BP OIL

BP Oil Company
16400 Southcenter Parkway, Suite 301
Tukwila, Washington 98188
(206) 575-4077

[redacted]

Alameda County Health Care Services Agency
Division of Hazardous Materials
Attention Mr. Brian Oliva
80 Swan Way, Room 200
Oakland, CA 94621

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

RE: **BP Oil Site No. 11126**
1700 Powell Street
Emeryville, CA

Gentlemen:

Attached please find a report describing a recent investigation we undertook at the referenced location. Based on the results of this investigation, we will perform additional investigation as necessary to define the extent of the release. We will keep you informed as developments warrant. Please give me a call in the event you wish to discuss this matter further. I can be reached at (206) 586-8349.

Sincerely,

Scott T. Hooton
Environmental Resources Management

attachment

cc: site file

PRELIMINARY SITE ASSESSMENT REPORT

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

Project No. 10-061

January 1993

PRELIMINARY SITE ASSESSMENT REPORT

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

Project No. 10-061

Prepared for:

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

Prepared by:

Alisto Engineering Group
1000 Burnett Avenue, Suite 420
Concord, California

January 1993

Brady Nagle
Project Manager

Al Sevilla, P.E.
Principal

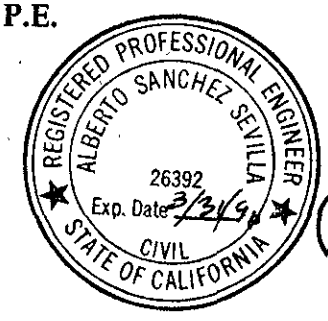


TABLE OF CONTENTS

1.0 INTRODUCTION

BP Oil Company retained Alisto Engineering Group in September 1992 to conduct a preliminary site assessment at BP Oil Company Service Station No. 11126, 1700 Powell Stre. Emeryville, California. A site vicinity map is shown in Figure 1.

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/or groundwater at the site, if any, and to determine the appropriate courses of action to comply with applicable laws and regulations.

The tasks performed during the assessment included the following:

- Conducted a sensitive receptors survey.
- Drilled and logged exploratory soil borings and collected soil samples.
- Installed four groundwater monitoring wells, MW-1 through MW-4.
- Developed and surveyed the monitoring wells and collected groundwater samples.
- Analyzed the soil and groundwater samples for specific hydrocarbon constituents.
- Analyzed the data and analytical results and prepared this report presenting the findings.

The above tasks and related field and sampling activities were performed in accordance with the requirements of the Alameda County Health Services Agency, 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 located on the northwest corner of the intersection of Powell Street and Christie Avenue, Emeryville, California. The site is presently an operating service station with three underground fuel storage tanks and one underground used oil tank. Refer to Figure 2 for the layout of the site and the locations of underground fuel storage tanks and dispenser islands.

The properties in the immediate vicinity of the site are a mixture of residential and commercial developments. South of the site and across Powell Street is Powell Street Plaza, a retail commercial development with a number of groundwater monitoring wells onsite and around its perimeter. Immediately east of Powell Street Plaza and approximately 1,000 feet southeast of the BP Oil Company site are monitoring wells installed in the immediate vicinity of Harcros Pigments, located at 4650 Shell Mound Street.

1.3 Sensitive Receptors Survey

A sensitive receptors survey was performed to identify nearby environmental elements land uses that may affect or be affected by the BP Oil Company site. Results of the sensi receptors survey are presented in Appendix A.

2.0 FIELD METHODS

The following are the procedures and methods used during field activities:

2.1 Soil Boring Drilling and Sampling

Before drilling, a permit was acquired from the Alameda County Flood Control and Water Conservation District (Zone 7), a copy of which is presented in Appendix B. On October 20, 199[redacted] soil exploratory borings were drilled at the site to depths ranging from 4 to 20 feet below grade. Drilling activities were performed by Great Sierra Exploration Drilling Company of Union City, California, using a truck-mounted Mobile B-57 drilling rig equipped with 8-inch-diameter, hollow-stem augers. Soil Boring B-2 was drilled in the vicinity of the underground fuel storage tanks; B-3 was drilled in the vicinity of the underground fuel storage tanks and dispenser islands; B-4 was drilled in the vicinity of the underground used oil storage tank; and B-5 was drilled in the vicinity of the dispenser islands. Soil Borings B-1, B-3a, B-3b, and B-5a were abandoned due to auger refusal, subsurface interference, or to prevent penetrating a competent clay interval. These borings were backfilled to grade with neat cement using the pipe tremie method. The locations of the soil borings are shown in Figure 2. Drilling and soil sampling procedures are presented in Appendix C.

Boring logs were prepared using the Unified Soil Classification System. They include a description of soil characteristics such as color, moisture, consistency, and field readings using an organic vapor meter. The boring logs are presented in Appendix D.

2.2 Monitoring Well Installation and Construction

Soil Borings B-2, B-3, B-4, and B-5 were converted into Monitoring Wells MW-1 through MW-4, in accordance with the field procedures for groundwater monitoring well installation presented in Appendix C. The wells were constructed with clean, 2-inch-diameter, flush-threaded, Schedule 40, polyvinyl chloride blank casing and 0.010-inch slotted casing to a depth of 12 feet below grade. The locations of the monitoring wells are shown in Figure 2. Well construction details are included on the boring logs presented in Appendix D.

2.3 Monitoring Well Development and Sampling

Well development and sampling procedures were conducted in accordance with the guidelines of Zone 7 and the RWQCB. Field procedures for groundwater monitoring well development and sampling are presented in Appendix E.

The monitoring wells were developed on October 27, 1992. Before development, ea[illegible]ell was inspected for the presence or absence of free-floating product. The wells were de[illegible]pe[illegible] by removing at least 10 casing volumes, or until groundwater was relatively free of sedi[illegible]nt, by alternately using a surge block and pump.

To ensure that the groundwater sample was representative of the aquifer, the wells were purged of 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 F.

2.4 Groundwater Level Monitoring and Well Surveying

The monitoring 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 November 4, 1992, the depth to groundwater in the wells was measured from the top of the well 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 E, and a graphical interpretation of the groundwater gradient beneath the site is shown in Figure 2.

3.0 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.

Soil and groundwater samples were analyzed for the following:

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

Soil and groundwater samples collected from the borings and monitoring wells in the vicinity of the underground used oil tank were additionally analyzed for the following:

- Total petroleum hydrocarbons as diesel (TPH-D) using EPA Methods 3550/8015
- Total oil and grease using EPA Method 5520
- Halogenated volatile organic compounds using EPA Method 8010

Laboratory results for the groundwater and soil samples are summarized in Tables 1 and 2, and the official laboratory reports and chain of custody records are included in Appendix G. Concentrations of petroleum hydrocarbons in the soil and groundwater are shown in Figures 3 and 4.

4.0 DISCUSSION OF RESULTS

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

- During drilling, groundwater was encountered in the soil borings at approximately 6 feet below grade, and stabilized at approximately the same depth.
- Soil types encountered at the site generally consisted of gravelly sand from grade to approximately 3 feet below grade underlain by approximately 3 feet of sandy silt. Silty clay was encountered from approximately 6 to 16 feet below grade interbedded with a silty sand stringer from approximately 9 to 11 feet below grade. Sandy silt underlain by silty sand was encountered in B-1 from 16 to 20 feet below grade.
- Analysis of soil samples collected from three of the borings at between 4 and 7 feet below grade detected TPH-G at concentrations of up to 280 parts per million and BTEX constituents.
- No free product or sheen was observed in any of the monitoring wells.
- Groundwater elevation data indicate a gradient of approximately 0.02 foot per foot in a general southwest direction across the site.
- TPH-G and benzene were detected in the groundwater samples collected from the four monitoring wells at concentrations of up to 12,000 and 3,900 parts per billion (ppb).
- TPH-D at a concentration of 690 ppb was detected in the groundwater sample collected from Monitoring Well MW-3.

TABLES

TABLE 1 - SUMMARY OF RESULTS OF GROUNDWATER ANALYSIS
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	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	7.73 Surveyed 4-12	4.96	2.77	5300	---	1100	480	ND<0.5	1500	---	---	PACE
MW-2	11/04/92	8.56 5-12	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-3	11/04/92	8.26 5-12	6.38	1.88	200	690	1.6	ND<0.5	ND<0.5	1.1	ND<5000	ND (d)	PACE
MW-4	11/04/92	8.11 5-12	6.66	1.45	340	---	4.5 (e)	ND<0.5	4.3	ND<0 5	---	---	PACE
QC-2 (f)	11/05/92	---	---	---	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 limits
---	Not analyzed
Pace	Pace, Incorporated

NOTES:

(a) Top of casing elevation for all wells was 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 of MW-2.

(d) Various detection limits; see laboratory reports.

(e) A peak eluting earlier than benzene and suspected to be methyl tert butyl ether was present at approximately 190 ppb.

(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
B-2	4	10/20/92	32	---	0.94	1.8	0.53	2.2	---		---	PACE
B-3	5	10/20/92	2.6	---	0.019	0.13	0.06	0.3	---		---	PACE
B-4	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
B-5	5.5	10/20/92	280	---	0.42	0.58	3.8	1.6	---		---	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 limits

NOTES:

(a) Various detection limits; see laboratory reports.

