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LETTER REPORT
QUARTERLY GROUNDWATER MONITORING
First Quarter 1992
at
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California
06/04/92
61035.03



92 JUN -3 11 2: 33

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TRANSMITTAL

TO: MS. SUSAN HUGO
ACHCSA-DEH
80 SWAN WAY, ROOM 200
OAKLAND, CALIFORNIA 94621

DATE: 6/5/92
 PROJECT NUMBER: 61035.03
 SUBJECT: ARCO STATION 6148,
5131 SHATTUCK AVENUE, OAKLAND,
CALIFORNIA.

FROM: LOU LEET
 TITLE: STAFF GEOLOGIST

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*Revision Date: 11/21/91
 *File Name: TRANSMT.PRJ

3315 Almaden Expressway, Suite 34
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Phone: (408) 264-7723
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June 4, 1992
0602MWHE
61035.03

Mr. Michael Whelan
ARCO Products Company
P.O. Box 5811
San Mateo, California 94402

Subject: First Quarter 1992 Groundwater Monitoring Report for ARCO Station 6148,
5131 Shattuck Avenue, Oakland, California.

Mr. Whelan:

As requested by ARCO Products Company (ARCO), this letter report summarizes the results of first quarter 1992 groundwater monitoring performed by ARCO's contractor, EMCON Associates (EMCON) of San Jose, California, at the above-referenced site. The objectives of this quarterly groundwater monitoring are to evaluate changes in the groundwater flow direction and gradient, and changes in concentrations of petroleum hydrocarbons in the local groundwater associated with a former waste-oil and existing underground gasoline-storage tanks at the site. The field work and laboratory analyses of groundwater samples during this quarter was performed under the direction of EMCON and included measuring depths to groundwater, subjectively analyzing groundwater for the presence of petroleum product, collecting groundwater samples from the wells for laboratory analyses, and directing a State-certified laboratory to analyze the groundwater samples. RESNA Industries (RESNA's) scope of work was limited to interpretation of field and laboratory analyses data, which included evaluating trends in reported hydrocarbon concentrations in the local groundwater, the groundwater gradient, and direction of groundwater flow beneath the site.

The operating Arco Station 6148 is located on the southwestern corner of the intersection of Shattuck Avenue and 52nd Street at 5131 Shattuck Avenue, Oakland, California, as shown on the Site Vicinity Map, Plate 1.

Prior to the present monitoring, RESNA conducted an initial subsurface investigation related to the former waste-oil tank. The waste-oil tank was removed by Crosby and Overton in June 1987. In December 1991, RESNA initiated a subsurface investigation

which included drilling four soil borings (B-1 through B-4) and installing three 4-inch-diameter groundwater monitoring wells (MW-1 through MW-3) in borings B-1 through B-3, respectively. The location of the groundwater monitoring wells, borings, and pertinent site features are shown on the Generalized Site Plan, Plate 2.

Groundwater Sampling and Gradient Evaluation

Depth to water measurements (DTW) were performed by EMCON field personnel on January 19, February 19, and March 18, 1992. Quarterly sampling was performed by EMCON field personnel on March 18, 1992. The results of EMCON's field work on the site, including DTW measurements and subjective analysis for the presence of product in the groundwater in MW-1 through MW-3 are presented on EMCON's field report sheets and EMCON's Summary of Groundwater Monitoring Data. These data are included in Appendix A.

The DTW levels, wellhead elevations, groundwater elevations, and subjective observations of product in the groundwater from MW-1 through MW-3 for this quarter and previous groundwater monitoring at the site are summarized in Table 1, Cumulative Groundwater Monitoring Data. EMCON's DTW measurements were used to evaluate groundwater elevations. Evidence of product or sheen was not observed by EMCON's field personnel during this quarterly monitoring (see EMCON's field report sheets, Appendix A). Groundwater elevations in wells MW-1 through MW-3 fluctuated up to approximately 1 foot between January 19 and March 18, 1992. Two different DTW measurements from well MW-1 were reported by EMCON on January 19; the first DTW was 17.77 feet and the second was 17.17 feet. The second DTW measurement was chosen to evaluate the groundwater gradient. The groundwater gradients interpreted from the January, February, and March 1992 groundwater monitoring are shown on the Groundwater Gradient Maps, Plates 3 through 5. The groundwater gradients interpreted from EMCON's DTW measurements indicate a gradient of less than 0.01 toward the southwest. These gradients are generally consistent with previously interpreted gradients.

Groundwater monitoring wells MW-1 through MW-3 were purged and sampled by EMCON field personnel on March 18, 1992. EMCON's water sample field data sheets are included in Appendix A. Approximately three to five well volumes were purged from each groundwater monitoring well prior to collecting groundwater samples. Purge water was removed from the site by a licensed hazardous waste hauler.

Laboratory Methods and Analyses

Under the direction of EMCON, water samples collected from the wells were analyzed by Columbia Analytical Services, Inc., located in San Jose, California (Hazardous Waste

Testing Laboratory Certification No. 1426). The water samples from MW-1 through MW-3 were analyzed for total petroleum hydrocarbons as gasoline (TPHg) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) using modified Environmental Protection Agency (EPA) Methods 5030/8020. Concentrations of TPHg and benzene in the groundwater are shown on Plate 6, TPHg Concentration in Groundwater and Plate 7, Benzene Concentration in Groundwater. Groundwater from all of the onsite wells were also analyzed for following constituents; 1) total petroleum hydrocarbons as diesel (TPHd) using EPA Method 3510, 2) total oil and grease (TOG) using Method 5520F-IR/5520C, 3) VOCs using EPA 5030/8010, and 4) total metals using EPA Methods 6010 and 7421. Concentrations of VOCs in groundwater are shown in Plate 8, Total VOC Concentrations in Groundwater. The Chain of Custody Records and Laboratory Analysis Reports are included in Appendix A. Results of these and previous water analyses are summarized in Table 2, Cumulative Results of Laboratory Analyses of Groundwater.

Results of this quarter's groundwater monitoring indicate:

- o TPHg was detected in groundwater samples from MW-1, MW-2, and MW-3 at concentrations ranging from 790 parts per billion (ppb) to 20,000 ppb.
- o Benzene was detected in groundwater samples from MW-1, MW-2, and MW-3 at concentrations ranging from 310 ppb to 3,200 ppb.
- o Toluene, ethylbenzene, and total xylenes were detected in groundwater samples from MW-1, MW-2, and MW-3 at concentrations ranging from 12 ppb to 1,000 ppb.
- o TPHd was detected in groundwater samples from MW-2 at a concentration of 230 ppb and from MW-3 at 2,800 ppb. TPHd was nondetectable (less than 50 ppb) in the groundwater sample from MW-1.
- o TOG was detected in groundwater samples from MW-2 at a concentration of 1.2 parts per million (ppm) and from MW-3 at 7.8 ppm. TOG was nondetectable (less than 0.5 ppm) in the groundwater sample from MW-1.
- o Cis-1,2-Dichloroethene was only detected in the groundwater sample from MW-2 at near detection limit concentration of 0.5 ppb in well MW-2.

- o Trichloroethene was detected in groundwater samples from MW-1 at a concentration of 1.2 ppb and from MW-2 at 2.2 ppb; this chemical was nondetectable (less than 0.5 ppb) in the groundwater from MW-3.
- o Tetrachloroethene was detected in groundwater samples from MW-1 at a concentration of 13 ppb, from MW-2 at 19 ppb, and from MW-3 at 2.7 ppb.
- o Metals analysis included the following results: cadmium was nondetectable (less than 3 ppb) in groundwater samples from MW-1 through MW-3; chromium was detected in groundwater samples from MW-1 at a concentration of 5 ppb, from MW-2 at 21 ppb, and from MW-3 and 67 ppb; lead was detected in groundwater samples from MW-1 at a concentration of 3 ppb, from MW-2 at 9 ppb, and from MW-3 at 27 ppb; nickel was detected in groundwater samples from MW-2 at a concentration of 38 ppb, and from MW-3 at 113 ppb; nickel was nondetectable (less than 20 ppb) in the groundwater from MW-1; and, zinc was detected in groundwater samples from MW-1 at concentrations of 31 ppb, from MW-2 at 54 ppb, and from MW-3 at 156 ppb.

The wells were not sampled previously because product sheen was present during well development. The following is a general summary of the concentrations of hydrocarbon constituents in the groundwater from the three onsite wells. The lowest concentrations of TPHg, TPHd, BTEX, TOG, and metals were reported in well MW-1, which is located closest to the former waste-oil tank; the highest concentrations were reported in well MW-3, located south (slightly crossgradient) of the former waste-oil tank. The highest concentration of total VOCs were reported in well MW-2 and MW-1.

Conclusions and Recommendations

Groundwater on this site has been impacted by gasoline hydrocarbons; the lateral extent of petroleum hydrocarbons has not been delineated. Although the laboratory analytical results indicated detectable amounts of TPHd in the groundwater, according to ARCO diesel has never been stored at this site; therefore, the results of the TPHd analysis may actually be weathered gasoline or originate from an offsite source. Additional recommendations for delineating the extent of petroleum hydrocarbons will be included under separate cover.

RESNA recommends monthly groundwater monitoring and quarterly groundwater sampling at the site, including analyses of the groundwater for TPHg, BTEX, TPHd, TOG, and VOCs.

Schedule

Monthly groundwater monitoring and quarterly groundwater sampling will continue to be performed by ARCO's contracted sampler. At ARCO's request, RESNA will continue to analyze and report monthly and quarterly groundwater monitoring data from this site to evaluate trends in petroleum hydrocarbons, and changes in groundwater gradient with time. A work plan for further site investigation is being prepared by RESNA for submittal to ARCO in draft form during June 1992.

It is recommended that copies of this report be forwarded to:

Ms. Susan Hugo
Alameda County Health Care Services Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

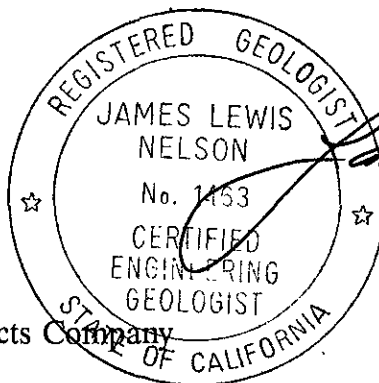
Mr. Eddy So
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94612

If you have any questions or comments, please call us at (408) 264-7723.

