QUARTERLY GROUND WATER MONITORING AND SAMPLING REPORT

for

BP Oil Company

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

Project No. 30-0080-01

Prepared by:

Alton Geoscience
1000 Burnett Avenue, Suite 140
Concord, California

October 9, 1991

QUARTERLY GROUND WATER MONITORING AND SAMPLING REPORT
for
BP Oil Service Station No. 11133
2220 98th Avenue
Oakland, California

INTRODUCTION

This report presents a summary of the results and findings of the recent quarterly ground water monitoring and sampling activities performed by Alton Geoscience at BP Oil Service Station No. 11133, 2220 98th Avenue, Oakland, California. A site vicinity map is presented in Figure 1.

PROJECT BACKGROUND

In June 1987, three underground gasoline storage tanks were removed from the site. Soil samples were collected from the soil below the tank excavation. Analysis of the soil samples indicated total petroleum hydrocarbons (TPH) at levels ranging from 12 to 420 parts per million (ppm). In May 1988, a consultant was retained by Mobil Oil Corporation to install three monitoring wells (MW-1, MW-2, and MW-3) to assess ground water quality.

BP Oil Company subsequently retained Alton Geoscience to conduct a supplemental site investigation. Between May and June, 1990, Alton Geoscience supervised the drilling of five soil borings which were converted into four monitoring wells (AW-1 through AW-4) and one recovery well (RW-1).

Free-floating product was encountered in two of the wells (RW-1 and MW-1) while dissolved-phase petroleum hydrocarbon constituents were detected in ground water samples collected from three of the wells (AW-1, AW-3, and AW-4).

The extent of the hydrocarbon plume in the ground water beneath the site was not adequately defined at that time. It was therefore proposed that an additional site investigation be conducted to define the extent of hydrocarbons in the ground water and develop appropriate remedial measures.

On February 27 and 28, 1991 Alton Geoscience supervised the drilling of two onsite and two offsite soil borings. The soil borings were converted into monitoring wells AW-5, AW-6, AW-7, and AW-8. Recovery Well RW-1 was not accessible and therefore was not monitored or sampled. Free-floating product was encountered in MW-1 while dissolved-phase petroleum hydrocarbon constituents were detected in ground water samples from eight of the wells (MW-2, AW-1, AW-3, AW-4, AW-5, AW-6, AW-7, and AW-8).

FIELD PROCEDURES

On June 28, 1991, Alton Geoscience monitored all the wells, and sampled MW-2, MW-3, AW-1 through AW-8 in accordance with Alton Geoscience's procedures and the guidelines of the RWQCB and ACDHS.

Free-floating product was encountered in MW-1 (globules) and RW-1 (approximately 0.40 foot). Monitoring Well MW-1 and Recovery Well RW-1 were not sampled due to the presence of free-floating product.

Ground water samples were analyzed for total petroleum hydrocarbons as gasoline (TPH-G), and benzene, toluene, ethylbenzene, and total xylenes (BTEX) constituents. Ground water sampling field procedures, ground water sampling field survey forms, and official laboratory reports and chain of custody records are presented in Appendices A, B, and C, respectively.

DISCUSSION OF RESULTS

The results of the June 28, 1991 ground water monitoring and sampling performed by Alton Geoscience are summarized in Tables 1 and 2. A ground water elevation contour map, based on the depth to ground water measurements collected on June 28, 1991, is presented in Figure 2.

Ground water measurements obtained from MW-2 and MW-3 were not used in developing the ground water elevation contour map due to anomalous water level readings. The equivalent ground water surface elevation for MW-1 and RW-1 was calculated assuming a specific gravity of 0.75 for free product. Concentrations of TPH-G and benzene in the ground water are presented in Figures 3 and 4, respectively.

- Based on the water level measurements recorded on June 28, 1991, ground water gradient and direction was estimated to be approximately 0.01 foot/foot and to the southwest.
- Depth to ground water has dropped an average of 1.40 feet since March 1991.
- Water samples collected from MW-2, MW-3, AW-2, AW-7, and AW-8 had no detectable concentrations of TPH-G above reported detection limits.
- The highest concentrations of TPH-G and benzene were detected in the water samples collected from offsite monitoring well AW-4 (130,000 ppb and 56,000 ppb, respectively).

- Ground water sample analysis over the last two quarters suggest that total petroleum hydrocarbons (TPH-G) and benzene concentrations detected in Monitoring Well AW-3 which is upgradient from the potential tank cavity source, may be reflective of an offsite source of dissolved-phase hydrocarbons.

- Free-floating product was encountered in MW-1 (globules) and RW-1 (approximately 0.40 foot). The highest concentrations of TPH-G (130,000 ppb) and benzene (56,000) were detected in the water samples collected from AW-4.

This report was based on currently available data and was developed in accordance with current hydrogeologic and engineering practices.

ALTON GEOSCIENCE

Matthew A. Taylor
Civil Engineer

Source: U.S.G.S. Map, San Leandro, California
Quadrangle 7.5 minute Series.

