BP OIL

BP Oil Company
Aetna Bldg., Suite 360
2868 Prospect Park Drive
Rancho Cordova, California 95670-6020
(916) 631-0733

February 10, 1992

Mr Rafat Shahid
Oakland County Department of Health Services
80 Swan Way, #200
Oakland, California 94621

RE: BP FACILITY #11133
2220 98th AVENUE
OAKLAND, CALIFORNIA

Dear Mr. Shahid,

Attached please find the results of the Quarterly Ground Water Monitoring and Sampling Report for the above referenced facility.

Please call me at 916/631-6919 with any questions regarding this submission.

Respectfully,

Peter J DeSantis

Peter J. DeSantis SMR
Environmental Resources Management

PJD:lk

Attachment

cc: CONSULTANT
Dave Baker - Mobil Oil Corporation
J.R. Rocco - BP Oil, Cleveland
Site file

QUARTERLY GROUND WATER MONITORING AND SAMPLING REPORT

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

Project No. 30-0080-01

Prepared for:

BP Oil Company
Aetna Building, Suite 360
Rancho Cordova, California 95670-6020

Prepared by:

Alton Geoscience
1000 Burnett Avenue, Suite 140
Concord, California

January 31, 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 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 September 26, 1991, Alton Geoscience performed quarterly ground water monitoring of all wells at the site and sampled Monitoring Wells MW-2, MW-3, and AW-1 through AW-8. The wells were monitored in sampled in accordance with Alton Geoscience's procedures and the requirements and guidelines of the Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) and Alameda County Department of Health Services (ACDHS). Ground water sampling field procedures and ground water sampling field survey forms are presented in Appendix A. Locations of monitoring wells are shown on Figure 2.

Ground water samples were analyzed for total petroleum hydrocarbons as gasoline (TPH-G), and benzene, toluene, ethylbenzene, and total xylenes (BTEX) constituents at Superior Precision Analytical, Inc., Martinez, California. Official laboratory reports and chain of custody records are presented in Appendix B.

DISCUSSION OF RESULTS

The laboratory results for this and previous quarterly ground water monitoring and sampling events are summarized in Tables 1 and 2. A ground water elevation map, based on the depth to ground water measurements collected on September 26, 1991, is shown in Figure 3. Concentrations of petroleum hydrocarbon constituents detected in ground water samples are presented in Figure 4.

Results of this ground water monitoring and laboratory analysis indicate the following:

- Free-floating product was encountered in MW-1 (approximately 0.15 foot) and RW-1 (approximately 1.19 feet).
- Monitoring Well MW-1 and Recovery Well RW-1 were not sampled due to the presence of free-floating product.
- Ground water measurements obtained from MW-2 and MW-3

- 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.

- Based on the water level measurements recorded on September 26, 1991, ground water gradient and direction was estimated to be approximately 0.03 foot/foot and to the southwest.

- TPH-G and BTEX constituents were not detected in ground water samples collected from MW-2, MW-3, AW-2, AW-5, AW-6, AW-7, and AW-8 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.

