Received:			10/13/93	
Client Sample ID:			QC-2	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	10/19/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	ND	10/19/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	10/19/93
Benzene	ug/L	0.5	ND	10/19/93
Toluene	ug/L	0.5	ND	10/19/93
Ethylbenzene	ug/L	0.5	ND	10/19/93
Xylenes, Total	ug/L	0.5	ND	10/19/93

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REPORT OF LABORATORY ANALYSIS

October 22, 1993
PACE Project Number: 431013515

Client Reference: BP Station # 11126

PACE Sample Number:			70 0172560	
Date Collected:			10/12/93	
Date Received:			10/13/93	
Client Sample ID:			QC-1	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	10/19/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	150	10/19/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	10/19/93
Benzene	ug/L	0.5	5.6	10/19/93
Toluene	ug/L	0.5	0.6	10/19/93
Ethylbenzene	ug/L	0.5	ND	10/19/93
Xylenes, Total	ug/L	0.5	1.6	10/19/93

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REPORT OF LABORATORY ANALYSIS

Mr. Bill Howell
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October 22, 1993
PACE Project Number: 431013515

Client Reference: BP Station # 11126

PACE Sample Number:			70 0172578	
Date Collected:			10/12/93	
Date Received:			10/13/93	
Client Sample ID:			MW-6	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	10/19/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	63	10/19/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	10/19/93
Benzene	ug/L	0.5	ND	10/19/93
Toluene	ug/L	0.5	ND	10/19/93
Ethylbenzene	ug/L	0.5	ND	10/19/93
Xylenes, Total	ug/L	0.5	ND	10/19/93

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REPORT OF LABORATORY ANALYSIS

Mr. Bill Howell
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October 22, 1993
PACE Project Number: 431013515

Client Reference: BP Station # 11126

PACE Sample Number:			70 0172586	
Date Collected:			10/12/93	
Date Received:			10/13/93	
Client Sample ID:			MW-7	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	10/19/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	ND	10/19/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	10/19/93
Benzene	ug/L	0.5	ND	10/19/93
Toluene	ug/L	0.5	ND	10/19/93
Ethylbenzene	ug/L	0.5	ND	10/19/93
Xylenes, Total	ug/L	0.5	0.7	10/19/93

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REPORT OF LABORATORY ANALYSIS

Mr. Bill Howell
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October 22, 1993
PACE Project Number: 431013515

Client Reference: BP Station # 11126

PACE Sample Number:			70 0172594	
Date Collected:			10/12/93	
Date Received:			10/13/93	
Client Sample ID:			MW-8	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	10/20/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	ND	10/20/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	10/20/93
Benzene	ug/L	0.5	ND	10/20/93
Toluene	ug/L	0.5	ND	10/20/93
Ethylbenzene	ug/L	0.5	ND	10/20/93
Xylenes, Total	ug/L	0.5	ND	10/20/93

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REPORT OF LABORATORY ANALYSIS

October 22, 1993
PACE Project Number: 431013515

Client Reference: BP Station # 11126

PACE Sample Number:			70 0172608	
Date Collected:			10/12/93	
Date Received:			10/13/93	
Client Sample ID:			MW-1	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	10/21/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	3600	10/21/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	10/21/93
Benzene	ug/L	25	970	10/21/93
Toluene	ug/L	0.5	71	10/21/93
Ethylbenzene	ug/L	0.5	100	10/21/93
Xylenes, Total	ug/L	1.0	550	10/21/93

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REPORT OF LABORATORY ANALYSIS

October 22, 1993
PACE Project Number: 431013515

Client Reference: BP Station # 11126

PACE Sample Number:			70 0172616	
Date Collected:			10/12/93	
Date Received:			10/13/93	
Client Sample ID:			MW-2	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	10/21/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	4500	10/21/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	10/21/93
Benzene	ug/L	25	3400	10/21/93
Toluene	ug/L	2.5	180	10/21/93
Ethylbenzene	ug/L	0.5	230	10/21/93
Xylenes, Total	ug/L	2.5	940	10/21/93

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REPORT OF LABORATORY ANALYSIS

Mr. Bill Howell
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October 22, 1993
PACE Project Number: 431013515

Client Reference: BP Station # 11126

PACE Sample Number:			70 0172624	
Date Collected:			10/12/93	
Date Received:			10/13/93	
Client Sample ID:			MW-4	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	10/20/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	160	10/20/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	10/20/93
Benzene	ug/L	0.5	5.8	10/20/93
Toluene	ug/L	0.5	1.4	10/20/93
Ethylbenzene	ug/L	0.5	0.8	10/20/93
Xylenes, Total	ug/L	0.5	2.7	10/20/93

