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**GROUNDWATER MONITORING AND SAMPLING REPORT**

**BP Oil Company Service Station No. 11133  
2220 98th Avenue  
Oakland, California**

**Project No. 10-025-02-002**

**Prepared for:**

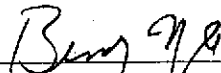
**BP Oil Company  
Environmental Resources Management  
295 S.W. 41st Street  
Building 13, Suite N  
Renton,, Washington**


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**Prepared by:**

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**January 4, 1994**

  
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**Brady Nagle  
Project Manager**

  
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Principal**



# GROUNDWATER MONITORING AND SAMPLING REPORT

BP Oil Company Service Station No. 11133  
2220 98th Avenue  
Oakland, California

Project No. 10-025-02-002

January 4, 1994

## INTRODUCTION

This report presents the results and findings of the October 21, 1993 groundwater monitoring and sampling conducted by Alisto Engineering Group at BP Oil Company Service Station No. 11133, 2220 98th Avenue, Oakland, California. A site vicinity map is shown in Figure 1.

## FIELD PROCEDURES

Field activities were performed in accordance with the procedures and guidelines of the Alameda County Health Care Services Agency and the California Regional Water Quality Control Board, San Francisco Bay Region.

Before purging and sampling, the groundwater level in each well was measured from a permanent mark on top of the casing to the nearest 0.01 foot using an electronic sounder. The depth to groundwater and top of casing elevation data were used to calculate the groundwater elevation in each well in reference to mean sea level. The survey data and groundwater elevation measurements collected to date are presented in Table 1.

Before sample collection, each well was purged of 3 casing volumes, while recording field readings of pH, temperature, and electrical conductivity. Groundwater samples were collected for laboratory analysis by lowering a bottom-fill, disposable bailer to just below the water level in the well. The samples were transferred from the bailer into laboratory-supplied containers. The water sampling field survey forms are presented in Appendix A.

## SAMPLING AND ANALYTICAL RESULTS

Results of monitoring and laboratory analysis of the groundwater samples for this and previous quarters are summarized in Table 1. The potentiometric groundwater elevations as interpreted from the results of this monitoring event are shown in Figure 2. The results of groundwater analysis are shown in Figure 3. The laboratory report and chain of custody record are presented in Appendix B.

## FREE PRODUCT MONITORING AND RECOVERY

Passive product recovery systems have been installed in Monitoring Wells MW-1 and RW-1 to recover liquid-phase product. Product thicknesses as measured during this and previous monitoring events are presented in Table 1. The volume of free product recovered from the two wells is presented in Table 2.



TABLE 1 - SUMMARY OF RESULTS OF GROUNDWATER SAMPLING  
 BP OIL COMPANY SERVICE STATION NO. 11133  
 2220 98TH AVENUE, OAKLAND, CALIFORNIA

ALISTO PROJECT NO. 10-025

WELL ID	DATE OF MONITORING/ SAMPLING	CASING ELEVATION (a) (Feet)	DEPTH TO WATER (Feet)	PRODUCT THICKNESS (Feet)	GROUNDWATER ELEVATION (b) (Feet)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	LAB
MW-1	04/05/91	34.46	---	---	---	---	---	---	---	---	---
MW-1	04/01/92	34.46	11.25	0.01	23.22	---	---	---	---	---	---
MW-1	07/06/92	34.46	13.61	0.02	20.87	---	---	---	---	---	---
MW-1	10/07/92	34.46	15.15	0.09	19.38	---	---	---	---	---	---
MW-1	01/14/93	34.46	10.73	0.01	23.74	---	---	---	---	---	---
MW-1	04/22/93	34.46	11.64	0.16	22.94	---	---	---	---	---	---
MW-1	07/15/93	34.46	13.50	1.11	21.79	---	---	---	---	---	---
MW-1	10/21/93	34.46	15.21	1.00	20.00	---	---	---	---	---	---
MW-2	04/05/91	35.50	16.62	---	18.88	ND<50	0.6	0.9	ND<0.3	ND<0.3	SUP
MW-2	04/01/92	35.50	11.25	---	24.25	---	---	---	---	---	---
MW-2	04/02/92	35.50	---	---	---	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	APP
MW-2	07/06/92	35.50	12.72	---	22.78	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ANA
MW-2	10/07/92	35.50	15.08	---	20.42	ND<50	ND<0.5	1.8	ND<0.5	2.3	ANA
MW-2	01/14/93	35.50	9.69	---	25.81	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	PACE
MW-2	04/22/93	35.50	10.46	---	25.04	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	PACE
MW-2	07/15/93	35.50	12.02	---	23.48	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	PACE
MW-2	10/21/93	35.50	13.12	---	22.38	ND<50	0.7	0.9	ND<0.5	0.9	PACE
MW-3	04/05/91	36.53	17.84	---	18.69	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.3	SUP
MW-3	04/01/92	36.53	15.64	---	20.89	---	---	---	---	---	---
MW-3	04/02/92	36.53	---	---	---	ND<50	1.4	ND<0.5	ND<0.5	ND<0.5	APP
MW-3	07/06/92	36.53	19.03	---	17.50	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ANA
MW-3	10/07/92	36.53	21.83	---	14.70	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ANA
MW-3	01/14/93	36.53	15.96	---	20.57	---	ND<0.5	ND<0.5	ND<0.5	ND<0.5	PACE
MW-3	04/22/93	36.53	16.20	---	20.33	2800	ND<0.5	ND<0.5	ND<0.5	ND<0.5	PACE
MW-3	07/15/93	36.53	16.82	---	19.71	1400	1.2	ND<0.5	2.0	3.5	PACE
MW-3	10/21/93	36.53	18.84	---	17.69	370	2.1	2.3	2.3	6.0	PACE