Sincerely,
RESNA Industries

Lou Leet
RL

Lou Leet
Staff Geologist



James L. Nelson
James L. Nelson
Certified Engineering
Geologist 1463

cc: H.C. Winsor, ARCO Products Company

Enclosures: References

Plate 1, Site Vicinity Map
Plate 2, Generalized Site Plan
Plate 3, Groundwater Gradient Map, January 19, 1992
Plate 4, Groundwater Gradient Map, February 19, 1992
Plate 5, Groundwater Gradient Map, March 18, 1992
Plate 6, TPHg Concentration in Groundwater, March 18, 1992
Plate 7, Benzene Concentration in Groundwater, March 18, 1992
Plate 8, Total VOC Concentration in Groundwater, March 18, 1992

Table 1, Cumulative Groundwater Monitoring Data
Table 2, Cumulative Results of Laboratory Analyses of Water Samples-TPHg,
TPHd, BTEX, TOG, and Metals
Table 3, Cumulative Results of Laboratory Analyses of Groundwater Samples-
VOCs

Appendix A: EMCON's Field Reports (3), Summary of Groundwater
Monitoring Data, Certified Analytical Reports with Chain-of
Custody, and Water Sample Field data Sheets.
EMCON's Water Sample Field Data Sheets
Monitoring Well Purge water Disposal Form

Quarterly Groundwater Monitoring
ARCO Station 6148, Oakland, California

June 4, 1992
61035.03

REFERENCES

RESNA. March 20, 1992. Initial Subsurface Investigation Related to the Former Waste-Oil Tank at ARCO Station 6148, 5131 Shattuck Avenue, Oakland, California. 61035.02



Base: U.S. Geological Survey
 7.5-Minute Quadrangles
 Oakland East/West,
 California
 Photorevised 1980

LEGEND

○ = Site Location



Approximate Scale



RESNA

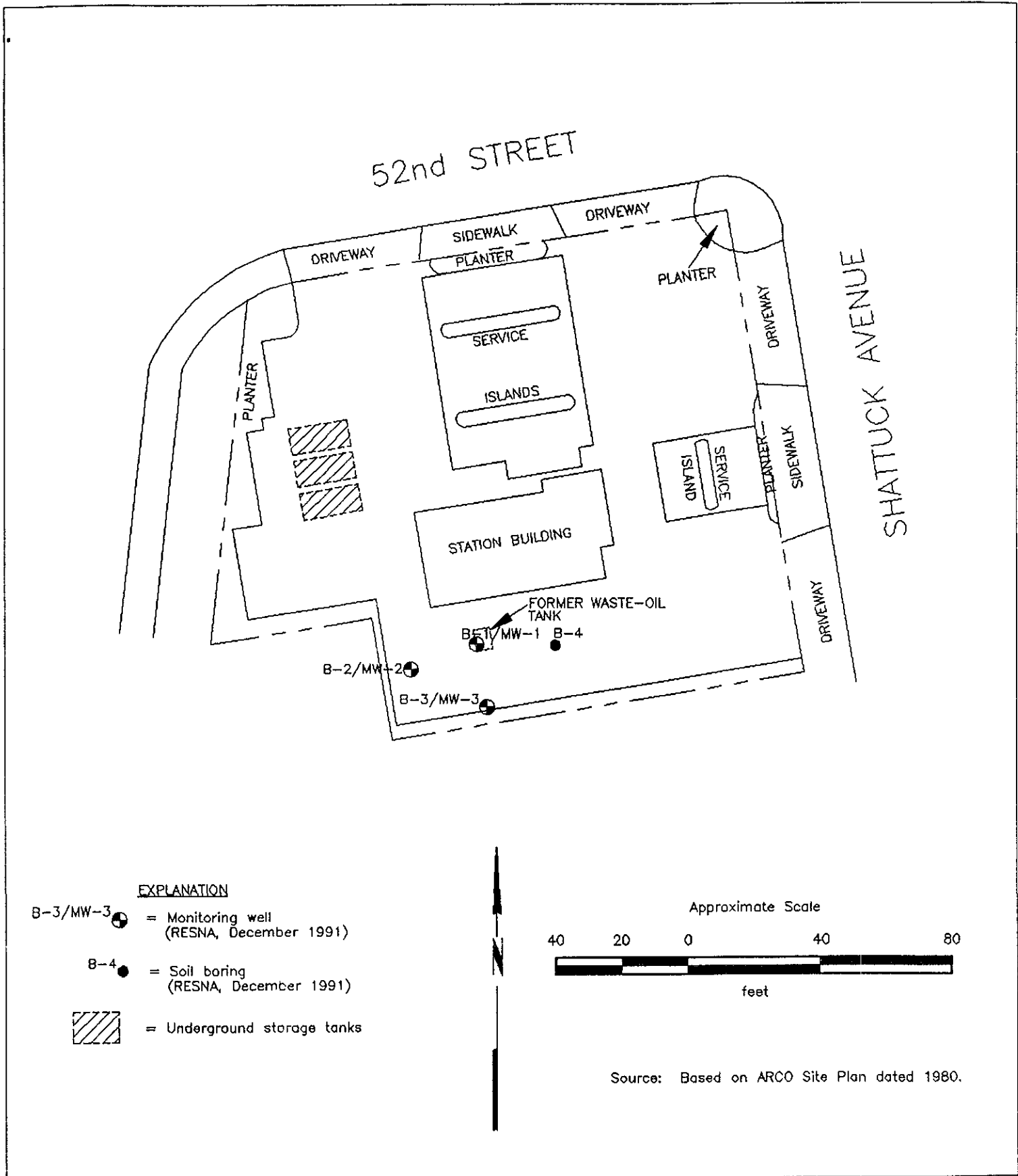
PROJECT 61035.03

SITE VICINITY MAP




ARCO Station 6148
 5131 Shattuck Avenue
 Oakland, California

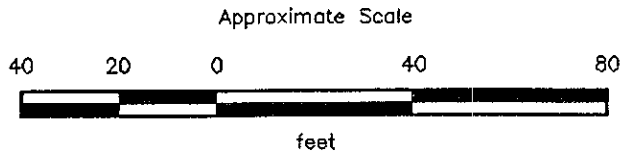
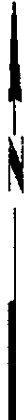
PLATE

1



EXPLANATION

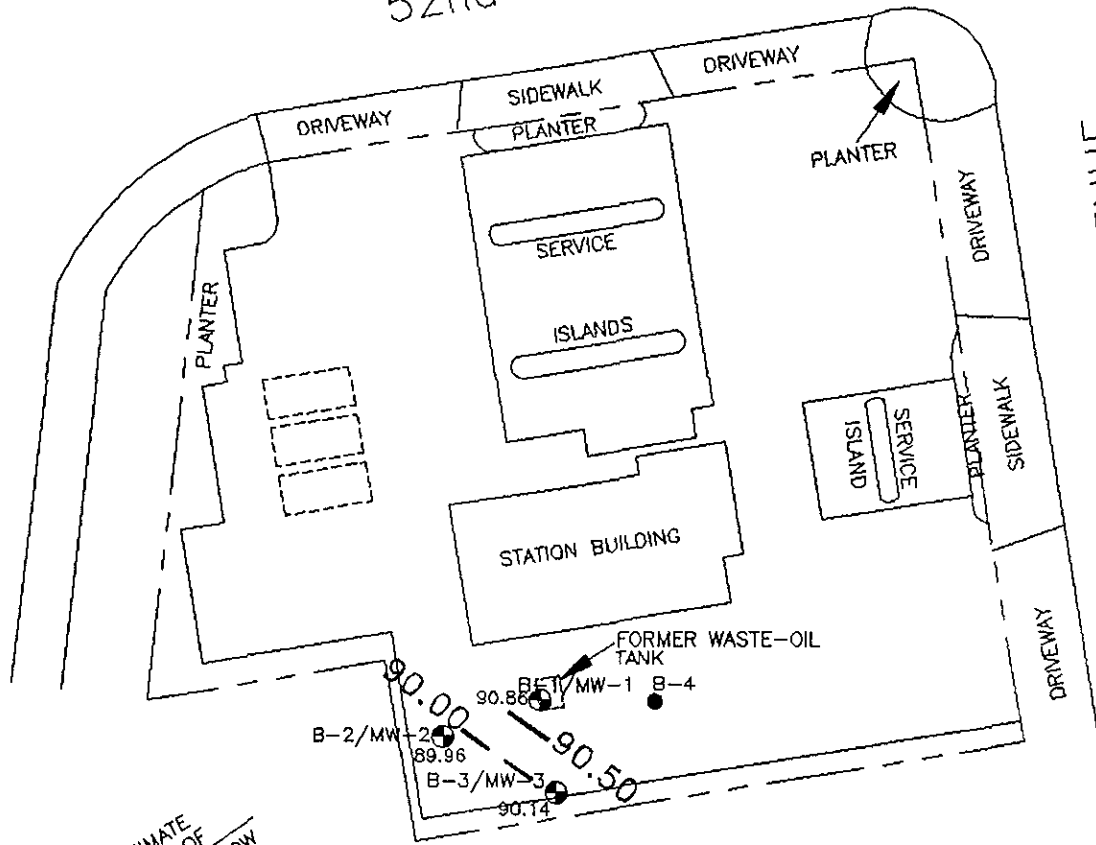
- B-3/MW-3  = Monitoring well (RESNA, December 1991)
- B-4  = Soil boring (RESNA, December 1991)
-  = Underground storage tanks



Source: Based on ARCO Site Plan dated 1980.

52nd STREET

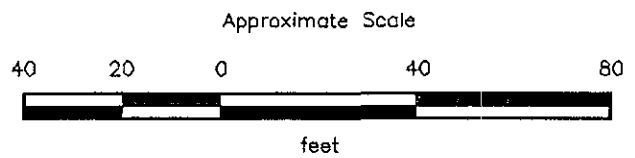
SHATTUCK AVENUE



APPROXIMATE DIRECTION OF GROUNDWATER FLOW (January 19, 1992)

EXPLANATION

- B-3/MW-3 ● = Monitoring well (RESNA, December 1991)
- B-4 ● = Soil boring (RESNA, December 1991)
- 90.50 — = Line of equal elevation of groundwater in feet above mean sea level (MSL) (January 19, 1992)
- 90.88 = Elevation of groundwater in feet above mean sea level (MSL) (January 19, 1992)



Source: Based on ARCO Site Plan dated 1980.