FIGURES

N

0 1000 2000

SCALE IN FEET

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

FIGURE 1

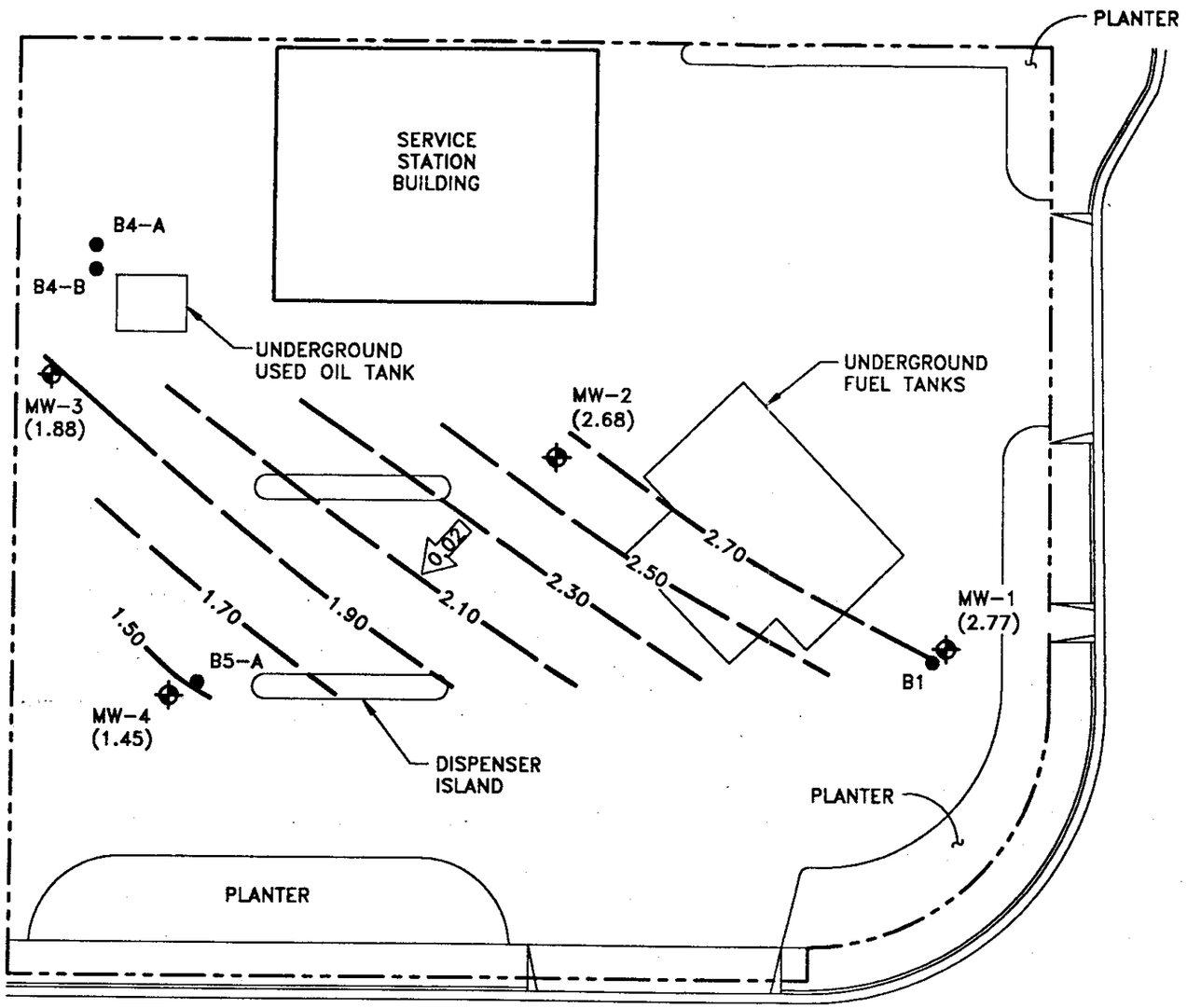
SITE VICINITY MAP

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

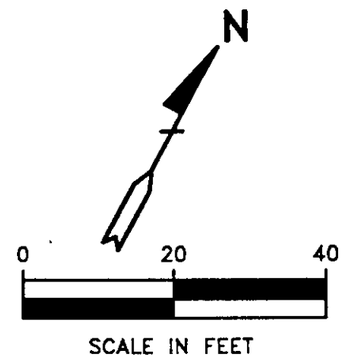
ALISTO PROJECT NO. 10-061

ALISTO ENGINEERING GROUP
CONCORD, CALIFORNIA

10061011F.DWG 10-2-01 SMF 1:1



POWELL STREET



LEGEND:

- GROUNDWATER MONITORING WELL
- BORING LOCATION
- (1.88) GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL
- 1.50 GROUNDWATER ELEVATION CONTOUR IN FEET ABOVE MEAN SEA LEVEL (CONTOUR INTERVAL – 0.20 FOOT).
- 0.02 CALCULATED GROUNDWATER GRADIENT DIRECTION AND MAGNITUDE

FIGURE 2

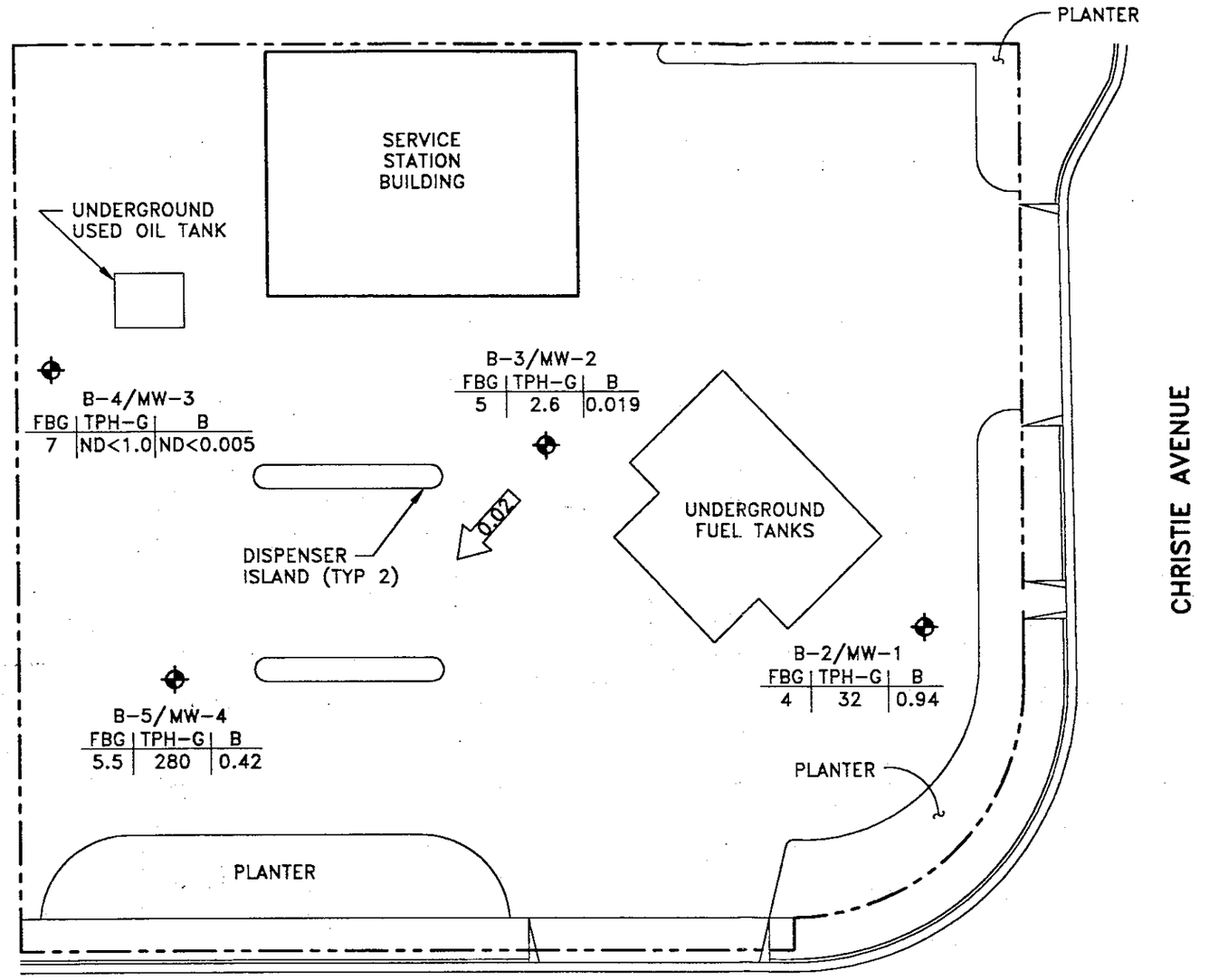
POTENTIOMETRIC GROUNDWATER ELEVATION CONTOUR MAP (NOVEMBER 4, 1992)

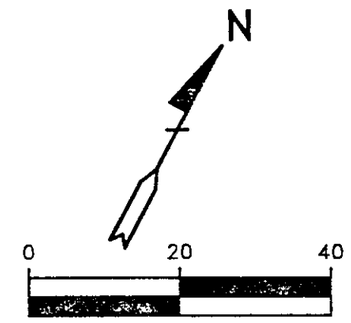
BP OIL SERVICE STATION NO. 11126
1700 POWELL STREET
EMERYVILLE, CALIFORNIA

PROJECT NO. 10-061

ALISTO ENGINEERING GROUP
CONCORD, CALIFORNIA

10061018.DWG 11-30-92 JWB 1"=40'





LEGEND:

⊕	SOIL BORING/GROUNDWATER MONITORING WELL
FBG	FEET BELOW GRADE
TPH-G	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE IN PARTS PER BILLION
B	BENZENE IN PARTS PER BILLION
ND	NOT DETECTED ABOVE REPORTED DETECTION LIMIT
0.02 →	CALCULATED GROUNDWATER GRADIENT DIRECTION AND MAGNITUDE

FIGURE 3

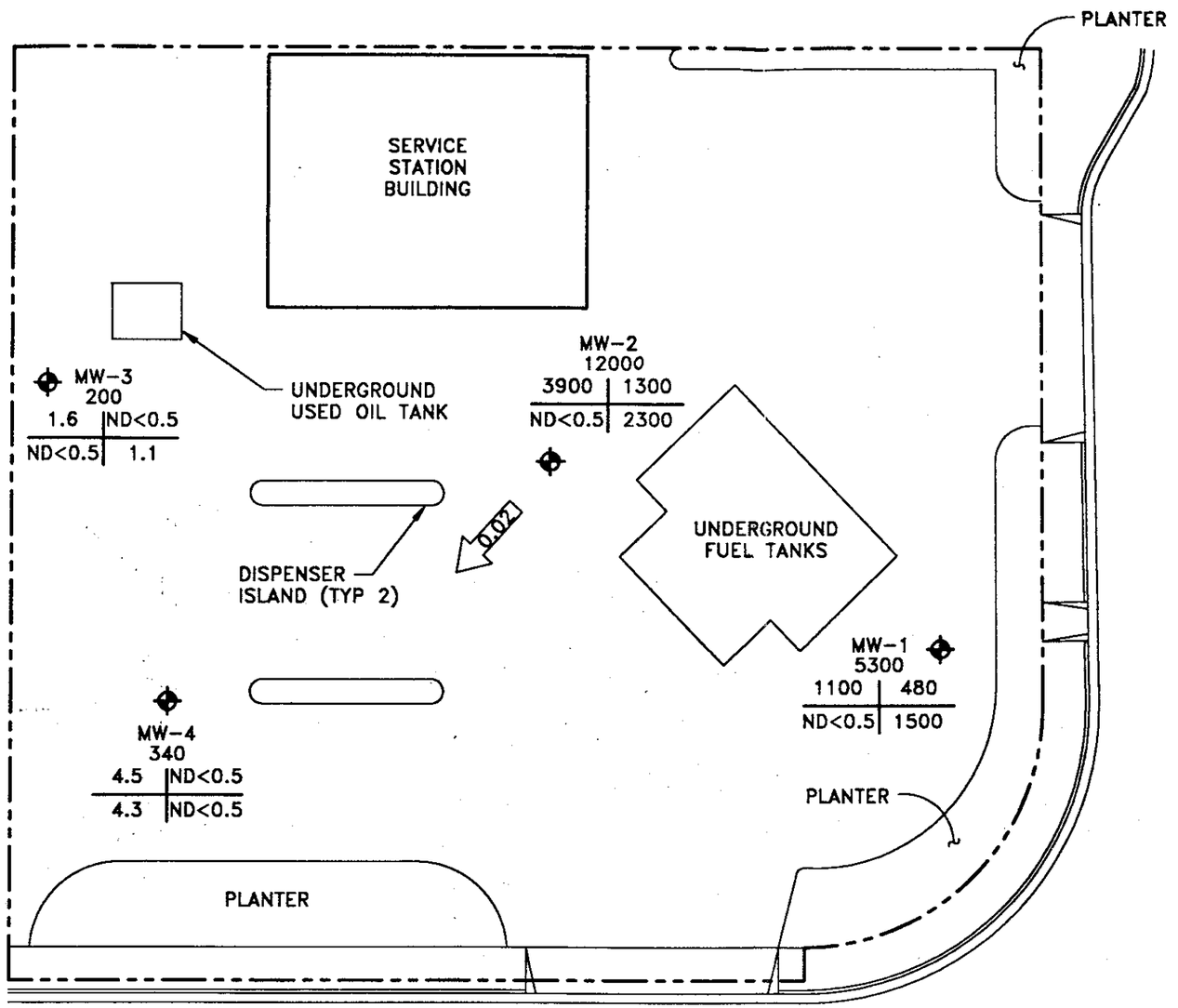
CONCENTRATIONS OF PETROLEUM HYDROCARBONS IN SOIL (OCTOBER 20, 1992)