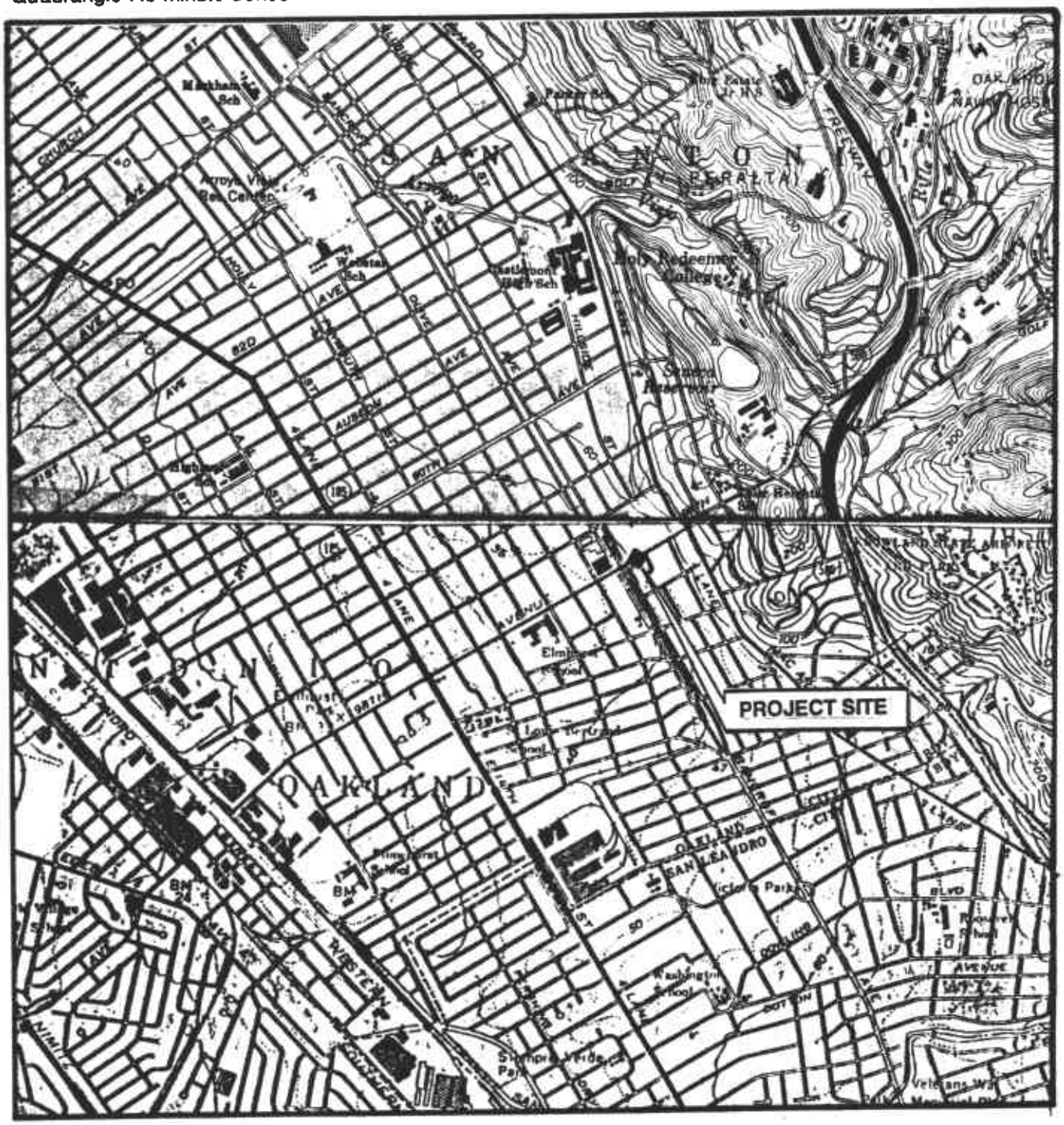

FIGURE 1

SITE VICINITY MAP

0 1000 2000

SCALE IN FEET

B P SERVICE STATION NO. 11133
2220 98TH AVENUE
OAKLAND, CALIFORNIA

PROJECT NO. 30-080-01

ALTON GEOSCIENCE
1000 Burnett Ave., Ste 140
Concord, CA 94520

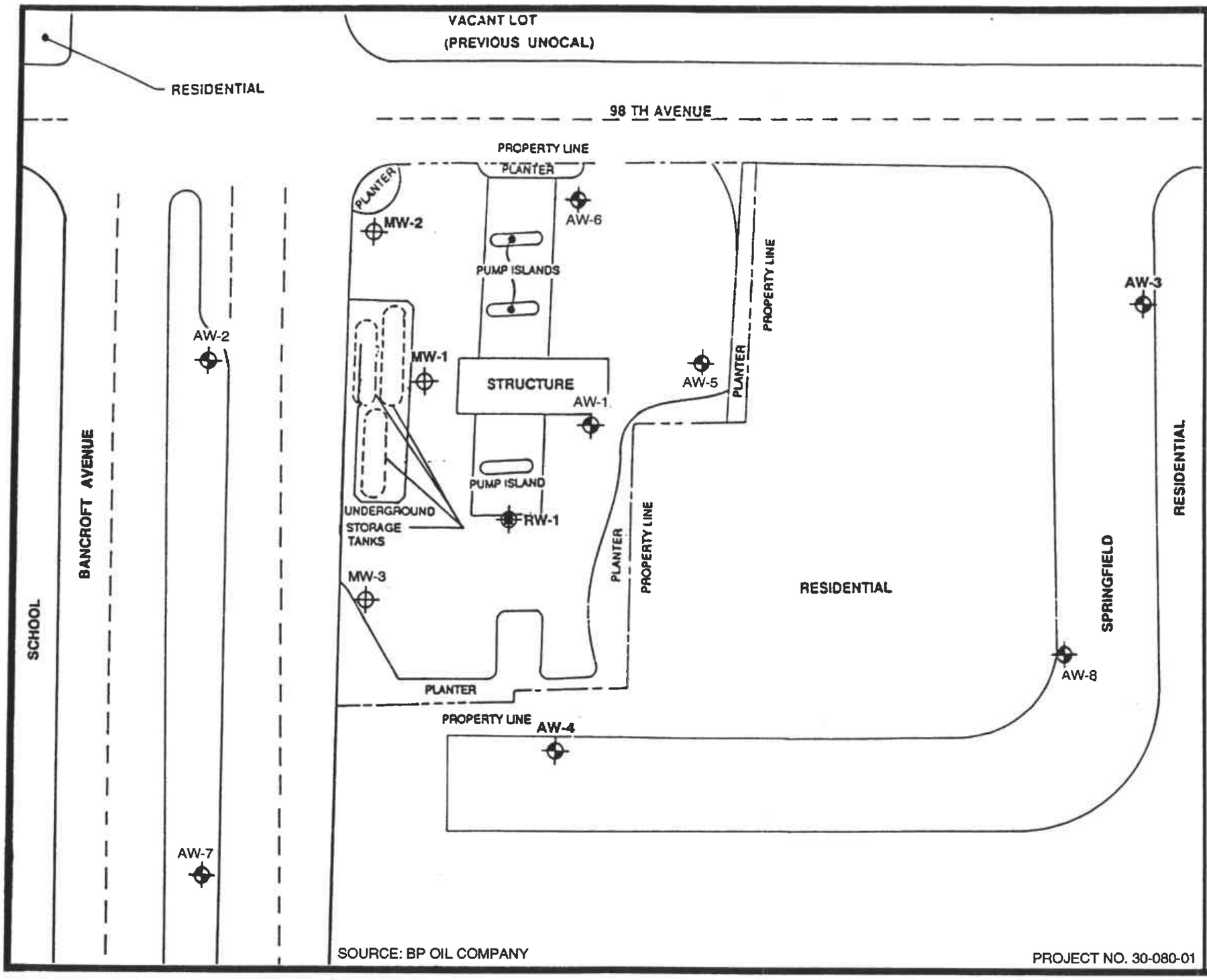

FIGURE 2: SITE PLAN

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

ALTON GEOSCIENCE