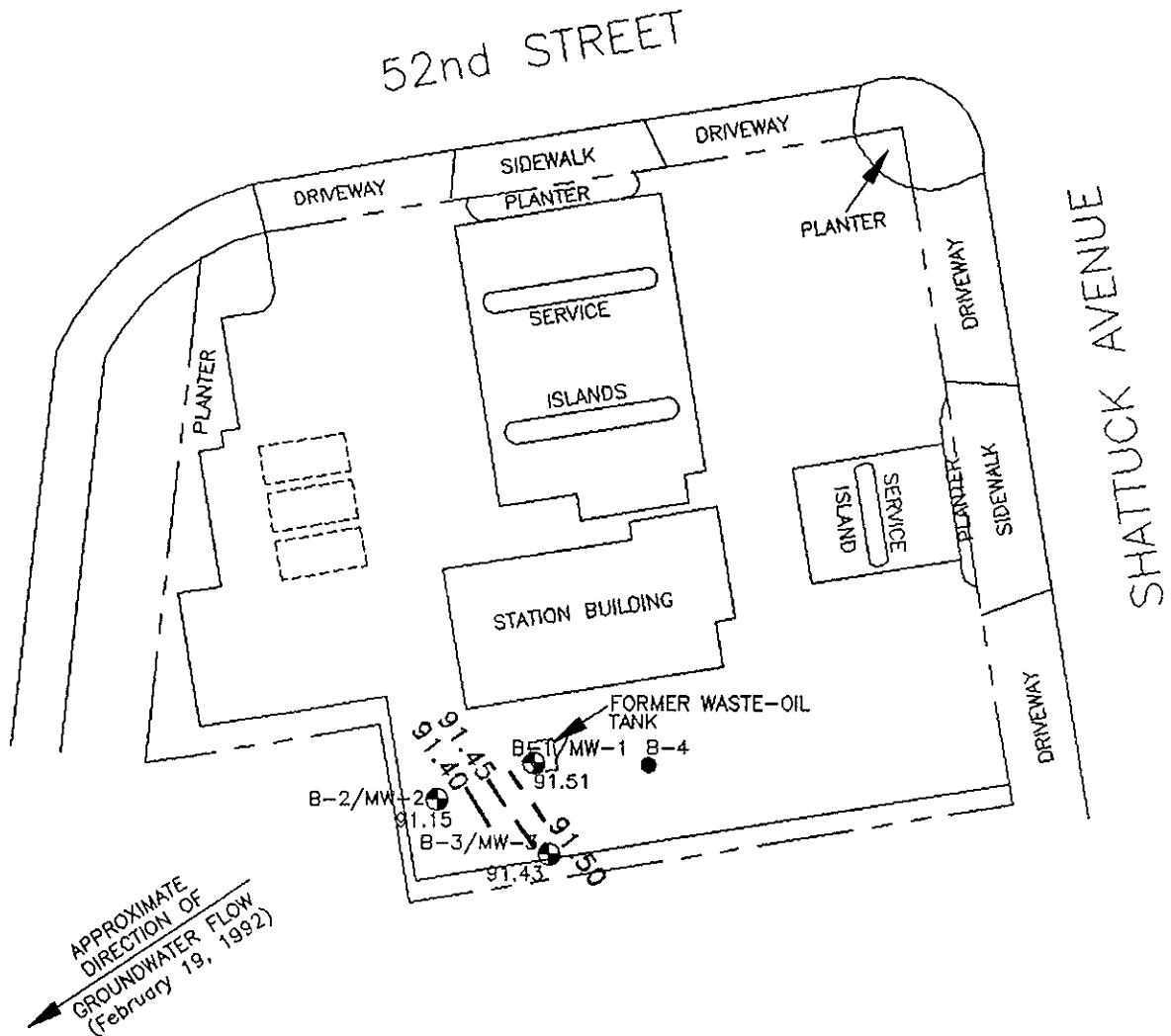
GROUNDWATER GRADIENT MAP

**ARCO Station 6148
5131 Shattuck Avenue
Oakland, California**

PLATE



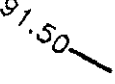
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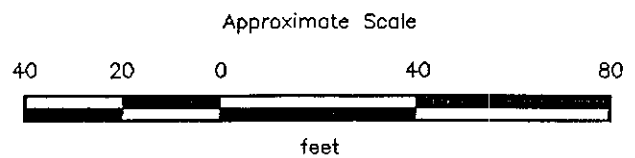
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APPROXIMATE
DIRECTION OF
GROUNDWATER FLOW
(February 19, 1992)

EXPLANATION

- B-3/MW-3  = Monitoring well (RESNA, December 1991)
- B-4  = Soil boring (RESNA, December 1991)
- 91.50  = Line of equal elevation of groundwater in feet above mean sea level (MSL) (February 19, 1992)
- 91.51 = Elevation of groundwater in feet above mean sea level (MSL) (February 19, 1992)



Source: Based on ARCO Site Plan dated 1980.



PROJECT 61035.03

GROUNDWATER GRADIENT MAP

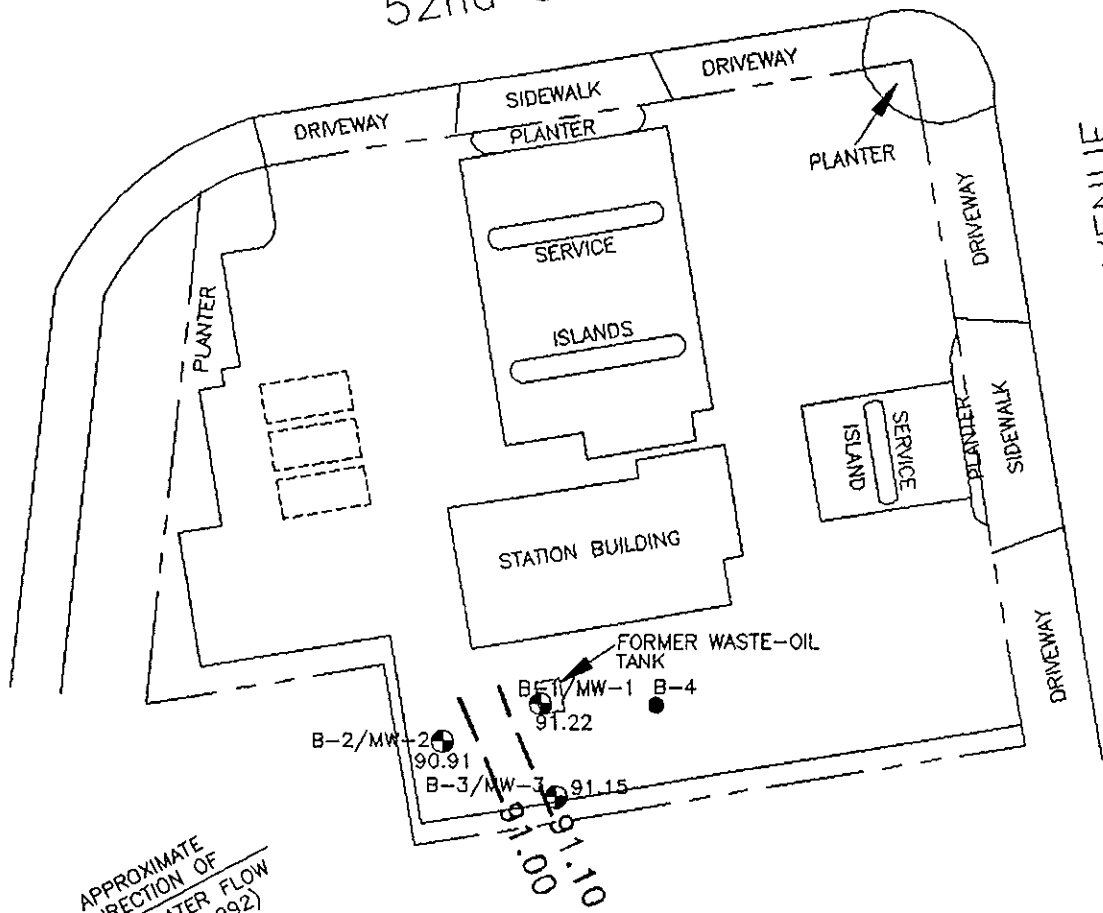
**ARCO Station 6148
5131 Shattuck Avenue
Oakland, California**

PLATE

4

52nd STREET

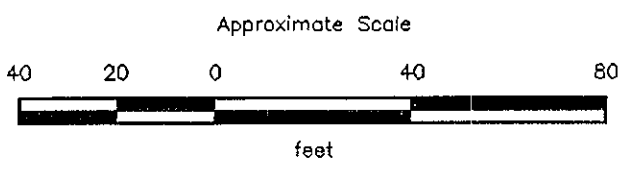
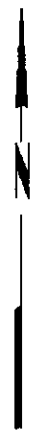
SHATTUCK AVENUE



APPROXIMATE DIRECTION OF GROUNDWATER FLOW (March 18, 1992)

EXPLANATION

- B-3/MW-3 = Monitoring well (RESNA, December 1991)
- B-4 = Soil boring (RESNA, December 1991)
- 91.10 = Line of equal elevation of groundwater in feet above mean sea level (MSL) (March 18, 1992)
- 91.22 = Elevation of groundwater in feet above mean sea level (MSL) (March 18, 1992)



Source: Based on ARCO Site Plan dated 1980.



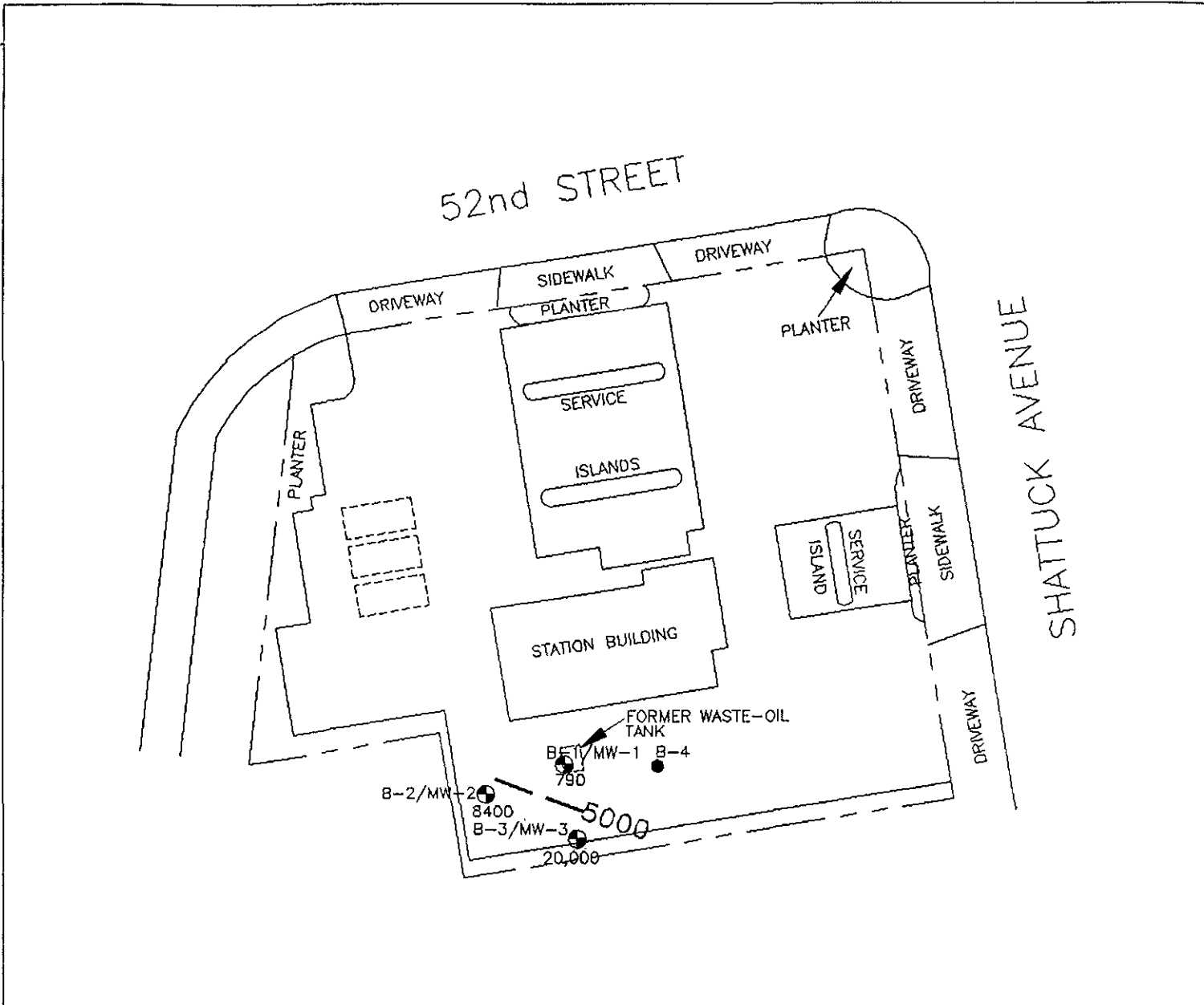
GROUNDWATER GRADIENT MAP

**ARCO Station 6148
5131 Shattuck Avenue
Oakland, California**




PLATE

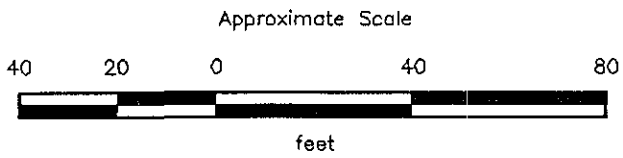
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PROJECT 61035.03