ALTON GEOSCIENCE

Matthew A. Taylor
Civil Engineer

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

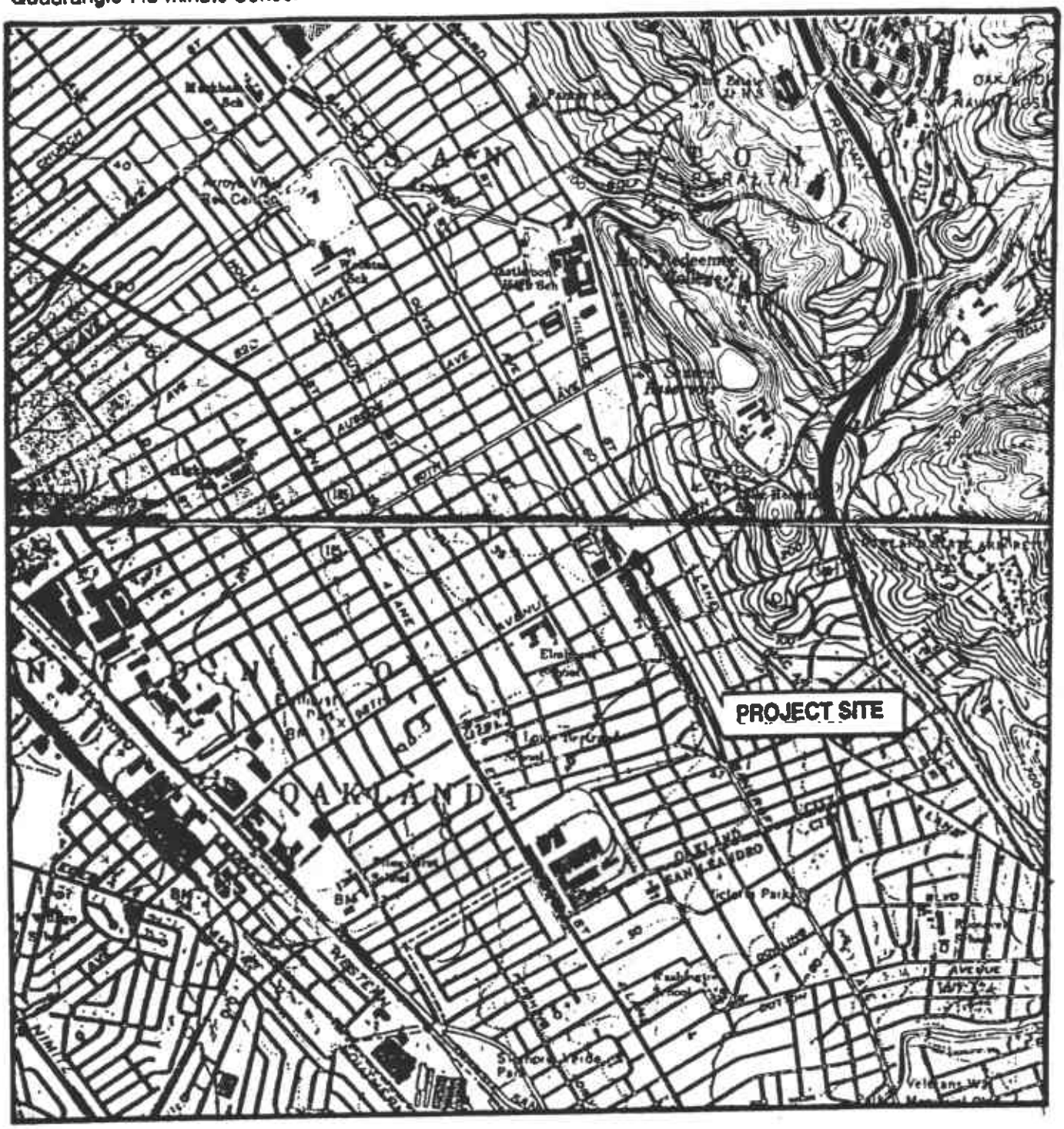


FIGURE 1

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

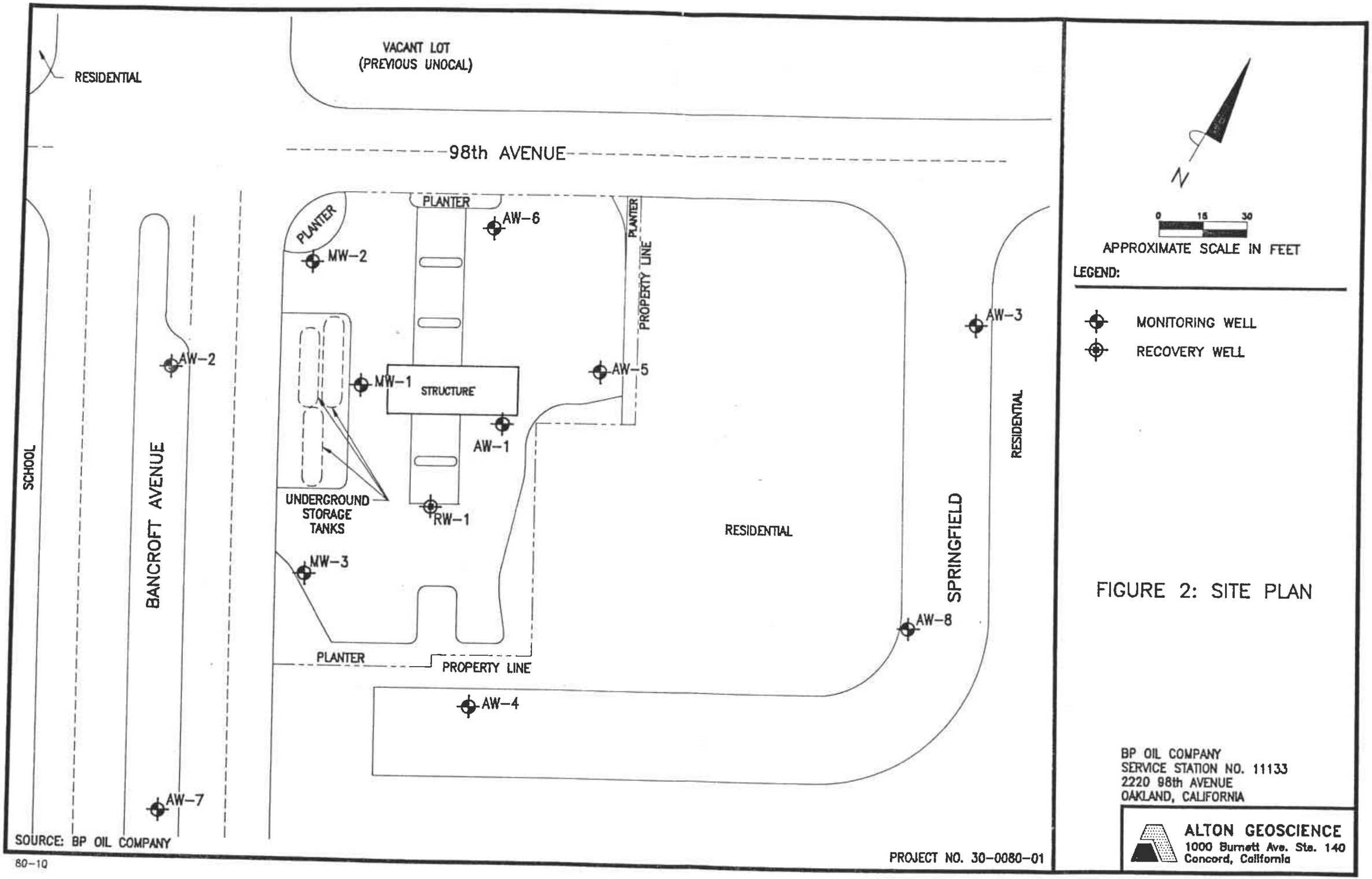


FIGURE 2: SITE PLAN

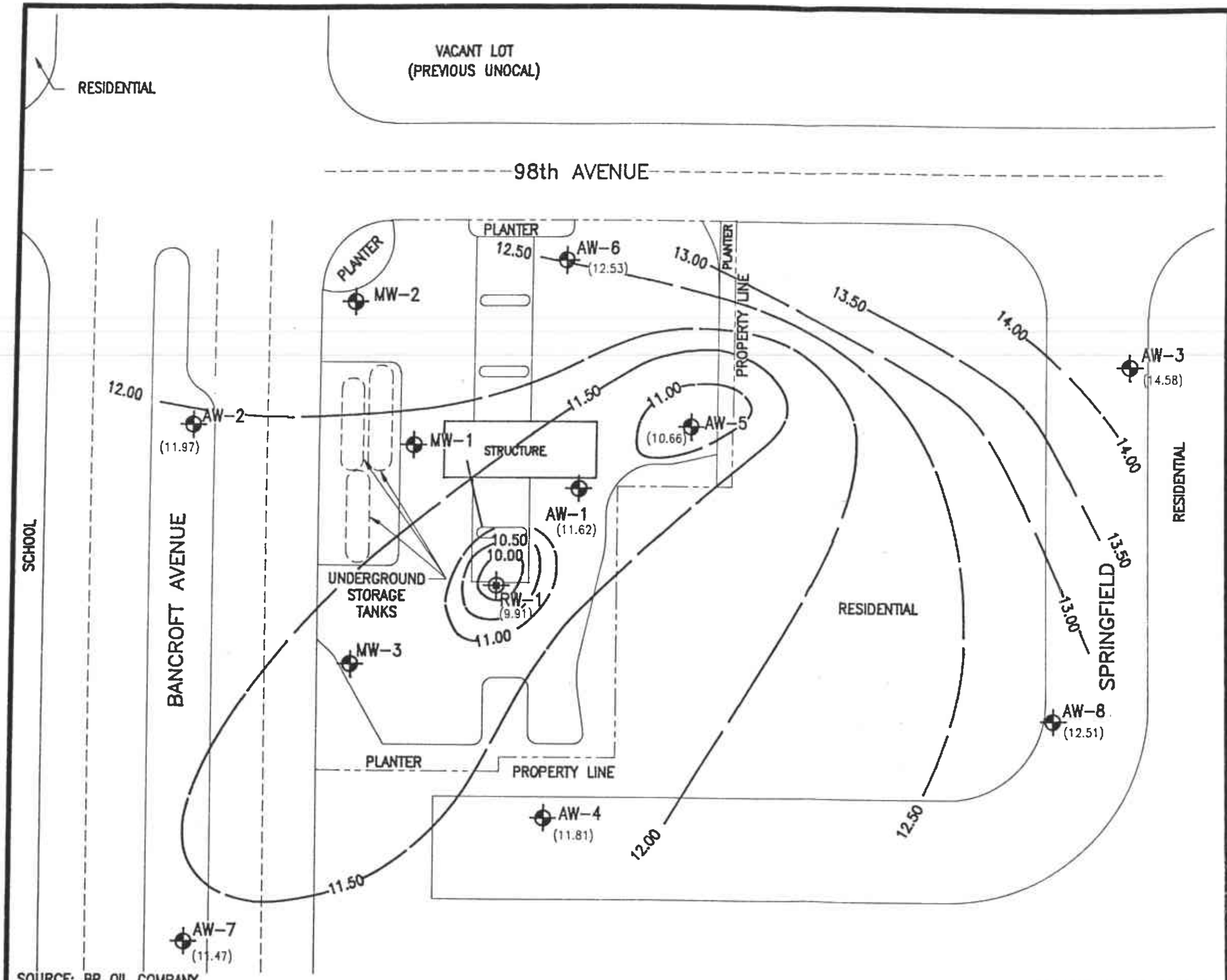
BP OIL COMPANY
SERVICE STATION NO. 11133
2220 98th AVENUE
OAKLAND, CALIFORNIA

ALTON GEOSCIENCE
1000 Burnett Ave. Ste. 140
Concord, California

PROJECT NO. 30-0080-01

80-10

12/91



NOTE:
1. CONTOUR LINES ARE INTERPRETIVE BESED ON WATER LEVELS IN MONITORING WELLS MEASURED ON SEPTEMBER 26, 1991.
2. EQUIVALENT GROUND WATER SURFACE ELEVATION CALCULATED ASSUMING 0.75 SPECIFIC GRAVITY FOR FREE PRODUCT.
3. CONTOUR INTERVAL = 0.50 FOOT.
4. GROUND WATER GRADIENT = 0.03 FOOT/FOOT.
5. GROUND WATER ELEVATIONS FOR MW-1, MW-2 & MW-3 WERE NOT USED DUE TO ANOMALOUS WATER LEVEL READINGS.