1000 Burnett Ave., Ste. 140
Concord, CA 94520

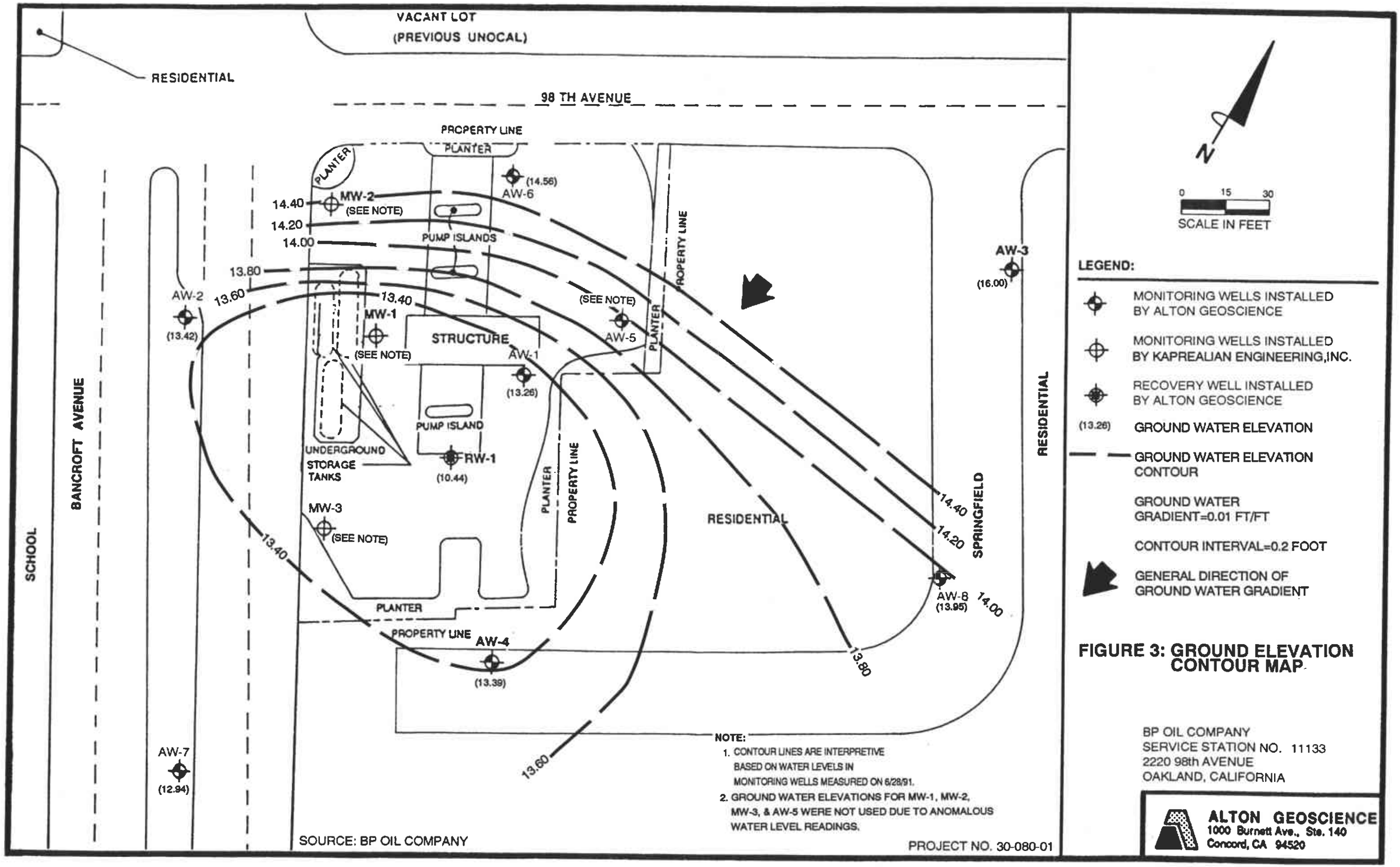

FIGURE 3: GROUND ELEVATION CONTOUR MAP

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

ALTON GEOSCIENCE
1000 Burnett Ave., Ste. 140
Concord, CA 94520

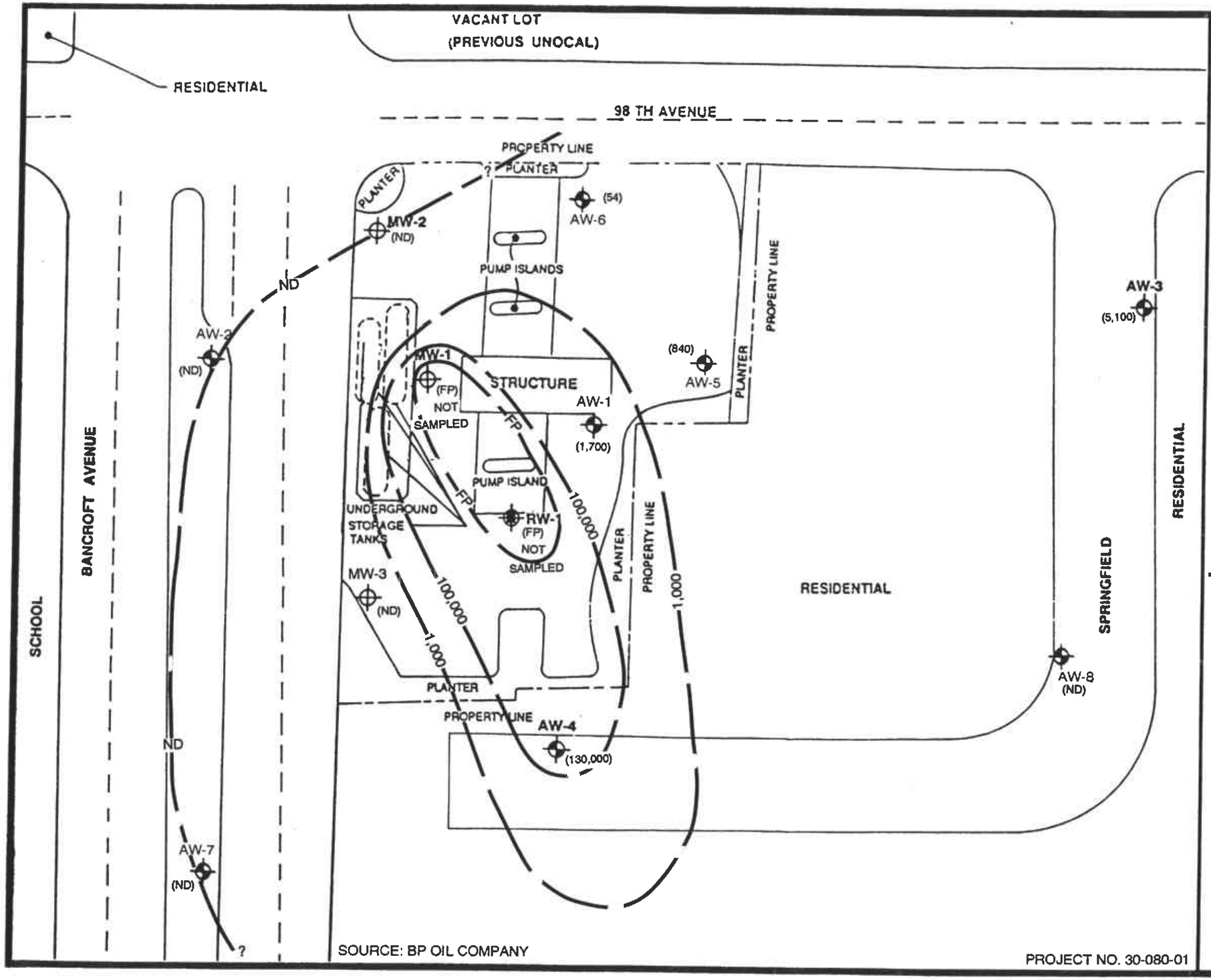

FIGURE 4: TOTAL PETROLEUM HHYDROCARBONS AS GASOLINE (TPH-G) ISOCONCENTRATION MAP (PPB)