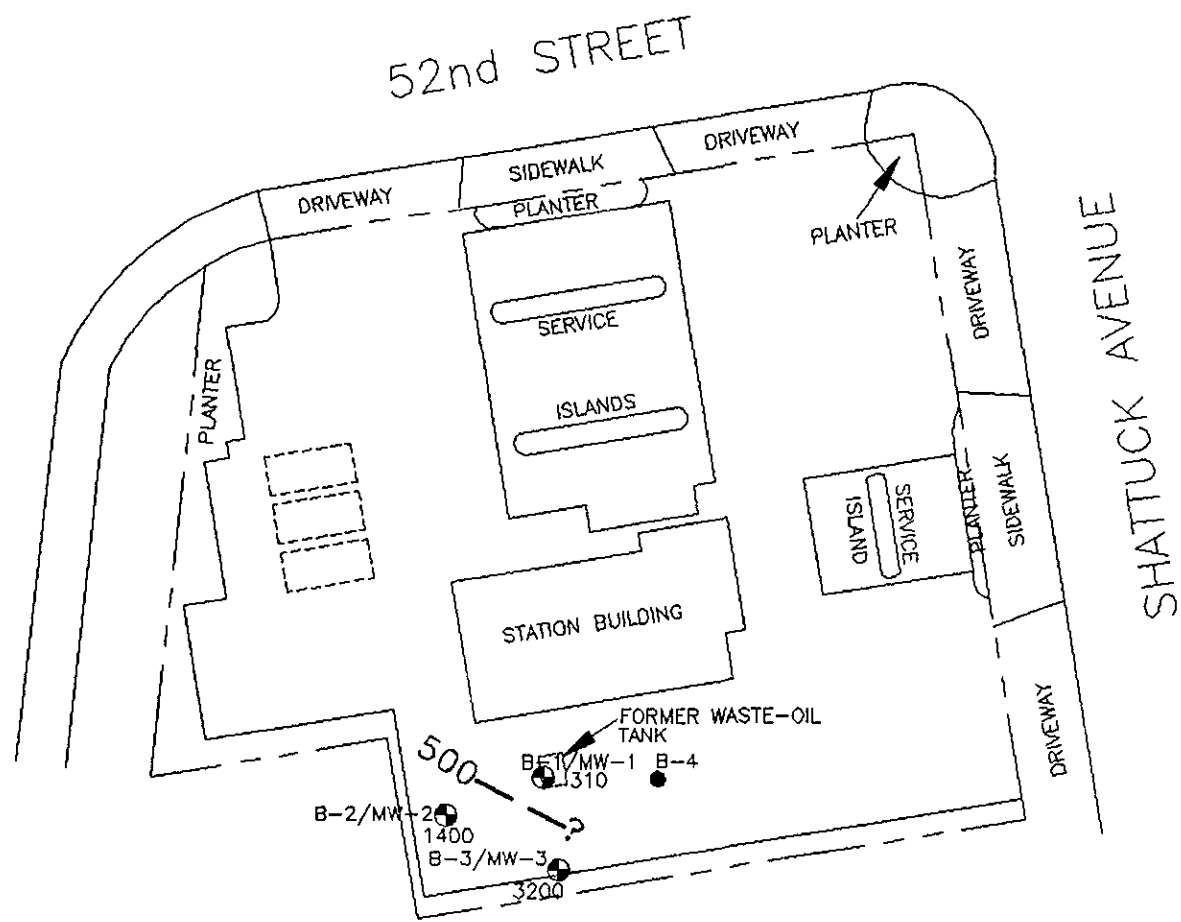
EXPLANATION

- B-3/MW-3  = Monitoring well (RESNA, December 1991)
- B-4  = Soil boring (RESNA, December 1991)
-  = Line of equal concentration of TPHg in groundwater in parts per billion (March 18, 1992)
- 20,000 = Concentration of TPHg in groundwater in parts per billion (March 18, 1992)






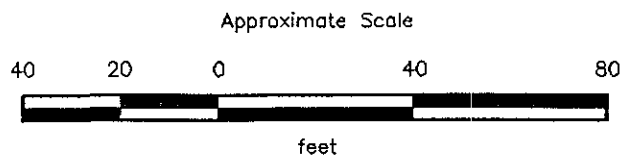
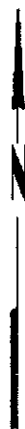
Source: Based on ARCO Site Plan dated 1980.

 Working to Restore Nature	TPHg CONCENTRATION IN GROUNDWATER ARCO Station 6148 5131 Shattuck Avenue Oakland, California	PLATE 6
	PROJECT 61035.03	



EXPLANATION

- B-3/MW-3  = Monitoring well (RESNA, December 1991)
- B-4  = Soil boring (RESNA, December 1991)
- 500  = Line of equal concentration of benzene in groundwater in parts per billion (March 18, 1992)
- 3200 = Concentration of benzene in ppb in groundwater (March 18, 1992)



Source: Based on ARCO Site Plan dated 1980.

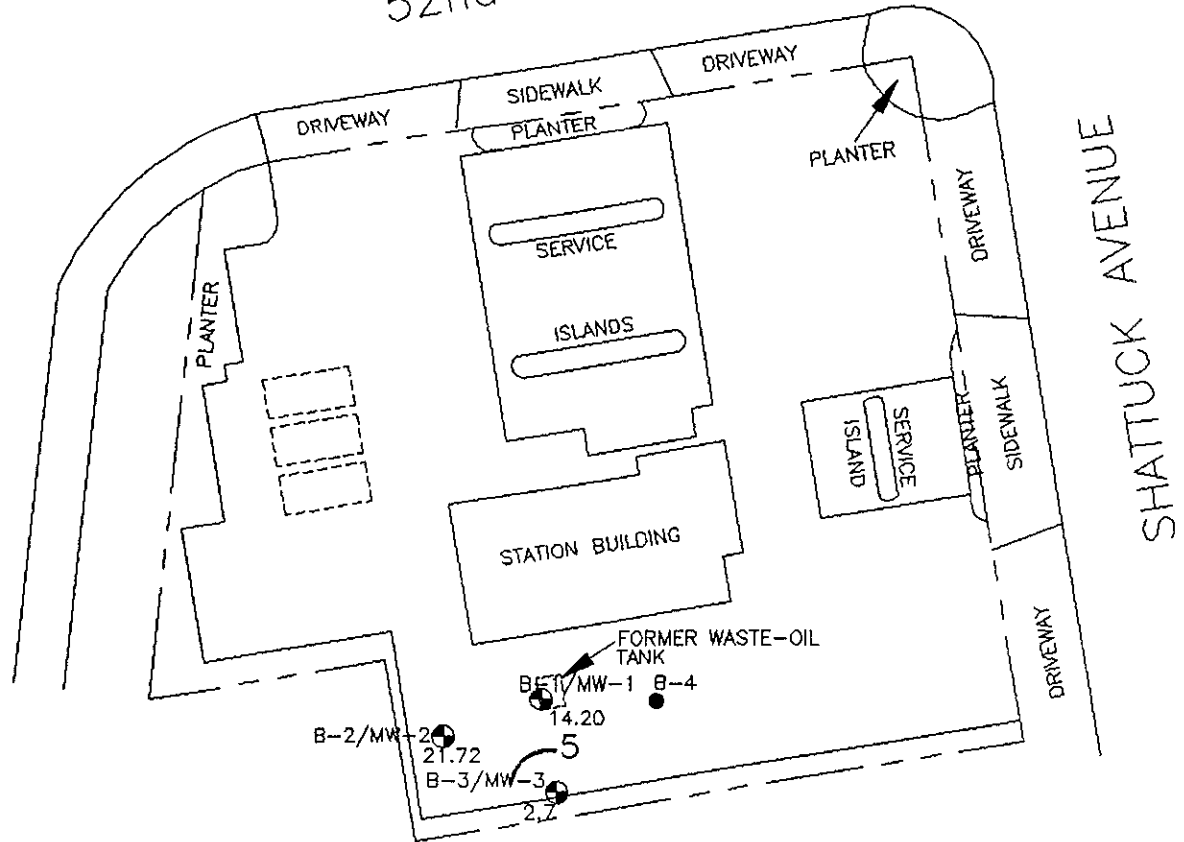


PROJECT 61035.03




**BENZENE CONCENTRATION IN GROUNDWATER
ARCO Station 6148
5131 Shattuck Avenue
Oakland, California**

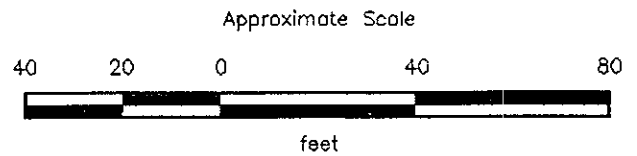
**PLATE
7**

52nd STREET



EXPLANATION

- B-3/MW-3  = Monitoring well (RESNA, December 1991)
- B-4  = Soil boring (RESNA, December 1991)
- 5  = Line of equal concentration of total VOC in groundwater in parts per billion (March 18, 1992)
- 21.72 = Concentration of total VOC in ppb in groundwater (March 18, 1992)



Source: Based on ARCO Site Plan dated 1980.

RESNA
Working to Restore Nature

PROJECT

61035.03

TOTAL VOC CONCENTRATION IN GROUNDWATER

**ARCO Station 6148
5131 Shattuck Avenue
Oakland, California**

PLATE

8

TABLE 1
 CUMULATIVE GROUNDWATER MONITORING DATA
 ARCO Station 6148
 Oakland, California

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
<u>MW-1</u>				
12-23-91		18.26	89.77	Sheen
01-07-92	108.03	17.44	90.59	Sheen
01-19-92		17.17	90.86	None
02-19-92		16.52	91.51	None
03-18-92		16.81	91.22	None
<u>MW-2</u>				
12-23-91		17.98	89.45	Sheen
01-07-92	107.43	17.15	90.28	Sheen
01-19-92		17.47	89.96	None
02-19-92		16.28	91.15	None
03-18-92		16.52	90.91	None
<u>MW-3</u>				
12-23-91		18.14	89.63	Sheen
01-07-92	107.77	17.26	90.51	Sheen
01-19-92		17.63	90.14	None
02-19-92		16.34	91.43	None
03-18-92		16.62	91.15	None

Measurements in feet.

Wells surveyed on December 27, 1991. Datum is City of Oakland = (USGS) + 3.00

TABLE 2
 CUMULATIVE RESULTS OF LABORATORY ANALYSES OF WATER SAMPLES-
 TPHg, TPHd, BTEX, TOG, and Metals
 ARCO Station 6148
 Oakland, California

WELL DATE	TPHg	TPHd	B	T	E	X	Cd	Cr	Pb	Ni	Zn	TOG
<u>MW-1</u> 03/18/92	790	<50	310	26	12	44	<3	5	3	<20	31	<0.5 (1.4)
<u>MW-2</u> 03/18/92	8,400	230*	1,400	1,000	220	870	<3	21	9	38	54	1.2 (3.0)
<u>MW-3</u> 03/18/92	20,000	2,800*	3,200	560	380	1,000	<3	67	27	113	156	7.8 (8.1)
MCL:	--	--	1	--	680	1,750	10	50	50	--	--	--
DWAL:	--	--	--	100	--	--	--	--	--	--	--	--

Results in parts per billion (ppb), except TOG which is in parts per million (ppm).

TPHg: Total petroleum hydrocarbons as gasoline by EPA method 5030/8015/8020.

TPHd: Total petroleum hydrocarbons as diesel by EPA method 3510.

B: benzene, T: toluene, E: ethylbenzene, X: total xylenes isomers

BTEX: Analyzed by EPA method 5030/8015/8020.

TOG: Total oil and grease by Standard method 5520F-IR.

(): Concentrations in parentheses were results of Method 5520C.

*: Laboratory reported sample matrix contained high boiling point fuel mixture calculated as diesel, possibly weathered gasoline.

Metals: By EPA method 6010 and 7421.

<: Results reported below the laboratory detection limit.

Sample Identification:

W-11-MW-3



Monitoring well number
 Depth in feet
 Water Sample

TABLE 3
 CUMULATIVE RESULTS OF LABORATORY ANALYSES OF WATER SAMPLES-VOCs
 ARCO Station 6148
 Oakland, California

Date/Well	Compound	VOCs (ppb)
<u>MW-1</u> 03/18/21	Tetrachloroethene <i>PCE</i>	13
	Trichloroethene <i>TCE</i>	1.2
<u>MW-2</u> 03/18/92	Tetrachloroethene <i>PCE</i>	19
	Trichloroethene <i>TCE</i>	2.22
	cis-1,2-Dichloroethene	0.5
<u>MW-3</u> 03/18/92	Tetrachloroethene <i>PCE</i>	2.7

Results in parts per billion (ppb).

VOCs: Volatile Organic Compounds by EPA method 5030/8010. Compounds not shown were not detected.

Cd: Cadmium by EPA method 6010.

Cr: Chromium by EPA method 6010.

Pb: Lead by EPA method 7421.

Zn: Zinc by EPA method 6010.

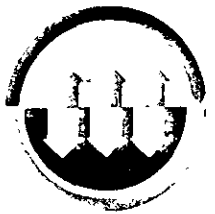
Ni: Nickel by EPA method 6010.

MCLs: Maximum Contaminant Levels as reported by the California Department of Health Services 10/24/90.

APPENDIX A

**EMCON'S FIELD REPORTS (3),
DEPTH TO WATER/FLOATING PRODUCT SURVEY RESULTS,
SUMMARY OF GROUNDWATER MONITORING DATA,
CERTIFIED ANALYTICAL REPORTS WITH CHAIN-OF-CUSTODY, AND
WATER SAMPLE FIELD DATA SHEETS**

MONITORING WELL PURGE WATER DISPOSAL FORM



ARCO
ASSOCIATES

Consultants in Wastes
Management and
Environmental Control

Date February 25, 1992

Project G70-39.01

To:

Mr. Joel Coffman

RESNA/ Applied Geosystems

3315 Almaden Expressway, Suite 34

San Jose, California 95118

We are enclosing:

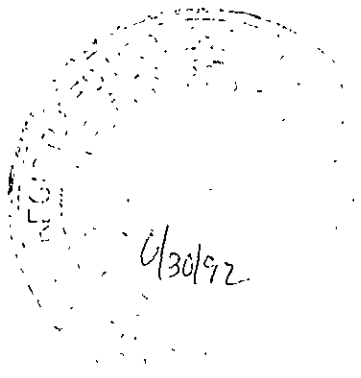
Copies	Description
<u>1</u>	<u>Depth To Water/Floating Product Survey Form,</u>
<u> </u>	<u>February 1992 monthly water level survey, ARCO</u>
<u> </u>	<u>station 6148, 5131 Shattuck Avenue, Oakland, CA</u>

For your: X Information Sent by: X Mail

Comments:

Monthly water level data for the above mentioned site are attached. Please call if you have any questions: (408) 453-2266.

Reviewed by:



Mark Knuttel *MK*

Robert Porter
Robert Porter, Senior Project
Engineer.



FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : G70-39.01

STATION ADDRESS : 5131 Shattuck Avenue, Oakland, Ca

DATE : 2/19/92

ARCO STATION # : 6148

FIELD TECHNICIAN : VINCE BARLOCK

DAY : WEDNESDAY

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-1	OK	Yes	OK	Yes	Yes	16.52	16.53	ND	ND	25.73	—
2	MW-2	OK	Yes	OK	Yes	Yes	16.28	16.29	ND	ND	25.77	—
3	MW-3	OK	Yes	OK	Yes	Yes	16.34	16.35	ND	ND	25.80	—



ASSOCIATES
 Consultants in Wastes
 Management and
 Environmental Control

Date January 29, 1992
 Project G70-39.01

To:
Mr. Joel Coffman
RESNA/ Applied Geosystems
3315 Almaden Expressway, Suite 34
San Jose, California 95118

We are enclosing:

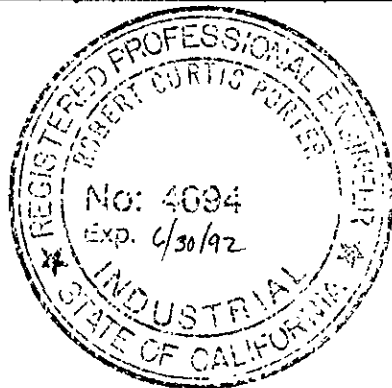
Copies	Description
<u>1</u>	<u>DTW/FP Survey Form, January 1992 monthly</u>
	<u>water level survey, ARCO station 6148,</u>
	<u>5131 Shattuck Avenue, Oakland, CA</u>

For your: X Information Sent by: X Mail

Comments:

Monthly water level data for the above mentioned site are attached. Please call if you have any questions: (408) 453-2266.

Reviewed by:



Mark Knuttel *MK*

Robert Porter
 Robert Porter, Senior P.E. #4094



FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : G70-39.01

STATION ADDRESS : 5131 Shattuck Avenue, Oakland, Ca

DATE : 1-17-72

ARCO STATION # : 6148

FIELD TECHNICIAN : J. Williams

DAY : Monday

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-1	ok	ok	ok	ok	ok	17.77	17.17	ND	ND	25.07	-
2	MW-2						17.47	17.47	ND	ND	25.80	-
3	MW-3						17.63	17.63	ND	ND	25.82	-



ARCO ASSOCIATES
 Consultants in Waste
 Management and
 Environmental Control

44-

Date April 2, 1992
 Project G70-39.01

To:
Mr. Joel Coffman
RESNA/ Applied Geosystems
3315 Alamden Expressway, Suite 34
San Jose, California 95050

We are enclosing:

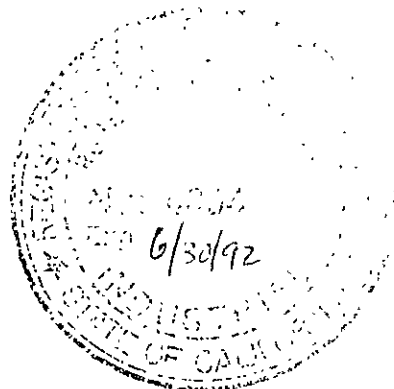
Copies	Description
<u>1</u>	<u>Depth To Water / Floating Product Survey Results</u>
<u>3</u>	<u>Summary of Groundwater Monitoring Data</u>
<u>1</u>	<u>Certified Analytical Reports with Chain-of-Custody</u>
<u>3</u>	<u>Water Sample Field Data Sheets</u>

For your: X Information Sent by: X Mail

Comments:

Enclosed are the data from the first quarter 1992 monitoring event at ARCO service station 6148, 5131 Shattuck Avenue, Oakland, California. Please call if you have any questions: (408) 453-2266.

Reviewed by:



Mark Knuttel *MK*

Robert Porter
 Robert Porter, Senior Project
 Engineer.



FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : G70-39.01

STATION ADDRESS : 5131 Shattuck Avenue, Oakland, Ca

DATE : 3/18/92

ARCO STATION # : 6148

FIELD TECHNICIAN : L. RATH

DAY : wednesday

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-1	good	Yes	good	3259	good	16.81	16.82	ND	ND	25.8	—
2	MW-2	good	Yes	good	3259	good	16.52	16.52	ND	ND	25.8	—
3	MW-3	good	Yes	good	3259	good	16.62	16.62	ND	ND	25.8	—

Summary of Groundwater Monitoring Data
 First Quarter 1992
 ARCO Service Station 6148
 5131 Shattuck Avenue, Oakland, California
 micrograms per liter ($\mu\text{g/l}$) and milligrams per liter (mg/l)

Well ID and Sample Depth	Sampling Date	Depth To Water (feet)	Floating Product Thickness (feet)	TPH ¹ as Gasoline ($\mu\text{g/l}$)	Benzene ($\mu\text{g/l}$)	Toluene ($\mu\text{g/l}$)	Ethyl- benzene ($\mu\text{g/l}$)	Total Xylenes ($\mu\text{g/l}$)	TPH as Diesel ($\mu\text{g/l}$)	Total Oil and Grease, 5520B (mg/l)	Hydrocarbons 5520F-IR (mg/l)
MW-1(24)	03/18/92	16.81	ND. ²	790	310.	26	12.	44.	<50	1.4	<0.5
MW-2(24)	03/18/92	16.52	ND	8,400	1,400.	1,000	220	870.	230 *	3.0	1.2
MW-3(24)	03/18/92	16.62	ND.	20,000.	3,200.	560.	380.	1,000.	2,800.*	8.1	7.8
FB-1. ³	03/18/92	NA. ⁴	NA.	<50	<0.5	<0.5	<0.5	<0.5	NR ⁵	NR.	NR

1. TPH. = Total petroleum hydrocarbons

2. ND. = Not detected

3. FB. = Field Blank

4. NA. = Not applicable

5. NR. = Not reported; sample was not scheduled for analysis of the selected parameter

*. = Sample matrix contains high boiling point fuel mixture calculated as diesel

Summary of Analytical Results
Halogenated Volatile Organic Compounds by EPA¹ Methods 5030/8010
First Quarter 1992
ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California
micrograms per liter ($\mu\text{g/l}$) or parts per billion (ppb)

Well ID and Sample Depth	Sampling Date	cis-1,2-DCE ² (ppb)	TCE ³ (ppb)	PCE ⁴ (ppb)
MW-1(24)	03/18/92	<0.5	1.2	13
MW-2(24)	03/18/92	0.5	2.2	19
MW-3(24)	03/18/92	<0.5	<0.5	2.7

1. EPA = United States Environmental Protection Agency.
2. cis-1,2-DCE = cis-1,2-Dichloroethene
3. TCE = Trichloroethene
4. PCE = Tetrachloroethene

Summary of Analytical Results
Total Metals by EPA¹ Method 6010 and 7421
First Quarter 1992
ARCO Service Station 6148
5131 Shattuck Avenue, Oakland, California
micrograms per liter ($\mu\text{g/l}$) or parts per billion (ppb)

Well ID and Sample Depth	Sampling Date	Cadmium (ppb)	Chromium (ppb)	Lead (ppb)	Nickle (ppb)	Zinc (ppb)
MW-1(24)	03/18/92	<3	5	3	<20	31
MW-2(24)	03/18/92	<3	21	9	38	54
MW-3(24)	03/18/92	<3	67	27	113	156

1. EPA = United States Environmental Protection Agency

**Columbia
Analytical
Services^{INC.}**

March 31, 1992

Mr. Mark Knuttel
EMCON Associates
1921 Ringwood Avenue
San Jose, CA 95131

Re: EMCON Project No. G70-39.01
Arco Facility No. 6148

Dear Mr. Knuttel:

Enclosed are the results of the water samples submitted to our lab on March 19, 1992. For your reference, our service request number for this work is SJ92-0282.

All analyses were performed in accordance with the laboratory's quality assurance program.

Please call if you have any questions.

Respectfully submitted:



Keoni A. Murphy
COLUMBIA ANALYTICAL SERVICES, INC.

le/KAM

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
 Project: EMCON Project No. G70-39.01
 Arco Facility No. 6148

Date Received: 03/19/92
 Work Order #: SJ92-0282
 Sample Matrix: Water

Inorganic Parameters¹
 mg/L (ppm)

<u>Sample Name</u>	<u>Date Sampled</u>	<u>Total Oil & Grease, 5520C</u>	<u>Hydrocarbons, 5520F-IR</u>
MW-1 (24)	03/18/92	1.4	ND
MW-2 (24)	03/18/92	3.0	1.2
MW-3 (24)	03/18/92	8.1	7.8
Method Blank		ND	ND
Method Reporting Limit		0.5	0.5

ND None Detected at or above the method reporting limit

¹ Unless otherwise noted, all analyses were performed within EPA recommended maximum holding times specified in *Test Methods for Evaluating Solid Waste*, (SW-846, 3rd Edition) and *Methods for Chemical Analysis of Water and Waste* (EPA-600/4-79-020, Revised March 1983).

Approved by Kevin Murphy Date March 31 1992

Analytical Report

Client: EMCON Associates
Project: EMCON Project No. G70-39.01
Arco Facility No. 6148
Sample Matrix: Water

Date Received: 03/19/92
Date Extracted: 03/20/92
Date Analyzed: 03/23/92
Work Order #: SJ92-0282

Total Petroleum Hydrocarbons as Diesel
EPA Methods 3510/California DHS LUFT Method
 $\mu\text{g/L}$ (ppb)

<u>Sample Name</u>	<u>MRL</u>	<u>TPH as Diesel</u>
MW-1 (24)	50	ND
MW-2 (24)	50	230.*
MW-3 (24)	50	2,800.*
Method Blank	50	ND

MRL Method Reporting Limit

TPH Total Petroleum Hydrocarbons

ND None Detected at or above the method reporting limit

* Sample matrix contains high boiling point fuel mixture calculated as diesel.

Approved by *Robert M. [Signature]* Date *March 31, 1992*

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
 Project: EMCON Project No. G70-39.01
 Arco Facility No. 6148

Date Received: 03/19/92
 Work Order #: SJ92-0282
 Sample Matrix: Water

BTEX and TPH as Gasoline
 EPA Methods 5030/8020/DHS LUFT Method
 µg/L (ppb)

Sample Name:	<u>MW-1 (24)</u>	<u>MW-2 (24)</u>	<u>MW-3 (24)</u>
Date Analyzed:	03/20/92	03/20/92	03/20/92

<u>Analyte</u>	<u>MRL</u>			
Benzene	0.5	310.	1,400.	3,200.
Toluene	0.5	26.	1,000.	560.
Ethylbenzene	0.5	12.	220.	380.
Total Xylenes	0.5	44.	870.	1,000.
TPH as Gasoline	50	790.	8,400.	20,000.

TPH Total Petroleum Hydrocarbons
 MRL Method Reporting Limit
 ND None Detected at or above the method reporting limit

Approved by *Kenneth Murphy* Date *March 31, 1992*

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: EMCON Project No. G70-39.01
Arco Facility No. 6148

Date Received: 03/19/92
Work Order #: SJ92-0282
Sample Matrix: Water

BTEX and TPH as Gasoline
EPA Methods 5030/8020/DHS LUFT Method
 $\mu\text{g/L}$ (ppb)

Sample Name: FB-1 Method Blank
Date Analyzed: 03/20/92 03/20/92

<u>Analyte</u>	<u>MRL</u>		
Benzene	0.5	ND	ND
Toluene	0.5	ND	ND
Ethylbenzene	0.5	ND	ND
Total Xylenes	0.5	ND	ND
TPH as Gasoline	50	ND	ND

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by Kenneth M. May, Sr. Date March 31, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
 Project: EMCON Project No. G70-39.01
 Arco Facility No. 6148

Date Received: 03/19/92
 Work Order #: SJ92-0282
 Sample Matrix: Water

Halogenated Volatile Organic Compounds
 EPA Methods 5030/8010
 µg/L (ppb)

Sample Name: MW-1 (24) MW-2 (24) MW-3 (24)
 Date Analyzed: 03/20/92 03/23/92 03/23/92

Analyte	MRL	MW-1 (24)	MW-2 (24)	MW-3 (24)
Dichlorodifluoromethane (Freon 12)	1	ND	ND	ND
Chloromethane	1	ND	ND	ND
Vinyl Chloride	0.5	ND	ND	ND
Bromomethane	0.5	ND	ND	ND
Chloroethane	0.5	ND	ND	ND
Trichlorofluoromethane (Freon 11)	0.5	ND	ND	ND
1,1-Dichloroethene	0.5	ND	ND	ND
Trichlorotrifluoroethane (Freon 113)	0.5	ND	ND	ND
Methylene Chloride	0.5	ND	ND	ND
trans-1,2-Dichloroethene	0.5	ND	ND	ND
cis-1,2-Dichloroethene	0.5	ND	0.5	ND
1,1-Dichloroethane	0.5	ND	ND	ND
Chloroform	0.5	ND	ND	ND
1,1,1-Trichloroethane (TCA)	0.5	ND	ND	ND
Carbon Tetrachloride	0.5	ND	ND	ND
1,2-Dichloroethane	0.5	ND	ND	ND
Trichloroethene (TCE)	0.5	1.2	2.2	ND
1,2-Dichloropropane	0.5	ND	ND	ND
Bromodichloromethane	0.5	ND	ND	ND
2-Chloroethyl Vinyl Ether	5	ND	ND	ND
trans-1,3-Dichloropropene	0.5	ND	ND	ND
cis-1,3-Dichloropropene	0.5	ND	ND	ND
1,1,2-Trichloroethane	0.5	ND	ND	ND
Tetrachloroethene (PCE)	0.5	13.	19.	2.7
Dibromochloromethane	0.5	ND	ND	ND
Chlorobenzene	0.5	ND	ND	ND
Bromoform	0.5	ND	ND	ND
1,1,2,2-Tetrachloroethane	0.5	ND	ND	ND
1,3-Dichlorobenzene	1	ND	ND	ND
1,4-Dichlorobenzene	1	ND	ND	ND
1,2-Dichlorobenzene	1	ND	ND	ND

MRL Method Reporting Limit

ND None Detected at or above the method reporting limit

Approved by Neeraj M. M. M. M. Date March 31, 1992

Analytical Report

Client: EMCON Associates
 Project: EMCON Project No. G70-39.01
 Arco Facility No. 6148

Date Received: 03/19/92
 Work Order #: SJ92-0282
 Sample Matrix: Water

Halogenated Volatile Organic Compounds
 EPA Methods 5030/8010
 µg/L (ppb)

Sample Name: _____
 Date Analyzed: _____

Method Blank Method Blank
 03/20/92 03/23/92

<u>Analyte</u>	<u>MRL</u>		
Dichlorodifluoromethane (Freon 12)	1	ND	ND
Chloromethane	1	ND	ND
Vinyl Chloride	0.5	ND	ND
Bromomethane	0.5	ND	ND
Chloroethane	0.5	ND	ND
Trichlorofluoromethane (Freon 11)	0.5	ND	ND
1,1-Dichloroethene	0.5	ND	ND
Trichlorotrifluoroethane (Freon 113)	0.5	ND	ND
Methylene Chloride	0.5	ND	ND
<i>trans</i> -1,2-Dichloroethene	0.5	ND	ND
<i>cis</i> -1,2-Dichloroethene	0.5	ND	ND
1,1-Dichloroethane	0.5	ND	ND
Chloroform	0.5	ND	ND
1,1,1-Trichloroethane (TCA)	0.5	ND	ND
Carbon Tetrachloride	0.5	ND	ND
1,2-Dichloroethane	0.5	ND	ND
Trichloroethene (TCE)	0.5	ND	ND
1,2-Dichloropropane	0.5	ND	ND
Bromodichloromethane	0.5	ND	ND
2-Chloroethyl Vinyl Ether	5	ND	ND
<i>trans</i> -1,3-Dichloropropene	0.5	ND	ND
<i>cis</i> -1,3-Dichloropropene	0.5	ND	ND
1,1,2-Trichloroethane	0.5	ND	ND
Tetrachloroethene (PCE)	0.5	ND	ND
Dibromochloromethane	0.5	ND	ND
Chlorobenzene	0.5	ND	ND
Bromoform	0.5	ND	ND
1,1,2,2-Tetrachloroethane	0.5	ND	ND
1,3-Dichlorobenzene	1	ND	ND
1,4-Dichlorobenzene	1	ND	ND
1,2-Dichlorobenzene	1	ND	ND

MRL Method Reporting Limit
 ND None Detected at or above the method reporting limit

Approved by *K. E. [Signature]* Date March 31, 1992

APPENDIX A
LABORATORY QC RESULTS

COLUMBIA ANALYTICAL SERVICES, INC.

Client: EMCON Associates
Project: EMCON Project No. G70-39.01
Arco Facility No. 6148

Date Received: 03/19/92
Work Order #: SJ92-0282
Sample Matrix: Water

QA/QC Report
Surrogate Recovery Summary
TPH as Diesel
EPA Method 3510/DHS LUFT Method

<u>Sample Name</u>	<u>Date Analyzed</u>	<u>Percent Recovery</u> P-Terphenyl
MW-1 (24)	03/23/92	80.
MW-2 (24)	03/23/92	89.
MW-3 (24)	03/23/92	81.
Method Blank	03/23/92	86.
	CAS Acceptance Criteria	55-145

TPH Total Petroleum Hydrocarbons

Approved by K. E. M. Murphy Date March 31, 1992

Client: EMCON Associates
Project: EMCON Project No. G70-39.01
Arco Facility No. 6148

Date Received: 03/19/92
Work Order #: SJ92-0282
Sample Matrix: Water

QA/QC Report
Surrogate Recovery Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020/DHS LUFT Method

<u>Sample Name</u>	<u>Date Analyzed</u>	<u>Percent Recovery</u> <i>a,a,a</i> -Trifluorotoluene
MW-1 (24)	03/20/92	88.
MW-2 (24)	03/20/92	92.
MW-3 (24)	03/20/92	103.
FB-1	03/20/92	91.
Method Blank	03/20/92	84.

CAS Acceptance Criteria 70-130

TPH Total Petroleum Hydrocarbons

Approved by *Michael Murphy* Date *March 31, 1992*

Client: EMCON Associates
Project: EMCON Project No. G70-39.01
Arco Facility No. 6148

Date Received: 03/19/92
Work Order #: SJ92-0282
Sample Matrix: Water

QA/QC Report
Surrogate Recovery Summary
Halogenated Volatile Organic Compounds
EPA Methods 5030/8010

<u>Sample Name</u>	<u>Date Analyzed</u>	<u>Percent Recovery</u>
		4-Bromofluorobenzene
MW-1 (24)	03/20/92	78.
MW-2 (24)	03/23/92	87.
MW-3 (24)	03/23/92	81.
Method Blank	03/20/92	79.
Method Blank	03/23/92	77.
	CAS Acceptance Criteria	70-130

Approved by *Meghan H. [Signature]* Date *March 31, 1992*

APPENDIX B
CHAIN OF CUSTODY

ARCO Facility no. 6148	City (Facility) Oakland	Project manager (Consultant) Mark Kmetz	Laboratory name CAS
ARCO engineer Kyle Christie	Telephone no. (ARCO) 415-571-2434	Telephone no. (Consultant) 408-453-0719	Contract number 07077
Consultant name Emcon Associates	Address (Consultant) 1938 Junction Ave, San Jose, CA		Method of shipment sampler will deliver
			Special detection Limit/reporting Lowest Possible
			Special QA/QC Normal
			Remarks G70-39.01
			Lab number SJ92-0282
			Turnaround time Standard
			Priority Rush 1 Business Day <input type="checkbox"/>
			Rush 2 Business Days <input type="checkbox"/>
			Expedited 5 Business Days <input type="checkbox"/>
			Standard 10 Business Days <input checked="" type="checkbox"/>

Sample ID	Lab no.	Container no	Matrix			Preservation		Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH 843 EPA M602/8020/8015	TPH Modified 8015 Gas <input type="checkbox"/> Diesel <input type="checkbox"/>	Oil and Grease 4131 <input type="checkbox"/> 4132 <input type="checkbox"/> 4133 <input type="checkbox"/> 4134 <input type="checkbox"/> 4135 <input type="checkbox"/>	TPH EPA 418.1/SM403E	EPA 801/8010	EPA 624/8240	EPA 625/8270	TCLP Metals <input type="checkbox"/> VOA <input type="checkbox"/> VOA <input type="checkbox"/>	CAM Metals EPA 601/07000 TTLC <input type="checkbox"/> STLC <input type="checkbox"/>	Lead Org (DHS) <input type="checkbox"/> Lead EPA <input type="checkbox"/> 7420/7421 <input type="checkbox"/>	
			Soil	Water	Other	Ice	Acid														
11w 1(24)	1-2	2		X		X	HCl	3/18/92	1500		X										
11w 2(24)	3-4	2		X		X	HCl		1540		X										
11w 3(24)	5-6	2		X		X	HCl		1600		X										
11w 1	7-8	2		X		X	HCl		1500		X										
11w 1(24)	9-10	2		X		X	HCl		1500					X							
11w 4(24)	11-12	2		X		X	HCl		1540					X							
11w 3(24)	13-14	2		X		X	HCl		1600					X							
11w 1(24)	15-16	2		X		X	NP		1500			X									
11w 4(24)	17-18	2		X		X	NP		1540			X									
11w 3(24)	19-20	2		X		X	NP		1600			X									
11w 1(24)	21-22	2		X		X	HCl		1500			X									
11w 2(24)	23-24	2		X		X	HCl		1540			X									
11w 3(24)	25-26	2		X		X	HCl		1600			X									
11w 1(24)		1		X		X	HNO ₃		1500											X	
11w 2(24)		1		X		X	HNO ₃		1540											X	
11w 3(24)		1		X		X	HNO ₃	✓	1600											X	

Condition of sample OK	Temperature received cool	
Relinquished by sampler Insee Z Rankin	Date 3/19/92 Time 9:18	Received by [Signature] 3/19-92 9:30
Relinquished by	Date	Received by
Relinquished by	Date	Received by laboratory
	Date	Time

ARCO Facility no 6148	City (Facility) Dakota	Project manager (Consultant) Mark Knutson	Laboratory name CAS
ARCO engineer Kyle Christie	Telephone no (ARCO) 415-571-2434	Telephone no (Consultant) 415-453-0719	Contract number 07077
Consultant name Emcon Associates	Address (Consultant) 1938 Junction Ave, San Jose, CA		
			Fax no (Consultant) 415-453-0152

Sample ID	Lab no	Container no	Matrix			Preservation		Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA 1602/8020/8015	TPH Modified 8015 Gas <input type="checkbox"/> Diesel <input type="checkbox"/>	Oil and Grease 413.1 <input type="checkbox"/> 413.2 <input type="checkbox"/>	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals <input type="checkbox"/> VOA <input type="checkbox"/> Se <input type="checkbox"/>	CAM Metals EPA 6010/7000 TTLC <input type="checkbox"/> STLC <input type="checkbox"/>	Lead Org IDHS Lead EPA 7420/7421 <input type="checkbox"/>	Mercury C.A.C.R.N. Zn 2007/Gcib	Special detection Limit/reporting	
			Soil	Water	Other	Ice	Acid																
HW-1 (24)		1		X		X	HNO ₃	3/18/92	1500													X	Sampler will deliver
HW-2 (24)		1		X		X	HNO ₂	✓	1540													X	Lowest Possible
HW-3 (24)		1		X		X	HNO ₃	✓	1600													X	Normal
																							Remarks G70-39.01 see attached Bottle List

Condition of sample. OK	Temperature received cool	Lab number 5592-0282
Relinquished by sampler Jose Z Poth	Date 3/19/92 Time 0918	Priority Rush 1 Business Day <input type="checkbox"/>
Relinquished by	Date	Rush 2 Business Days <input type="checkbox"/>
Relinquished by	Date	Expedited 5 Business Days <input type="checkbox"/>
Relinquished by	Date	Standard 10 Business Days <input checked="" type="checkbox"/>

RECEIVED

APR 01 1992

CAS S.I.

**Columbia
Analytical
Services** inc.

March 31, 1992

Mark Knuttel
EMCON Associates
1921 Ringwood Avenue
San Jose, CA 95131

Re: **ARCO #6148 - Oakland/Project #G70-39.01/SJ920282**

Dear Mark:

Enclosed are the results of the samples submitted to our lab on March 19, 1992. For your reference, these analyses have been assigned our work order number K921741C.

All analyses were performed in accordance with our laboratory's quality assurance program.

Please call if you have any questions.

Respectfully submitted,

Columbia Analytical Services, Inc.



Colin B. Elliott
Senior Project Chemist

CBE/das

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: ARCO #6148 - Oakland
Sample Matrix: Water

Date Received: 03/19/92
Work Order No.: K921741C

Total Metals
µg/L (ppb)

Analyte	EPA Method	MRL	Sample Name:	MW-1	MW-2	MW-3
			Lab Code:	K1741-1	K1741-2	K1741-3
Cadmium	6010	3		ND	ND	ND
Chromium	6010	5		5	21	67
Lead	7421	2		3	9	27
Nickel	6010	20		ND	38	113
Zinc	6010	10		31	54	156

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by Colin Elliott Date 3/31/92

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: ARCO #6148 - Oakland
Sample Matrix: Water

Work Order No.: K921741C

Total Metals
µg/L (ppb)

Sample Name:
Lab Code:

Method Blank
K1741-MB

Analyte	EPA Method	MRL	
Cadmium	6010	3	ND
Chromium	6010	5	ND
Lead	7421	2	ND
Nickel	6010	20	ND
Zinc	6010	10	ND

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by

Colin Elliott

Date

3/31/92

110002

RCO Facility no **6148** City (Facility) **Oakland** Project manager (Consultant) **Mark K. Mitchell** Laboratory name **CAS**
 RCO engineer **Kyle Christie** Telephone no. (ARCO) **415-571-2434** Telephone no. (Consultant) **408-453-0719** Fax no. (Consultant) **408-453-0452** Contract number **07077**
 Consultant name **Emcon Associates** Address (Consultant) **1938 Junction Ave, San Jose, CA** Method of shipment **Sampler will deliver**

Sample ID	Lab no	Container no	Matrix			Preservation		Sampling date	Sampling time	BTEX EPA 802	BTEX/TPH EPA M602/80208015	TPH Modified 8015 Gas Diesel	Oil and Grease 413.1 413.2 413.3 3522 413.4 413.5	TPH EPA 418.1/SM503E	EPA 6018010	EPA 624/8240	EPA 625/8270	TCLP Metals VOA	Semi-VOA	CAM Metals EPA 6010/7000 TLC STLC	Lead Org./DHS Lead EPA 7420/7421		
			Soil	Water	Other	Ice	Acid																
16.1(24)		2		X		X	HCl	3/18/92	1500		X												
16.2(24)		2		X		X	HCl		1540		X												
16.3(24)		2		X		X	HCl		1600		X												
16.4		2		X		X	HCl		1500		X												
16.1(24)		2		X		X	HCl		1500						X								
16.2(24)		2		X		X	HCl		1540						X								
16.3(24)		2		X		X	HCl		1600						X								
16.1(24)		2		X		X	NP		1500			X											
16.2(24)		2		X		X	NP		1540			X											
16.3(24)		2		X		X	NP		1600			X											
16.1(24)		2		X		X	HCl		1500				X										
16.2(24)		2		X		X	HCl		1540				X										
16.3(24)		2		X		X	HCl		1600				X										
16.1(24)		1		X		X	HNO ₃		1500												X		
16.2(24)		1		X		X	HNO ₃		1540												X		
16.3(24)		1		X		X	HNO ₃	✓	1600												X		

Special detection Limit/reporting **Lowest Possible**

Special QA/QC **Normal TOG-5520F IR per P Lacey 3-14-92**

Remarks **G70-39.01 See attached Bottle List**

Lab number **SJ92-0282**

Turnaround time **Priority Rush 1 Business Day ()**
Rush 2 Business Days ()
Expedited 5 Business Days ()
Standard 10 Business Days ()

Condition of sample: **ok** Temperature received **cool**

Relinquished by sampler **Islee 2 Rock 11** Date **3/19/92** Time **9:18** Received by **[Signature]** Date **3-19-92** Time **9:30**

Relinquished by **[Signature]** Date **[Blank]** Time **[Blank]** Received by **[Signature]** Date **[Blank]** Time **[Blank]**

Relinquished by **[Signature]** Date **[Blank]** Time **[Blank]** Received by laboratory **[Signature]** Date **3/20/92** Time **0930**

ARCO Facility no. 6148 City (Facility) Oakland Project manager (Consultant) Mark Knuttal
 ARCO engineer Kyle Christie Telephone no. (ARCO) 415-571-2434 Telephone no. (Consultant) 408-453-0719 Fax no. (Consultant) 408-453-0452
 Consultant name Emcow Associates Address (Consultant) 1938 Junction Ave, San Jose, CA

Laboratory name ICAS
 Contract number 07077

Sample ID	Lab no.	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX EPA 802/EPA 8020	BTEX/TPH EPA 1602/8020/8015	TPH Modified 8015 Gas <input type="checkbox"/> Diesel <input type="checkbox"/>	Oil and Grease 413.1 <input type="checkbox"/> 413.2 <input type="checkbox"/>	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TC/PC Metals <input type="checkbox"/> VOA <input type="checkbox"/> VOA <input type="checkbox"/>	Semi Metals <input type="checkbox"/> VOA <input type="checkbox"/>	CAM Metals EPA 8010/7000 TTLC <input type="checkbox"/> STLC <input type="checkbox"/>	Lead Org/DHS <input type="checkbox"/> Lead EPA 7420/7421 <input type="checkbox"/>	Metals <u>Cr, Ni, Zn</u> <u>2007/Gcid</u>	Method of shipment	Special detection Limit/reporting	Special QA/QC	Remarks	
			Soil	Water	Other	Ice	Acid																				
<u>2-1 (24)</u>		<u>1</u>		<u>X</u>		<u>X</u>	<u>HNO₃</u>	<u>3/18/92</u>	<u>1500</u>														<u>Sampler will deliver</u>	<u>Lowest Possible</u>	<u>normal</u>	<u>G70-39.01 see attached Bottle List</u>	
<u>2-2 (24)</u>		<u>1</u>		<u>X</u>		<u>X</u>	<u>HNO₂</u>	<u>✓</u>	<u>1540</u>																		
<u>2-3 (24)</u>		<u>1</u>		<u>X</u>		<u>X</u>	<u>HNO₃</u>	<u>✓</u>	<u>1600</u>																		

Condition of sample ok Temperature received cool
 Relinquished by sampler Josel Z Routh Date 3/19/92 Time 0915 Received by [Signature] Date 3-19-92 Time 9:30
 Relinquished by [Signature] Date _____ Time _____ Received by _____ Date _____ Time _____
 Relinquished by [Signature] Date _____ Time _____ Received by laboratory [Signature] Date 3/20/92 Time 0930

Priority Rush 1 Business Day
 Rush 2 Business Days
 Expedited 5 Business Days
 Standard 10 Business Days



WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/

EMCON ASSOCIATES

PROJECT NO: G70 39 01
PURGED BY: L. RATH
SAMPLED BY: L. RATH

SAMPLE ID: MW-1
CLIENT NAME: ARCO 6148
LOCATION: 5131 Shattuck Ave
Oak CA

TYPE: Ground Water Surface Water _____ Treatment Effluent _____ Other _____

CASING DIAMETER (inches): 2 _____ 3 _____ 4 4.5 _____ 6 _____ Other _____

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 5.89
DEPTH TO WATER (feet): 16.81 CALCULATED PURGE (gal.): 29.48
DEPTH OF WELL (feet): 25.8 ACTUAL PURGE VOL (gal.): 30.0
29.48 + 3.28

DATE PURGED: 3/18/92 Start (2400 Hr) 1410 End (2400 Hr) 1432
DATE SAMPLED: 3/18/92 Start (2400 Hr) 1500 End (2400 Hr) _____

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1413</u>	<u>6</u>	<u>6.19</u>	<u>437</u>	<u>70.4</u>	<u>Clear</u>	<u>light</u>
<u>1416</u>	<u>12</u>	<u>6.38</u>	<u>526</u>	<u>70.0</u>	<u>"</u>	<u>"</u>
<u>1420</u>	<u>18</u>	<u>6.41</u>	<u>467</u>	<u>69.9</u>	<u>"</u>	<u>"</u>
<u>1429</u>	<u>24</u>	<u>6.36</u>	<u>451</u>	<u>69.8</u>	<u>"</u>	<u>"</u>
<u>1432</u>	<u>30</u>	<u>6.35</u>	<u>462</u>	<u>69.7</u>	<u>"</u>	<u>"</u>

D. O. (ppm): NR ODOR: strong
NR (COBALT 0 - 100) NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): FB-1

PURGING EQUIPMENT

SAMPLING EQUIPMENT

- | | | | |
|--|---|--|--|
| <input type="checkbox"/> 2" Bladder Pump | <input type="checkbox"/> Bailer (Teflon®) | <input type="checkbox"/> 2" Bladder Pump | <input checked="" type="checkbox"/> Bailer (Teflon®) |
| <input type="checkbox"/> Centrifugal Pump | <input type="checkbox"/> Bailer (PVC) | <input type="checkbox"/> DDL Sampler | <input type="checkbox"/> Bailer (Stainless Steel) |
| <input checked="" type="checkbox"/> Submersible Pump | <input type="checkbox"/> Bailer (Stainless Steel) | <input type="checkbox"/> Dipper | <input type="checkbox"/> Submersible Pump |
| <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated | <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated |
- Other: 2" green Pos Other: _____

WELL INTEGRITY: good LOCK #: 3259

REMARKS: _____

Meter Calibration: Date: 3/15/92 Time: 1359 Meter Serial #: 911 Temperature °F: 74.4
(EC 1000 9.51 / 1000) (DI 12.80) (pH 7 7.15 / 7.00) (pH 10 10.09 / 10.00) (pH 4 3.94)

Location of previous calibration: _____

Signature: L. RATH Reviewed By: MIC Page 1 of 3



WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5

EMCON ASSOCIATES

PROJECT NO: G70 39 01
PURGED BY: L. RATIT
SAMPLED BY: L. RATIT

SAMPLE ID: MW-2
CLIENT NAME: ARCO 6148
LOCATION: 5131 Shattuck A

TYPE: Ground Water Surface Water _____ Treatment Effluent _____ Other _____

CASING DIAMETER (inches): 2 _____ 3 _____ 4 4.5 _____ 6 _____ Other _____

CASING ELEVATION (feet/MSL): N/R VOLUME IN CASING (gal.): 6.0
DEPTH TO WATER (feet): 16.52 CALCULATED PURGE (gal.): 30.4
DEPTH OF WELL (feet): 258 ACTUAL PURGE VOL (gal.): 20.5

DATE PURGED: 3/18/92 Start (2400 Hr) 1518 End (2400 Hr) 1529
DATE SAMPLED: 3/18/92 Start (2400 Hr) 1540 End (2400 Hr) _____

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1520</u>	<u>6.0</u>	<u>6.35</u>	<u>4.59</u>	<u>69.5</u>	<u>clear</u>	<u>light</u>
<u>1524</u>	<u>12.0</u>	<u>6.51</u>	<u>4.99</u>	<u>69.3</u>	<u>"</u>	<u>"</u>
<u>1526</u>	<u>18.0</u>	<u>6.59</u>	<u>4.76</u>	<u>69.1</u>	<u>"</u>	<u>"</u>
<u>well dried at 20.5 gal at 1530 HRS</u>						
<u>1540</u>	<u>Recharge</u>	<u>6.52</u>	<u>4.75</u>	<u>68.7</u>	<u>Brown</u>	<u>MOD</u>
D. O. (ppm): <u>N/R</u>		ODOR: <u>Strong</u>		_____ <u>N/R</u> _____		_____ <u>N/R</u> _____
				(COBALT 0 - 100)		(NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): N/R

PURGING EQUIPMENT

SAMPLING EQUIPMENT

- | | | | |
|--|---|--|--|
| <input type="checkbox"/> 2" Bladder Pump | <input type="checkbox"/> Bailer (Teflon®) | <input type="checkbox"/> 2" Bladder Pump | <input checked="" type="checkbox"/> Bailer (Teflon®) |
| <input type="checkbox"/> Centrifugal Pump | <input type="checkbox"/> Bailer (PVC) | <input type="checkbox"/> DDL Sampler | <input type="checkbox"/> Bailer (Stainless Steel) |
| <input checked="" type="checkbox"/> Submersible Pump | <input type="checkbox"/> Bailer (Stainless Steel) | <input type="checkbox"/> Dipper | <input type="checkbox"/> Submersible Pump |
| <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated | <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated |
| Other: <u>2" screen</u> | | Other: _____ | |

WELL INTEGRITY: good LOCK #: 3259

REMARKS: well dried at 20.5 gal at 1530 HRS

Meter Calibration: Date: _____ Time: _____ Meter Serial #: 9111 Temperature °F: _____
(EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)
Location of previous calibration: MW-1

Signature: L. Ratit Reviewed By: MK Date: 7. 3



WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/

PROJECT NO: 6703901
PURGED BY: L. RATH
SAMPLED BY: L. RATH

SAMPLE ID: MW-3
CLIENT NAME: ARCO 6148
LOCATION: 5131 Shattuck St Oak CA

TYPE: Ground Water Surface Water _____ Treatment Effluent _____ Other _____
CASING DIAMETER (inches): 2 _____ 3 _____ 4 4.5 _____ 6 _____ Other _____

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 6.0
DEPTH TO WATER (feet): 16.62 CALCULATED PURGE (gal.): 30.1
DEPTH OF WELL (feet): 25.8 ACTUAL PURGE VOL (gal.): 30.5

DATE PURGED: 3/18/92 Start (2400 Hr) 1540 End (2400 Hr) 1555
DATE SAMPLED: 3/18/92 Start (2400 Hr) 1600 End (2400 Hr) _____

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1543</u>	<u>6.0</u>	<u>6.53</u>	<u>4.77</u>	<u>68.7</u>	<u>Clear</u>	<u>light</u>
<u>1545</u>	<u>12.0</u>	<u>6.56</u>	<u>545</u>	<u>68.5</u>	<u>11</u>	<u>11</u>
<u>1548</u>	<u>18.0</u>	<u>6.52</u>	<u>583</u>	<u>68.2</u>	<u>11</u>	<u>11</u>
<u>1551</u>	<u>24.0</u>	<u>6.51</u>	<u>596</u>	<u>67.9</u>	<u>11</u>	<u>11</u>
<u>1555</u>	<u>30.5</u>	<u>6.54</u>	<u>601</u>	<u>67.8</u>	<u>11</u>	<u>11</u>

D. O. (ppm): NR ODOR: Slight _____
(COBALT 0 - 100) (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

PURGING EQUIPMENT

SAMPLING EQUIPMENT

- | | | | |
|--|---|--|--|
| <input type="checkbox"/> 2" Bladder Pump | <input type="checkbox"/> Bailer (Teflon®) | <input type="checkbox"/> 2" Bladder Pump | <input checked="" type="checkbox"/> Bailer (Teflon®) |
| <input type="checkbox"/> Centrifugal Pump | <input type="checkbox"/> Bailer (PVC) | <input type="checkbox"/> DDL Sampler | <input type="checkbox"/> Bailer (Stainless Steel) |
| <input checked="" type="checkbox"/> Submersible Pump | <input type="checkbox"/> Bailer (Stainless Steel) | <input type="checkbox"/> Dipper | <input type="checkbox"/> Submersible Pump |
| <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated | <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated |
- Other: 2" Grundfos Other: _____

WELL INTEGRITY: Good LOCK #: 3259

REMARKS: _____

Meter Calibration: Date: _____ Time: _____ Meter Serial #: 9111 Temperature °F: _____
(EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)
Location of previous calibration: MW-1

Signature: L. Rath Reviewed By: MK Page 3 of 3