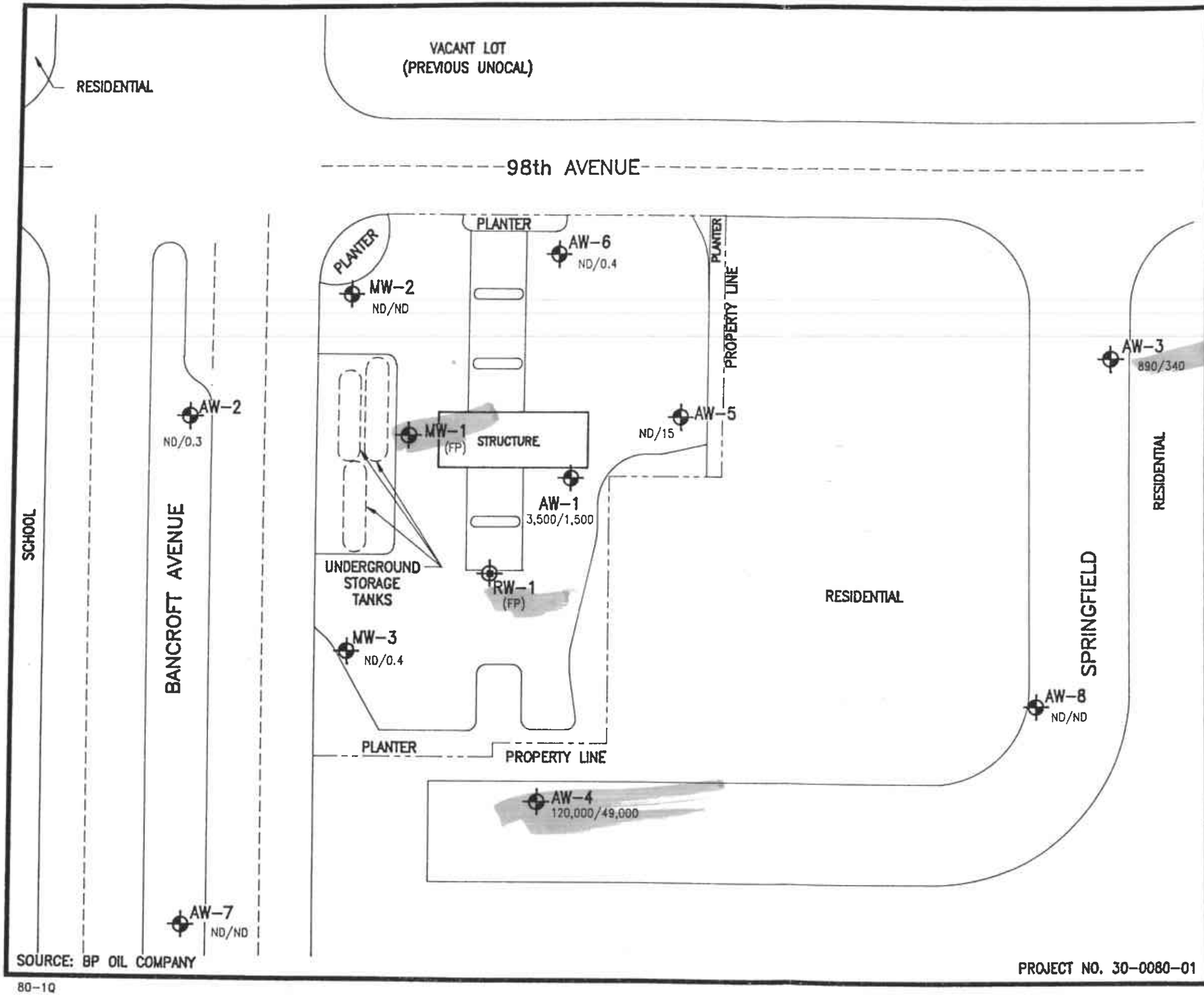
FIGURE 3: GROUND WATER ELEVATION CONTUOR MAP

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

ALTON GEOSCIENCE
1000 Burnett Ave. Ste. 140
Concord, California

80-10

12/91



LEGEND:

⊕	MONITORING WELL
⊕	RECOVERY WELL
ND	NOT DETECTED AT OR ABOVE METHOD DETECTION LIMITS
FP	FREE PRODUCT
TPH–G	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
890/340	TPH–G/BENZENE CONCENTRATIONS IN PARTS PER BILLION (ppb)

FIGURE 4: ANALYTICAL RESULTS OF GROUND WATER SAMPLES

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

ALTON GEOSCIENCE
1000 Burnett Ave. Ste. 140
Concord, California

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	37.33	01-90	18.07	0.2	18.22
MW-1	37.33	07-90	13.31	0.22	13.48
MW-1	37.33	03-91	***	***	*****
MW-1	37.33	06-91	14.76	globules	22.57
MW-1	37.33	09-91	14.79	0.15	22.54
MW-2	36.36	01-90	25.65	----	10.71
MW-2	36.36	07-90	23.15	----	13.21
M2-2	36.36	03-91	16.62	----	19.74
MW-2	36.36	06-91	17.87	----	18.49
MW-2	36.36	09-91	18.05	----	18.31
MW-3	37.40	01-90	24.16	----	13.24
MW-3	37.40	07-90	23.06	----	14.34
MW-3	37.40	03-91	17.84	----	19.56
MW-3	37.40	06-91	21.05	----	16.35
MW-3	37.40	09-91	21.88	----	15.52
AW-1	38.99	07-90	26.87	----	12.12
AW-1	38.99	03-91	25.44	----	13.55
AW-1	38.99	06-91	25.73	----	13.26
AW-1	38.99	09-91	27.37	----	11.62

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-2	37.69	07-90	24.88	----	12.81
AW-2	37.69	03-91	22.36	----	15.33
AW-2	37.69	06-91	24.27	----	13.42
AW-2	37.69	09-91	25.72	----	11.97
AW-3	40.00	07-90	24.75	----	15.25
AW-3	40.00	03-91	23.90	----	16.10
AW-3	40.00	06-91	24.00	----	16.00
AW-3	40.00	09-91	25.42	----	14.58
AW-4	39.36	07-90	27.29	----	12.07
AW-4	39.36	03-91	25.12	----	14.88
AW-4	39.96	06-91	26.57	----	13.39
AW-4	39.36	09-91	28.19	----	11.81
AW-5	39.35	03-91	25.48	----	13.87
AW-5	39.35	06-91	27.24	----	12.11
AW-5	39.35	09-91	28.69	----	10.66
AW-6	37.93	03-91	22.48	----	15.45
AW-6	37.95	06-91	23.39	----	14.56
AW-6	37.95	09-91	25.40	----	12.53

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 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-7	38.17	03-91	23.38	----	14.79
AW-7	38.17	06-91	25.23	----	12.94
AW-7	38.17	09-91	26.70	----	11.47
AW-8	41.74	03-91	26.68	----	15.06
AW-8	41.74	06-91	27.29	----	13.95
AW-8	41.74	09-91	29.23	----	12.51
RW-1	38.60	03-91	**	***	*****
RW-1	38.60	06-91	28.46	0.40	10.44**
RW-1	38.60	09-91	28.69	1.19	9.91

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
September 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-1	9-26-91	---	---	---	---	---
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-2	9-26-91	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.3
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
MW-3	9-26-91	ND<50	0.4	1.3	0.4	1.6
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-1	9-26-91	3,500	1,500	120	100	170