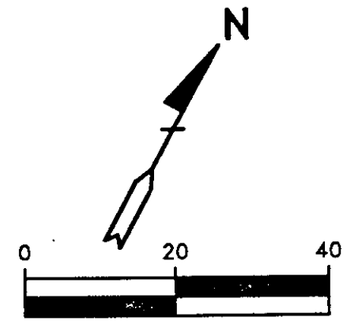
BP OIL SERVICE STATION NO. 11126
1700 POWELL STREET
EMERYVILLE, CALIFORNIA

PROJECT NO. 10-061

ALISTO ENGINEERING GROUP
CONCORD, CALIFORNIA

10061011.DWG 11-30-92 JWB 1=240





LEGEND:

⊕	GROUNDWATER MONITORING WELL
TPH-G / B | T / E | X	CONCENTRATION OF CONSTITUENTS IN PARTS PER BILLION (PPB)
TPH-G	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	TOTAL XYLENES
ND	NOT DETECTED ABOVE REPORTED DETECTION LIMIT
0.02 →	CALCULATED GROUNDWATER GRADIENT DIRECTION AND MAGNITUDE

FIGURE 4

CONCENTRATIONS OF PETROLEUM HYDROCARBONS IN GROUNDWATER (NOVEMBER 4, 1992)

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

PROJECT NO. 10-061

ALISTO ENGINEERING GROUP
CONCORD, CALIFORNIA

1008101F.DWG 11-30-92 JMB 1=240

APPENDIX A

SENSITIVE RECEPTORS SURVEY

SENSITIVE RECEPTORS SURVEY
Site Survey and Literature Research

Store No: BP Oil Company Service Station No. 11126
Location: 1700 Powell Street
City/State San Francisco, California

I. Provide answers to the following questions:

a. Is a public water supply well within 2500 ft? (y/(n))
If yes, Distance (ft)_____

b. Is a private water supply well within 1000 ft? (y/(n))
If yes, Distance (ft)_____

c. Is a subway within 1000 ft? (y/(n))
If yes, Distance (ft)_____

d. Is a basement within 1000 ft? (y/(n))
If yes, Distance (ft)_____

e. Is a School within 1000 ft? (y/(n))
If yes, Distance (ft)_____

f. Is a surface body of water within 1000 ft? ((y)/n)
If yes, Distance (ft) 1,000

II. Describe type of local water supply:

Public
*Supplier's Name East Bay Municipal Utility District
*Supplier's Source Imported
*Distance to Site ---
Private ---

III. Aquifer Classification, if available:

_____ Class I: Special Ground Waters
Irreplaceable Drinking Water Sources
Ecologically Vital

_____ Class II: Current and Potential Drinking Water

X Class III: Not Potential Source of Drinking Water

IV. Describe observation wells, if any:

Number 0
Free Product _____(y/(n))

V. Signature of Preparer Ted Moore Date 12/7/92

APPENDIX B

PERMIT

10-061

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

5997 PARKSIDE DRIVE ♦ PLEASANTON, CALIFORNIA 94566 ♦ (415) 484-2600

GROUNDWATER PROTECTION ORDINANCE PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT 1700 Powell Street
Emeryville CA

CLIENT
Name BP Oil Company
Address 16400 Southcenter Pkwy Phone (206) 394-5246
City Tukwila CA Zip 98188

APPLICANT
Name Ted Moise
Alisto Engineering Group
Address 1000 Burnett Avenue Phone (510) 798-4080
City Concord CA Zip 94520

TYPE OF PROJECT
Well Construction
Cathodic Protection ___
Water Supply ___
Monitoring V
Geotechnical Investigation
General ___
Contamination ___
Well Destruction ___

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

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

DRILLER'S LICENSE NO. C57-610487

WELL PROJECTS
Drill Hole Diameter 8 in. Maximum Depth 40 ft.
Casing Diameter 2 in. Number 3
Surface Seal Depth ~5 ft.

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

ESTIMATED STARTING DATE 10/7/92
ESTIMATED COMPLETION DATE 10/10/92

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

APPLICANT'S SIGNATURE Ted Moise Date 10/2/92

FOR OFFICE USE

PERMIT NUMBER 92496
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 Date 5 Oct 92

APPENDIX C

FIELD PROCEDURES FOR SOIL BORING DRILLING AND SAMPLING AND GROUNDWATER MONITORING WELL INSTALLATION

FIELD PROCEDURES
FOR
SOIL BORING DRILLING, SOIL SAMPLING, AND
GROUNDWATER MONITORING WELL INSTALLATION

Soil Boring Drilling Procedures

The soil borings were drilled using 8-inch-diameter, continuous-flight, hollow-stem augers. To avoid cross-contamination, drilling equipment in contact with potentially contaminated material was decontaminated before and after each use by steam cleaning. 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 selected 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, when representative, drill cuttings were described by Alisto Engineering personnel using the Unified Soil 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

The construction of groundwater monitoring wells was based on the stratigraphy encountered 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-inch-diameter PVC 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 6 inches below grade level. The casings, fittings, screens, and other components of the well construction 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 feet above the top of the screened section. The monitoring well was then developed in accordance with the procedures described in Appendix E. After well development, an additional filter pack was added to the annulus to approximately 1 foot above the top of the screened well casing. 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 D

BORING LOGS AND WELL CONSTRUCTION DETAILS

ALISTO ENGINEERING GROUP
CONCORD, CALIFORNIA

LOG OF BORING B-1

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: *N/A ft. 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
		Grout				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 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.
7,7,8							Same: no sand, minor silt, plant rootlets.
7,11,12			15				Plant rootlets, very fine- to fine-grained sand.
9,14,14						ML	sandy SILT: blue/brown, wet, very stiff, very fine- to medium- grained sand, minor clay, minor angular gravel to 1/2".
10,11 12,12			20			SM	silty SAND: brown, wet, medium dense, fine- to very coarse-grained sand, minor angular gravel to 1/2".
			25				
			30				

ALISTO ENGINEERING GROUP
CONCORD, CALIFORNIA

LOG OF BORING B-2/MW-1

SEE SITE PLAN

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

CLIENT: BP Oil Company

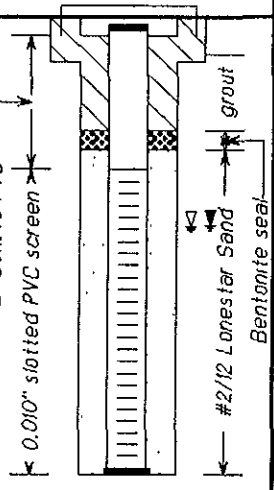
LOCATION: 1700 Powell Street, Emeryville, California

DRILLING METHOD: Hollow-stem Auger (8")

DRILLING COMPANY: Great Sierra Exploration CASING ELEVATION: 7.73 ' 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
							3" Asphalt.
						SW	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.
			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 three 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
CONCORD, CALIFORNIA

LOG OF BORING B-3/MW-2

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: 8.56 ' 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, damp, loose, fine- to very coarse-grained sand, gravel to 1", minor fines.
1,3,3	266	0.010" slotted PVC screen 2" Sch.40 PVC; #2/12 Lonestar Sand; Bentonite seal; grout	5			ML	sandy SILT: black, moist/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 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
CONCORD, CALIFORNIA

LOG OF BORING B-4a

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: Hand Auger

DRILLING COMPANY: Great Sierra Exploration CASING ELEVATION: N/A ft. 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
		Grout				SW	3" Asphalt.
							gravelly SAND: brown, damp, very loose, fine- to very coarse-grained sand, angular gravel to 1-1/2".
						ML	sandy SILT: black, damp, soft, fine- to medium-grained sand, minor clay, minor gravel to 1".
							Auger refusal at 2.5 Feet (Concrete slab).
			5				
			10				
			15				
			20				
			25				
			30				

ALISTO ENGINEERING GROUP
CONCORD, CALIFORNIA

LOG OF BORING B-4b

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: Hand Auger

DRILLING COMPANY: Great Sierra Exploration CASING ELEVATION: N/A ft. 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
		Grout					3" Asphalt.
						SW	gravelly SAND: brown, damp, very loose, fine- to very coarse-grained sand, angular gravel to 1-1/2".
						ML	sandy SILT: black, damp, soft, fine- to medium-grained sand, minor clay, minor gravel to 1".
							Auger refusal at 2.5 Feet (Concrete slab).
			5				
			10				
			15				
			20				
			25				
			30				

ALISTO ENGINEERING GROUP
CONCORD, 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: 8.26 ' 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	3" Asphalt. gravelly SAND: tan, damp, loose, medium- to very coarse-grained sand, gravel to 1".
50/5"			5	⊠			Concrete slab.
4,8,8	0.2			■		SM	silty SAND: black, wet, loose, very fine- to medium-grained sand, abundant silt, minor gravel to 1/2".
3,4,5			10				
4,3,4						CL	silty CLAY: blue/green, damp, medium firm, minor silt, rootlets.
			15				
			20				
			25				
			30				

WELL DIAGRAN: 0.010" slotted PVC screen; 2" Sch.40 PVC; #2/12 Lonestar Sand; Bentonite seal; grout