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REPORT OF LABORATORY ANALYSIS

Mr. Bill Howell
Page 9

October 22, 1993
PACE Project Number: 431013515

Client Reference: BP Station # 11126

PACE Sample Number:			70 0172632	
Date Collected:			10/12/93	
Date Received:			10/13/93	
Client Sample ID:			MW-3	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	10/20/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	270	10/20/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	10/20/93
Benzene	ug/L	0.5	5.0	10/20/93
Toluene	ug/L	0.5	0.7	10/20/93
Ethylbenzene	ug/L	0.5	ND	10/20/93
Xylenes, Total	ug/L	0.5	2.6	10/20/93
EXTRACTABLE FUELS EPA 3510/8015				
Extractable Fuels, as Diesel	mg/L	0.05	2.1	10/19/93
Date Extracted			10/19/93	
HALOGENATED VOLATILE COMPOUNDS EPA 8010				
Dichlorodifluoromethane	ug/L	2.0	ND	10/16/93
Chloromethane	ug/L	2.0	ND	10/16/93
Vinyl Chloride	ug/L	2.0	ND	10/16/93
Bromomethane	ug/L	2.0	ND	10/16/93
Chloroethane	ug/L	2.0	ND	10/16/93
Trichlorofluoromethane (Freon 11)	ug/L	2.0	ND	10/16/93
1,1-Dichloroethene	ug/L	0.5	ND	10/16/93
Methylene Chloride	ug/L	2.0	ND	10/16/93
trans-1,2-Dichloroethene	ug/L	0.5	ND	10/16/93
cis-1,2-Dichloroethene	ug/L	0.5	ND	10/16/93
1,1-Dichloroethane	ug/L	0.5	ND	10/16/93
Chloroform	ug/L	0.5	ND	10/16/93
1,1,1-Trichloroethane (TCA)	ug/L	0.5	ND	10/16/93
Carbon Tetrachloride	ug/L	0.5	ND	10/16/93
1,2-Dichloroethane (EDC)	ug/L	0.5	ND	10/16/93
Trichloroethene (TCE)	ug/L	0.5	ND	10/16/93
1,2-Dichloropropane	ug/L	0.5	ND	10/16/93
Bromodichloromethane	ug/L	0.5	ND	10/16/93
2-Chloroethylvinyl ether	ug/L	0.5	ND	10/16/93

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THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

Mr. Bill Howell
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October 22, 1993
PACE Project Number: 431013515

Client Reference: BP Station # 11126

PACE Sample Number:			70 0172632	
Date Collected:			10/12/93	
Date Received:			10/13/93	
Client Sample ID:			MW-3	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
HALOGENATED VOLATILE COMPOUNDS EPA 8010				
cis-1,3-Dichloropropene	ug/L	0.5	ND	10/16/93
trans-1,3-Dichloropropene	ug/L	0.5	ND	10/16/93
1,1,2-Trichloroethane	ug/L	0.5	ND	10/16/93
Tetrachloroethene	ug/L	0.5	ND	10/16/93
Dibromochloromethane	ug/L	0.5	ND	10/16/93
Chlorobenzene	ug/L	0.5	ND	10/16/93
Bromoform	ug/L	0.5	ND	10/16/93
1,1,2,2-Tetrachloroethane	ug/L	0.5	ND	10/16/93
1,3-Dichlorobenzene	ug/L	0.5	ND	10/16/93
1,4-Dichlorobenzene	ug/L	0.5	ND	10/16/93
1,2-Dichlorobenzene	ug/L	0.5	ND	10/16/93
Bromochloromethane (Surrogate Recovery)			102%	10/16/93
1,4-Dichlorobutane (Surrogate Recovery)			104%	10/16/93
OIL AND GREASE, SILICA GEL (LUFT)				
Oil and Grease, Gravimetric (SM5520)	mg/L	5.0	ND	10/20/93
Date Extracted			10/18/93	

These data have been reviewed and are approved for release.

Darrell C. Cain
Regional Director

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Mr. Bill Howell
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FOOTNOTES
for pages 1 through 10

October 22, 1993
PACE Project Number: 431013515

Client Reference: BP Station # 11126

MDL Method Detection Limit
ND Not detected at or above the MDL.