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
September 1991

Well ID	Date	TPH-G	B	T	E	X
		(Concentrations in Parts per Billion)				
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-2	9-26-91	ND<50	0.3	0.8	0.4	1.3
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
AW-3	9-26-91	890	340	18	26	33
AW-4	7-09-90	38,000	18,000	2,300	1,500	2,000
AW-4	3-08-91	10,000	40,000	13,000	2,000	5,500
AW-4	6-28-91	130,000	56,000	12,000	2,500	5,800
AW-4	9-26-91	120,000	49,000	13,000	2,900	6,800
AW-5	3-08-91	420	31	7.5	20	68
AW-5	6-28-91	840	83	4.2	71	70
AW-5	9-26-91	ND<50	15	ND<0.3	4.1	0.5
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-6	9-26-91	ND<50	0.4	ND<0.3	ND<0.3	ND<0.3

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
September 1991

Well ID	Date	TPH-G	B	T	E	X
		(Concentrations in Parts per Billion)				
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-7	9-26-91	ND<50	ND<0.3	1.0	0.5	2.1
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
AW-8	9-26-91	ND<50	ND<0.3	ND<0.3	ND<0.3	ND<0.3
RW-1	3-08-91	---	---	---	---	---
RW-1	6-28-91	---	---	---	---	---
RW-1	9-26-91	---	---	---	---	---

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 MONITORING AND SAMPLING PROCEDURES

ALTON GEOSCIENCE FIELD PROCEDURES
FOR
GROUND WATER SAMPLING

Prior to purging and sampling, the depth to ground water in each well was measured from a reference mark at the top of each well casing. The depth to ground water was measured to the nearest 0.01 foot using an electronic sounder. Ground water samples were then collected using a hand bailer and observed for the presence of free product.

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 disposable bailer and then transferred to glass 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. Ground water samples collected from all eight ground water wells were analyzed for total petroleum hydrocarbons as gasoline (TPH-G) by EPA Method 5030 and EPA Method 8020 for benzene, toluene, ethylbenzene, and xylenes (BTEX) constituents.

APPENDIX B

WATER SAMPLING FIELD SURVEY FORMS, FIELD MEASUREMENTS AND OBSERVATIONS

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

JOB NUMBER 30-0080-01 TECHNICIAN Chris Reinheimer

JOB LOCATION BP Oil 98th Ave Oakland DATE 9-26-91

PUMPOUT ☐ YES ☐ NO	DATE OF LAST PUMPOUT:			WEATHER: clear TIME:		COMMENTS (Notes, conditions, etc.)
	HOLD	CUT	LEVEL			
WELL #	DEPTH TO WATER	DEPTH TO PRODUCT	PROD. THICKNESS (FT)	TOTAL DEPTH	DEPTH TO PUMP	
MW-1	14.68			28.23		1.75" thick FP
MW-2	18.05			30.97		
MW-3	21.88			33.80		
AW-1	27.37			38.38		
AW-2	25.72			35.08		
AW-3	25.42			35.62		
AW-4	28.19			32.83		
AW-5	28.69			42.41		
AW-6	25.40			34.12		
AW-7	26.70			32.28		
AW-8	29.23			35.35		
RW-1	27.80			39.36		~14.25" thick FP

ALTON GEOSCIENCE

Ground Water Monitoring Well Development or Sampling Field Survey Forms

---

Well # MW-1 **Project #** 30-0080-01 **Location** BP 0:1 98th Oak **Date** 9-26-91

Sampling Team Chris Reinheimer **Sampling Method: Bailer** X **Pump** ____
Type of Pump or Bailer Used PVC Disp

Decon Method: Alconox
Triple rinsed w/TSP and Deionized Water X **or Steam Cleaned** ____

Well Data:
Depth to Water 14.68 ft
Total Well Depth 28.23 ft
Water Col. Height 13.55 ft

Conversion diam.	gal/ft
2 in.	x 0.16
3 in.	x 0.36
4 in.	x 0.65
6 in.	x 1.44

Vol. of Water Column 2.16
Purge Factor 3
Total Vol. to Purge 6.50

Chemical Data: Free product

T (F)	SC/umhos	pH	Time	Comments	Volume (gal)
			3:05		4.0
					4.5
					5.0
					5.5
					6.0
				Actual Volume Purged	5

Comments:

FP ≈ 1.75" thick (meas. with FP bailer & paste)
Bailed ~ 2 pints FP, + approx 5 gals water

ALTON GEOSCIENCE

Ground Water Monitoring Well Development
or Sampling Field Survey Forms

Well # MW-2 Project # 30-1080-01 Location BP 98th, Oak. Date 9-26-91

Sampling Team Chris R Sampling Method: Bailer X Pump ___
Type of Pump or Bailer Used PVC Disp

Decon Method: Alconox
Triple rinsed w/TSP and Deionized Water X or Steam Cleaned ___

Well Data:
Depth to Water 18.05 ft
Total Well Depth 30.97 ft
Water Col. Height 12.92 ft

Conversion diam.	gal/ft
2 in.	x (0.16)
3 in.	x 0.36
4 in.	x 0.65
6 in.	x 1.44

Vol. of Water Column 2.06
Purge Factor 3
Total Vol. to Purge 6.20

Chemical Data:

T (F)	SC/umhos X1000	pH	Time	Comments	Volume (gal)
65.8	1.93	8.96	3:31	cloudy	4.0
65.8	1.61	8.83	3:33	"	4.5
65.7	1.63	8.71	3:33	"	5.0
65.3	1.62	8.69	3:35	"	5.5
65.3	1.62	8.70	3:35	"	6.0
				Actual Volume Purged	6

Comments:

Sampled 5:37

ALTON GEOSCIENCE

Ground Water Monitoring Well Development or Sampling Field Survey Forms

---

Well # MW-3 Project # 30-0080-01 Location BP 98th Oak Date 9-26-91

Sampling Team Chris Reinheimer Sampling Method: Bailer X Pump ___
Type of Pump or Bailer Used PVC Disp