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

ALTON GEOSCIENCE
1000 Burnett Ave., Ste. 140
Concord, CA 94520

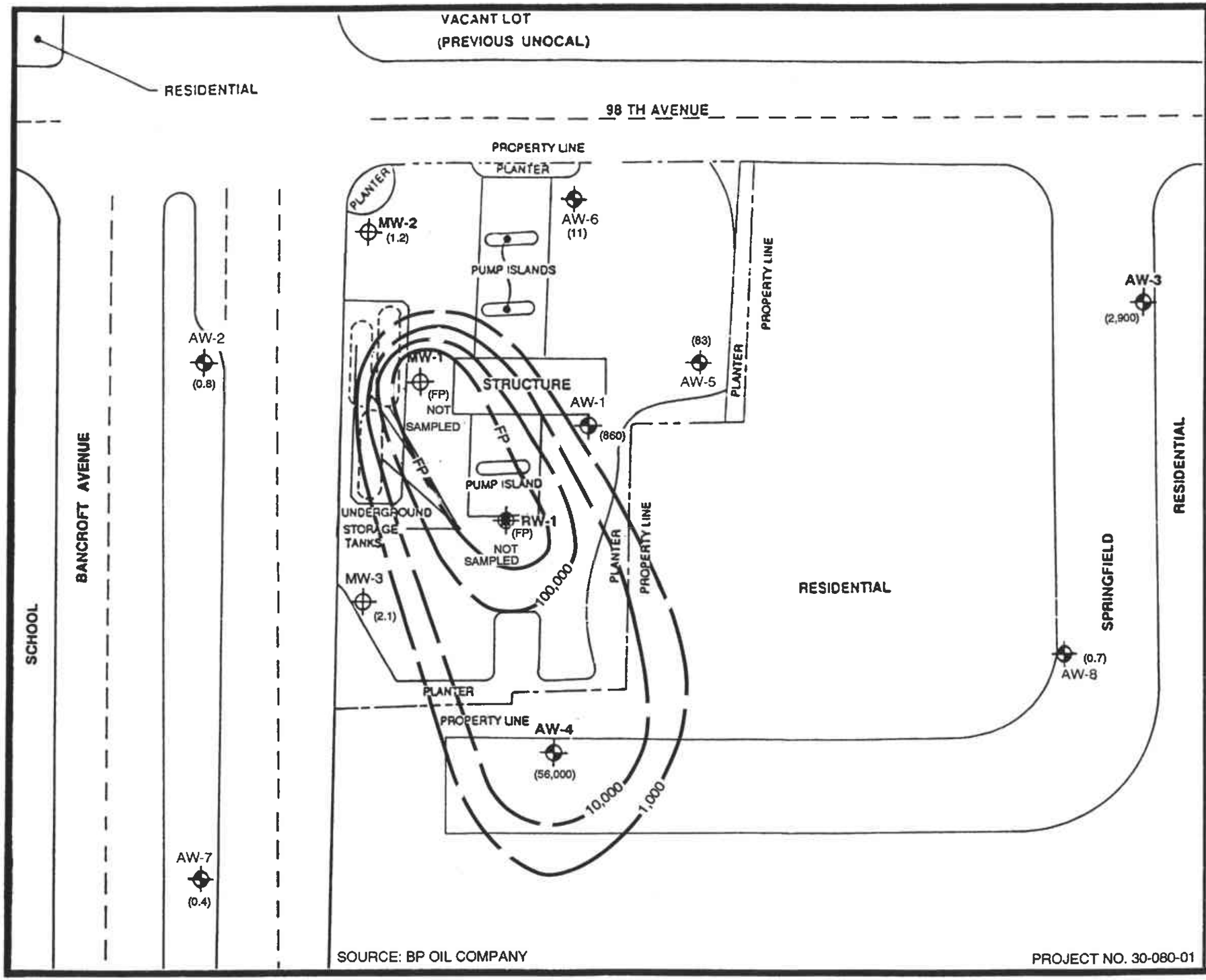

FIGURE 5: BENZENE ISOCONCENTRATION MAP (PPB)

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

ALTON GEOSCIENCE
1000 Burnett Ave., Ste. 140
Concord, CA 94520

TABLE 1

SURVEY AND WATER LEVEL MONITORING DATA
June 1991

Well ID	Well Elevation (Feet)*	Date	Depth to Water (Feet)	Free Product Thickness (Feet)	Ground Water Elevation (Feet)*
MW-1		01-90	18.07	0.2	
MW-1		07-90	13.31	0.22	
MW-1		03-91	***	***	
MW-1	37.33	06-91	14.76	globules	22.57
MW-2		01-90	25.65	----	
MW-2		07-90	23.15	----	
M2-2		03-91	16.62	----	
MW-2	36.36	06-91	17.87	----	18.49
MW-3		01-90	24.16	----	
MW-3		07-90	23.06	----	
MW-3		03-91	17.84	----	
MW-3	37.40	06-91	21.05	----	16.35
AW-1		07-90	26.87	----	
AW-1		03-91	25.44	----	
AW-1	38.99	06-91	25.73	----	13.26
AW-2		07-90	24.88	----	
AW-2		03-91	22.36	----	
AW-2	37.69	06-91	24.27	----	13.42

Note:

* Elevation in feet relative to a common datum (AW-3) with an assumed elevation of 40.00 feet above mean sea level, as measured on July 5, 1990 by Alton Geoscience. Monitoring Wells AW-1, AW-2, and AW-4 were used as reference bench marks for survey performed April 5, 1991.

** Equivalent ground water surface elevation for RW-1 was calculated assuming a specific gravity of 0.75 for free product

*** Depth to water not recorded due to the presence of free product.

TABLE 1
(cont'd)

SURVEY AND WATER LEVEL MONITORING DATA
June 1991

Well ID	Well Elevation (Feet)*	Date	Depth to Water (Feet)	Free Product Thickness (Feet)	Ground Water Elevation (Feet)*
AW-3		07-90	24.75	----	
AW-3		03-91	23.90	----	
AW-3	40.00	06-91	24.00	----	16.00
AW-4		07-90	27.29	----	
AW-4		03-91	25.12	----	
AW-4	39.96	06-91	26.57	----	13.39
AW-5		03-91	25.48	----	
AW-5	39.35	06-91	27.24	----	12.11
AW-6		03-91	22.48	----	
AW-6	37.95	06-91	23.39	----	14.56
AW-7		03-91	23.38	----	
AW-7	38.17	06-91	25.23	----	12.94
AW-8		03-91	26.68	----	
AW-8	41.74	06-91	27.29	----	13.95
RW-1		03-91	**	***	
RW-1	38.60	06-91	28.46	0.40	10.44**

Note:

* Elevation in feet relative to a common datum (AW-3) with an assumed elevation of 40.00 feet above mean sea level, as measured on July 5, 1990 by Alton Geoscience. Monitoring Wells AW-1, AW-2, and AW-4 were used as reference bench marks for survey performed April 5, 1991.

** Equivalent ground water surface elevation for RW-1 was calculated assuming a specific gravity of 0.75 for free product.

N/A Recovery Well RW-1 was not accessible.

TABLE 2

RESULTS OF
LABORATORY ANALYSIS OF GROUND WATER SAMPLES
June 1991

Well ID	Date	TPH-G	B	T	E	X
		(Concentrations in Parts per Billion)				
MW-1	1-24-90	---	---	---	---	---
MW-1	7-09-90	---	---	---	---	---
MW-1	3-08-91	---	---	---	---	---
MW-1	6-28-91	---	---	---	---	---
MW-2	1-24-90	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
MW-2	7-09-90	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
MW-2	3-08-91	ND<50	0.6	0.9	ND<0.3	ND<0.3
MW-2	6-28-91	ND<50	1.2	0.7	ND<0.3	0.5
MW-3	1-24-90	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
MW-3	7-09-90	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
MW-3	3-08-91	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.3
MW-3	6-28-91	ND<50	2.1	1.1	ND<0.3	0.7
AW-1	7-09-90	66	1	ND<0.5	ND<0.5	ND<0.5
AW-1	3-08-91	ND<50	1,500	69	100	83
AW-1	6-28-91	1,700	860	53	38	51
AW-2	7-09-90	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
AW-2	3-08-91	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.3
AW-2	6-28-91	ND<50	0.8	0.4	ND<0.3	0.5
AW-3	7-09-90	88	1.9	ND<0.5	ND<0.5	42
AW-3	3-08-91	5,200	980	450	95	310
AW-3	6-28-91	5,100	2,900	110	110	220

Notes:

TPH-G = Total Petroleum Hydrocarbons as Gasoline
B = Benzene
T = Toluene
E = Ethylbenzene
X = Total Xylenes
ND = Not Detected at Method Detection Limit
--- = No sample collected from MW-1 and RW-1 due to the presence of free product

TABLE 2
(cont'd)

RESULTS OF
LABORATORY ANALYSIS OF GROUND WATER SAMPLES
June 1991

Well ID	Date	TPH-G	B	T	E	X
		(Concentrations in Parts per Billion)				
AW-4	7-09-90	38,000	18,000	2,300	1,500	2,000
AW-4	3-08-91	110,000	40,000	13,000	2,000	5,500
AW-4	6-28-91	130,000	56,000	12,000	2,500	5,800
AW-5	3-08-91	420	31	7.5	20	68
AW-5	6-28-91	840	83	4.2	71	70
AW-6	3-08-91	1,100	80	19	1.4	230
AW-6	6-28-91	54	11	2.4	0.8	2.1
AW-7	3-08-91	ND<50	0.4	0.7	ND<0.3	ND<0.3
AW-7	6-28-91	ND<50	0.4	ND<0.3	ND<0.3	ND<0.3
AW-8	3-08-91	80	1.9	2.2	0.5	1.3
AW-8	6-28-91	ND<50	0.7	0.4	ND<0.3	0.4
RW-1	3-08-91	---	---	---	---	---
RW-1	6-28-91	---	---	---	---	---

Notes:

TPH-G = Total Petroleum Hydrocarbons as Gasoline
B = Benzene
T = Toluene
E = Ethylbenzene
X = Total Xylenes
ND = Not Detected at Method Detection Limit
--- = No sample collected from MW-1 and RW-1 due to the presence of free product

APPENDIX A

GROUND WATER SAMPLING FIELD PROCEDURES

APPENDIX A

GROUND WATER SAMPLING FIELD PROCEDURES

Prior to purging and sampling, total well depth and depth to ground water were measured from a reference mark at the top of each well casing to the nearest 0.01 foot using an electronic sounder. Ground water was examined, using a hand bailer, for the presence of free-floating product or sheen.

Prior to sample collection, each well was purged of the required well casing volumes and until stabilization of pH, temperature, and conductivity was achieved. Each sample was collected using a clean bailer and transferred to the appropriate clean sample containers for delivery to a California certified laboratory following proper preservation and chain of custody procedures. Purged ground water was stored onsite in DOT-approved, 55-gallon drums pending analytical results and proper offsite disposal.

APPENDIX B

GROUND WATER SAMPLING FIELD SURVEY FORMS

ALTON GEOSCIENCE, INC
1170 Burnett Ave., Ste. S
Concord, CA 94520

JOB NUMBER 30-080-01 TECHNICIAN Chris R / Donnie ?

JOB LOCATION BP 98th Oakland DATE 6-28-91

PUMPOUT ☑ YES ☐ NO	DATE OF LAST PUMPOUT:			WEATHER: cloudy TIME: 11:30		COMMENTS (Notes, conditions, etc.)
	HOLD	CUT	LEVEL			
WELL #	DEPTH TO WATER	DEPTH TO PRODUCT	PROD. THICKNESS (FT)	TOTAL DEPTH	DEPTH TO PUMP	
FP MW-1	14.76			28.20		2" FP Globules (black)
ND MW-2	17.87			30.98		2"
ND MW-3	21.05			33.85		2"
AW-1	25.73			38.46		2"
ND AW-2	24.27			35.15		2"
AW-3	24.00			35.63		2"
AW-4	26.57			32.85		2"
AW-5	27.24			42.61		4"
coc AW-6	23.39			34.10		4"
AW-7	25.23			32.24		2"
ND AW-8	27.79			35.36		2"
cool RW-1	28.46			39.28		6" FP 4.75" thick Black
			21 Brok on side		2 full	
		MW-1	Baled	10 gals	~.25 gal FP	
		RW-1	Baled	30 gals	45 gals FP	
			well recharging		with FP	

FP

ALTON GEOSCIENCE, INC.
Well Development and
Water Sampling Field Survey

Project # 30-280-α Site: BP 98th Ave Date: 6-28-91

Well: MW-1 Sampling Team: Chris R / DB

Well Development Method: —

Sampling Method: —

Describe Equipment Before Sampling This Well: Trip rinse

Well Development/ Well Sampling Data

Total Well Depth: 28.20 feet Time: _____ Water level Before Pumping: 14.76

Water Column		Casing Diameter 2-inch	4-inch	Volume	Factor	Volume to Purge
_____	feet x	0.16	0.65	_____	_____	_____

Depth Purging From: ____ feet. Time Purging Begins: 5:15

Notes on Initial Discharge: Free product; globules

Time	Volume	pH	Conductivity	T	Notes
____	_____	_____	_____	_____	_____
____	_____	_____	_____	_____	_____
____	_____	_____	_____	_____	_____
____	_____	_____	_____	_____	_____
____	_____	_____	_____	_____	_____

Time Field Parameter Measurement Begins: _____

	Rep #1	Rep #2	Rep #3	Rep #4
pH	_____	_____	_____	_____
Conductivity	_____	_____	_____	_____
Temperature (F)	_____	_____	_____	_____

Presample Collection Gallons Purged: _____

Time Sample Collection Begins: _____

Time Sample Collection Ends: _____

Total Gallons Purged: 10 [~.25 gal FP purged]

Comments: Free product globules black; remain in suspension.

ND

ALTON GEOSCIENCE, INC.
Well Development and
Water Sampling Field Survey

Project # 30-080-01 Site: BP 98th, Oak. Date: 6-28-91

Well: MW-2 Sampling Team: Chris R / DTB

Well Development Method: —

Sampling Method: bailer

Describe Equipment Before Sampling This Well: Trip. rinse

Well Development/ Well Sampling Data

Total Well Depth: 30.98 feet Time: _____ Water level Before Pumping: 17.87

Water Column		Casing Diameter 2-inch	4-inch	Volume	Factor	Volume to Purge
13.11	feet x	(0.16)	0.65	2.09	3	6.29

Depth Purging From: 24 feet. Time Purging Begins: 2:16

Notes on Initial Discharge: cloudy

Time	Volume	pH	Conductivity x1000	T	Notes
2:19	4.5	9.76	1.71	65.1	cloudy
2:20	5.0	8.71	1.70	65.4	
2:20	5.5	8.56	1.63	65.6	
2:21	6.0	8.58	1.62	65.4	
2:21	6.5	8.52	1.64	65.4	

Time Field Parameter Measurement Begins: _____

	Rep #1	Rep #2	Rep #3	Rep #4
pH				
Conductivity				
Temperature (F)				

Presample Collection Gallons Purged: 6.29

Time Sample Collection Begins: 2:21

Time Sample Collection Ends: 2:24

Total Gallons Purged: 6.5

Comments: _____

ALTON GEOSCIENCE, INC.
Well Development and
Water Sampling Field Survey

NP

Project # 30-080-01 Site: BP 98th Oak. Date: 6-28-91

Well: MW-3 Sampling Team: Chris R / DB

Well Development Method: —

Sampling Method: bailer

Describe Equipment Before Sampling This Well: Trip. rinse

Well Development/ Well Sampling Data

Total Well Depth: 33.85 feet Time: _____ Water level Before Pumping: 21.05

Water Column	Casing Diameter 2-inch	4-inch	Volume	Factor	Volume to Purge
12.80 feet x	(0.16)	0.65	2.04	3	6.14

Depth Purging From: 24 feet. Time Purging Begins: 1:58

Notes on Initial Discharge: clear

Time	Volume	pH	Conductivity x1000	T	Notes
2:02	4.0	8.14	1.09	66.3	clear
2:07	4.5	8.74	1.06	66.1	"
2:03	5.0	8.67	1.02	65.9	"
2:03	5.5	8.60	1.00	65.8	"
2:04	6	8.62	0.99	65.8	"

Time Field Parameter Measurement Begins: _____

	Rep #1	Rep #2	Rep #3	Rep #4
pH				
Conductivity				
Temperature (F)				

Presample Collection Gallons Purged: 6.14

Time Sample Collection Begins: 2:08

Time Sample Collection Ends: 2:10

Total Gallons Purged: 6.0

Comments: _____

ALTON GEOSCIENCE, INC.
Well Development and
Water Sampling Field Survey

Project # 30-080-01 Site: BP 98th Oak. Date: 6-28-91

Well: AW-1 Sampling Team: Chris R / DB

Well Development Method: —

Sampling Method: bailer

Describe Equipment Before Sampling This Well: Trip rinse

Well Development/ Well Sampling Data

Total Well Depth: 38.46 feet Time: _____ Water level Before Pumping: 25.73

Water Column	Casing Diameter 2-inch	4-inch	Volume	Factor	Volume to Purge
12.73 feet x	(0.16)	0.65	2.03	3	6.09

Depth Purging From: 28 feet. Time Purging Begins: 4:48

Notes on Initial Discharge: clear

Time	Volume	pH	Conductivity	T	Notes
			HYDAC	WET	

Time Field Parameter Measurement Begins: _____

	Rep #1	Rep #2	Rep #3	Rep #4
pH				
Conductivity				
Temperature (F)				

Presample Collection Gallons Purged: 6.09

Time Sample Collection Begins: 4:48

Time Sample Collection Ends: 4:52

Total Gallons Purged: 7

Comments: Hydac meter not giving accurate readings

ND

ALTON GEOSCIENCE, INC.
Well Development and
Water Sampling Field Survey

Project # 30-080-01 Site: BP 98th Oak Date: 6-28-91

Well: AW-2 Sampling Team: Chris R / DB

Well Development Method: —

Sampling Method: bailer

Describe Equipment Before Sampling This Well: Trip rinsed

Well Development/ Well Sampling Data

Total Well Depth: 35.15 feet Time: _____ Water level Before Pumping: 24.27

Water Column		Casing Diameter 2-inch	4-inch	Volume		Factor	Volume to Purge
10.88	feet x	(0.16)	0.65	1.74	·	3	5.22

Depth Purging From: 26 feet. Time Purging Begins: 2:59

Notes on Initial Discharge: clear

Time	Volume	pH	Conductivity x1000	T	Notes
3:01	3.5	8.30	3.27	65.2	cloudy
3:01	4.0	8.18	3.28	65.3	
3:02	4.5	8.16	3.24	65.2	
3:03	5.0	8.19	3.28	65.1	
3:03	5.5	8.15	3.27	65.2	

Time Field Parameter Measurement Begins: _____

	Rep #1	Rep #2	Rep #3	Rep #4
pH				
Conductivity				
Temperature (F)				

Presample Collection Gallons Purged: 5.22

Time Sample Collection Begins: 3:05

Time Sample Collection Ends: 3:08

Total Gallons Purged: 6

Comments: _____

ALTON GEOSCIENCE, INC.
Well Development and
Water Sampling Field Survey

Project # 30-080-01 Site: BP 98th Oak Date: 6-28-91

Well: AW-3 Sampling Team: Chris R / DB

Well Development Method: —

Sampling Method: bailer

Describe Equipment Before Sampling This Well: Trip. rinse

Well Development/ Well Sampling Data

Total Well Depth: 35.63 feet Time: _____ Water level Before Pumping: 24.00

Water Column	Casing Diameter 2-inch	4-inch	Volume	Factor	Volume to Purge
11.63 feet x	(0.16)	0.65	1.86	3	5.58

Depth Purging From: 28 feet. Time Purging Begins: 3:18

Notes on Initial Discharge: clear

Time	Volume	pH	Conductivity x1000	T	Notes
3:20	3.5	8.03	3.67	64.6	cloudy
3:21	4.0	7.90	3.71	64.8	
3:21	4.5	7.88	3.78	64.4	
3:22	5.0	7.89	3.81	64.4	
3:22	5.5	7.91	3.79	64.5	

Time Field Parameter Measurement Begins: _____

	Rep #1	Rep #2	Rep #3	Rep #4
pH				
Conductivity				
Temperature (F)				

Presample Collection Gallons Purged: 5.58

Time Sample Collection Begins: 3:24

Time Sample Collection Ends: 3:25

Total Gallons Purged: 6.0

Comments: _____

ALTON GEOSCIENCE, INC.
Well Development and
Water Sampling Field Survey

Project # 30-080-01 Site: BP 98th Oak. Date: 6-28-91

Well: AW-4 Sampling Team: Chris R / DB

Well Development Method: —

Sampling Method: bailer

Describe Equipment Before Sampling This Well: Trip. rinse

Well Development/ Well Sampling Data

Total Well Depth: 32.85 feet Time: _____ Water level Before Pumping: 26.57

Water Column		Casing Diameter 2-inch	4-inch	Volume	Factor	Volume to Purge
6.28	feet x	(0.16)	0.65	1.00	3	3.0

Depth Purging From: 28 feet. Time Purging Begins: 3:50

Notes on Initial Discharge: clear

Time	Volume	pH	Conductivity	T	Notes
3:51	1.5	UA *	4.73	64.7	cloudy
3:51	2.0	"	4.79	64.6	
3:52	2.5	"	4.78	64.8	
3:52	3.0	"	4.69	64.6	
3:53	3.5	"	4.72	64.8	

Time Field Parameter Measurement Begins: _____

	Rep #1	Rep #2	Rep #3	Rep #4
pH				
Conductivity				
Temperature (F)				

Presample Collection Gallons Purged: 3.0

Time Sample Collection Begins: 3:53

Time Sample Collection Ends: 3:58

Total Gallons Purged: 3.5

Comments: * Hydac meter not giving accurate readings for PH

ALTON GEOSCIENCE, INC.
Well Development and
Water Sampling Field Survey

Project # 30-080-01 Site: BP 98th Oak. Date: 6-28-91

Well: AW-5 Sampling Team: ChrisR / DB

Well Development Method: —

Sampling Method: bailer

Describe Equipment Before Sampling This Well: Trip. rinse

Well Development/ Well Sampling Data

Total Well Depth: 42.61 feet Time: _____ Water level Before Pumping: 27.24

Water Column		Casing Diameter 2-inch	4-inch	Volume	Factor	Volume to Purge
15.37	feet x	0.16	(0.65)	9.99	3	29.97

Depth Purging From: 30 feet. Time Purging Begins: 4:30

Notes on Initial Discharge: clear

Time	Volume	pH	Conductivity	T	Notes
4:33	25	HYDAC	NA	65.6	cloudy
4:35	26		METER	WET	
4:35	27	↓	↓	↓	↓
4:36	28				
4:36	29				

Time Field Parameter Measurement Begins: _____

	Rep #1	Rep #2	Rep #3	Rep #4
pH				
Conductivity				
Temperature (F)				

Presample Collection Gallons Purged: 29.97

Time Sample Collection Begins: 4:36

Time Sample Collection Ends: 4:39

Total Gallons Purged: 30

Comments: Hydac not giving accurate readings

ALTON GEOSCIENCE, INC.
Well Development and
Water Sampling Field Survey

Project # 30-080.01 Site: BP 98th Oak. Date: 6-28-91

Well: AW-6 Sampling Team: Chris R / DB

Well Development Method: —

Sampling Method: bailer

Describe Equipment Before Sampling This Well: Trip. rinse

Well Development/ Well Sampling Data

Total Well Depth: 34.10 feet Time: _____ Water level Before Pumping: 23.39

Water Column	Casing Diameter 2-inch	4-inch	Volume	Factor	Volume to Purge
10.71 feet x	0.16	(0.65)	6.96	3	20.88

Depth Purging From: 26 feet. Time Purging Begins: 4:11

Notes on Initial Discharge: clear

Time	Volume	pH	Conductivity x1000	T	Notes
4:18	16	2.69	3.56	65.6	clear
4:18	17	2.46	3.54	65.7	
4:19	18	2.56	3.60	65.4	
4:20	19	2.49	3.58	65.7	
4:21	20	2.52	3.61	65.6	

Time Field Parameter Measurement Begins: _____

	Rep #1	Rep #2	Rep #3	Rep #4
pH				
Conductivity				
Temperature (F)				

Presample Collection Gallons Purged: 20.88

Time Sample Collection Begins: 4:21

Time Sample Collection Ends: 4:24

Total Gallons Purged: 22

Comments: _____

ALTON GEOSCIENCE, INC.
Well Development and
Water Sampling Field Survey

ND

Project # 30-080-01 Site: BP 98th Oak. Date: 6-28-91

Well: AW-7 Sampling Team: Chris R / DB

Well Development Method: —

Sampling Method: bailer

Describe Equipment Before Sampling This Well: Trip. rinse

Well Development/ Well Sampling Data

Total Well Depth: 32.24 feet Time: _____ Water level Before Pumping: 25.23

Water Column		Casing Diameter 2-inch	4-inch	Volume	Factor	Volume to Purge
7.01	feet x	(0.16)	0.65	1.12	3	3.36

Depth Purging From: 28 feet. Time Purging Begins: 243

Notes on Initial Discharge: clear

Time	Volume	pH	Conductivity (x1000)	T	Notes
2:44	2.0	8.30	2.28	64.5	cloudy, brown
2:45	2.5	8.25	2.28	65.3	
2:45	3.0	8.26	2.32	65.4	
2:46	3.5	8.19	2.41	65.5	
2:46	4.0	8.21	2.41	65.4	

Time Field Parameter Measurement Begins: _____

	Rep #1	Rep #2	Rep #3	Rep #4
pH				
Conductivity				
Temperature (F)				

Presample Collection Gallons Purged: 3.26

Time Sample Collection Begins: 2:47

Time Sample Collection Ends: 2:49

Total Gallons Purged: 4

Comments: _____

ALTON GEOSCIENCE, INC.
Well Development and
Water Sampling Field Survey

Project # 30-080-01 Site: BP 98th Oak. Date: 6-28-91

Well: AW-8 Sampling Team: Chris R / DB

Well Development Method: —

Sampling Method: bailer

Describe Equipment Before Sampling This Well: Trip. rinse

Well Development/ Well Sampling Data

Total Well Depth: 35.36 feet Time: _____ Water level Before Pumping: 27.79

Water Column		Casing Diameter 2-inch	4-inch	Volume	Factor	Volume to Purge
7.57	feet x	(0.16)	0.65	1.21	3	3.6

Depth Purging From: 30 feet. Time Purging Begins: 3:38

Notes on Initial Discharge: clear

Time	Volume	pH	Conductivity	T	Notes
3.39	2.0	8.78	4.11	64.7	cloudy
3:40	2.5	8.61	4.00	64.8	
3:42	3.0	8.59	4.12	64.9	
3:4	3.5	8.67	3.96	64.8	
3:4	4.0	8.62	3.90	64.9	

Time Field Parameter Measurement Begins: _____

	Rep #1	Rep #2	Rep #3	Rep #4
pH				
Conductivity				
Temperature (F)				

Presample Collection Gallons Purged: 3.6

Time Sample Collection Begins: 3:41

Time Sample Collection Ends: 3:43

Total Gallons Purged: 4.0

Comments: _____

ALTON GEOSCIENCE, INC.
Well Development and
Water Sampling Field Survey

Project # 30-080-01 Site: BP 98th Oakland Date: 6-28-91

Well: RW-1 Sampling Team: Chris R / Donnie B

Well Development Method: —

Sampling Method: —

Describe Equipment Before Sampling This Well: Triple rinsed

Well Development/ Well Sampling Data

Total Well Depth: 39.29 feet Time: _____ Water level Before Pumping: 29.46

Water Column		Casing Diameter 2-inch	4-inch	Volume	Factor	Volume to Purge
_____	feet x	0.16	0.65	_____	_____	_____

Depth Purging From: ____ feet. Time Purging Begins: 5:15

Notes on Initial Discharge: Free product ~ 4.75" thick

Time	Volume	pH	Conductivity	T	Notes

Time Field Parameter Measurement Begins: _____

	Rep #1	Rep #2	Rep #3	Rep #4
pH				
Conductivity				
Temperature (F)				

Presample Collection Gallons Purged: _____ [~5gal FP purged]

Time Sample Collection Begins: —

Time Sample Collection Ends: —

Total Gallons Purged: 30

28.46
25.72
2.74

Comments: Keck gave ambiguous readings. FP bailer ~3-5" thick

APPENDIX C

OFFICIAL LABORATORY REPORTS
AND
CHAIN OF CUSTODY RECORD

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I · SAN FRANCISCO, CA 94124 · PHONE (415) 647-2081
DOHS #1332

JUL 11 1991

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 53830
CLIENT: Alton Geoscience
CLIENT JOB NO.: 30-080-01

DATE RECEIVED: 07/01/91
DATE REPORTED: 07/09/91

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
by Modified EPA SW-846 Method 5030 and 8015

LAB #	Sample Identification	Concentration (ug/L) Gasoline Range
1	MW-2	ND<50
2	MW-3	ND<50
3	AW-1	1700
4	AW-2	ND<50
5	AW-3	5100
6	AW-4	130000
7	AW-5	840
8	AW-6	54
9	AW-7	ND<50
10	AW-8	ND<50

ug/L - parts per billion (ppb)
Minimum Detection Limit for Gasoline in Water: 50ug/L

QAQC Summary:
Daily Standard run at 2mg/L: %Diff Gasoline = <15
MS/MSD Average Recovery = 102%: Duplicate RPD = 3.5%

Richard Srna, Ph.D.
Laboratory Director

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE. UNIT I · SAN FRANCISCO CA 94124 · PHONE (415) 647-2081 DOHS #1332

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 53830
CLIENT: Alton Geoscience
CLIENT JOB NO.: 30-080-01

DATE RECEIVED: 07/01/91
DATE REPORTED: 07/09/91

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES
by EPA SW-846 Methods 5030 and 8020

LAB #	Sample Identification	Concentration(ug/L) Benzene	Toluene	Ethyl Benzene	Xylenes
1	MW-2	1.2	0.7	ND<0.3	0.5
2	MW-3	2.1	1.1	ND<0.3	0.7
3	AW-1	860	53	38	51
4	AW-2	0.8	0.4	ND<0.3	0.5
5	AW-3	2900	110	110	220
6	AW-4	56000	12000	2500	5800
7	AW-5	83	4.2	71	70
8	AW-6	11	2.4	0.8	2.1
9	AW-7	0.4	ND<0.3	ND<0.3	ND<0.3
10	AW-8	0.7	0.4	ND<0.3	0.4

ug/L - parts per billion (ppb)

Minimum Detection Limit in Water:0.3ug/L

QAQC Summary:
Daily Standard run at 20ug/L: %Diff 8020 = <15
MS/MSD Average Recovery = 101% : Duplicate RPD = 0.5%

Richard Srna, Ph.D.
Laboratory Director

ALTON GEOSCIENCE
1000 BURNETT ST., #140
CONCORD, CA 94520 (415) 682-1582

CHAIN of CUSTODY RECORD

PAGE 1 of 2

DATE: 6-28-91

RESULTS DUE BY:

PROJECT NUMBER: 30-080-01

PROJECT NAME AND ADDRESS: B.P. 0:1 2220 98th Ave Oakland

PROJECT MANAGER: MATT HORWOOD

SAMPLER'S SIGNATURE:

LABORATORY:

REMARKS OR SPECIAL INSTRUCTIONS: SF # 53830

NOTE: PLEASE INDICATE VERBAL REQUESTS FOR ADDITIONAL ANALYSES IN THIS BOX.

SAMPLE NUMBER	SAMPLE DATE/TIME	LOCATION/ DESCRIPTION	SAMPLE MATERIAL	SAMPLE TYPE: GRAB	SAMPLE TYPE: COMP.	NUMBER OF CONTAINERS
MW-2	6-28-91 2:24		WATER	X		3
MW-3	6-28-91 2:10					3
AW-1	6.28.91 4:52					3
AW-2	6.28.91 5:08					3
AW-3	6-28-91 5:25					3
AW-4	6.28.91 3:58					3
AW-5	6.28.91 4:39					3
AW-6	6.28.91 4:24					3
AW-7	6.28.91 2:49					3
					TOTAL NO. OF CONTAINERS:	

SAMPLE PREP.			SOIL ANALYSIS					WATER ANALYSIS					
3510: SOLV. EXTR.	3810: HEAD SPACE	5030: PURGE & TRAP	418.1: TPHC (IR)	8010: HALOCARBONS	8020: BTXE	DHS METHOD: TPHC (GC)	7420: TOTAL Pb	418.1: TPHC (IR)	601: HALOCARBONS	602: BTXE	DHS METHOD: TPHC (GC)	7421: TOTAL Pb	TPH-G/BTEX
													X
													—
													V

Please initial
Samples stored in ice
Appropriate containers.
Samples preserved.
VOA's without headspace.
Comments:

RELINQUISHED BY:	RECEIVED BY:	DATE/TIME:	METHOD OF SHIPMENT:
		7-1 10:30A	EXPRESS-IT
RELINQUISHED BY:	RECEIVED BY:	DATE/TIME:	SHIPPED BY:
		7-1-91 1200	EXPRESS-IT
RELINQUISHED BY:	RECEIVED BY:	DATE/TIME:	COURIER:
	7/1/91		Express IT

ALTON GEOSCIENCE
1000 BURNETT ST., #140
CONCORD, CA 94520 (415) 682-1582

CHAIN of CUSTODY RECORD

PAGE 2 of 2

DATE: 6-28-91

RESULTS DUE BY:

PROJECT NUMBER: 30-080-01

PROJECT NAME AND ADDRESS: BP Oil 2220 98th Ave Oakland

PROJECT MANAGER: MATT HOPWOOD

SAMPLER'S SIGNATURE:

LABORATORY:

REMARKS OR SPECIAL INSTRUCTIONS: SF # 53820

NOTE: PLEASE INDICATE VERBAL REQUESTS FOR ADDITIONAL ANALYSES IN THIS BOX.

SAMPLE NUMBER	SAMPLE DATE/TIME	LOCATION/ DESCRIPTION	SAMPLE MATERIAL	SAMPLE TYPE: GRAB	SAMPLE TYPE: COMP.	NUMBER OF CONTAINERS	SAMPLE PREP. 3510: SOLV. EXTR.	SAMPLE PREP. 3810: HEAD SPACE	SAMPLE PREP. 5030: PURGE & TRAP	SOIL ANALYSIS 418.1: TPHC (IR)	SOIL ANALYSIS 8010: HALOCARBONS	SOIL ANALYSIS 8020: BTXE	SOIL ANALYSIS DHS METHOD: TPHC (GC)	SOIL ANALYSIS 7420: TOTAL Pb	WATER ANALYSIS 418.1: TPHC (IR)	WATER ANALYSIS 601: HALOCARBONS	WATER ANALYSIS 602: BTXE	WATER ANALYSIS DHS METHOD: TPHC (GC)	WATER ANALYSIS 7421: TOTAL Pb	WATER ANALYSIS TPH-G/BTEX
AW-8	6-28-91 3:43		WATER	X		3														X

Please initial:
Samples stored in ice.
Appropriate containers.
Samples preserved.
VOA's without headspace.
Comments:

TOTAL NO. OF CONTAINERS: 30

RELINQUISHED BY:	RECEIVED BY:	DATE/TIME: 7-1 10:30	METHOD OF SHIPMENT: EXPRESS-IT
RELINQUISHED BY:	RECEIVED BY:	DATE/TIME:	SHIPPED BY: EXPRESS-IT
RELINQUISHED BY:	RECEIVED BY:	DATE/TIME: 7/02/91	COURIER: Express IT