ALISTO ENGINEERING GROUP
CONCORD, CALIFORNIA

LOG OF BORING B-5a

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: *Hand Auger*

DRILLING COMPANY: *Great Sierra Exploration* CASING ELEVATION: *N/A ft. 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
		grout	0			SW	3" Asphalt. gravelly SAND: tan, damp, loose, fine- to very coarse-grained sand, rounded gravel to 3/4".
			5				Boring terminated at 5', (8" clay pipe).
			10				
			15				
			20				
			25				
			30				

ALISTO ENGINEERING GROUP
CONCORD, 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*

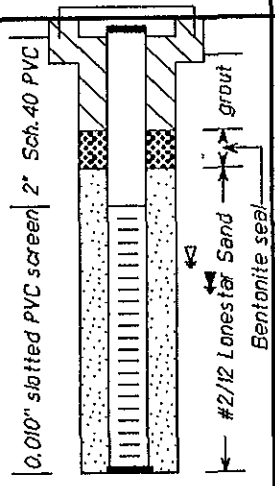
LOCATION: *1700 Powell Street, Emeryville, California*

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

DRILLING COMPANY: *Great Sierra Exploration* CASING ELEVATION: *8.11 ' 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: 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.
5,6,8			10			SM	silty SAND: gray/brown, damp, soft, minor very fine- to medium-grained sand, abundant silt, minor clay.
4,4,8						CL	silty CLAY: blue/green, damp, medium firm, minor silt.
			15				
			20				
			25				
			30				



APPENDIX E

FIELD PROCEDURES FOR GROUNDWATER MONITORING WELL DEVELOPMENT, 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. The well was developed during drilling before installation of the bentonite spacer and neat cement seal. Additionally, monitoring 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 activities continued until the groundwater was relatively free of sediments and/or stabilization of pH, electrical conductivity, and temperature parameters was achieved. Well development fluids were placed into properly labeled Department of Transportation approved drums for disposal.

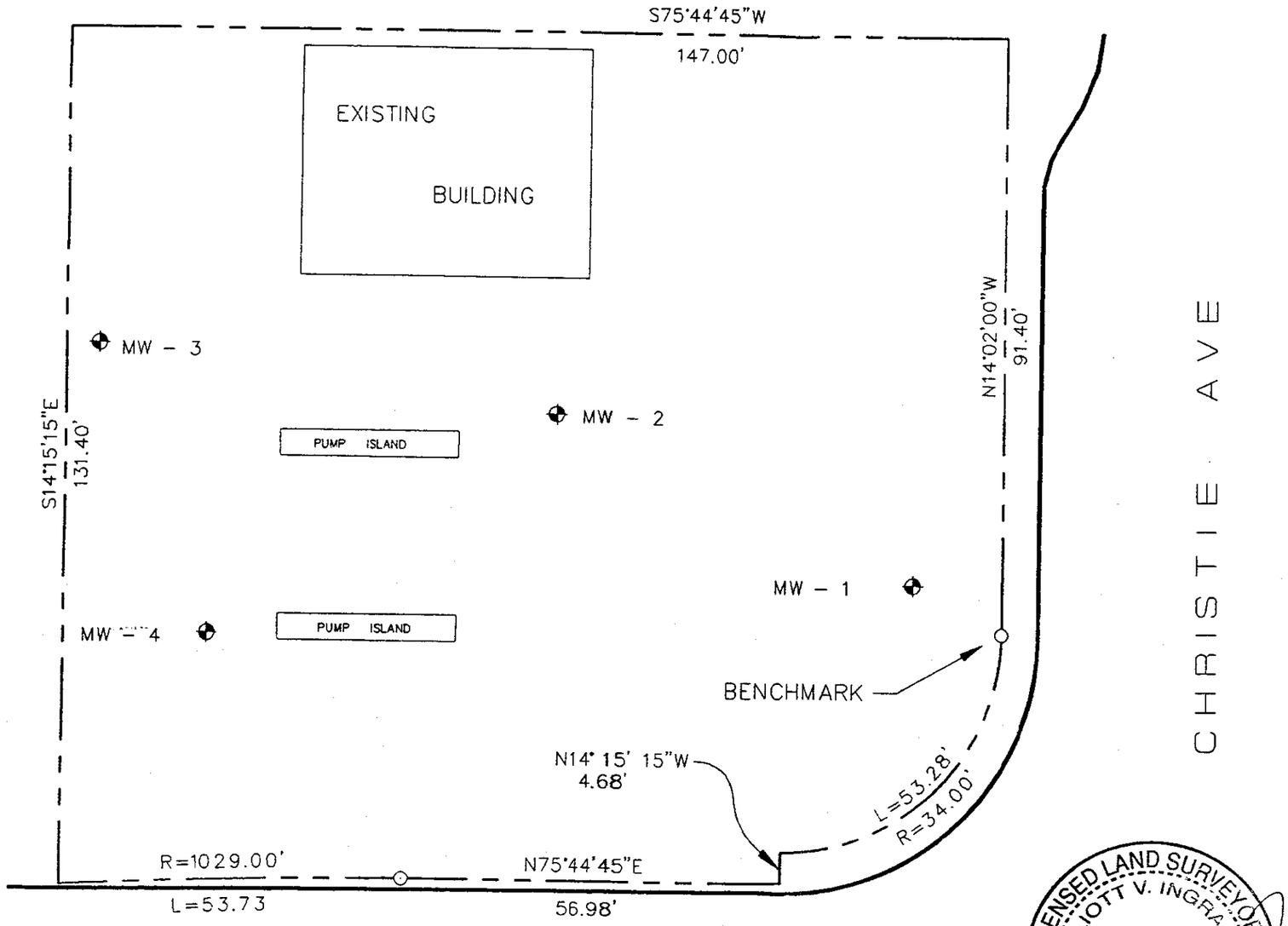
Groundwater Level Measurement

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

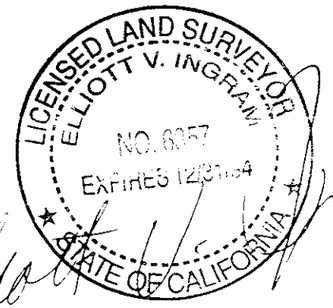
Groundwater Monitoring Well Sampling

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. This purging was accomplished using a pump.

The groundwater samples were collected using a disposable bailer, and carefully transferred into the 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.



NOTE:
THIS IS NOT A SURVEY OF THE BOUNDARY.
ALL REPRESENTATIONS HEREIN ARE BASED
UPON RECORD INFORMATION.



SCALE: 1" = 20'

MONITORING WELL ELEVATIONS	
MW - 1	7.73
MW - 2	8.56
MW - 3	8.26
MW - 4	8.11

LEGEND

MONITORING WELL

BENCHMARK
5/8" REBAR & CAP AT PROP. LINE RETURN. EL= 8.11

BP STATION NO. 11126
EMERYVILLE CA.

MONITORING WELL LOCATIONS

NOVEMBER 13, 1992

ELLIOTT V. INGRAM
LAND SURVEYOR
1310 LA VISTA CONCORD, CA. 94521
(510) 689 - 4578

ALISTO ENGINEERING GROUP
CONCORD, CALIFORNIA

APPENDIX F

WATER SAMPLING FIELD SURVEY FORMS

Birch Technical Services

116 Liberty Street
Santa Cruz, Ca 95060
(408) 459-0718

Monitoring Well Development Form

Well Number: MW-1

Project Number: 10-061
Station Number: BP11126
Date: 10/27/92

Sampled by: Dan Birch

WELL PURGING

PURGE VOLUME

Casing Diameter (inches) / Volume Factors:

⊗2"	O3"	O4"	O4.5"	O6"	O____
0.1632	0.3672	0.6528	0.826	1.469	____

Total Depth of Well Prior to Development 11.62 Initial Water Level: 5.04

Total Depth of Well After Development 11.62 Final Water Level 10.60

DEVELOPMENT METHOD:
⊗Honda Pump
⊗Disposable PolyTubing(13 ft)
ODisposable PVC Bailer(s)(____)
OOther_____

Total Volume Purged: 8 Time Elapsed: 30

Subjective Analysis Prior to Development
SHEEN OYes ⊗No

Subjective Evaluation of Well Production
OGood OModerate ⊗Poor

Product Thickness None (ft)

Depth to Product None (ft)

Calculated Purge Volume:

11.62 (Total Depth) - 5.04 (Water Level) = 6.58 x .16 (Well Vol. Fac.) = 1.05 x 10 (#of vol. to Purge) = 10.53 (gallons) Calculated Purge Volume

COMMENTS: Purged dry @ 2 gallons, 4 gallons, 6 gallons and 8 gallons.

SUBJECTIVE ANALYSIS DURING DEVELOPMENT

Gallons Removed	Time	Black	Grey	Dark Brown	Light Brown	Clear	
2	1751					X	
4	1759					X	
6	1804					X	
8	1807					X	

SUSPENDED SAND & SILT

YES	NO
	X
	X
	X
	X

Birch Technical Services

116 Liberty Street
Santa Cruz, Ca 95060
(408) 459-0718

Monitoring Well Development Form

Well Number: MW-2

Project Number: 10-061
Station Number: BP1126
Date: 10/27/92

Sampled by: DAN BIRCH

WELL PURGING

PURGE VOLUME

Casing Diameter (inches) / Volume Factors:

⊗2"	O3"	O4"	O4.5"	O6"	O____
0.1632	0.3672	0.6528	0.826	1.469	____

Total Depth of Well Prior to Development 11.83 Initial Water Level: 5.93

Total Depth of Well After Development 11.91 Final Water Level 10.71

Total Volume Purged: 10 Time Elapsed: 12

DEVELOPMENT METHOD:
⊗ Honda Pump
⊗ Disposable PolyTubing(12 ft)
O Disposable PVC Bailer(s)(____)
O Other____

Subjective Analysis Prior to Development
SHEEN OYes ⊗No
Product Thickness None (ft)
Depth to Product None (ft)

Subjective Evaluation of Well Production
OGood OModerate ⊗Poor

Calculated Purge Volume:

11.83 (Total Depth) - 5.93 (Water Level) = 5.9 x .16 (Well Vol. Fac.) = 0.94 x 10 (#of vol. to Purge) = 9.44 (gallons) Calculated Purge Volume

COMMENTS:

SUBJECTIVE ANALYSIS DURING DEVELOPMENT

Gallons Removed	Time	Black	Grey	Dark Brown	Light Brown	Clear	
3	1810		X				
6	1814		X				
9	1820		X				
10	1822					X	

SUSPENDED SAND & SILT

YES	NO
	X
	X
	X
	X

Birch Technical Services

116 Liberty Street
Santa Cruz, Ca 95060
(408) 459-0718

Project Number: 10-061
Station Number: BP11126
Date: 10/27/92

Monitoring Well Development Form

Well Number: MW-3

Sampled by: Dan Birch

WELL PURGING

PURGE VOLUME

Casing Diameter (inches) / Volume Factors:

⊗2"	O3"	O4"	O4.5"	O6"	O____
0.1632	0.3672	0.6528	0.826	1.469	____

Total Depth of Well Prior to Development 12.08 Initial Water Level: 6.43

Total Depth of Well After Development 12.08 Final Water Level 10.76

Total Volume Purged: 9 Time Elapsed: 15

Subjective Evaluation of Well Production
OGood OModerate ⊗Poor

DEVELOPMENT METHOD:
⊗Honda Pump
⊗Disposable PolyTubing(14 ft)
ODisposable PVC Bailer(s)(____)
OOther____

Subjective Analysis Prior to Development
SHEEN OYes ⊗No

Product Thickness None (ft)

Depth to Product None (ft)

Calculated Purge Volume:

12.08 (Total Depth) - 6.43 (Water Level) = 5.65 x .16 (Well Vol. Fac.) = 0.90 x 10 (#of vol. to Purge) = 9.04 (gallons) Calculated Purge Volume

COMMENTS: Purge dry @ 2, 4, 6, 8 and 9 gallons. Needed to add new plug.

SUBJECTIVE ANALYSIS DURING DEVELOPMENT

Gallons Removed	Time	Black	Grey	Dark Brown	Light Brown	Clear	
2	1645	X					
4	1649	X					
6	1652		X				
8	1655		X				
9	1659		X				

SUSPENDED SAND & SILT

YES	NO
X	
X	
X	
X	
	X

Birch Technical Services

116 Liberty Street
Santa Cruz, Ca 95060
(408) 459-0718

Monitoring Well Development Form

Well Number: MW-4

Project Number: 10-061
Station Number: BP11126
Date: 10/27/92

Sampled by: Dan Birch

WELL PURGING

PURGE VOLUME

Casing Diameter (inches) / Volume Factors:

⊗ 2"	O3"	O4"	O4.5"	O6"	O____
0.1632	0.3672	0.6528	0.826	1.469	_____

Total Depth of Well Prior to Development: 11.06
Initial Water Level: 6.45

Total Depth of Well After Development: 11.06
Final Water Level: 10.91

DEVELOPMENT METHOD:
⊗ Honda Pump
O Disposable PolyTubing(12 ft)
O Disposable PVC Bailer(s)(____)
O Other_____

Total Volume Purged: 8
Time Elapsed: 42

Subjective Analysis Prior to Development
SHEEN OYes ⊗No

Subjective Evaluation of Well Production
OGood OModerate ⊗Poor

Product Thickness None (ft)

Depth to Product None (ft)

Calculated Purge Volume:

11.06 (Total Depth) - 6.45 (Water Level) = 4.61 x .16 (Well Vol. Fac.) = 0.74 x 10 (#of vol. to Purge) = 7.40 (gallons) Calculated Purge Volume

COMMENTS: Purged dry @ 1 gallon.

SUBJECTIVE ANALYSIS DURING DEVELOPMENT

Gallons Removed	Time	Black	Grey	Dark Brown	Light Brown	Clear	
1	1705	X					
2	1710		X				
3	1720		X				
4	1726		X				
5	1731		X				
6	1735		X				
8	1745		X				

SUSPENDED SAND & SILT

YES	NO
X	
	X
	X
	X
	X
	X
	X

Birch Technical Services

116 Liberty Street
Santa Cruz, Ca 95060
(408) 459-0718

GROUNDWATER SAMPLING FORM

Well Number: MW-1

Project Number: 10-061
Station Number: BP11126
Date: 11/4/92

Sample Type: XGroundwater OTrip Blank ODuplicate of _____
Sampled by: DAN BIRCH

WELL PURGING

PURGE VOLUME

Casing Diameter (inches) / Volume Factors:

X 2"	O3"	O4"	O4.5"	O6"	O____
0.1632	0.3672	0.6528	0.826	1.469	_____

Total Depth of Well 11.62 Initial Water Level: 4.96

Total Volume Purged: 4 Time Elapsed: 9

PURGE METHOD:
X Honda Pump
X Disposable PolyTubing(12 ft)
O Disposable PVC Bailer(s)(____)
O Other_____

Calculated Purge Volume:

11.62 (Total Depth) - 4.96 (Water Level) = 6.66 x .16 (Well Vol. Fac.) = 1.06 x 3 (#of vol. to Purge) = 3.20 (gallons) Calculated Purge Volume

Subjective Analysis Prior to Purging

SHEEN: OYes XNo
Depth to Product: — (ft)
Product Thickness: — (ft)

COMMENTS:

PARAMETER EQUIPMENT CALIBRATION

pH Meter #: 9112 Time: 1101
Solution pH 7.00 7 at 61.0 °F
Solution pH 4.00 4 at 61.0 °F
Solution pH 10.00 10 at 61.0 °F
Water Level Meter#: 10337

SAMPLING METHOD

XPVC Disposable Bailer
O Teflon Bailer
O Other:_____

Time Sampled (24 hour clock): 1340

WELL SAMPLING PARAMETERS

Gallons Removed	Time	Temp °F	pH	Cond. (umhos/cm)		Analysis Required	No. of	Container Type	Preservatives
1	1330	72.5	8.79	3.35		EPA 601		VOA's	
2	1333	73.3	7.96	3.25	X	TPH-G/BTEX	3	VOA's	HCl
3	1336	73.1	7.99	3.21		TPH- Diesel		Amber Liter	
4	1339	73.2	7.91	3.24		TOG 5520 BF		Amber Liter	H_2SO_4

Birch Technical Services

116 Liberty Street
Santa Cruz, Ca 95060
(408) 459-0718

GROUNDWATER SAMPLING FORM

Well Number: MW-2

Project Number: 10-061
Station Number: 11126
Date: 11/4/92

Sample Type: X Groundwater O Trip Blank O Duplicate of _____

Sampled by: DAN BIRCH

WELL PURGING

PURGE VOLUME

Casing Diameter (inches) / Volume Factors:

X 2"	O3"	O4"	O4.5"	O6"	O____
0.1632	0.3672	0.6528	0.826	1.469	_____

Total Depth of Well 11.91 Initial Water Level: 5.88

Total Volume Purged: 3 Time Elapsed: 8

PURGE METHOD:
X Honda Pump
X Disposable PolyTubing(____ft)
O Disposable PVC Bailer(s)(____)
O Other_____

Calculated Purge Volume:

11.91 (Total Depth) - 5.88 (Water Level) = 6.03 x .16 (Well Vol. Fac.) = .96 x 3 (#of vol. to Purge) = 2.90 (gallons) Calculated Purge Volume

Subjective Analysis Prior to Purging

SHEEN O Yes X No — Depth to Product _____(ft) — Product Thickness _____ (ft)

COMMENTS:

PARAMETER EQUIPMENT CALIBRATION

pH Meter #: 9112 Time: 1601
Solution pH 7.00 7 at 61.0 °F
Solution pH 4.00 4 at 61.0 °F
Solution pH 10.00 10 at 61.0 °F
Water Level Meter#: 10337

SAMPLING METHOD

X PVC Disposable Bailer
O Teflon Bailer
O Other:_____

Time Sampled (24 hour clock) 1355

WELL SAMPLING PARAMETERS

Gallons Removed	Time	Temp °F	pH	Cond. (umhos/cm)		Analysis Required	No. of	Container Type	Preservatives
1	1347	70.0	6.60	3.19		EPA 601		VOA's	
2	1351	71.6	6.57	3.25	X	TPH-G/BTEX	3	VOA's	HCl
3	1355	71.7	6.60	3.24		TPH- Diesel		Amber Liter	
						TOG 5520 BF		Amber Liter	H_2SO_4

Birch Technical Services

116 Liberty Street
Santa Cruz, Ca 95060
(408) 459-0718

GROUNDWATER SAMPLING FORM

Well Number: MW-3

Project Number: 10-061
Station Number: 11126
Date: 11/4/92

Sample Type: XGroundwater OTrip Blank ODuplicate of _____

Sampled by: DAN BIRCH

WELL PURGING

PURGE VOLUME

Casing Diameter (inches) / Volume Factors:

X2"	O3"	O4"	O4.5"	O6"	O____
0.1632	0.3672	0.6528	0.826	1.469	____

Total Depth of Well 12.08 Initial Water Level: 6.38

Total Volume Purged: 3 Time Elapsed: 8

PURGE METHOD:
XHonda Pump
ODisposable PolyTubing(____ft)
ODisposable PVC Bailer(s)(____)
OOther_____

Calculated Purge Volume:

12.08 (Total Depth) - 6.38 (Water Level) = 5.7 x .16 (Well Vol. Fac.) = .91 x 3 (#of vol. to Purge) = 2.73 (gallons) Calculated Purge Volume

Subjective Analysis Prior to Purging

SHEEN OYes XNo Depth to Product ____(ft) Product Thickness ____(ft)

COMMENTS:

PARAMETER EQUIPMENT CALIBRATION

pH Meter #: 9112 Time: 1101
Solution pH 7.00 7 at 61.0 °F
Solution pH 4.00 4 at 61.0 °F
Solution pH 10.00 10 at 61.0 °F
Water Level Meter#: 10332

SAMPLING METHOD

XPVC Disposable Bailer
OTeflon Bailer
OOther:_____

Time Sampled (24 hour clock) 1240

WELL SAMPLING PARAMETERS

Gallons Removed	Time	Temp °F	pH	Cond. (umhos/cm)	Analysis Required	No. of	Container Type	Preservatives
1	1228	76.9	6.71	10.44	X EPA 601	3	VOA's	
2	1231	76.3	6.58	10.69	X TPH-G/BTEX	3	VOA's	HCl
3	1235	75.8	6.43	10.97	X TPH- Diesel	1	Amber Liter	
					X TOG 5520 BF	1	Amber Liter	H_2SO_4

Birch Technical Services

116 Liberty Street
Santa Cruz, Ca 95060
(408) 459-0718

GROUNDWATER SAMPLING FORM

Well Number: MW-4

Project Number: 10-061
Station Number: BP11126
Date: 11/4/92

Sample Type: X Groundwater O Trip Blank O Duplicate of _____

Sampled by: Dan Birch

WELL PURGING

PURGE VOLUME

Casing Diameter (inches) / Volume Factors:

X 2"	O3"	O4"	O4.5"	O6"	O____
0.1632	0.3672	0.6528	0.826	1.469	_____

Total Depth of Well 11.06 Initial Water Level: 6.66

Total Volume Purged: 3 Time Elapsed: 11

PURGE METHOD:
X Honda Pump
O Disposable PolyTubing(____ft)
O Disposable PVC Bailer(s)(____)
O Other_____

Calculated Purge Volume:

11.06 (Total Depth) - 6.66 (Water Level) = 4.40 x .16 (Well Vol. Fac.) = .70 x 3 (#of vol. to Purge) = 2.11 (gallons) Calculated Purge Volume

Subjective Analysis Prior to Purging

SHEEN O Yes X No — Depth to Product ___ (ft) — Product Thickness ___ (ft)

COMMENTS:

PARAMETER EQUIPMENT CALIBRATION

pH Meter #: 5112 Time: 1101
Solution pH 7.00 7 at 61 °F
Solution pH 4.00 4 at 61 °F
Solution pH 10.00 10 at 61 °F
Water Level Meter#: 10337

SAMPLING METHOD

X PVC Disposable Bailer
O Teflon Bailer
O Other:_____

Time Sampled (24 hour clock) 1320

WELL SAMPLING PARAMETERS

Gallons Removed	Time	Temp °F	pH	Cond. (umhos/cm)
1	1306	75.3	7.65	7.48
2	1310	75.5	7.72	8.17
3	1317	75.3	7.71	8.11

	Analysis Required	No. of	Container Type	Preservatives
	EPA 601		VOA's	
X	TPH-G/BTEX	3	VOA's	HCl
	TPH- Diesel		Amber Liter	
	TOG 5520 BF		Amber Liter	H_2SO_4

Birch Technical Services

116 Liberty Street
Santa Cruz, Ca 95060
(408) 459-0718

GROUNDWATER SAMPLING FORM

Project Number: 10-061
Station Number: BP 11126
Date: 11/4/92

Well Number: QC-1
Sample Type: OGroundwater OTrip Blank X Duplicate of MW-2
Sampled by: Dan Birch

WELL PURGING

PURGE VOLUME

Casing Diameter (inches) / Volume Factors:

O 2"	O3"	O4"	O4.5"	O6"	O____
0.1632	0.3672	0.6528	0.826	1.469	____

Total Depth of Well _____ Initial Water Level:_____

Total Volume Purged:_____ Time Elapsed:_____

PURGE METHOD:
O Honda Pump
ODisposable PolyTubing(____ft)
ODisposable PVC Bailer(s)(____)
OOther_____

Calculated Purge Volume:

_____ - _____ = _____ x _____ = _____ x _____ = _____(gallons)
Total Depth | Water Level | Well Vol. Fac. | #of vol. to Purge | Calculated Purge Volume

Subjective Analysis Prior to Purging

SHEEN OYes ONo
Depth to Product _____(ft)
Product Thickness _____ (ft)

COMMENTS:
Duplicate of MW-2

PARAMETER EQUIPMENT CALIBRATION

pH Meter #:_____ Time:_____
Solution pH 7.00 _____at _____°F
Solution pH 4.00_____at _____°F
Solution pH 10.00 _____ at _____°F
Water Level Meter#:_____

SAMPLING METHOD

OPVC Disposable Bailer
OTeflon Bailer
OOther:_____

Time Sampled (24 hour clock) 1358

WELL SAMPLING PARAMETERS

Gallons Removed	Time	Temp °F	pH	Cond. (umhos/cm)		Analysis Required	No. of	Container Type	Preservatives
						EPA 601		VOA's	
					X	TPH-G/BTEX	3	VOA's	HCl
						TPH- Diesel		Amber Liter	
						TOG 5520 BF		Amber Liter	H_2SO_4

Birch Technical Services

116 Liberty Street
Santa Cruz, Ca 95060
(408) 459-0718

GROUNDWATER SAMPLING FORM

Well Number: QC-2

Project Number: 10-061
Station Number: BP 11126
Date: 11/6/92

Sample Type: OGroundwater X Trip Blank ODuplicate of _____

Sampled by: Dan Birch

WELL PURGING

PURGE VOLUME

Casing Diameter (inches) / Volume Factors:

O 2"	O3"	O4"	O4.5"	O6"	O____
0.1632	0.3672	0.6528	0.826	1.469	_____

Total Depth of Well _____ Initial Water Level:_____

Total Volume Purged:_____ Time Elapsed:_____

PURGE METHOD:
O Honda Pump
ODisposable PolyTubing(____ft)
ODisposable PVC Bailer(s)(____)
OOther_____

Calculated Purge Volume:

_____ - _____ = _____ x _____ = _____ x _____ = _____(gallons)
Total Depth | Water Level | Well Vol. Fac. | #of vol. to Purge | Calculated Purge Volume

Subjective Analysis Prior to Purging

SHEEN OYes ONo | Depth to Product _____(ft) | Product Thickness _____ (ft)

COMMENTS:

Trip blank supplied by PACE.

PARAMETER EQUIPMENT CALIBRATION

pH Meter #:_____ Time:_____
Solution pH 7.00 _____at _____°F
Solution pH 4.00_____at _____°F
Solution pH 10.00 _____ at _____°F
Water Level Meter#:_____

SAMPLING METHOD

OPVC Disposable Bailer
OTeflon Bailer
OOther:_____

Time Sampled (24 hour clock) 1200

WELL SAMPLING PARAMETERS

Gallons Removed	Time	Temp °F	pH	Cond. (umhos/cm)		Analysis Required	No. of	Container Type	Preservatives
						EPA 601		VOA's	
					X	TPH-G/BTEX	3	VOA's	HCl
						TPH- Diesel		Amber Liter	
						TOG 5520 BF		Amber Liter	H_2SO_4

APPENDIX G

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 coolers 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.

10-061

pace INCORPORATED
THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

November 04, 1992

Mr. Brady Nagle
Alisto Engineering Group
1000 Burnett Ave., Ste. 420
Concord, CA 94520

RE: PACE Project No. 421022.515
Client Reference: BP Station # 11126

Dear Mr. Nagle:

Enclosed is the report of laboratory analyses for samples received October 22, 1992.

Footnotes are given at the end of the report.

If you have any questions concerning this report, please feel free to contact us.

Sincerely,

Stephanie Matzo

Stephanie Matzo
Project Manager

Enclosures

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883-2673

pace INCORPORATED
THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

Alisto Engineering Group
1000 Burnett Ave., Ste. 420
Concord, CA 94520

November 04, 1992
PACE Project Number: 421022515

Attn: Mr. Brady Nagle

Client Reference: BP Station # 11126

PACE Sample Number:			70 0232317	
Date Collected:			10/20/92	
Date Received:			10/22/92	
Client Sample ID:			B-2-4	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	10/30/92
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	4000	32000	10/30/92
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	10/30/92
Benzene	ug/kg wet	20	940	10/30/92
Toluene	ug/kg wet	20	1800	10/30/92
Ethylbenzene	ug/kg wet	20	530	10/30/92
Xylenes, Total	ug/kg wet	20	2200	10/30/92

REPORT OF LABORATORY ANALYSIS

Mr. Brady Nagle
Page 2

November 04, 1992
PACE Project Number: 421022515

Client Reference: BP Station # 11126

PACE Sample Number:			70 0232333	
Date Collected:			10/20/92	
Date Received:			10/22/92	
Client Sample ID:			B-3-5	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	10/30/92
Purgeable Fuels, as Gasoline (EPA 8015M)	mg/kg wet	100	2600(PPM)	10/30/92
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	10/30/92
Benzene	mg/kg wet	0.5	19 (PPM)	10/30/92
Toluene	mg/kg wet	0.5	130 (PPM)	10/30/92
Ethylbenzene	mg/kg wet	0.5	60 (PPM)	10/30/92
Xylenes, Total	mg/kg wet	0.5	300 (PPM)	10/30/92

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883-2673

Client Reference: BP Station # 11126

PACE Sample Number:			70 0232376	
Date Collected:			10/20/92	
Date Received:			10/22/92	
Client Sample ID:			B-4-7	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	10/30/92
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	10/30/92
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	10/30/92
Benzene	ug/kg wet	5.0	ND	10/30/92
Toluene	ug/kg wet	5.0	ND	10/30/92
Ethylbenzene	ug/kg wet	5.0	ND	10/30/92
Xylenes, Total	ug/kg wet	5.0	ND	10/30/92
EXTRACTABLE FUELS EPA 3550/8015				
Extractable Fuels, as Diesel	mg/kg	5.0	ND	10/28/92
Date Extracted			10/26/92	
OIL AND GREASE, SILICA GEL (LUFT)				
Oil and Grease, Gravimetric (SM5520)	mg/kg wet	50	ND	10/28/92
Date Extracted			10/27/92	
HALOGENATED VOLATILE COMPOUNDS EPA 8010				
Dichlorodifluoromethane	ug/kg	20	ND	10/26/92
Chloromethane	ug/kg	20	ND	10/26/92
Vinyl Chloride	ug/kg	20	ND	10/26/92
Bromomethane	ug/kg	20	ND	10/26/92
Chloroethane	ug/kg	20	ND	10/26/92
Trichlorofluoromethane	ug/kg	20	ND	10/26/92
1,1-Dichloroethene	ug/kg	5.0	ND	10/26/92
Methylene Chloride	ug/kg	20	ND	10/26/92
trans-1,2-Dichloroethene	ug/kg	5.0	ND	10/26/92
cis-1,2-Dichloroethene	ug/kg	5.0	ND	10/26/92
1,1-Dichloroethane	ug/kg	5.0	ND	10/26/92
Chloroform	ug/kg	5.0	ND	10/26/92
1,1,1-Trichloroethane (TCA)	ug/kg	5.0	ND	10/26/92
Carbon Tetrachloride	ug/kg	5.0	ND	10/26/92
1,2-Dichloroethane (EDC)	ug/kg	5.0	ND	10/26/92
Trichloroethene (TCE)	ug/kg	5.0	ND	10/26/92

REPORT OF LABORATORY ANALYSIS

Mr. Brady Nagle
Page 4

November 04, 1992
PACE Project Number: 421022515

Client Reference: BP Station # 11126

PACE Sample Number:			70 0232376	
Date Collected:			10/20/92	
Date Received:			10/22/92	
Client Sample ID:			B-4-7	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
HALOGENATED VOLATILE COMPOUNDS EPA 8010				
1,2-Dichloropropane	ug/kg	5.0	ND	10/26/92
Bromodichloromethane	ug/kg	5.0	ND	10/26/92
2-Chloroethylvinyl ether	ug/kg	5.0	ND	10/26/92
cis-1,3-Dichloropropene	ug/kg	5.0	ND	10/26/92
trans-1,3-Dichloropropene	ug/kg	5.0	ND	10/26/92
1,1,2-Trichloroethane	ug/kg	5.0	ND	10/26/92
Tetrachloroethene	ug/kg	5.0	ND	10/26/92
Dibromochloromethane	ug/kg	5.0	ND	10/26/92
Chlorobenzene	ug/kg	5.0	ND	10/26/92
Bromoform	ug/kg	5.0	ND	10/26/92
1,1,2,2-Tetrachloroethane	ug/kg	5.0	ND	10/26/92
1,3-Dichlorobenzene	ug/kg	5.0	ND	10/26/92
1,4-Dichlorobenzene	ug/kg	5.0	ND	10/26/92
1,2-Dichlorobenzene	ug/kg	5.0	ND	10/26/92
Bromochloromethane (Surrogate Recovery)			115%	10/26/92
1,4-Dichlorobutane (Surrogate Recovery)			106%	10/26/92

pace INCORPORATED
THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

Mr. Brady Nagle
Page 5

November 04, 1992
PACE Project Number: 421022515

Client Reference: BP Station # 11126

PACE Sample Number:			70 0232406	
Date Collected:			10/20/92	
Date Received:			10/22/92	
Client Sample ID:			B-5-5.5	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	10/30/92
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	20000	280000	10/30/92
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	10/30/92
Benzene	ug/kg wet	100	420	10/30/92
Toluene	ug/kg wet	100	580	10/30/92
Ethylbenzene	ug/kg wet	100	3800	10/30/92
Xylenes, Total	ug/kg wet	100	1600	10/30/92

These data have been reviewed and are approved for release.