Decon Method:
Triple rinsed w/TSP and Deionized Water ___ or Steam Cleaned ___

Well Data:
Depth to Water 21.88 ft
Total Well Depth 33.80 ft
Water Col. Height 11.92 ft

Conversion diam.	gal/ft
2 in.	x 0.16
3 in.	x 0.36
4 in.	x 0.65
6 in.	x 1.44

Vol. of Water Column 1.90
Purge Factor 3
Total Vol. to Purge 5.72

Chemical Data:

T (F)	SC/umhos x1000	pH	Time	Comments	Volume (gal)
68.0	0.42	8.65	1:09	clear	4.0
67.6	0.31	8.06	1:10	clear	4.5
66.4	0.24	8.77	1:14	cloudy	5.0
65.8	0.23	8.62	1:17	cloudy	5.5
65.8	0.24	8.63	1:17	cloudy	6.0
				Actual Volume Purged	6

Comments:

Sampled 1:20 P

ALTON GEOSCIENCE

Ground Water Monitoring Well Development
or Sampling Field Survey Forms

Well # AW-1 Project # 30-2080.01 Location BP 98th Oak Date 9-26-91

Sampling Team Chris Reinheimer Sampling Method: Bailer X Pump ____
Type of Pump or Bailer Used PVC Disp

Decon Method: Alconox
Triple rinsed w/TSP and Deionized Water X or Steam Cleaned ____

Well Data:
Depth to Water 27.37 ft
Total Well Depth 39.38 ft
Water Col. Height 11.01 ft

Conversion diam.	gal/ft
2 in.	x 0.16
3 in.	x 0.36
4 in.	x 0.65
6 in.	x 1.44

Vol. of Water Column 1.76
Purge Factor 3
Total Vol. to Purge 5.28

Chemical Data:

T (F)	SC/umhos X1000	pH	Time	Comments	Volume (gal)
65.3	3.82	8.46	2:34	clear	4.0
65.0	3.66	7.99	2:36	"	4.5
65.0	3.61	7.91	2:36	"	5.0
64.9	3.64	7.96	2:37	"	5.5
64.8	3.63	7.96	2:37	cloudy gray	6.0
				Actual Volume Purged	

Comments:

Sampled 2:40

ALTON GEOSCIENCE

Ground Water Monitoring Well Development or Sampling Field Survey Forms

---

Well # MW-2 Project # 30.0080.01 Location BP 98th Oak Date 9-26-91

Sampling Team Chris Reichheimer Sampling Method: Bailer X Pump ___
Type of Pump or Bailer Used PVC Disp

Decon Method: Alconox
Triple rinsed w/TSP and Deionized Water X or Steam Cleaned ___

Well Data:
Depth to Water 25.72 ft
Total Well Depth 35.08 ft
Water Col. Height 9.36 ft

Conversion diam.	gal/ft
2 in.	x (0.16)
3 in.	x 0.36
4 in.	x 0.65
6 in.	x 1.44

Vol. of Water Column 1.49
Purge Factor 3
Total Vol. to Purge 4.49

Chemical Data:

T (F)	SC/umhos x1000	pH	Time	Comments	Volume (gal)
66.1	1.41	8.42	3:51	cloudy	4.0
65.8	1.33	8.33	3:51	"	4.5
65.5	1.31	8.21	3:51	"	5.0
65.6	1.34	8.32	3:54	"	5.5
65.3	1.36	8.11	3:54	"	6.0
				Actual Volume Purged	6

Comments:

sampled 3:56

ALTON GEOSCIENCE

Ground Water Monitoring Well Development or Sampling Field Survey Forms

---

Well # AW-3 Project # 30-0080-01 Location RP 98th Oak Date 9-26-91

Sampling Team Chris Reinheimer Sampling Method: Bailer X Pump ____
Type of Pump or Bailer Used PVC Disp.

Decon Method: Alconox
Triple rinsed w/TSP and Deionized Water X or Steam Cleaned ____

Well Data:
Depth to Water 25.42 ft
Total Well Depth 35.62 ft
Water Col. Height 10.2 ft

Conversion diam.	gal/ft
2 in.	x 0.16
3 in.	x 0.36
4 in.	x 0.65
6 in.	x 1.44

Vol. of Water Column 1.63
Purge Factor 3
Total Vol. to Purge 4.89

Chemical Data: x1000

T (F)	SC/umhos	pH	Time	Comments	Volume (gal)
65.6	3.22	7.94	1:40	clear	4.0
65.4	3.29	8.01	1:42	clear	4.5
65.0	3.01	7.96	1:42	cloudy brn	5.0
64.8	2.96	7.99	1:43	" "	5.5
64.8	2.99	7.96	1:43	" "	6.0
				Actual Volume Purged	6

Comments:

sampled 1:45

ALTON GEOSCIENCE

Ground Water Monitoring Well Development or Sampling Field Survey Forms

---

Well # AW-4 Project # 30-0080-01 Location 2nd 78th, Oak. Date 9-26-91

Sampling Team Chris Reinheimer Sampling Method: Bailer X Pump ___
Type of Pump or Bailer Used PVC

Decon Method: Alconox
Triple rinsed w/~~TSP~~ and Deionized Water X or Steam Cleaned ___

Well Data:
Depth to Water 28.19 ft
Total Well Depth 32.83 ft
Water Col. Height 4.64 ft

Conversion diam.	gal/ft
2 in.	x 0.16
3 in.	x 0.36
4 in.	x 0.65
6 in.	x 1.44

Vol. of Water Column 0.74
Purge Factor 3
Total Vol. to Purge 2.22

Chemical Data: x1000

T (F)	SC/umhos	pH	Time	Comments	Volume (gal)
65.3	4.11	2.99	2:17	clear	1.0
66.1	4.01	3.46	2:17	clear	1.5
65.0	3.92	3.31	2:18	cloudy	2.0
64.9	3.99	3.86	2:19	cloudy	2.5
64.9	3.96	3.79	2:19	"	3
				Actual Volume Purged	