TABLE 1 - SUMMARY OF RESULTS OF GROUNDWATER SAMPLING  
 BP OIL COMPANY SERVICE STATION NO. 11133  
 2220 98TH AVENUE, OAKLAND, CALIFORNIA

ALISTO PROJECT NO. 10-025

WELL ID	DATE OF MONITORING/ SAMPLING	CASING ELEVATION (a) (Feet)	DEPTH TO WATER (Feet)	PRODUCT THICKNESS (Feet)	GROUNDWATER ELEVATION (b) (Feet)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	LAB
AW-1	04/05/91	38.11	25.44	---	12.67	4100	1500	69	100	83	SUP
AW-1	04/01/92	38.11	23.22	---	14.89	---	---	---	---	---	---
AW-1	04/02/92	38.11	---	---	---	11000	1800	210	210	490	APP
AW-1	07/06/92	38.11	24.89	---	13.22	6500	4000	40	290	530	ANA
AW-1	10/07/92	38.11	26.55	---	11.56	4700	1500	41	47	300	ANA
QC-1 (c)	10/07/92	38.11	---	---	---	2900	1200	25	37	210	ANA
AW-1	01/14/93	38.11	23.73	---	14.38	2800	830	31	140	240	PACE
QC-1 (c)	01/14/93	38.11	---	---	---	4100	1700	28	130	230	PACE
AW-1	04/22/93	38.11	22.29	---	15.82	39000	14000	530	1800	6100	PACE
AW-1	07/15/93	38.11	22.50	---	15.61	6200	2200	28	210	540	PACE
AW-1	10/21/93	38.11	24.32	---	13.79	2400	820	13	55	120	PACE
AW-2	04/05/91	36.83	22.36	---	14.47	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.3	SUP
AW-2	04/01/92	36.83	20.81	---	16.02	---	---	---	---	---	---
AW-2	04/02/92	36.83	---	---	---	130	25	2.3	0.7	2.1	APP
AW-2	07/06/92	36.83	23.57	---	13.26	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ANA
AW-2	10/07/92	36.83	25.24	---	11.59	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ANA
AW-2	01/14/93	36.83	20.82	---	16.01	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	PACE
AW-2	04/22/93	36.83	19.37	---	17.46	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	PACE
AW-2	07/15/93	36.83	21.29	---	15.54	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	PACE
AW-2	10/21/93	36.83	23.14	---	13.69	ND<50	1.3	1.1	0.9	2.1	PACE
AW-3	04/05/91	39.13	23.90	---	15.23	5200	980	450	95	310	SUP
AW-3	04/01/92	39.13	22.50	---	16.63	4700	890	47	43	110	APP
AW-3	07/06/92	39.13	23.26	---	15.87	3900	3100	30	80	99	ANA
AW-3	10/07/92	39.13	24.75	---	14.38	5000	2600	ND<0.5	ND<0.5	59	ANA
AW-3	01/14/93	39.13	23.59	---	15.54	350	250	ND<0.5	ND<0.5	ND<0.5	PACE
AW-3	04/22/93	39.13	19.42	---	19.71	240	71	2.4	0.6	4.0	PACE
AW-3	07/15/93	39.13	20.09	---	19.04	650	71	2.8	1.5	1.1	PACE
AW-3	10/21/93	39.13	21.88	---	17.25	160	4.8	1.7	1.8	3.6	PACE
QC-1 (c)	10/21/93	39.13	---	---	---	170	6.1	2.0	1.7	4.4	PACE

TABLE 1 - SUMMARY OF RESULTS OF GROUNDWATER SAMPLING  
 BP OIL COMPANY SERVICE STATION NO. 11133  
 2220 98TH AVENUE, OAKLAND, CALIFORNIA

ALISTO PROJECT NO. 10-025

WELL ID	DATE OF MONITORING/ SAMPLING	CASING ELEVATION (a) (Feet)	DEPTH TO WATER (Feet)	PRODUCT THICKNESS (Feet)	GROUNDWATER ELEVATION (b) (Feet)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	LAB
AW-4	04/05/91	39.08	25.12	---	13.96	110000	40000	13000	2000	5500	SUP
AW-4	04/01/92	39.08	23.56	---	15.52	230000	57000	31000	2900	7600	APP
AW-4 (d)	04/01/92	39.08	23.56	---	15.52	210000	55000	23000	2900	7000	APP
AW-4	07/06/92	39.08	25.87	---	13.21	38000	16000	5400	2000	6100	ANA
AW-4	10/07/92	39.08	27.53	---	11.55	120000	41000	26000	4700	13000	ANA
AW-4	01/14/93	39.08	24.12	---	14.96	62000	18000	14000	2700	7700	PACE
AW-4	04/22/93	39.08	21.47	---	17.61	18000	1100	2100	320	3500	PACE
AW-4	07/15/93	39.08	23.30	---	15.78	21000	820	2300	590	3800	PACE
AW-4	10/21/93	39.08	25.08	---	14.00	11000	570	83	630	2300	PACE
AW-5	04/05/91	38.51	25.48	---	13.03	420	31	7.5	20	68	SUP
AW-5	04/01/92	38.51	23.95	---	14.56	---	---	---	---	---	---
AW-5	04/02/92	38.51	---	---	---	4000	270	63	190	290	APP
AW-5	07/06/92	38.51	26.48	---	12.03	1400	160	ND<2.5	250	58	ANA
AW-5	10/07/92	38.51	28.18	---	10.33	360	12	0.6	8.7	5	ANA
AW-5	01/14/93	38.51	24.15	---	14.36	1700	270	7.5	130	62	PACE
AW-5	04/22/93	38.51	22.43	---	16.08	2700	780	30	220	180	PACE
QC-1	04/22/93	38.51	---	---	---	3500	780	29	240	210	PACE
AW-5	07/15/93	38.51	24.31	---	14.20	1300	69	16	67	120	PACE
QC-1	07/15/93	38.51	---	---	---	1300	68	8.3	64	99	PACE
AW-5	10/21/93	38.51	26.05	---	12.46	510	9.6	1.5	17	45	PACE
AW-6	04/05/91	37.08	22.48	---	14.60	1100	80	19	1.4	230	SUP
AW-6	04/01/92	37.08	22.50	---	14.58	---	---	---	---	---	---
AW-6	04/02/92	37.08	---	---	---	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	APP
AW-6	07/06/92	37.08	22.74	---	14.34	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ANA
AW-6	10/07/92	37.08	24.64	---	12.44	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ANA
AW-6	01/14/93	37.08	22.36	---	14.72	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	PACE
AW-6	04/22/93	37.08	22.82	---	14.26	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	PACE
AW-6	07/15/93	37.08	20.49	---	16.59	ND<50	ND<0.5	ND<0.5	ND<0.5	0.8	PACE
AW-6	10/21/93	37.08	22.84	---	14.24	ND<50	0.5	0.6	ND<0.5	0.7	PACE
AW-7	04/05/91	37.60	23.38	---	14.22	ND<50	0.4	0.7	ND<0.3	ND<0.3	SUP
AW-7	04/01/92	37.60	21.92	---	15.68	---	---	---	---	---	---
AW-7	04/02/92	37.60	---	---	---	ND<50	ND<0.5	3.2	1.0	5.4	APP
AW-7	07/06/92	37.60	24.50	---	13.10	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ANA
AW-7	10/07/92	37.60	26.18	---	11.42	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ANA
AW-7	01/14/93	37.60	22.03	---	15.57	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	PACE
AW-7	04/22/93	37.60	21.18	---	16.42	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	PACE
AW-7	07/15/93	37.60	22.09	---	15.51	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	PACE
AW-7	10/21/93	37.60	24.05	---	13.55	51	5.0	4.2	3.5	8.2	PACE

TABLE 1 - SUMMARY OF RESULTS OF GROUNDWATER SAMPLING  
 BP OIL COMPANY SERVICE STATION NO. 11133  
 2220 96TH AVENUE, OAKLAND, CALIFORNIA

ALISTO PROJECT NO. 10-025

WELL ID	DATE OF MONITORING/ SAMPLING	CASING ELEVATION (a) (Feet)	DEPTH TO WATER (Feet)	PRODUCT THICKNESS (Feet)	GROUNDWATER ELEVATION (b) (Feet)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	LAB
AW-8	04/05/91	40.86	26.68	---	14.18	80	1.9	2.2	0.5	1.3	SUP
AW-8	04/01/92	40.86	25.11	---	15.75	73	ND<0.5	0.7	ND<0.5	0.6	APP
AW-8	07/06/92	40.86	26.43	---	14.43	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ANA
AW-8	10/07/92	40.86	28.59	---	12.27	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ANA
AW-8	01/14/93	40.86	25.55	---	15.31	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	PACE
AW-8	04/22/93	40.86	22.29	---	18.57	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	PACE
AW-8	07/15/93	40.86	23.42	---	17.44	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	PACE
AW-8	10/21/93	40.86	25.15	---	15.71	ND<50	1.9	1.8	1.3	3.3	PACE
RW-1	04/05/91	37.73	---	---	---	---	---	---	---	---	---
RW-1	04/01/92	37.73	22.81	0.30	15.14	---	---	---	---	---	---
RW-1	07/06/92	37.73	26.92	0.41	11.12	---	---	---	---	---	---
RW-1	10/07/92	37.73	28.51	1.26	10.16	---	---	---	---	---	---
RW-1	01/14/93	37.73	23.75	0.25	14.17	---	---	---	---	---	---
RW-1	04/22/93	37.73	22.70	1.38	16.07	---	---	---	---	---	---
RW-1	07/15/93	37.73	26.10	0.81	12.24	---	---	---	---	---	---
RW-1	10/21/93	37.73	25.40	0.49	12.70	---	---	---	---	---	---
QC-2 (e)	10/07/92	---	---	---	---	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ANA
QC-2 (e)	01/14/93	---	---	---	---	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	PACE
QC-2 (e)	04/22/93	---	---	---	---	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	PACE
QC-2 (e)	07/15/93	---	---	---	---	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	PACE
QC-2 (e)	10/21/93	---	---	---	---	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	PACE

ABBREVIATIONS:

TPH-G	Total petroleum hydrocarbons as gasoline
B	Benzene
T	Toluene
E	Ethylbenzene
X	Total xylenes
ppb	Parts per billion
---	Not analyzed/available
ND	Not detected above reported detection limit
SUP	Superior Analytical Laboratories, Inc.
APP	Applied Analytical
ANA	Anamatrix, Inc.
PACE	Pace, Inc.

NOTES:

- (a) Top of casing elevations surveyed to the nearest 0.01 foot above mean sea level.
- (b) Groundwater elevations adjusted assuming a specific gravity of 0.75 for free product.
- (c) Blind duplicate.
- (d) Duplicate.
- (e) Travel blank.

TABLE 2  
PRODUCT REMOVAL STATUS

BP OIL COMPANY SERVICE STATION NO. 11133  
2220 98TH AVENUE, OAKLAND, CALIFORNIA

ALISTO PROJECT NO. 10-025

WELL ID	DATE	PRODUCT REMOVED (Gallons)	PRODUCT REMOVED CUMULATIVE (Gallons)
RW-1	10/06/93	1.0	1.0
	10/14/93	1.0	2.0
	10/20/93	18.0	20.0
	10/26/93	3.0	23.0
	11/02/93	5.0	28.0
	11/10/93	6.0	34.0
	11/16/93	2.5	36.5
	11/23/93	5.0	41.5
	11/30/93	2.0	43.5
	12/07/93	4.0	47.5
12/17/93	1.5	49.0	
MW-1	10/20/93	0.1	0.1
	11/10/93	0.1	0.2



SOURCE:  
 USGS MAP, OAKLAND EASE AND SAN LEANDRO  
 QUADRANGLES, CALIFORNIA. 7.5 MINUTE SERIES. 1958.  
 PHOTOREVISED 1980.



**FIGURE 1**

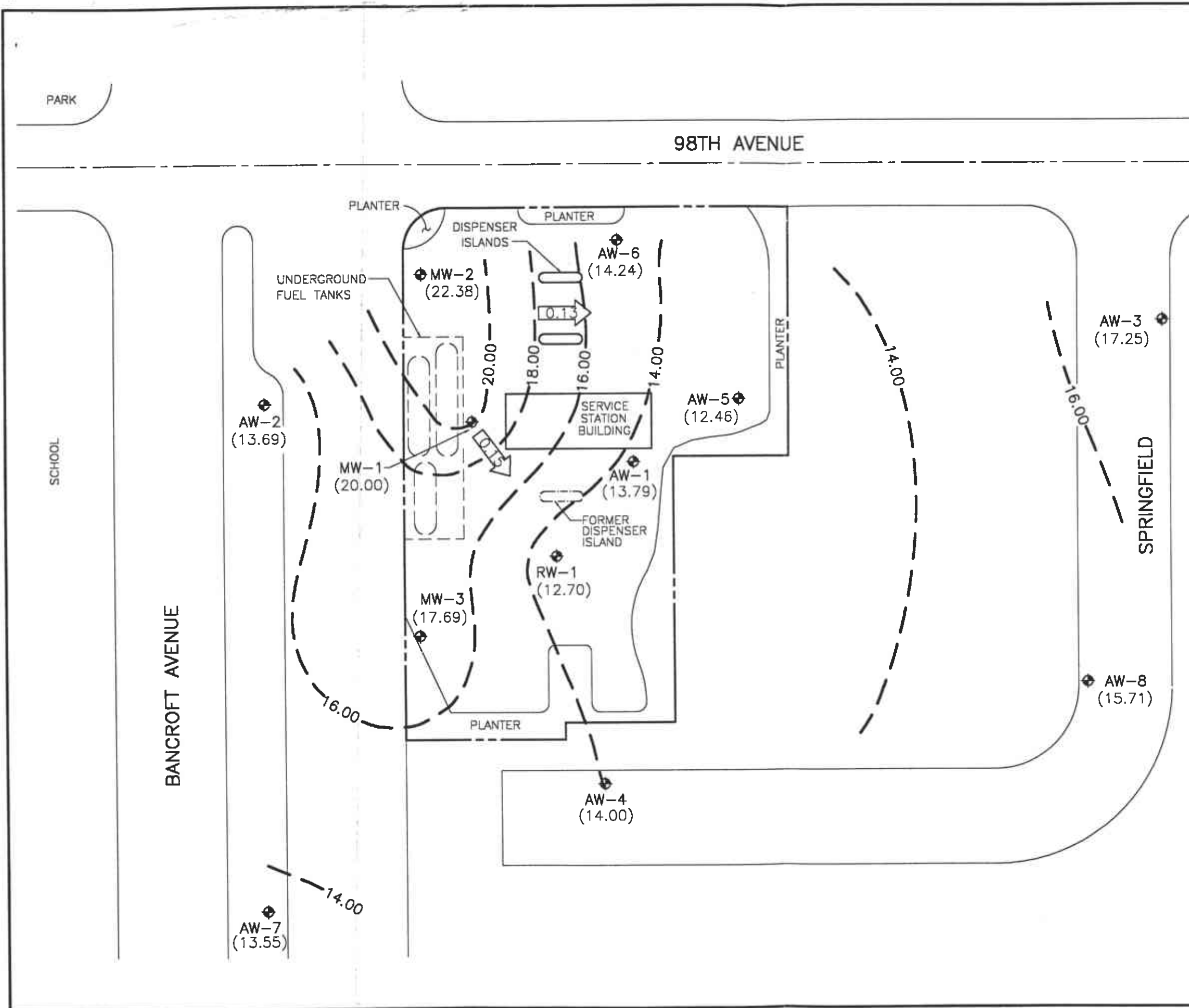
**SITE VICINITY MAP**

**BP OIL SERVICE STATION NO. 11133  
 2220 98TH AVENUE  
 OAKLAND, CALIFORNIA  
 PROJECT NO. 10-025**



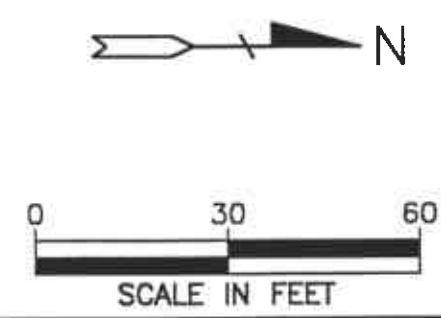
**ALISTO ENGINEERING GROUP**  
 WALNUT CREEK, CALIFORNIA





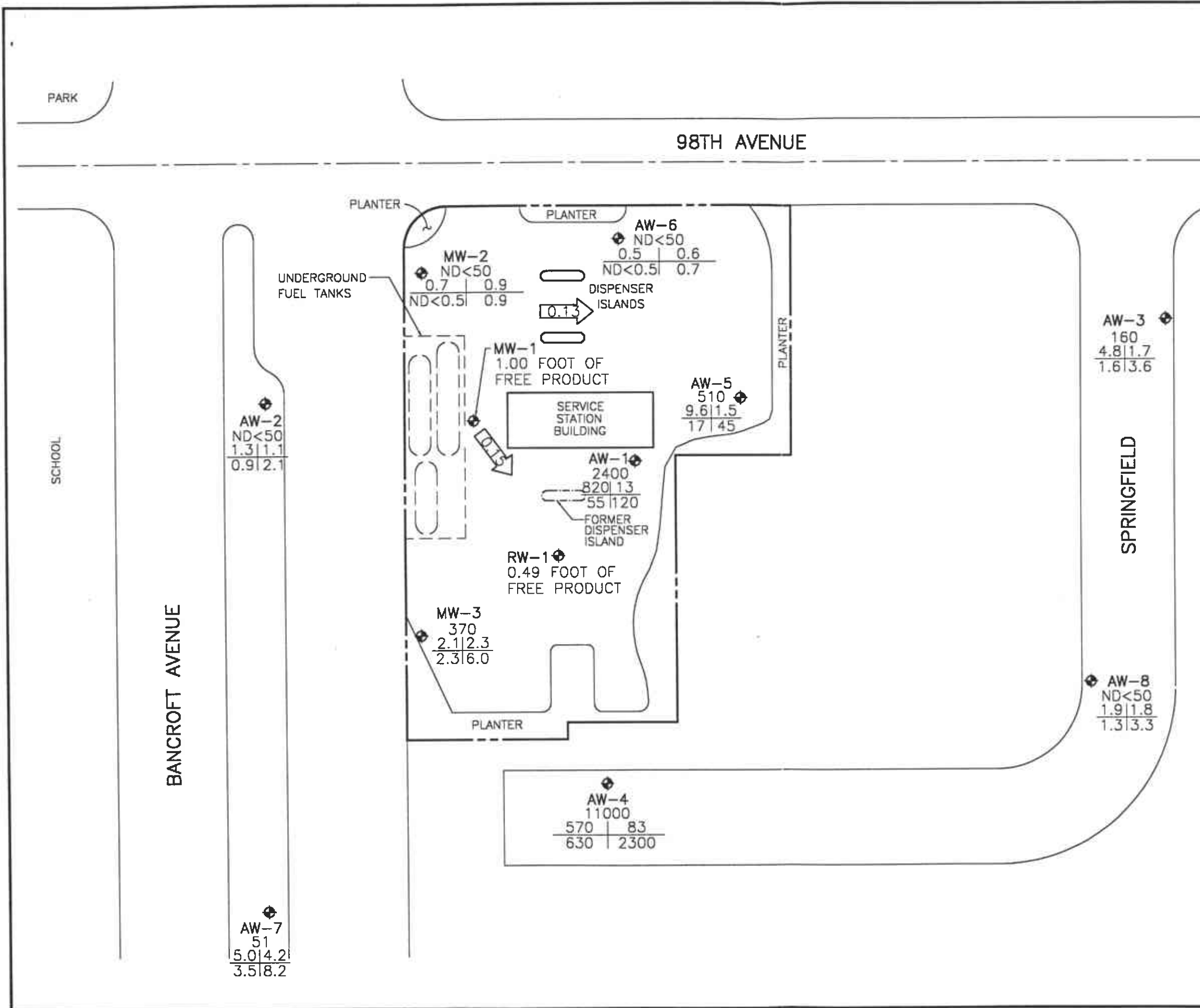
**LEGEND**

- ◆ GROUNDWATER MONITORING WELL
- (14.24) GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL
- 14.00 - GROUNDWATER ELEVATION CONTOUR IN FEET ABOVE MEAN SEA LEVEL (CONTOUR INTERVAL - 2.00 FEET)
- ← 0.15 → CALCULATED GROUNDWATER GRADIENT DIRECTION AND MAGNITUDE IN FOOT PER FOOT



**FIGURE 2**  
**POTENTIOMETRIC GROUNDWATER ELEVATION CONTOUR MAP**  
**OCTOBER 21, 1993**  
 BP OIL SERVICE STATION NO. 11133  
 2220 98TH AVENUE  
 OAKLAND, CALIFORNIA  
 PROJECT NO. 10-025

10/20/93-11/04/93 12-8-93 11/04 1'-0"



**LEGEND**

◆ GROUNDWATER MONITORING WELL

TPH-G  
B | T  
E | X  
TPH-G  
B  
T  
E  
X  
ND

CONCENTRATION OF CONSTITUENTS IN PARTS PER BILLION

TOTAL PETROLEUM HYDROCARBONS AS GASOLINE

BENZENE

TOLUENE

ETHYLBENZENE

TOTAL XYLENES

NOT DETECTED ABOVE REPORTED DETECTION LIMIT

←0.15→ CALCULATED GROUNDWATER GRADIENT DIRECTION AND MAGNITUDE IN FOOT PER FOOT

**FIGURE 3**  
**CONCENTRATIONS OF PETROLEUM HYDROCARBONS IN GROUNDWATER**  
**OCTOBER 21, 1993**  
 BP OIL SERVICE STATION NO. 11133  
 2220 98TH AVENUE  
 OAKLAND, CALIFORNIA  
 PROJECT NO. 10-025

# Birch Technical Services

# Field Report / Data Sheet

Groundwater Sampling  Groundwater Monitoring  Well Development  Drill Support  Stockpile Sampling

Firm: <u>Alisto</u>		Date: <u>10/21/93</u>	Station #: <u>BP1133</u>	Day: M Tu W <u>(Th)</u> F
Project Number: <u>10-025-02-002</u>		Field Technician: <u>S. Rizer</u>	Address: <u>2220</u> <u>9th Ave</u> <u>OKland</u>	Weather: <u>Mild</u>
116 Liberty st Santa Cruz, Ca 95060 (408) 459-0718				

DT/Order	Well ID	Lock	Exp Cap	Total Depth (feet)	1st Depth to Water (feet)	2nd Depth to Water (feet)	Depth to Product Product Thickness (feet)	Comments	Well Dia.
	9 AW-1	ok	ok	38.6	24.32	24.32			2
	1 AW-2			35.2	23.06	23.14			2
	6 AW-3			35.75	21.88	21.88		QC-1	2
	10 AW-4			33.9	25.08	25.08			2
	7 AW-5			42.9	26.05	26.05		Replaced lock	4
	4 AW-6			34.2	22.80	22.84			4
	2 AW-7			32.3	23.84	24.05			2
	3 AW-8			39.2	25.15	25.15			2
	11 MW-1			NM	15.21 <del>13.50</del>	15.21 <del>13.50</del>	14.21 1.00	Product	2
	5 MW-2			31.4	13.12	13.12		Replaced cap	2
	8 MW-3			34.1	18.84	18.84			2
	12 RW-1	✓	✓	NM	25.40 <del>25.89</del>	25.40 <del>25.89</del>	25.89 0.49		× 16

Notes:

CALIBRATION

pH 7.00 7

pH 4.00 4

pH 10.00 10 at 72 °F

**APPENDIX A**  
**WATER SAMPLING FIELD SURVEY FORMS**





















# Birch Technical Services

# GROUNDWATER SAMPLING FORM

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

Well Number: MW-2

Project Number: 10-025-02-002

Station Number: SP11133

Date: 10 / 21 / 93

Sample Type:  Groundwater  Trip Blank  Duplicate of \_\_\_\_\_

Sampled by: Stephen Ryle

## WELL PURGING

**PURGE VOLUME**

Casing Diameter (inches)  
 Volume Factors:

2"  3"  4"  4.5"  6"  0  
 0.1632 0.3672 0.6528 0.826 1.469

Total Depth of Well 31.4

Initial Water Level: 13.12

Total Volume Purged: 9.9

Time Elapsed: 9 min

Calculated Purge Volume:

**PURGE METHOD:**

Honda Pump  
 Disposable Poly Tubing (\_\_\_\_ ft)  
 Speed Winch  
 Disposable PVC Bailer(s) (\_\_\_\_)  
 Other 12 VDC Pump

$$\frac{31.40}{\text{Total Depth}} - \frac{13.12}{\text{Water Level}} = \frac{18.28}{\text{Well Vol. Fac.}} \times \frac{1.632}{\text{Well Vol. Fac.}} = \frac{2.9}{\text{Well Vol. Fac.}} \times \frac{3}{\text{\# of vol. to Purge}} = \frac{8.7}{\text{Calculated Purge Volume}} \text{ (gallons)}$$

### COMMENTS:

### Subjective Analysis Prior to Purging

SHEEN  No  Yes  
 Depth to Product \_\_\_\_\_ (ft)  
 Product Thickness \_\_\_\_\_ (ft)

### SAMPLING METHOD

PVC Disposable Bailer  
 Teflon Bailer  
 Other: \_\_\_\_\_  
 Time Sampled (24 hour clock) 16:09

### WELL SAMPLING PARAMETERS

Gallons Removed	Time	pH	Temp °F	Cond. (umhos/cm)
1	16:00	6.98	68.7	0.34
3	16:03	6.92	70.0	0.32
6	16:06	6.91	70.8	0.32
9	16:09	6.90	70.6	0.31

Analysis Required	No. of	Container Type	Preservatives
EPA 601		VOA's	
TPH-G/BTEX	3	VOA's	HCl
TPH- Diesel		Amber Liter	
TOG 5520 BF		Amber Liter	H <sub>2</sub> SO <sub>4</sub>











**APPENDIX B**

**LABORATORY REPORT AND CHAIN OF CUSTODY RECORD**



# REPORT OF LABORATORY ANALYSIS

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

November 02, 1993  
 PACE Project Number: 431022533

Attn: Mr. Bill Howell

Client Reference: BP Station # 11133

PACE Sample Number: 70 0179394  
 Date Collected: 10/21/93  
 Date Received: 10/22/93  
 Client Sample ID: AW-1

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>DATE ANALYZED</u>
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## ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS			
TOTAL FUEL HYDROCARBONS, (LIGHT):			10/28/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	500	2400
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			10/28/93
Benzene	ug/L	5.0	820
Toluene	ug/L	5.0	13
Ethylbenzene	ug/L	5.0	55
Xylenes, Total	ug/L	5.0	120

Mr. Bill Howell  
 Page 2

November 02, 1993  
 PACE Project Number: 431022533

Client Reference: BP Station # 11133

PACE Sample Number: 70 0179408  
 Date Collected: 10/21/93  
 Date Received: 10/22/93  
 Client Sample ID: AW-2

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>DATE ANALYZED</u>
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ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS			
TOTAL FUEL HYDROCARBONS, (LIGHT):			
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	10/28/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			
Benzene	ug/L	0.5	10/28/93
Toluene	ug/L	0.5	10/28/93
Ethylbenzene	ug/L	0.5	10/28/93
Xylenes, Total	ug/L	0.5	10/28/93

**REPORT OF LABORATORY ANALYSIS**

Mr. Bill Howell  
 Page 3

November 02, 1993  
 PACE Project Number: 431022533

Client Reference: BP Station # 11133

PACE Sample Number: 70 0179416  
 Date Collected: 10/21/93  
 Date Received: 10/22/93  
 Client Sample ID: AW-3

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>DATE ANALYZED</u>
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ORGANIC ANALYSIS

<b>PURGEABLE FUELS AND AROMATICS</b>			
<b>TOTAL FUEL HYDROCARBONS, (LIGHT):</b>			
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	10/28/93
<b>PURGEABLE AROMATICS (BTXE BY EPA 8020M):</b>			
Benzene	ug/L	0.5	10/28/93
Toluene	ug/L	0.5	10/28/93
Ethylbenzene	ug/L	0.5	10/28/93
Xylenes, Total	ug/L	0.5	10/28/93



# REPORT OF LABORATORY ANALYSIS

Mr. Bill Howell  
Page 4

November 02, 1993  
PACE Project Number: 431022533

Client Reference: BP Station # 11133

PACE Sample Number: 70 0179424  
Date Collected: 10/21/93  
Date Received: 10/22/93  
Client Sample ID: AW-4

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>DATE ANALYZED</u>
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## ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS			
TOTAL FUEL HYDROCARBONS, (LIGHT):		-	10/28/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	250	11000
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			
Benzene	ug/L	2.5	570
Toluene	ug/L	2.5	83
Ethylbenzene	ug/L	2.5	630
Xylenes, Total	ug/L	2.5	2300

Mr. Bill Howell  
 Page 5

November 02, 1993  
 PACE Project Number: 431022533

Client Reference: BP Station # 11133

PACE Sample Number: 70 0179432  
 Date Collected: 10/21/93  
 Date Received: 10/22/93  
 Client Sample ID: AW-5

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>DATE ANALYZED</u>
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ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS			
TOTAL FUEL HYDROCARBONS, (LIGHT):			
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	510
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			
Benzene	ug/L	0.5	9.6
Toluene	ug/L	0.5	1.5
Ethylbenzene	ug/L	0.5	17
Xylenes, Total	ug/L	0.5	45



**REPORT OF LABORATORY ANALYSIS**

Mr. Bill Howell  
 Page 6

November 02, 1993  
 PACE Project Number: 431022533

Client Reference: BP Station # 11133

PACE Sample Number: 70 0179440  
 Date Collected: 10/21/93  
 Date Received: 10/22/93  
 Client Sample ID: AW-6

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>DATE ANALYZED</u>
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ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):			-	10/28/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	ND	10/28/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	10/28/93
Benzene	ug/L	0.5	0.5	10/28/93
Toluene	ug/L	0.5	0.6	10/28/93
Ethylbenzene	ug/L	0.5	ND	10/28/93
Xylenes, Total	ug/L	0.5	0.7	10/28/93

Mr. Bill Howell  
 Page 7

November 02, 1993  
 PACE Project Number: 431022533

Client Reference: BP Station # 11133

PACE Sample Number: 70 0179459  
 Date Collected: 10/21/93  
 Date Received: 10/22/93  
 Client Sample ID: AW-7

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>DATE ANALYZED</u>
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ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):			-	10/28/93
Purgeable Fuels, as Gasoline (EPA 8015M) ug/L	50	51		10/28/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	10/28/93
Benzene ug/L	0.5	5.0		10/28/93
Toluene ug/L	0.5	4.2		10/28/93
Ethylbenzene ug/L	0.5	3.5		10/28/93
Xylenes, Total ug/L	0.5	8.2		10/28/93

Mr. Bill Howell  
 Page 8

November 02, 1993  
 PACE Project Number: 431022533

Client Reference: BP Station # 11133

PACE Sample Number: 70 0179467  
 Date Collected: 10/21/93  
 Date Received: 10/22/93  
 Client Sample ID: AW-8

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>DATE ANALYZED</u>
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ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS			
TOTAL FUEL HYDROCARBONS, (LIGHT):		-	10/28/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	ND 10/28/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):		-	10/28/93
Benzene	ug/L	0.5	1.9 10/28/93
Toluene	ug/L	0.5	1.8 10/28/93
Ethylbenzene	ug/L	0.5	1.3 10/28/93
Xylenes, Total	ug/L	0.5	3.3 10/28/93

Mr. Bill Howell  
 Page 9

November 02, 1993  
 PACE Project Number: 431022533

Client Reference: BP Station # 11133

PACE Sample Number: 70 0179475  
 Date Collected: 10/21/93  
 Date Received: 10/22/93  
 Client Sample ID: MW-2

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>DATE ANALYZED</u>
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ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS			
TOTAL FUEL HYDROCARBONS, (LIGHT):		-	10/28/93
Purgeable Fuels, as Gasoline (EPA 8015M) ug/L	50	ND	10/28/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):		-	10/28/93
Benzene ug/L	0.5	0.7	10/28/93
Toluene ug/L	0.5	0.9	10/28/93
Ethylbenzene ug/L	0.5	ND	10/28/93
Xylenes, Total ug/L	0.5	0.9	10/28/93

Mr. Bill Howell  
 Page 10

November 02, 1993  
 PACE Project Number: 431022533

Client Reference: BP Station # 11133

PACE Sample Number: 70 0179483  
 Date Collected: 10/21/93  
 Date Received: 10/22/93  
 Client Sample ID: MW-3

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>DATE ANALYZED</u>
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ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS			
TOTAL FUEL HYDROCARBONS, (LIGHT):		-	10/28/93
Purgeable Fuels, as Gasoline (EPA 8015M) ug/L	50	370	10/28/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):		-	10/28/93
Benzene ug/L	0.5	2.1	10/28/93
Toluene ug/L	0.5	2.3	10/28/93
Ethylbenzene ug/L	0.5	2.3	10/28/93
Xylenes, Total ug/L	0.5	6.0	10/28/93

Mr. Bill Howell  
 Page 11

November 02, 1993  
 PACE Project Number: 431022533

Client Reference: BP Station # 11133

PACE Sample Number: 70 0179491  
 Date Collected: 10/21/93  
 Date Received: 10/22/93  
 Client Sample ID: QC-1

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>DATE ANALYZED</u>
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ORGANIC ANALYSIS

<u>PURGEABLE FUELS AND AROMATICS</u>			
TOTAL FUEL HYDROCARBONS, (LIGHT):		-	10/28/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	170
PURGEABLE AROMATICS (BTXE BY EPA 8020M):		-	10/28/93
Benzene	ug/L	0.5	6.1
Toluene	ug/L	0.5	2.0
Ethylbenzene	ug/L	0.5	1.7
Xylenes, Total	ug/L	0.5	4.4

Mr. Bill Howell  
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November 02, 1993  
 PACE Project Number: 431022533

Client Reference: BP Station # 11133

PACE Sample Number: 70 0179505  
 Date Collected: 10/21/93  
 Date Received: 10/22/93  
 Client Sample ID: QC-2

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>		<u>DATE ANALYZED</u>
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ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):			-	10/28/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	ND	10/28/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	10/28/93
Benzene	ug/L	0.5	ND	10/28/93
Toluene	ug/L	0.5	ND	10/28/93
Ethylbenzene	ug/L	0.5	ND	10/28/93
Xylenes, Total	ug/L	0.5	ND	10/28/93

These data have been reviewed and are approved for release.

  
 Darrell C. Cain  
 Regional Director

Mr. Bill Howell  
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FOOTNOTES  
for pages 1 through 12

November 02, 1993  
PACE Project Number: 431022533

Client Reference: BP Station # 11133

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



Mr. Bill Howell  
 Page 14

QUALITY CONTROL DATA

November 02, 1993  
 PACE Project Number: 431022533

Client Reference: BP Station # 11133

**PURGEABLE FUELS AND AROMATICS**

Batch: 70 25992

Samples: 70 0179394, 70 0179408, 70 0179416, 70 0179424, 70 0179432  
 70 0179440, 70 0179459, 70 0179467, 70 0179475, 70 0179483  
 70 0179491, 70 0179505

**METHOD BLANK:**

Parameter	Units	MDL	Method Blank
<b>TOTAL FUEL HYDROCARBONS, (LIGHT):</b>			
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	ND
<b>PURGEABLE AROMATICS (BTXE BY EPA 8020M)</b>			
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	Dup1 Recv	RPD
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	1000	99%	101%	2%
Benzene	ug/L	0.5	100	103%	107%	3%
Toluene	ug/L	0.5	100	109%	111%	1%
Ethylbenzene	ug/L	0.5	100	109%	110%	0%
Xylenes, Total	ug/L	0.5	300	110%	110%	0%

Mr. Bill Howell  
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FOOTNOTES  
for page 14

November 02, 1993  
PACE Project Number: 431022533

Client Reference: BP Station # 11133

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



431022 ~~57~~ 533

CHAIN OF CUSTODY

No. 00279 Page 1 of 1

CONSULTANT'S NAME: **ALISTO ENGINEERING** ADDRESS: **1777 OAKLAND BLVD., STE 200 WALNUT CREEK CA** CITY: **WALNUT CREEK** STATE: **CA** ZIP CODE: **94596**

BP SITE NUMBER: **BP1133** BP CORNER ADDRESS: **2220 98TH AVE OAKLAND CA** CITY: **OAKLAND** STATE: **CA** ZIP CODE: **94612**

CONSULTANT PROJECT NUMBER: **10-025-02-002**

CONSULTANT PROJECT MANAGER: **BILL HOWELL** PHONE NUMBER: **510 295 1650** FAX NUMBER: **510 295 1823**

CONSULTANT CONTRACT NUMBER: **10-025-02-002**

BP CONTACT: **JIM OYES** BP ADDRESS: **16400 Southeastern Pky 301** PHONE NUMBER: **206-394-5243** FAX NO.: **206-394-5280**

LAB CONTACT: **JIM OYES** LABORATORY ADDRESS: **11 DIGITAL DR. NOVATO** PHONE NUMBER: **415-883-6100** FAX NO.: **415-883 2673**

SAMPLED BY (Please Print Name): **Steve Rider** SAMPLED BY (Signature): **STR** SHIPMENT DATE: **10-22-93** SHIPMENT METHOD: **Courier - PACE**

TAT:  24 Hours  48 Hours  1 Week  Standard 2 Weeks

ANALYSIS REQUIRED

AIRBILL NUMBER

SAMPLE DESCRIPTION	COLLECTION DATE	MATRIX SOIL/WATER	CONTAINERS		PRESERVATIVE	LAB SAMPLE #	HPL	THMAS	BTEX	COMMENTS
			NO.	TYPE (VOL.)						
AN-1	17:45	10/21/93	W	3	Na's	17939.4				
AN-2	14:09	↓	↓	↓	↓	17940.8				
AN-3	16:35					17941.6				
AN-4	18:05					17942.4				
AN-5	17:05					17943.2				
AN-6	15:39					17944.0				
AN-7	14:42					17945.9				
AN-8	13:32					17946.7				
MW-2	16:09					17947.5				
MW-3	17:26					17948.3				
QL-1	11:00					17949.1				
QL-2		17950.5								

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	ADDITIONAL COMMENTS
<i>[Signature]</i>	10/22/93	9:00	<i>[Signature]</i>	10/22/93	9:00	F973646 Pace #
<i>[Signature]</i>	10/24/93	1525	<i>[Signature]</i> - PACE	10/24/93	1525	
<i>[Signature]</i> - PACE	10/22/93	1910	<i>[Signature]</i> - PACE	10/22	1910	