Darrell Cain for

Mark A. Valentini, Ph.D.
Regional Director

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883-2673

Mr. Brady Nagle | FOOTNOTES | November 04, 1992
Page 6 | for pages 1 through 5 | PACE Project Number: 421022515

Client Reference: BP Station # 11126

MDL Method Detection Limit
ND Not detected at or above the MDL.
(PPM) Results reported in parts per million due to high concentration.

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883-2673

REPORT OF LABORATORY ANALYSIS

Mr. Brady Nagle
Page 7

QUALITY CONTROL DATA

November 04, 1992
PACE Project Number: 421022515

Client Reference: BP Station # 11126

Oil and Grease, Gravimetric (SM5520)
Batch: 70 16487
Samples: 70 0232376

METHOD BLANK:

Parameter	Units	MDL	Method Blank
Oil and Grease, Gravimetric (SM5520)	mg/kg wet	50	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Oil and Grease, Gravimetric (SM5520)	mg/kg wet	50	667	84%	85%	1%

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883-2673

REPORT OF LABORATORY ANALYSIS

Mr. Brady Nagle
Page 8

QUALITY CONTROL DATA

November 04, 1992
PACE Project Number: 421022515

Client Reference: BP Station # 11126

EXTRACTABLE FUELS EPA 3550/8015
Batch: 70 16492
Samples: 70 0232376

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	80%	71%	11%

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883 2673

Mr. Brady Nagle
Page 9

QUALITY CONTROL DATA

November 04, 1992
PACE Project Number: 421022515

Client Reference: BP Station # 11126

HALOGENATED VOLATILE COMPOUNDS EPA 8010
Batch: 70 16485
Samples: 70 0232376

METHOD BLANK:

Parameter	Units	MDL	Method Blank
Dichlorodifluoromethane	ug/kg	20	ND
Chloromethane	ug/kg	20	ND
Vinyl Chloride	ug/kg	20	ND
Bromomethane	ug/kg	20	ND
Chloroethane	ug/kg	20	ND
Trichlorofluoromethane	ug/kg	20	ND
1,1-Dichloroethene	ug/kg	5.0	ND
Methylene Chloride	ug/kg	20	ND
trans-1,2-Dichloroethene	ug/kg	5.0	ND
cis-1,2-Dichloroethene	ug/kg	5.0	ND
1,1-Dichloroethane	ug/kg	5.0	ND
Chloroform	ug/kg	5.0	ND
1,1,1-Trichloroethane (TCA)	ug/kg	5.0	ND
Carbon Tetrachloride	ug/kg	5.0	ND
1,2-Dichloroethane (EDC)	ug/kg	5.0	ND
Trichloroethene (TCE)	ug/kg	5.0	ND
1,2-Dichloropropane	ug/kg	5.0	ND
Bromodichloromethane	ug/kg	5.0	ND
2-Chloroethylvinyl ether	ug/kg	5.0	ND
cis-1,3-Dichloropropene	ug/kg	5.0	ND
trans-1,3-Dichloropropene	ug/kg	5.0	ND
1,1,2-Trichloroethane	ug/kg	5.0	ND
Tetrachloroethene	ug/kg	5.0	ND
Dibromochloromethane	ug/kg	5.0	ND
Chlorobenzene	ug/kg	5.0	ND
Bromoform	ug/kg	5.0	ND
1,1,2,2-Tetrachloroethane	ug/kg	5.0	ND
1,3-Dichlorobenzene	ug/kg	5.0	ND
1,4-Dichlorobenzene	ug/kg	5.0	ND
1,2-Dichlorobenzene	ug/kg	5.0	ND
Bromochloromethane (Surrogate Recovery)			85%
1,4-Dichlorobutane (Surrogate Recovery)			87%

Mr. Brady Nagle
Page 10

QUALITY CONTROL DATA

November 04, 1992
PACE Project Number: 421022515

Client Reference: BP Station # 11126

HALOGENATED VOLATILE COMPOUNDS EPA 8010
Batch: 70 16485
Samples: 70 0232376

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
1,1-Dichloroethane	ug/kg	5.0	10.00	111%	106%	4%
Trichloroethene (TCE)	ug/kg	5.0	10.00	98%	96%	2%
1,1,2-Trichloroethane	ug/kg	5.0	10.00	106%	109%	2%
Tetrachloroethene	ug/kg	5.0	10.00	116%	111%	4%

Mr. Brady Nagle
Page 11

QUALITY CONTROL DATA

November 04, 1992
PACE Project Number: 421022515

Client Reference: BP Station # 11126

PURGEABLE FUELS AND AROMATICS
Batch: 70 16566
Samples: 70 0232317, 70 0232333, 70 0232376, 70 0232406

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	369	94%	97%	3%
Benzene	ug/kg wet	1.0	40.0	98%	98%	0%
Toluene	ug/kg wet	1.0	40.0	96%	96%	0%
Ethylbenzene	ug/kg wet	1.0	40.0	96%	96%	0%
Xylenes, Total	ug/kg wet	1.0	80.0	93%	93%	0%

Client Reference: BP Station # 11126

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

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883-2673

pace INCORPORATED
THE ASSURANCE OF QUALITY

57339

CHAIN-OF-CUSTODY RECORD
Analytical Request

Client: Alisto Engineering Group
Address: 1000 Barnett Ave. Suite 420
Concord CA 94520
Phone: (510) 798-4070

Report To: Brady Nagle
Bill To: BP Oil Co
P.O. # / Billing Reference:
Project Name / No.: 10-061 / Powell & Christie

Pace Client No.:
Pace Project Manager:
Pace Project No.: 421022.515
Requested Due Date:

BP# 11126

Sampled By (PRINT): Ted Moise
Sampler Signature: Ted Moise
Date Sampled: 10/20/92

ITEM NO.	SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO. OF CONTAINERS	UNPRESERVED	H_2SO_4	HNO_3	VOA		TPHG/BTEX	TPH-D	TOG	8010	REMARKS
1	B-2-4		Soil	2323167	1						✓				
2	B-3-5		↓	33.3	1						✓				
3	B-4-7		↓	37.6	1						✓	✓	✓	✓	~~Hold~~ Analyze TM
4	B-5-5.5		↓	40.6	1						✓				
5															
6															
7															
8															

COOLER NOS.	BAILERS	SHIPMENT METHOD OUT DATE	RETURNED DATE
K/2			

Additional Comments

ITEM NUMBER	RELINQUISHED BY / AFFILIATION	ACCEPTED BY / AFFILIATION	DATE	TIME
	Ted Moise	Ed Wutty Pace	10/20	1730
	Ed Wutty - Pace	Lea Saffone PACE	10/21	1040

ORIGINAL

SEE REVERSE SIDE FOR INSTRUCTIONS

pace INCORPORATED
THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

November 18, 1992

Mr. Brady Nagle
Alisto Engineering Group
1000 Burnett Ave., Ste. 420
Concord, CA 94520

RE: PACE Project No. 421106.513
Client Reference: BP Station # 11126

Dear Mr. Nagle:

Enclosed is the report of laboratory analyses for samples received November 06, 1992.

Footnotes are given at the end of the report.

If you have any questions concerning this report, please feel free to contact us.

Sincerely,

Stephanie Matzo

Stephanie Matzo
Project Manager

Enclosures

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883-2673

pace INCORPORATED
THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

Alisto Engineering Group
1000 Burnett Ave., Ste. 420
Concord, CA 94520

November 18, 1992
PACE Project Number: 421106513

Attn: Mr. Brady Nagle

Client Reference: BP Station # 11126

PACE Sample Number:			70 0245800	
Date Collected:			11/04/92	
Date Received:			11/06/92	
Client Sample ID:			MW-1	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	11/11/92
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	1000	5300	11/11/92
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	11/11/92
Benzene	ug/L	10	1100	11/11/92
Toluene	ug/L	10	480	11/11/92
Ethylbenzene	ug/L	10	ND	11/11/92
Xylenes, Total	ug/L	10	1500	11/11/92

pace® INCORPORATED
THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

Mr. Brady Nagle
Page 2

November 18, 1992
PACE Project Number: 421106513

Client Reference: BP Station # 11126

PACE Sample Number:			70 0245818	
Date Collected:			11/04/92	
Date Received:			11/06/92	
Client Sample ID:			MW-2	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	11/11/92
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	2500	12000	11/11/92
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	11/11/92
Benzene	ug/L	25	3900	11/11/92
Toluene	ug/L	25	1300	11/11/92
Ethylbenzene	ug/L	25	ND	11/11/92
Xylenes, Total	ug/L	25	2300	11/11/92

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415 883-2673

REPORT OF LABORATORY ANALYSIS

November 18, 1992
PACE Project Number: 421106513

Client Reference: BP Station # 11126

Parameter	Units	MDL		DATE ANALYZED
PACE Sample Number:			70 0245826	
Date Collected:			11/04/92	
Date Received:			11/06/92	
Client Sample ID:			MW-3	
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	11/11/92
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	200	11/11/92
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	11/11/92
Benzene	ug/L	0.5	1.6	11/11/92
Toluene	ug/L	0.5	ND	11/11/92
Ethylbenzene	ug/L	0.5	ND	11/11/92
Xylenes, Total	ug/L	0.5	1.1	11/11/92
HALOGENATED VOLATILE COMPOUNDS EPA 8010				
Dichlorodifluoromethane	ug/L	2.0	ND	11/12/92
Chloromethane	ug/L	2.0	ND	11/12/92
Vinyl Chloride	ug/L	2.0	ND	11/12/92
Bromomethane	ug/L	2.0	ND	11/12/92
Chloroethane	ug/L	2.0	ND	11/12/92
Trichlorofluoromethane (Freon 11)	ug/L	2.0	ND	11/12/92
1,1-Dichloroethene	ug/L	0.5	ND	11/12/92
Methylene Chloride	ug/L	2.0	ND	11/12/92
trans-1,2-Dichloroethene	ug/L	0.5	ND	11/12/92
cis-1,2-Dichloroethene	ug/L	0.5	ND	11/12/92
1,1-Dichloroethane	ug/L	0.5	ND	11/12/92
Chloroform	ug/L	0.5	ND	11/12/92
1,1,1-Trichloroethane (TCA)	ug/L	0.5	ND	11/12/92
Carbon Tetrachloride	ug/L	0.5	ND	11/12/92
1,2-Dichloroethane (EDC)	ug/L	0.5	ND	11/12/92
Trichloroethene (TCE)	ug/L	0.5	ND	11/12/92
1,2-Dichloropropane	ug/L	0.5	ND	11/12/92
Bromodichloromethane	ug/L	0.5	ND	11/12/92
2-Chloroethylvinyl ether	ug/L	0.5	ND	11/12/92
cis-1,3-Dichloropropene	ug/L	0.5	ND	11/12/92
trans-1,3-Dichloropropene	ug/L	0.5	ND	11/12/92
1,1,2-Trichloroethane	ug/L	0.5	ND	11/12/92
Tetrachloroethene	ug/L	0.5	ND	11/12/92

REPORT OF LABORATORY ANALYSIS

November 18, 1992
PACE Project Number: 421106513

Client Reference: BP Station # 11126

PACE Sample Number:			70 0245826	
Date Collected:			11/04/92	
Date Received:			11/06/92	
Client Sample ID:			MW-3	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
HALOGENATED VOLATILE COMPOUNDS EPA 8010				
Dibromochloromethane	ug/L	0.5	ND	11/12/92
Chlorobenzene	ug/L	0.5	ND	11/12/92
Bromoform	ug/L	0.5	ND	11/12/92
1,1,2,2-Tetrachloroethane	ug/L	0.5	ND	11/12/92
1,3-Dichlorobenzene	ug/L	0.5	ND	11/12/92
1,4-Dichlorobenzene	ug/L	0.5	ND	11/12/92
1,2-Dichlorobenzene	ug/L	0.5	ND	11/12/92
Bromochloromethane (Surrogate Recovery)			91%	11/12/92
1,4-Dichlorobutane (Surrogate Recovery)			93%	11/12/92
EXTRACTABLE FUELS EPA 3510/8015				
Extractable Fuels, as Diesel	mg/L	0.050	0.69	11/12/92
Date Extracted			11/10/92	
OIL AND GREASE, SILICA GEL (LUFT)				
Oil and Grease, Gravimetric (SM5520)	mg/L	5.0	ND	11/16/92
Date Extracted			11/16/92	

REPORT OF LABORATORY ANALYSIS

November 18, 1992
PACE Project Number: 421106513

Client Reference: BP Station # 11126

PACE Sample Number:			70 0245834	
Date Collected:			11/04/92	
Date Received:			11/06/92	
Client Sample ID:			MW-4	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	11/11/92
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	340	11/11/92
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	11/11/92
Benzene	ug/L	0.5	4.5(MT)	11/11/92
Toluene	ug/L	0.5	ND	11/11/92
Ethylbenzene	ug/L	0.5	4.3	11/11/92
Xylenes, Total	ug/L	0.5	ND	11/11/92

pace INCORPORATED
THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

Mr. Brady Nagle
Page 6

November 18, 1992
PACE Project Number: 421106513

Client Reference: BP Station # 11126

PACE Sample Number:			70 0245842	
Date Collected:			11/04/92	
Date Received:			11/06/92	
Client Sample ID:			QC-1	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	11/11/92
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	5000	12000	11/11/92
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	11/11/92
Benzene	ug/L	50	3200	11/11/92
Toluene	ug/L	50	980	11/11/92
Ethylbenzene	ug/L	50	ND	11/11/92
Xylenes, Total	ug/L	50	1900	11/11/92

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883-2673

pace INCORPORATED
THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

Mr. Brady Nagle
Page 7

November 18, 1992
PACE Project Number: 421106513

Client Reference: BP Station # 11126

PACE Sample Number:			70 0245850	
Date Collected:			11/04/92	
Date Received:			11/06/92	
Client Sample ID:			QC-2	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	11/10/92
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	ND	11/10/92
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	11/10/92
Benzene	ug/L	0.5	ND	11/10/92
Toluene	ug/L	0.5	ND	11/10/92
Ethylbenzene	ug/L	0.5	ND	11/10/92
Xylenes, Total	ug/L	0.5	ND	11/10/92

These data have been reviewed and are approved for release.

Darrell Cain

Darrell C. Cain
Regional Director

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883-2673

Client Reference: BP Station # 11126

MDL Method Detection Limit
ND Not detected at or above the MDL.
(MT) A peak eluting earlier than Benzene and suspected to be methyl tert butyl ether was present at approximately 190 ppb.

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883-2673

Mr. Brady Nagle
Page 9

QUALITY CONTROL DATA

November 18, 1992
PACE Project Number: 421106513

Client Reference: BP Station # 11126

EXTRACTABLE FUELS EPA 3510/8015
Batch: 70 16884
Samples: 70 0245826

METHOD BLANK:

Parameter	Units	MDL	Method Blank
Extractable Fuels, as Diesel	mg/L	0.050	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Extractable Fuels, as Diesel	mg/L	0.050	1.00	71%	69%	2%

REPORT OF LABORATORY ANALYSIS

QUALITY CONTROL DATA

November 18, 1992
PACE Project Number: 421106513

Client Reference: BP Station # 11126

HALOGENATED VOLATILE COMPOUNDS EPA 8010
Batch: 70 16921
Samples: 70 0245826

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)			96%
1,4-Dichlorobutane (Surrogate Recovery)			91%

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883-2673

Mr. Brady Nagle
Page 11

QUALITY CONTROL DATA

November 18, 1992
PACE Project Number: 421106513

Client Reference: BP Station # 11126

HALOGENATED VOLATILE COMPOUNDS EPA 8010
Batch: 70 16921
Samples: 70 0245826

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
1,1-Dichloroethane	ug/L	0.5	10.00	96%	95%	1%
Trichloroethene (TCE)	ug/L	0.5	10.00	100%	102%	1%
trans-1,3-Dichloropropene	ug/L	0.5	3.8	101%	102%	0%
Tetrachloroethene	ug/L	0.5	10.00	103%	106%	2%

Client Reference: BP Station # 11126

OIL AND GREASE, SILICA GEL (LUFT)
Batch: 70 16949
Samples: 70 0245826

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	20.0	85%	80%	6%

REPORT OF LABORATORY ANALYSIS

QUALITY CONTROL DATA

November 18, 1992
PACE Project Number: 421106513

Client Reference: BP Station # 11126

PURGEABLE FUELS AND AROMATICS
Batch: 70 16838
Samples: 70 0245850

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	388	102%	103%	0%
Benzene	ug/L	0.5	40.0	96%	97%	1%
Toluene	ug/L	0.5	40.0	96%	97%	1%
Ethylbenzene	ug/L	0.5	40.0	104%	104%	0%
Xylenes, Total	ug/L	0.5	80.0	99%	100%	1%

Mr. Brady Nagle
Page 14

QUALITY CONTROL DATA

November 18, 1992
PACE Project Number: 421106513

Client Reference: BP Station # 11126

PURGEABLE FUELS AND AROMATICS
Batch: 70 16880
Samples: 70 0245826, 70 0245834

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	388	115%	103%	11%
Benzene	ug/L	0.5	40.0	89%	88%	1%
Toluene	ug/L	0.5	40.0	96%	94%	2%
Ethylbenzene	ug/L	0.5	40.0	105%	103%	1%
Xylenes, Total	ug/L	0.5	80.0	109%	103%	5%

Mr. Brady Nagle
Page 15

QUALITY CONTROL DATA

November 18, 1992
PACE Project Number: 421106513

Client Reference: BP Station # 11126

TPH GASOLINE/BTEX
Batch: 70 16879
Samples: 70 0245800, 70 0245818, 70 0245842

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	292	98%	96%	2%
Benzene	ug/L	0.5	40.0	110%	102%	7%
Toluene	ug/L	0.5	40.0	108%	100%	7%
Ethylbenzene	ug/L	0.5	40.0	110%	102%	7%
Xylenes, Total	ug/L	0.5	80.0	107%	99%	7%

Client Reference: BP Station # 11126

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

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883-2673

pace INCORPORATED
THE ASSURANCE OF QUALITY

B.P. OIL MARKETING COMPANY

33305 First Way South, Federal Way, WA 98003

CHAIN OF CUSTODY

421106.513

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

Consultant's Name: ALISTO ENGINEERING GROUP — Page 1 of 1

Address: 1000 BURNETT AVE ; STE 420

Project Contact: BRADY NAGLE — Consultant Project #: 10-061 — Phone #: 5107984070 Fax #: 7984019

Sampled by (print): DANIEL J. BIRCH — Sampler's Signature: DJB

Shipment Method: — B.P. Site Location #: BP11126 — B.P. Site Location: EMERYVILLE

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

ANALYSIS REQUIRED

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

Sample Description	Collection Date/Time	Matrix [redacted]/Water TIME	Prsv	# of Cont	PACE Sample #	TPH/GAS/BTEX EPA 8015/8020	TPH/Diesel EPA 8015	Oil & Grease SM 5520	HVOC 8010	COMMENTS
MW-1	11/14/92	1340	Hcl	3	24580.0	X				
MW-2	11/14/92	1355	Hcl	3	81.8	X				
MW-3	11/14/92	1240	Hcl	3	82.6	X	X	X	X	
MW-4	11/4/92	~~1240~~ DJB 1320		8	83.4	X	NA	NA	NA	TPHGBTEX ONLY
QC-1	11/14/92	1358	Hcl	3	84.2	X				
QC-2	11/14/92	1200	Hcl	~~3~~ 2 DJB	85.0	X				TRIP BLANK

→ samples rec'd on 11/6/92
SAM 11/6/92

10/2, c/2

Relinquished by/Affiliation	Date	Time	Accepted by/Affiliation	Date	Time
DJ Birch BTS	11/5/92	1715	Tommy Gormley	11-5-92	1720
Tommy Gormley	11-6-92	9:42	[illegible signature]	11/6/92	942
[illegible signature]	11/6/92	1354	[illegible signature]	11/6	1400

Additional Comments: [illegible]