Comments: Well drying out; slow producer

sampled 2:22

ALTON GEOSCIENCE

Ground Water Monitoring Well Development
or Sampling Field Survey Forms

Well # MW-5 Project # 30.0080.01 Location BP 98th Oak Date 9-26-91

Sampling Team Chris Reinheimer Sampling Method: Bailer X Pump ____
Type of Pump or Bailer Used ____ PVC Disp

Decon Method: Alconox
Triple rinsed w/TSP and Deionized Water ____X____ or Steam Cleaned ____

Well Data:
Depth to Water 28.69 ft
Total Well Depth ~~42.41~~ ft
Water Col. Height ~~13.72~~ ft

Conversion	
diam.	gal/ft
2 in.	x 0.16
3 in.	x 0.36
4 in.	x 0.65
6 in.	x 1.44

Vol. of Water Column 8.91
Purge Factor 3
Total Vol. to Purge 26.75

Chemical Data: Xlaxo

T (F)	SC/umhos	pH	Time	Comments	Volume (gal)
65.1	3.81	2.81	3:16	cloudy	18
65.1	4.01	2.73	3:20	"	20
64.9	3.81	2.70	3:20	"	22
65.1	3.80	2.69	3:24	"	24
65.1	3.76	2.67	3:24	"	26
				Actual Volume Purged	

Comments:

Sampled 3:28

ALTON GEOSCIENCE

Ground Water Monitoring Well Development or Sampling Field Survey Forms

---

Well # AW-6 Project # 30.0080.01 Location BP 98th Oak Date 9.26.91

Sampling Team Chris Reinheimer Sampling Method: Bailer X Pump ____
Type of Pump or Bailer Used PVC Disp

Decon Method: Alconox
Triple rinsed w/TSP and Deionized Water X or Steam Cleaned ____

Well Data:
Depth to Water 25.40 ft
Total Well Depth 34.12 ft
Water Col. Height 8.72 ft

Conversion diam.	gal/ft
2 in.	x 0.16
3 in.	x 0.36
4 in.	x 0.65
6 in.	x 1.44

Vol. of Water Column 5.66
Purge Factor 3
Total Vol. to Purge 17.00

Chemical Data:

T (F)	SC/umhos	pH	Time	Comments	Volume (gal)
65.0	3.81	2.99	3:29	cloudy	10
65.0	3.77	3.06	3:29	"	12
65.2	3.79	3.17	3:31	"	14
64.9	3.80	3.01	3:31	"	16
64.9	3.77	3.00	3:33	"	18
				Actual Volume Purged	

Comments:

Sampled 3:41

ALTON GEOSCIENCE

Ground Water Monitoring Well Development
or Sampling Field Survey Forms

Well # AW-7 Project # 30.0080.01 Location BP 98th Oak Date 9-26-91

Sampling Team Chris Reinheimer Sampling Method: Bailer X Pump ____
Type of Pump or Bailer Used PVC Disp

Decon Method: Alconox
Triple rinsed w/TSP and Deionized Water X or Steam Cleaned ____

Well Data:
Depth to Water 26.70 ft
Total Well Depth 32.28 ft
Water Col. Height 5.58 ft

Conversion diam.	gal/ft
2 in.	x 0.16
3 in.	x 0.36
4 in.	x 0.65
6 in.	x 1.44

Vol. of Water Column 0.83
Purge Factor 3
Total Vol. to Purge 2.5

Chemical Data:

T (F)	SC/umhos (X1000)	pH	Time	Comments	Volume (gal)
67.0	8.49	1.91	4:02	clear	0.5
67.1	8.33	1.90	4:02	clear	1.0
66.2	8.07	1.87	4:04	clear	1.5
65.0	8.06	1.90	4:06	cloudy	2.0
65.2	8.03	1.89	4:06	cloudy	2.5
				Actual Volume Purged	

Comments:

Sampled 4:08

ALTON GEOSCIENCE

Ground Water Monitoring Well Development or Sampling Field Survey Forms

---

Well # AW-8 Project # 30-0080.01 Location BP 984 Oak Date 9.26.91

Sampling Team Chris Reinheimer Sampling Method: Bailer X Pump ___
Type of Pump or Bailer Used PVC Disp

Decon Method: Alconox
Triple rinsed w/TSP and Deionized Water X or Steam Cleaned ___

Well Data:
Depth to Water 29.23 ft
Total Well Depth 35.35 ft
Water Col. Height 6.12 ft

Conversion	
diam.	gal/ft
2 in.	x 0.16
3 in.	x 0.36
4 in.	x 0.65
6 in.	x 1.44

Vol. of Water Column 0.97
Purge Factor 3
Total Vol. to Purge 2.93

Chemical Data:

T (F)	SC/umhos	pH	Time	Comments	Volume (gal)
66.8	2.06	8.83	2:04	clear	0.5
65.9	1.97	8.72	2:06	cloudy brn	1.0
65.3	1.91	8.71	2:06	" "	1.5
65.1	1.94	8.82	2:08	" "	2.0
65.2	1.91	8.69	2:08	" "	2.5
				Actual Volume Purged	3

Comments:

Sampled 2:10

ALTON GEOSCIENCE

Ground Water Monitoring Well Development or Sampling Field Survey Forms

---

Well # RW-1 Project # 30-0080-01 Location BP 98th Oak Date 9-26-91

Sampling Team Chris Reinheimer Sampling Method: Bailer X Pump ___
Type of Pump or Bailer Used PVC Disp

Decon Method: Alconox
Triple rinsed w/TSP and Deionized Water X or Steam Cleaned ___

Well Data:
Depth to Water 27.80 ft
Total Well Depth ___ ft
Water Col. Height ___ ft

Conversion diam.	gal/ft
2 in.	x 0.16
3 in.	x 0.36
~~4 in.~~	x 0.65
6 in.	x 1.44

Vol. of Water Column X
Purge Factor
Total Vol. to Purge X

Chemical Data: Free Product

T (F)	SC/umhos	pH	Time	Comments	Volume (gal)
			2:48		
				Actual Volume Purged	20

Comments: FP ≈ 14.25" thick (meas. with FP bailer & paste)
Bailed ≈2.5 gals FP ; + approx 20 gals water.