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REPORT OF LABORATORY ANALYSIS

Mr. Bill Howell
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QUALITY CONTROL DATA

October 22, 1993
PACE Project Number: 431013515

Client Reference: BP Station # 11126

EXTRACTABLE FUELS EPA 3510/8015
Batch: 70 25649
Samples: 70 0172632

METHOD BLANK:

Parameter	Units	MDL	Method Blank
Extractable Fuels, as Diesel	mg/L	0.05	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Extractable Fuels, as Diesel	mg/L	0.05	1.00	86%	78%	9%

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Mr. Bill Howell
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QUALITY CONTROL DATA

October 22, 1993
PACE Project Number: 431013515

Client Reference: BP Station # 11126

HALOGENATED VOLATILE COMPOUNDS EPA 8010
Batch: 70 25584
Samples: 70 0172632

METHOD BLANK:

Parameter	Units	MDL	Method Blank
Dichlorodifluoromethane	ug/L	2.0	ND
Chloromethane	ug/L	2.0	ND
Vinyl Chloride	ug/L	2.0	ND
Bromomethane	ug/L	2.0	ND
Chloroethane	ug/L	2.0	ND
Trichlorofluoromethane (Freon 11)	ug/L	2.0	ND
1,1-Dichloroethene	ug/L	0.5	ND
Methylene Chloride	ug/L	2.0	ND
trans-1,2-Dichloroethene	ug/L	0.5	ND
cis-1,2-Dichloroethene	ug/L	0.5	ND
1,1-Dichloroethane	ug/L	0.5	ND
Chloroform	ug/L	0.5	ND
1,1,1-Trichloroethane (TCA)	ug/L	0.5	ND
Carbon Tetrachloride	ug/L	0.5	ND
1,2-Dichloroethane (EDC)	ug/L	0.5	ND
Trichloroethene (TCE)	ug/L	0.5	ND
1,2-Dichloropropane	ug/L	0.5	ND
Bromodichloromethane	ug/L	0.5	ND
2-Chloroethylvinyl ether	ug/L	0.5	ND
cis-1,3-Dichloropropene	ug/L	0.5	ND
trans-1,3-Dichloropropene	ug/L	0.5	ND
1,1,2-Trichloroethane	ug/L	0.5	ND
Tetrachloroethene	ug/L	0.5	ND
Dibromochloromethane	ug/L	0.5	ND
Chlorobenzene	ug/L	0.5	ND
Bromoform	ug/L	0.5	ND
1,1,2,2-Tetrachloroethane	ug/L	0.5	ND
1,3-Dichlorobenzene	ug/L	0.5	ND
1,4-Dichlorobenzene	ug/L	0.5	ND
1,2-Dichlorobenzene	ug/L	0.5	ND
Bromochloromethane (Surrogate Recovery)			110%
1,4-Dichlorobutane (Surrogate Recovery)			107%

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REPORT OF LABORATORY ANALYSIS

QUALITY CONTROL DATA

October 22, 1993
PACE Project Number: 431013515

Client Reference: BP Station # 11126

HALOGENATED VOLATILE COMPOUNDS EPA 8010
Batch: 70 25584
Samples: 70 0172632

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
1,1-Dichloroethane	ug/L	0.5	20	96%	85%	12%
Trichloroethene (TCE)	ug/L	0.5	20	100%	103%	2%
1,1,2-Trichloroethane	ug/L	0.5	20	101%	97%	4%
Tetrachloroethene	ug/L	0.5	20	93%	103%	10%

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REPORT OF LABORATORY ANALYSIS

Mr. Bill Howell
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QUALITY CONTROL DATA

October 22, 1993
PACE Project Number: 431013515

Client Reference: BP Station # 11126

OIL AND GREASE, SILICA GEL (LUFT)
Batch: 70 25662
Samples: 70 0172632

METHOD BLANK:

Parameter	Units	MDL	Method Blank
Oil and Grease, Gravimetric (SM5520)	mg/L	5.0	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Oil and Grease, Gravimetric (SM5520)	mg/L	5.0	20	95%	95%	0%

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Mr. Bill Howell
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QUALITY CONTROL DATA

October 22, 1993
PACE Project Number: 431013515

Client Reference: BP Station # 11126

PURGEABLE FUELS AND AROMATICS
Batch: 70 25555
Samples: 70 0172551, 70 0172560, 70 0172578, 70 0172586, 70 0172594
70 0172624, 70 0172632

METHOD BLANK:

Parameter	Units	MDL	Method Blank
TOTAL FUEL HYDROCARBONS, (LIGHT):			-
Purgeable Fuels, as Gasoline (EPA 8015M	ug/L	50	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020M)			-
Benzene	ug/L	0.5	ND
Toluene	ug/L	0.5	ND
Ethylbenzene	ug/L	0.5	ND
Xylenes, Total	ug/L	0.5	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Purgeable Fuels, as Gasoline (EPA 8015M	ug/L	50	1000	106%	106%	0%
Benzene	ug/L	0.5	40.0	99%	100%	1%
Toluene	ug/L	0.5	40.0	100%	102%	1%
Ethylbenzene	ug/L	0.5	40.0	100%	102%	1%
Xylenes, Total	ug/L	0.5	120	102%	103%	0%

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Mr. Bill Howell
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QUALITY CONTROL DATA

October 22, 1993
PACE Project Number: 431013515

Client Reference: BP Station # 11126

PURGEABLE FUELS AND AROMATICS
Batch: 70 25773
Samples: 70 0172608, 70 0172616

METHOD BLANK:

Parameter	Units	MDL	Method Blank
TOTAL FUEL HYDROCARBONS, (LIGHT):			-
Purgeable Fuels, as Gasoline (EPA 8015M	ug/L	50	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020M)			-
Benzene	ug/L	0.5	ND
Toluene	ug/L	0.5	ND
Ethylbenzene	ug/L	0.5	ND
Xylenes, Total	ug/L	0.5	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Purgeable Fuels, as Gasoline (EPA 8015M	ug/L	50	1000	110%	109%	0%
Benzene	ug/L	0.5	100	96%	101%	5%
Toluene	ug/L	0.5	100	98%	103%	4%
Ethylbenzene	ug/L	0.5	100	97%	102%	5%
Xylenes, Total	ug/L	0.5	300	99%	103%	3%

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Client Reference: BP Station # 11126

MDL	Method Detection Limit
ND	Not detected at or above the MDL.
RPD	Relative Percent Difference

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431013.515

BP

CHAIN OF CUSTODY

No. 00134 Page 1 of 1

CONSULTANT'S NAME: Alisto Engineering	ADDRESS: 1777 Oakland Blvd #200	CITY: Walnut Creek	STATE: Ca ZIP CODE: 94596
BP SITE NUMBER: 11126	BP CORNER ADDRESS/CITY: Emeryville, Ca		CONSULTANT PROJECT NUMBER: Alisto
CONSULTANT PROJECT MANAGER: Bill Howell	PHONE NUMBER: (510) 295-1650	FAX NUMBER: 295-7823	~~CONSULTANT~~ CONTRACT NUMBER: F937603
BP CONTACT:	BP ADDRESS: Tukwilla, Wash	PHONE NUMBER:	FAX NO:
LAB CONTACT: Pace inc.	LABORATORY ADDRESS: Novato, Ca.	PHONE NUMBER:	FAX NO:
SAMPLED BY (Please Print Name): Larry Buenik	SAMPLED BY (Signature): [signature]	SHIPMENT DATE:	SHIPMENT METHOD: Courier
			AIRBILL NUMBER:

TAT: ☐ 24 Hours ☐ 48 Hours ☐ 1 Week ☒ Standard 2 Weeks

ANALYSIS REQUIRED

SAMPLE DESCRIPTION	COLLECTION DATE / COLLECTION TIME	MATRIX SOIL/WATER	CONTAINERS NO.	TYPE (VOL.)	PRESERVATIVE / LAB SAMPLE #	TPH-G / BTXE	TOG 5520	TPH-D	AVOCs PDLD	COMMENTS
QC-2	10/12/93	W	2		172551	X				all vocs pres
QC-1	↓	↓	3		17256.0	↓				per. container
MW-6					17257.8					labels 10/18 [illegible]
MW-7					17258.6					
MW-8					17259.4					
MW-1					17260.8					
MW-2					17261.6					
MW-4			↓		17262.4	↓				
MW-3	↓		8		17263.2	X	X	X	X	
~~MW-5~~	~~10/13/93~~	~~W~~	~~3~~			~~↓~~	NONE [initials] 10/13			

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
[signature]	10/14/93	1650	[signature] Pace	10/13	1645
[signature] -Pace	10/13	1750	[signature] McIntosh Pace	10/13	1750

ADDITIONAL COMMENTS: Relinquished by harry Buenik 10/13

10/2, T12

CLV-16722

Distribution: White - Original (with Data) Pink - Lab
Yellow - BP Blue - Consultant Field Staff

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THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

Alisto Engineering Group
1777 Oakland Blvd., Ste. 200
Walnut Creek, CA 94596

October 26, 1993
PACE Project Number: 431015520

Attn: Mr. Bill Howell

Client Reference: BP Station # 11126

PACE Sample Number:			70 0173655	
Date Collected:			10/13/93	
Date Received:			10/15/93	
			MW-5	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	10/21/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	2300	10/21/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	10/21/93
Benzene	ug/L	13	160	10/21/93
Toluene	ug/L	0.5	10	10/21/93
Ethylbenzene	ug/L	0.5	ND	10/21/93
Xylenes, Total	ug/L	0.5	26	10/21/93

These data have been reviewed and are approved for release.

Stephen Chan for

Darrell C. Cain
Regional Director

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REPORT OF LABORATORY ANALYSIS

FOOTNOTES
for page 1

October 26, 1993
PACE Project Number: 431015520

Client Reference: BP Station # 11126

MDL Method Detection Limit
ND Not detected at or above the MDL.

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THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

Mr. Bill Howell
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QUALITY CONTROL DATA

October 26, 1993
PACE Project Number: 431015520

Client Reference: BP Station # 11126

PURGEABLE FUELS AND AROMATICS
Batch: 70 25820
Samples: 70 0173655

METHOD BLANK:

Parameter	Units	MDL	Method Blank
TOTAL FUEL HYDROCARBONS, (LIGHT):			-
Purgeable Fuels, as Gasoline (EPA 8015M	ug/L	50	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020M)			-
Benzene	ug/L	0.5	ND
Toluene	ug/L	0.5	ND
Ethylbenzene	ug/L	0.5	ND
Xylenes, Total	ug/L	0.5	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Purgeable Fuels, as Gasoline (EPA 8015M	ug/L	50	1000	112%	112%	0%
Benzene	ug/L	0.5	100	99%	99%	0%
Toluene	ug/L	0.5	100	104%	103%	0%
Ethylbenzene	ug/L	0.5	100	103%	102%	0%
Xylenes, Total	ug/L	0.5	300	105%	103%	1%

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FOOTNOTES
for page 3

October 26, 1993
PACE Project Number: 431015520

Client Reference: BP Station # 11126

MDL	Method Detection Limit
ND	Not detected at or above the MDL.
RPD	Relative Percent Difference

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431015.520

BP

CHAIN OF CUSTODY

No. 00437 Page 1 of 1

CONSULTANT'S NAME	ADDRESS	CITY	STATE	ZIP CODE
Alisto Engineering	1777 Oakland Blvd #200	Walnut Creek	Ca	94596

BP SITE NUMBER	BP CORNER ADDRESS/CITY	CONSULTANT PROJECT NUMBER
11126	Emeryville, Ca	10-061-02/001

CONSULTANT/PROJECT MANAGER	PHONE NUMBER	FAX NUMBER	CONSULTANT CONTRACT NUMBER
Bill Howell	(510) 295-1650	295-1823	Alisto F937603

BP CONTACT	BP ADDRESS	PHONE NUMBER	FAX NO.
	Tukwila, WA		

LAB CONTACT	LABORATORY ADDRESS	PHONE NUMBER	FAX NO.
Pace Inc.	Novato, Ca	(415) 883-6100	883-2673

SAMPLED BY (Please Print Name)	SAMPLED BY (Signature)	SHIPMENT DATE	SHIPMENT METHOD
Larry Buenvenida	[signature]		Courier

AIRBILL NUMBER

TAT: ☐ 24 Hours ☐ 48 Hours ☐ 1 Week ☒ Standard 2 Weeks

ANALYSIS REQUIRED

SAMPLE DESCRIPTION	COLLECTION DATE / COLLECTION TIME	MATRIX SOIL/WATER	CONTAINERS NO.	TYPE (VOL.)	PRESERVATIVE / LAB SAMPLE #	TPH-G / BTEX	COMMENTS
MW-5	10/13/93	W	3	VOAs HCL pres.	173655	X	

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
[signature]	10/15/93	1500	Donald Dharshi Pace	10/15/93	1500
Donald Dokarshi Pace	10/15/93	1605	Sandra Briones Pace	10/15	1605

ADDITIONAL COMMENTS

5/13

CLV-16722

Distribution: White - Original (with Data) Yellow - BP Pink - Lab Blue - Consultant Field Staff