APPENDIX C

OFFICIAL LABORATORY REPORTS AND CHAIN OF CUSTODY RECORDS

Superior Precision Analytical, Inc.
P.O. Box 1545 • Martinez, California 94553 • (510) 229-1590 / Fax (510) 229-1591

OCT 16 1991

C E R T I F I C A T E O F A N A L Y S I S

LABORATORY NO.: 84036
CLIENT: Alton Geoscience
CLIENT JOB NO.: 30-0080.01

DATE RECEIVED: 09/30/91
DATE REPORTED: 10/08/91
DATE SAMPLED : 09/26/91

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
by MODIFIED EPA SW-846 METHOD 5030 and 8015

LAB #	Sample Identification	Concentration (mg/L) Gasoline Range
1	MW-2	ND<0.05
2	MW-3	ND<0.05
3	AW-1	3.5
4	AW-2	ND<0.05
5	AW-3	0.89
6	AW-4	120
7	AW-5	ND<0.05
8	AW-6	ND<0.05
9	AW-7	ND<0.05
10	AW-8	ND<0.05

mg/L - parts per million (ppm)

Method Detection Limit for Gasoline in Water: 0.05 mg/L

QAQC Summary:

Daily Standard run at 2mg/L: RPD Gasoline = <15
MS/MSD Average Recovery = 109/102%: Duplicate RPD = 6

Richard Srna, Ph.D.

(for)
Laboratory Director

Superior Precision Analytical, Inc.
PO Box 1545 • Martinez, California 94553 • (510) 229-1590 / fax (510) 229-0916

C E R T I F I C A T E O F A N A L Y S I S

LABORATORY NO.: 84036
CLIENT: Alton Geoscience
CLIENT JOB NO.: 30-0080.01

DATE RECEIVED: 09/30/91
DATE REPORTED: 10/08/91
DATE SAMPLED : 09/26/91

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	ND<0.3	ND<0.3	ND<0.3	ND<0.3
2	MW-3	0.4	1.3	0.4	1.6
3	AW-1	1500	120	100	170
4	AW-2	0.3	0.8	0.4	1.3
5	AW-3	340	18	26	33
6	AW-4	49000	13000	2900	6800
7	AW-5	15	ND<0.3	4.1	0.5
8	AW-6	0.4	ND<0.3	ND<0.3	ND<0.3
9	AW-7	ND<0.3	1.0	0.5	2.1
10	AW-8	ND<0.3	ND<0.3	ND<0.3	ND<0.3

ug/L - parts per billion (ppb)

Method Detection Limit in Water: 0.3 ug/L

QAQC Summary:

Daily Standard run at 20ug/L: RPD = <15%
MS/MSD Average Recovery =97%: Duplicate RPD = <2

Richard Srna, Ph.D.

(for)
Laboratory Director

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

CHAIN of CUSTODY RECORD

PAGE 1 of 2 84036

DATE: 9-30-91

RESULTS DUE BY:

PROJECT NUMBER: 30-0080-01

PROJECT NAME AND ADDRESS: BP Oil 98th Ave Oakland

PROJECT MANAGER: Matt Taylor

SAMPLER'S SIGNATURE:

LABORATORY: Superior

REMARKS OR SPECIAL INSTRUCTIONS:

P.O. #412043

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
1	MW-2	9-26-91		Water	X		3
2	MW-3	"		"	"		3
3	AW-1	"		"	"		3
4	AW-2	"		"	"		3
5	AW-3	"		"	"		3
6	AW-4	"		"	"		3
7	AW-5	"		"	"		3
8	AW-6	"		"	"		3
9	AW-7	9-26-91		Water	X		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-6/BTEX
															X
															"
															"
															"
															"
															"
															"
															"
															X

Please Initial:
Samples Stored in ice.
Appropriate containers
Samples preserved
VOA's without headspace
Comments:

RELINQUISHED BY:	RECEIVED BY: Erno Walter x622	DATE/TIME: 9/30 1315	METHOD OF SHIPMENT:
RELINQUISHED BY: Erno Walter x622	RECEIVED BY:	DATE/TIME:	SHIPPED BY:
RELINQUISHED BY:	RECEIVED BY:	DATE/TIME: 9/30/91 1355	COURIER:

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

CHAIN of CUSTODY RECORD

PAGE 2 of 2 84036

DATE:

RESULTS DUE BY:

PROJECT NUMBER: 30-0080-01

PROJECT NAME AND ADDRESS: BP Oil 98th Ave Oakland

PROJECT MANAGER: Matt Taylor

SAMPLER'S SIGNATURE:

LABORATORY: Superior

REMARKS OR SPECIAL INSTRUCTIONS:

STD T/A time

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	9-26-91		water	X		3														X

TOTAL NO. OF CONTAINERS: 30

Please Initial:
Samples Stored In Ice.
Appropriate containers
Samples preserved
VOA's without headspace
Comments:

RELINQUISHED BY:	RECEIVED BY:	DATE/TIME:	METHOD OF SHIPMENT:
	Esme Walter x672	9/30 1315	
RELINQUISHED BY: Esme Walter x672	RECEIVED BY:	DATE/TIME:	SHIPPED BY:
RELINQUISHED BY:	RECEIVED BY:	DATE/TIME:	COURIER: