

1993 OCT 25 PM 4:00

3315 Almaden Expressway, Suite 34
San Jose, CA 95118
Phone: (408) 264-7723
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LETTER REPORT
QUARTERLY GROUNDWATER MONITORING
Third Quarter 1993
at
ARCO Station 374
6407 Telegraph Avenue
Oakland, California

60025.12

10/19/93

93 OCT 25 PM 4:00

3315 Almaden Expressway, Suite 34
San Jose, CA 95118
Phone: (408) 264-7723
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TRANSMITTAL

TO: Ms. Susan Hugo
Alameda County Health
Care Services Agency
80 Swan Way, Room 200
Oakland, California 94621

DATE: October 19, 1993
PROJECT NUMBER: 60025.12
SUBJECT: ARCO Station No. 374

FROM: Zbigniew Ignatowicz

WE ARE SENDING YOU:

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1 10/19/93	Letter Report Quarterly Groundwater Monitoring Third Quarter 1993 at ARCO Station No. 374, 6407 Telegraph Avenue, Oakland, California.

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REMARKS:

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Zbigniew Ignatowicz
Zbigniew Ignatowicz, Staff Geologist

cc: Mr. Michael Whelan, ARCO
Mr. Richard Hiett, RWOCB

3315 Almaden Expressway, Suite 34
San Jose, CA 95118
Phone: (408) 264-7723
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October 19, 1993
1015MWHE
60025.12

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

Subject: Letter Report Quarterly Groundwater Monitoring Third Quarter 1993 at
ARCO Station 374, 6407 Telegraph Avenue, Oakland, California.

Mr. Whelan:

As requested by ARCO Products Company (ARCO), RESNA Industries Inc. (RESNA) presents this letter report which summarizes the results of third quarter 1993 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 event are to evaluate changes in the groundwater flow direction and gradient, and changes in concentrations of petroleum hydrocarbons in the local groundwater. 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. Field procedures and acquisition of field data were performed under the direction of EMCON; warrant of their field data and evaluation of their field protocols is beyond RESNA's scope of work. 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 374 is located on the northwestern corner of the intersection of Alcatraz and Telegraph Avenues in Oakland, California. The site location is shown on the Site Vicinity Map, Plate 1.

Quarterly Groundwater Monitoring
ARCO Station 374, Oakland, California

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Results of previous environmental investigations at the site are presented in the reports listed in the references section. The locations of the groundwater monitoring wells and pertinent site features are shown on the Generalized Site Plan, Plate 2.

Groundwater Sampling and Gradient Evaluation

Depth-to-water levels (DTW) were measured and quarterly sampling was performed by EMCON field personnel on August 4, and 5, 1993. 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-6, are presented on EMCON's Field Reports, Summary of Groundwater Monitoring Data, and Water Sample Field Data Sheets. These data are included in Appendix A.

The DTW levels, wellhead elevations, groundwater elevations, and subjective observations for product in the groundwater from MW-1 through MW-6 for this and previous quarterly groundwater monitoring at the site are summarized in Table 1, Cumulative Groundwater Monitoring Data. Evidence of product or sheen was not observed by EMCON's field personnel during this quarterly monitoring (see Appendix A). The groundwater gradient and flow directions interpreted from EMCON's DTW measurements from August 4, and 5, 1993 is shown on the Groundwater Gradient Map, Plate 3. The average interpreted groundwater gradient is approximately 0.035 ft/ft with an average flow direction toward the southwest. The averaged groundwater gradient and flow direction this quarter are generally consistent with those previously interpreted.

Groundwater monitoring wells MW-1 through MW-6 were purged and sampled by EMCON field personnel on August 4, and 5, 1993. Pertinent field sampling information is presented on EMCON's Water Sample Field Data Sheets (see Appendix A).

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-6 were analyzed for total petroleum hydrocarbons as gasoline (TPHg) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) using Environmental Protection Agency (EPA) Methods 5030/California DHS LUFT Method/8020. Monitoring well MW-4 was also analyzed for TPH as diesel (TPHd) using EPA Method 3510/California DHS LUFT Method. Concentrations of TPHg and benzene in the groundwater are shown on Plate 4, TPHg Concentrations in Groundwater, and Plate 5, Benzene Concentrations in

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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--TPHg, TPHd, BTEX, and TOG. Results of previous analyses are also presented in Table 3, Cumulative Results of Laboratory Analyses of Groundwater--VOCs and Metals.

The following general trends were noted in reported hydrocarbon concentrations in groundwater from monitoring wells MW-1 through MW-6 since last quarterly monitoring: reported concentrations of TPHg and BTEX have remained nondetectable in onsite well MW-1, and in offsite well MW-6. Concentrations of TPHg and BTEX have increased in on-site well MW-4, decreased in onsite well MW-2, and decreased in off-site wells MW-3 and MW-5.

RESNA recommends 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. Richard Hiett
Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94612

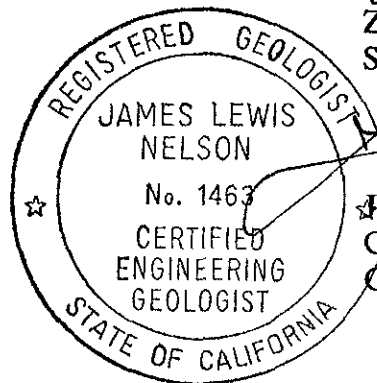
Quarterly Groundwater Monitoring
ARCO Station 374, Oakland, California


October 19, 1993
60025.12

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

Sincerely,
RESNA Industries Inc.


Zbigniew L. Ignatowicz
Staff Geologist




James L. Nelson
Certified Engineering
Geologist No. 1463

Attachments: References

Plate 1, Site Vicinity Map
Plate 2, Generalized Site Plan
Plate 3, Groundwater Gradient Map, August 4 and 5, 1993
Plate 4, TPHg Concentrations In Groundwater, August 4 and 5, 1993
Plate 5, Benzene Concentrations In Groundwater, August 4 and 5, 1993

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

Appendix A: EMCON's Field Reports Depth To Water/Floating
Product Survey Results, Summary of Groundwater
Monitoring Data, Certified Analytical Reports with Chain
of Custody, Water Sample Field Data Sheets

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REFERENCES

- Applied GeoSystems. June 15, 1988. Limited Environmental Site Assessment at ARCO Service Station No. 374, Telegraph Avenue and Alcatraz Avenue, Oakland, California. Job 18039-1.
- Applied GeoSystems. August 1, 1988. Report Environmental Investigation Related to Underground Tank Removal at ARCO Service Station No. 374, Telegraph Avenue and Alcatraz Avenue, Oakland, California. Job 18039-2.
- Applied GeoSystems. August 30, 1990. Letter Report, Quarterly Ground-Water Monitoring Third Quarter 1990 at ARCO Station 374, 6407 Telegraph Avenue, Oakland, California. AGS 60025-1.
- Applied GeoSystems. February 20, 1991. Letter Report, Quarterly Ground-Water Monitoring Fourth Quarter 1990 at ARCO Station 374, 6407 Telegraph Avenue, Oakland, California. AGS 60025-1.
- Applied GeoSystems. March 27, 1991. Report Limited Subsurface Environmental Investigation at ARCO Station 374, 6407 Telegraph Avenue, Oakland, California. AGS Report No. 18039-3.
- Applied GeoSystems. April 16, 1991. Letter Report, Quarterly Ground-Water Monitoring First Quarter 1991 at ARCO Station 374, 6407 Telegraph Avenue, Oakland, California. AGS 60025-2.
- Applied GeoSystems. May 15, 1991. Work Plan for Subsurface Investigations and Remediation at ARCO Station 374, 6407 Telegraph Avenue, Oakland, California. AGS 60025-3.
- RESNA/Applied GeoSystems. July 31, 1991. Report of pumping and Recovery Test Results at ARCO 374, 6407 Telegraph Avenue, Oakland, California. 60025.04
- RESNA. September 4, 1991. Letter Report, Quarterly Ground-Water Monitoring Second Quarter 1991 at ARCO Station 374, 6407 Telegraph Avenue, Oakland, California. RESNA 60025-2.

REFERENCES
(continued)

- RESNA. November 21, 1991. Letter Report, Quarterly Groundwater Monitoring Third Quarter 1991 at ARCO Station 374, 6407 Telegraph Avenue, Oakland, California.
RESNA 60025-2.
- RESNA. March 6, 1992. Letter Report, Quarterly Groundwater Monitoring Fourth Quarter 1991 at ARCO Station 374, 6407 Telegraph Avenue, Oakland, California.
RESNA 60025-2.
- RESNA. May 5, 1992. Letter Report, Quarterly Groundwater Monitoring First Quarter 1992 at ARCO Station 374, 6407 Telegraph Avenue, Oakland, California.
RESNA 60025-2.
- RESNA. August 28, 1992. Letter Report, Quarterly Groundwater Monitoring Second Quarter 1992 at ARCO Station 374, 6407 Telegraph Avenue, Oakland, California.
RESNA 60025-7.
- RESNA. December 18, 1992. Letter Report, Quarterly Groundwater Monitoring Third Quarter 1992 at ARCO Station 374, 6407 Telegraph Avenue, Oakland, California.
RESNA 60025-7.
- RESNA. September 23, 1992. Report on Offsite Subsurface Environmental Investigation at ARCO Station 374, 6407 Telegraph Avenue, Oakland, California.
RESNA 60035-5.
- RESNA. January 15, 1993. Letter Report, Quarterly Groundwater Monitoring Fourth Quarter 1992 at ARCO Station 374, 6407 Telegraph Avenue, Oakland, California.
RESNA Report 60025.10.
- RESNA. May 3, 1993. Letter Report, Quarterly Groundwater Monitoring First Quarter 1993 at ARCO Station 374, 6407 Telegraph Avenue, Oakland, California.
RESNA Report 60025.12.
- RESNA. July 24, 1993. Letter Report, Quarterly Groundwater Monitoring Second Quarter 1993 at ARCO Station 374, 6407 Telegraph Avenue, Oakland, California.
RESNA Report 60025.12.



Base. U.S Geological Survey
 7 1/2-Minute Quadrangles
 Oakland West/East, California.
 Photorevised 1988

LEGEND

● = Site Location



Approximate Scale



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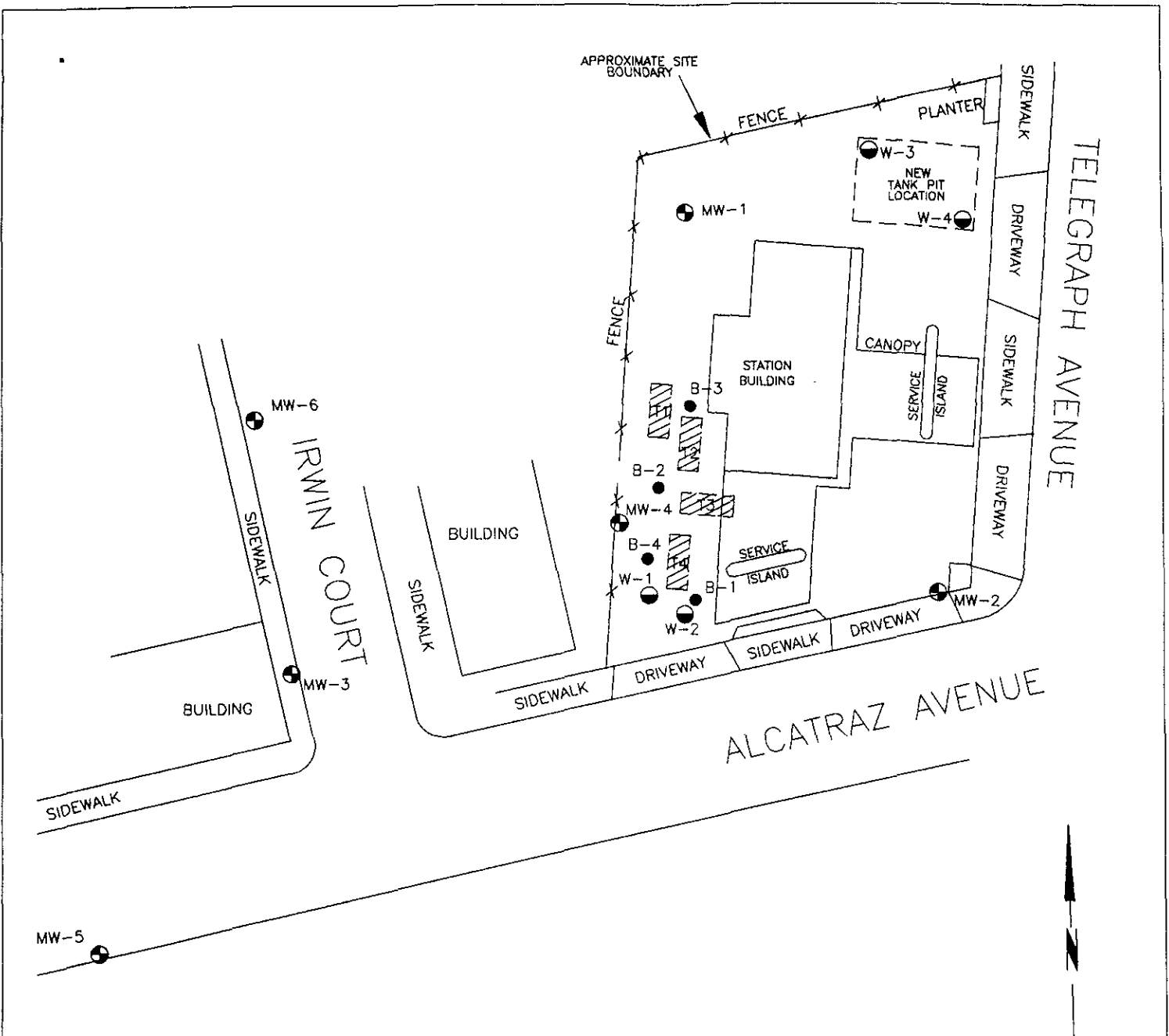
PROJECT

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SITE VICINITY MAP
 ARCO Station 374
 6407 Telegraph Avenue
 Oakland, California

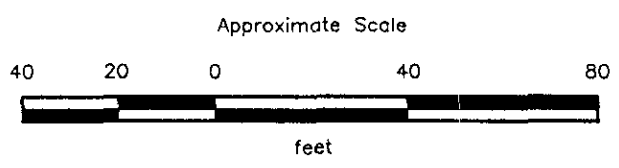
PLATE

1



EXPLANATION

- B-4 ● = Soil boring (RESNA, 1988)
- MW-6 ⊕ = Monitoring well (RESNA, July 1989, and April 1992)
- W-4 ⊙ = Tank pit monitoring well (RESNA, 1988)
- ▨ = Former underground storage tanks



Source: Surveyed by John Koch, Licensed Land Surveyor.

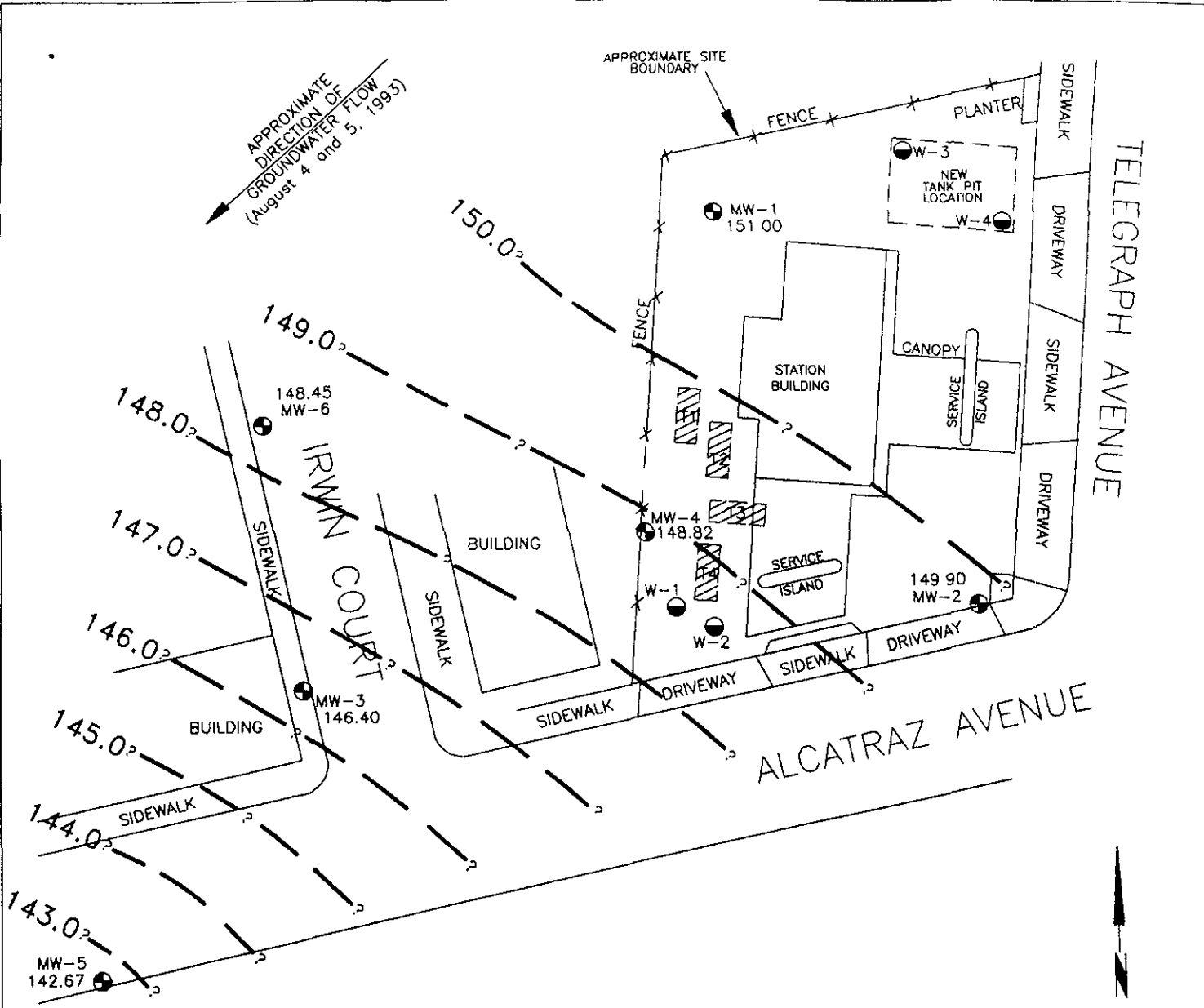
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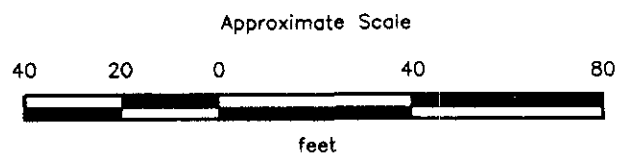
GENERALIZED SITE PLAN
ARCO Station 374
6407 Telegraph Avenue
Oakland, California

PLATE
2



EXPLANATION

- 150.0 = Line of equal elevation of groundwater in feet above mean sea level (MSL)
- 151.00 = Elevation of groundwater in feet above MSL August 4 and 5, 1993
- MW-6 ● = Monitoring well (RESNA, July 1989, and April 1992)
- W-4 ● = Tank pit monitoring well (RESNA, 1988)
- ▨ = Former underground storage tanks

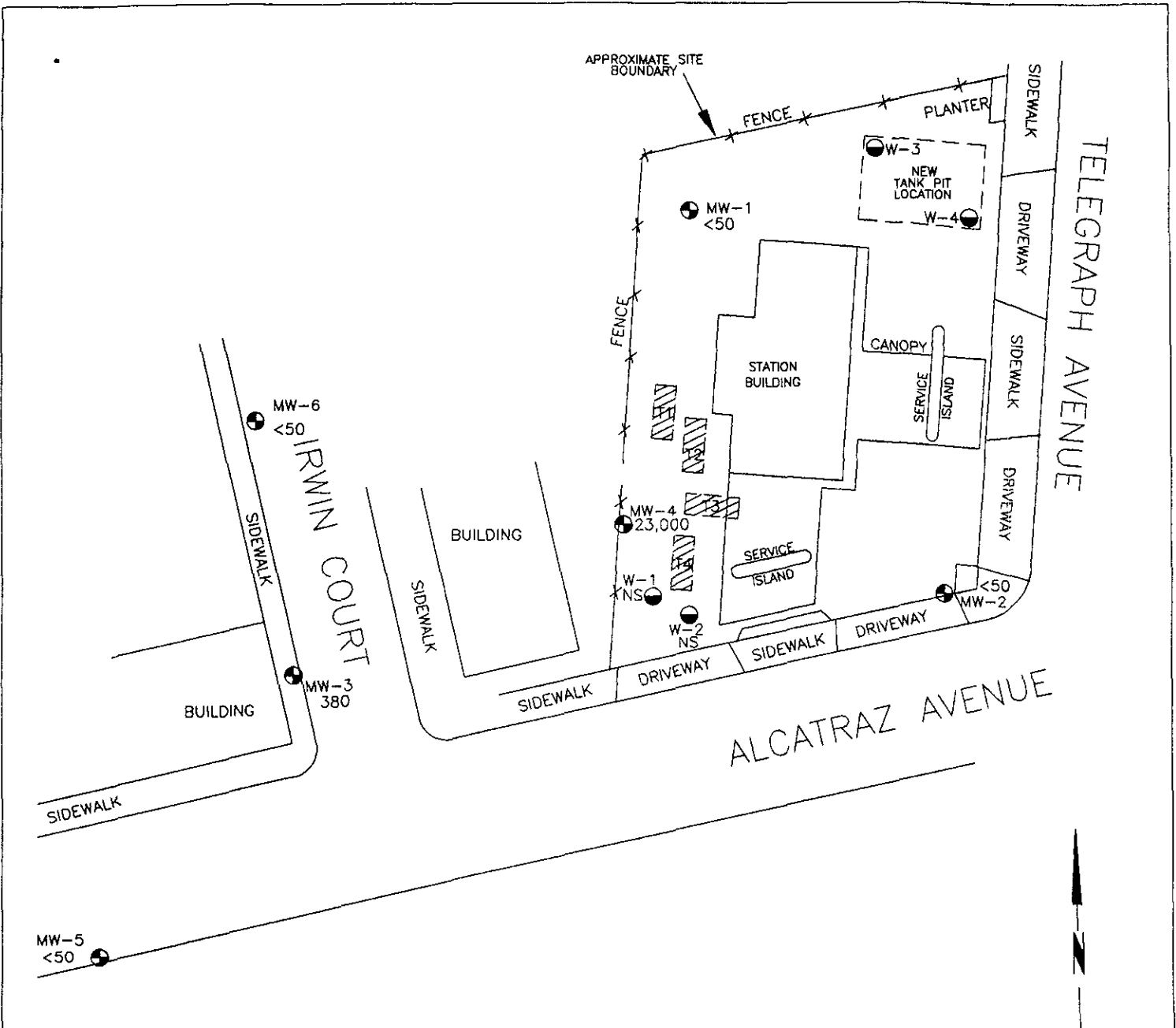


Source: Surveyed by John Koch, Licensed Land Surveyor.



GROUNDWATER GRADIENT MAP
ARCO Station 374
6407 Telegraph Avenue
Oakland, California

PLATE
3



EXPLANATION

23,000 = Concentration of TPHg in groundwater in parts per billion, August 4 and 5, 1993

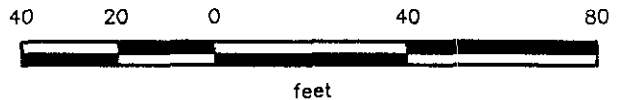
MW-6 ⊕ = Monitoring well (RESNA, July 1989, and April 1992)

W-4 ⊖ = Tank pit monitoring well (RESNA, 1988)

▨ = Former underground storage tanks

NS = Not sampled, tank pit well

Approximate Scale



Source: Surveyed by John Koch, Licensed Land Surveyor.

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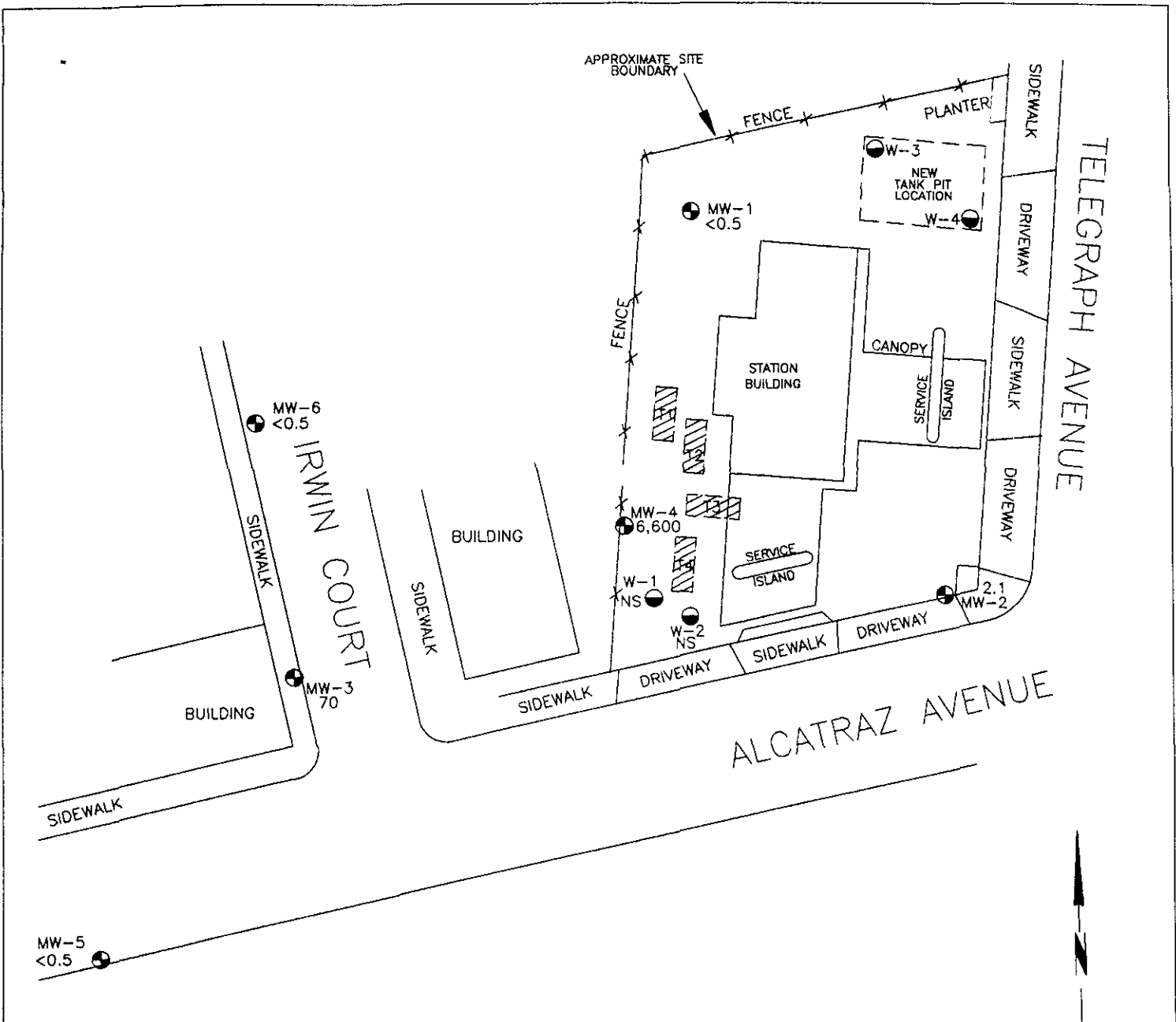
PROJECT 60025.12

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TPHg CONCENTRATIONS
IN GROUNDWATER
ARCO Station 374
6407 Telegraph Avenue
Oakland, California

PLATE

4



EXPLANATION

- 4,800 = Concentration of benzene in groundwater in parts per billion, August 4 and 5, 1993
- MW-6 = Monitoring well (RESNA, July 1989, and April 1992)
- W-4 = Tank pit monitoring well (RESNA, 1988)
- = Former underground storage tanks
- NS = Not sampled, tank pit well

Approximate Scale



Source: Surveyed by John Koch, Licensed Land Surveyor.



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00251203

**BENZENE CONCENTRATIONS
IN GROUNDWATER
ARCO Station 374
6407 Telegraph Avenue
Oakland, California**

**PLATE
5**

Quarterly Groundwater Monitoring
ARCO Station 374, Oakland, California

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 374
Oakland, California
(Page 1 of 5)

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
<u>MW-1</u>				
07/20/89		8.04	151.40	None
08/30/89		8.47	150.97	None
10/04/89	159.44	8.50	150.94	None
01/10/90		6.74	152.70	None
08/07/90		6.87	152.57	None
12/06/90		7.35	152.09	None
12/19/90		7.22	152.22	None
01/29/91		8.28	151.16	None
02/20/91		7.98	151.46	None
04/25/91		6.89	152.55	None
05/31/91		7.64	151.80	None
07/08/91		8.17	151.27	None
08/09/91		8.58	150.86	None
09/25/91		8.82	150.62	None
10/17/91		8.96	150.48	None
11/20/91		8.60	150.84	None
12/27/91		8.71	150.73	None
01/19/92		7.83	151.61	None
02/19/92		6.68	152.76	None
03/09/92		4.47	154.97	None
04/15/92	158.91**	6.44	152.47	None
05/12/92		7.31	151.60	None
06/16/92		7.97	150.94	None
07/14/92		8.22	150.69	None
08/07/92		8.46	150.45	None
09/22/92		6.76	152.15	None
10/12/92		7.13	151.78	None
11/23/92		7.24	151.67	None
12/16/92		6.44	152.47	None
01/21/93		5.03	153.88	None
02/22/93		4.93	153.98	None
03/25/93		5.13	153.78	None
04/27/93		5.68	153.23	None
08/04/93		7.91	151.00	None

See notes on page 5 of 5

Quarterly Groundwater Monitoring
ARCO Station 374, Oakland, California

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 374
Oakland, California
(Page 2 of 5)

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
MW-2				
07/20/89		8.15	150.31	None
08/30/89		8.42	150.04	None
10/04/89	158.46	8.40	150.06	None
01/10/90		6.12	152.34	None
08/07/90		6.35	152.11	None
12/06/90		7.15	151.31	None
12/19/90		7.38	151.08	None
01/29/91		8.41	150.05	None
02/20/91		8.26	150.20	None
04/25/91		7.70	150.76	None
05/31/91		8.10	150.36	None
07/08/91		8.34	150.12	None
08/09/91		8.51	149.95	None
09/25/91		8.66	149.80	None
10/17/91		8.80	149.66	None
11/20/91		8.66	149.80	None
12/27/91		8.57	149.89	Sheen
01/19/92		8.25	150.21	None
02/19/92		7.50	150.96	None
03/09/92		7.40	151.06	None
04/15/92	157.92**	7.72	150.20	None
05/12/92		8.01	149.91	None
06/16/92		8.25	149.67	None
07/14/92		8.33	149.59	None
08/07/92		8.42	149.50	None
09/22/92		6.13	151.79	None
10/12/92		6.80	151.12	None
11/23/92		7.15	150.77	None
12/16/92		6.66	151.26	None
01/21/93		5.93	151.99	None
02/22/93		6.01	151.91	None
03/25/93		5.91	152.01	None
04/27/93		6.63	151.29	None
08/04/93		8.02	149.90	None

See notes on page 5 of 5

Quarterly Groundwater Monitoring
ARCO Station 374, Oakland, California

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 374
Oakland, California
(Page 3 of 5)

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
<u>MW-3</u>				
07/20/89		7.58	146.60	None
08/30/89		8.00	146.18	None
10/04/89	154.18	7.73	146.45	Emulsion
01/10/90		7.78	146.40	None
08/07/90		7.66	146.52	None
12/06/90		7.75	146.43	None
12/19/90		7.58	146.60	None
01/29/91	154.18	7.60	146.58	None
02/20/91		7.51	146.67	None
04/25/91		6.37	147.81	None
05/31/91		7.19	146.99	None
07/08/91		7.60	146.58	None
08/09/91		7.94	146.24	None
09/25/91		8.23	145.95	None
10/17/91		8.44	145.74	None
11/20/91		8.78	145.40	None
12/27/91		8.05	146.13	Sheen
01/19/92		7.65	146.53	None
02/19/92		6.48	147.70	None
03/09/92		5.45	148.73	None
04/15/92	153.64**	7.75	145.89	None
05/12/92		7.45	146.19	None
06/16/92		7.51	146.13	None
07/14/92		7.60	146.04	None
08/07/92		7.85	145.79	None
09/22/92		7.73	145.91	None
10/12/92		7.83	145.81	None
11/23/92		6.98	146.66	None
12/16/92		5.96	147.68	None
01/21/93		4.62	149.02	None
02/22/93		5.15	148.49	None
03/25/93		5.45	148.19	None
04/27/93		5.79	147.85	None
08/04/93		7.24	146.40	None

See notes on page 5 of 5

Quarterly Groundwater Monitoring
ARCO Station 374, Oakland, California

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 374
Oakland, California
(Page 4 of 5)

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
<u>MW-4</u>				
07/20/89		8.09	148.99	None
08/30/89		8.45	148.63	Sheen
10/04/89	157.08	8.57	148.51	Sheen
01/10/90		7.26	149.82	None
08/07/90		6.87	150.21	None
12/06/90		8.02*	149.06*	Sheen
12/19/90		7.69	149.39	None
01/29/91		8.39	148.69	Sheen
02/20/91		8.16	148.92	None
04/25/91		7.14	149.94	None
05/31/91		7.64	149.44	None
07/08/91		8.34	148.74	None
08/09/91		8.60	148.48	None
09/25/91		8.80	148.28	None
10/17/91		8.98	148.10	None
11/20/91		8.78	148.30	None
12/27/91		8.82	148.26	Sheen
01/19/92		8.18	148.90	None
02/19/92		7.62	149.46	None
03/09/92		6.68	150.40	None
04/15/92	156.53**	6.96	149.57	None
05/12/92		7.45	149.08	None
06/16/92		7.94	148.59	None
07/14/92		8.21	148.32	None
08/07/92		8.41	148.12	None
09/22/92		6.14	150.39	None
10/12/92		6.45	150.08	None
11/23/92		7.48	149.05	None
12/16/92		6.95	149.58	None
01/21/93		5.53	151.00	None
02/22/93		5.83	150.70	None
03/25/93		5.96	150.57	None
04/27/93		6.30	150.23	None
08/04/93		7.71	148.82	None

See notes on page 5 of 5

Quarterly Groundwater Monitoring
ARCO Station 374, Oakland, California

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 374
Oakland, California
(Page 5 of 5)

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
<u>MW-5</u>				
04/15/92	151.33**	8.05	143.28	None
05/12/92		8.44	142.89	None
06/16/92		8.74	142.59	None
07/14/92		9.70	141.63	None
08/07/92		9.10	142.23	None
09/22/92		9.26	142.07	None
10/25/92#		9.24	142.09	None
11/23/92			Well Inaccessible	
12/16/92		8.20	143.13	None
01/21/93		7.89	143.44	None
02/22/93		7.29	144.03	None
03/25/93		7.51	143.82	None
04/27/93		7.72	143.61	None
08/05/93		8.66	142.67	None
<u>MW-6</u>				
04/15/92	153.84**	4.55	149.29	None
05/12/92		5.32	148.52	None
06/16/92		5.91	147.93	None
07/14/92		6.08	147.76	None
08/07/92		6.36	147.48	None
09/22/92		6.53	147.31	None
10/25/92#		6.54	147.30	None
11/23/92		5.75	148.09	None
12/16/92		4.69	149.15	None
01/21/93		3.82	150.02	None
02/22/93		3.78	150.06	None
03/25/93		3.93	149.91	None
04/27/93		4.30	149.54	None
08/05/93		5.39	148.45	None

Notes:

Elevations and DTW measured in feet.

* = Floating Product.

** = Wellheads surveyed by John E. Koch on April 27, 1992. Well elevation datum is mean sea level (MSL).

= Wells inaccessible on 10/12/92 due to parked cars. EMCON returned and sampled on 10/25/92.

Quarterly Groundwater Monitoring
ARCO Station 374, Oakland, California

October 19, 1993
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TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER--TPHg, TPHd, BTEX, AND TOG
ARCO Service Station 374
Oakland, California
(Page 1 of 3)

Date/Well	TPHg	TPHd	B	T	E	X	TOG
<u>MW-1</u>							
07/21/89	33	NA	0.77	1.6	1.5	5.0	NA
08/30/89	<20	NA	<0.50	<0.50	<0.50	<0.50	NA
10/04/89	<20	NA	<0.50	<0.50	<0.50	<0.50	NA
01/10/90	<20	NA	<0.50	<0.50	<0.50	<0.50	NA
08/07/90	<20	NA	<0.50	<0.50	<0.50	<0.50	NA
12/06/90	<50	NA	3.6	2.7	0.60	5.80	NA
02/20/91	<50	NA	<0.50	<0.50	<0.50	<0.50	NA
07/08/91	<30	NA	<0.30	<0.30	<0.30	<0.30	NA
09/25/91	<30	NA	0.57	0.57	0.54	1.7	NA
11/20/91	57	NA	9.2	3.7	0.63	2.5	NA
03/09/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
04/15/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
07/14/92	<50	NA	<0.5	0.7	<0.5	1.3	NA
10/12/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
01/21/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
04/27/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
08/04/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
<u>MW-2</u>							
07/21/89	4,200	NA	280	210	38	24	NA
08/30/89	4,200	NA	160	260	45	240	NA
10/04/89	4,300	NA	860	300	29	330	NA
01/10/90	8,000	NA	890	710	120	760	NA
08/07/90	6,000	NA	880	76	25	80	NA
12/06/90	1,600	NA	330	69	18	63	NA
02/20/91	1,300	NA	160	46	13	48	NA
07/08/91	310	NA	76	18	7.7	24	NA
09/25/91	83	NA	17	0.69	2.2	4.1	NA
11/20/91	180	NA	46	6.1	3.0	8.7	NA
03/09/92	690	NA	170	25	21	58	NA
04/15/92	86	NA	20	2.3	3.8	8.5	NA
07/14/92	160	NA	46	1.4	1.2	3.5	NA
10/12/92	230	NA	59	7.0	5.5	11	NA
01/21/93	450	NA	70	6.6	22	54	NA
04/27/93	<50	NA	6.6	<0.5	0.7	1.1	NA
08/04/93	<50	NA	2.1	<0.5	<0.5	<0.5	NA

See notes on page 3 of 3.

Quarterly Groundwater Monitoring
ARCO Station 374, Oakland, California

October 19, 1993
60025.12

TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER--TPHg, TPHd, BTEX, AND TOG
ARCO Service Station 374
Oakland, California
(Page 2 of 3)

Date/Well	TPHg	TPHd	B	T	E	X	TOG
<u>MW-3</u>							
07/21/89	430	NA	9	4.8	<0.50	50	NA
08/30/89	1,200	NA	85	46	8.4	55	NA
10/04/89	7,000	NA	580	900	120	670	NA
01/10/90	940	NA	130	59	21	73	NA
08/07/90	2,300	NA	180	64	59	120	NA
12/06/90	460	350	52	55	14	39	NA
02/20/91	470	<100	36	30	9.3	31	<5,000
07/08/91	2,500	NA	240	470	74	320	NA
09/25/91	1,100	NA	120	110	34	120	NA
11/20/91	1,000	NA	180	140	43	140	NA
03/10/92	1,200	NA	200	110	53	130	NA
04/15/92	1,600	NA	200	13	110	81	NA
07/14/92	5,200	NA	620	44	310	250	NA
10/12/92	850	NA	150	5.2	55	46	NA
01/21/93	620	NA	100	12	35	35	NA
04/27/93	1,700	NA	180	83	64	100	NA
08/04/93	380	NA	70	12	29	41	NA
<u>MW-4</u>							
07/21/89	8,700	NA	720	360	120	640	NA
08/30/89	7,300	NA	630	220	72	320	NA
10/04/89	21,000	NA	2,300	1,300	280	1,300	NA
01/10/90	4,300	NA	470	250	63	430	NA
08/07/90	69,000	28,000	8,700	4,200	540	4,600	<5,000
12/06/90	Not sampled--product sheen						
02/20/91	5,200	<100	690	200	95	580	<5,000
07/08/91	1,700	NA	280	68	37	170	NA
09/25/91	6,300	NA	2,100	290	210	590	NA
11/20/91	2,700	NA	1,200	200	110	320	NA
03/10/92	690	NA	180	80	18	43	NA
04/15/92	8,500	NA	2,100	750	280	1,000	NA
07/14/92	10,000	NA	2,900	530	290	930	NA
10/12/92	19,000	690*	5,200	1,600	490	1,800	NA
01/21/93	22,000	1,400*	4,400	1,300	580	2,200	NA
04/27/93	21,000	1,100*	4,800	1,200	630	2,400	NA
08/04/93	23,000	1,500*	6,600	1,700	770	2,600	NA

See notes on page 3 of 3.

Quarterly Groundwater Monitoring
ARCO Station 374, Oakland, California

October 19, 1993
60025.12

TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER—TPHg, TPHd, BTEX, AND TOG
ARCO Service Station 374
Oakland, California
(Page 3 of 3)

Date/Well	TPHg	TPHd	B	T	E	X	TOG
<u>MW-5</u>							
04/15/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
07/14/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
10/25/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
01/21/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
04/27/93	<50	NA	0.5	1.0	<0.5	0.8	NA
08/05/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
<u>MW-6</u>							
04/15/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
07/15/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
10/25/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
01/21/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
04/27/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
08/05/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
MCL:	---	---	1	---	680	1,750	---
DWAL:	---	---	---	100	---	---	---

Results in micrograms per liter (ug/L) = parts per billion (ppb).

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

TPHd: Total petroleum hydrocarbons as diesel using EPA method 3510/8015.

BTEX: B: Benzene, T: Toluene, E: Ethylbenzene, X: Total Xylene isomers; measured using EPA method 8020/602.

TOG: Total oil and grease measured using Standard Method 5520 B/F.

<: Results reported as less than the detection limit.

NA: Not analyzed

*: The sample contains a lower boiling point hydrocarbon mixture quantitated as diesel. The chromatogram does not match the typical diesel fingerprint.

FB-1: Field blank.

MCL: State Maximum Contaminant Level (October 1990).

DWAL: State recommended Drinking Water Action Level (October 1990).

Quarterly Groundwater Monitoring
ARCO Station 374, Oakland, California

October 19, 1993
60025.12

TABLE 3
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER--VOCs and Metals
ARCO Service Station 374
Oakland, California

Date/Well	VOC (ppb)	Cd (ppm)	Cr (ppm)	Pb (ppm)	Ni (ppm)	Zn (ppm)
<u>MW-4</u>						
07/31/90	Nondetectable for thirty one compounds tested (<1.0)	NA	NA	NA	NA	NA
02/20/91	Chloromethane* 3.4; nondetectable for twenty eight other compounds tested (<0.5)	NA	NA	NA	NA	NA
11/20/91	NA	<0.010	<0.010	<0.0050	<0.050	0.019
03/10/92	NA	NA	NA	NA	NA	NA
04/15/92	NA	NA	NA	NA	NA	NA
07/14/92	NA	NA	NA	NA	NA	NA
10/12/92	NA	NA	NA	NA	NA	NA
01/21/93	NA	NA	NA	NA	NA	NA
04/27/93	NA	NA	NA	NA	NA	NA
08/04/93	NA	NA	NA	NA	NA	NA

VOC results in micrograms per liter (ug/L) = parts per billion (ppb).
Metal results in milligrams per liter (mg/L) = parts per million (ppm).
Halogenated Volatile Organics measured by EPA method 601/8010.
NA = Not Analyzed

APPENDIX A

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



EMCON Associates

1938 Junction Avenue • San Jose, California 95131-2102 • (408) 453-0719 • Fax (408) 453-0452

RECEIVED

AUG 30 1993

RESNA
SAN JOSE

Date August 26, 1993

Project OG70-004.01

To:

Mr. John Young

RESNA

3315 Almaden Expressway, Suite 34

San Jose, California 95118

We are enclosing:

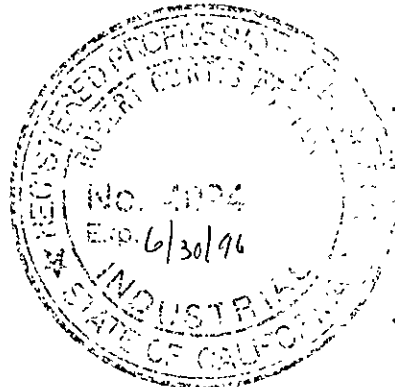
Copies	Description
<u>1</u>	<u>Depth To Water / Floating Product Survey Results</u>
<u>1</u>	<u>Summary of Groundwater Monitoring Data</u>
<u>1</u>	<u>Certified Analytical Reports with Chain-of-Custody</u>
<u>6</u>	<u>Water Sample Field Data Sheets</u>

For your: X Information Sent by: X Mail

Comments:

Enclosed are the data from the third quarter 1993 monitoring event at ARCO service station 374, 6407 Telegraph Avenue, Oakland, CA. Groundwater monitoring is conducted consistent with applicable regulatory guidelines. Please call if you have any questions: (408) 453-2266.

Reviewed by:



Jim Butera *JB*

Robert Porter
Robert Porter, Senior Project Engineer.



FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : OG70-004.01

STATION ADDRESS : 6407 Telegraph Hill, Oakland, CA

DATE : 8-4-93

ARCO STATION # : 374

FIELD TECHNICIAN : I. GRAHAM

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	HEX	N/A	3259	OK	7.91	7.91	NR	NR	26.7	-
2	MW-6	OK	15/16	OK	⁰⁴⁶⁴ 3259	OK	5.39	5.39	ND	NA	14.6	0464 LOCK (KR)
3	MW-5	OK	15/16	OK	³⁴⁹⁹ 3259	OK	8.66	8.66	ND	NA	23.1	3499 LOCK (KR)
4	MW-2	OK	HEX	N/A	3259	OK	8.02	8.02	NR	NR	26.3	-
5	MW-3	OK	HEX	N/A	3259	OK	7.24	7.24	NR	NR	26.8	-
6	MW-4	OK	HEX	N/A	3259	OK	7.71	7.71	NR	NR	26.6	NEEDS NEW LID
<p>WELLS MW-5 AND MW-6 WERE COVERED BY CARS ON 8-4-93. WATER LEVELS AND SAMPLES WERE NOT ABLE TO BE TAKEN UNTIL 8-5-93.</p>												

WELL SURVEY POINTS ARE TOP OF CASING

Summary of Groundwater Monitoring Data
 Third Quarter 1993
 ARCO Service Station 374
 6407 Telegraph Hill, Oakland, California
 micrograms per liter ($\mu\text{g/l}$) or parts per billion (ppb)

Well ID and Sample Depth	Sampling Date	Depth To Water (feet)	Floating Product Thickness (feet)	TPH ¹ as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	TPH as Diesel (ppb)
MW-1(25)	08/04/93	7.91	ND. ²	<50	<0.5	<0.5	<0.5	0.5	NR. ³
MW-2(25)	08/04/93	8.02	ND.	<50.	2.1	<0.5	<0.5	<0.5	NR.
MW-3(25)	08/04/93	7.24	ND.	380.	70.	12.	29.	41.	NR.
MW-4(25)	08/04/93	7.71	ND.	23,000.	6,600.	1,700.	770.	2,600.	1,500.
MW-5(23)	08/05/93*	8.66	ND.	<50	<0.5	<0.5	<0.5	<0.5	NR.
MW-6(14)	08/05/93*	5.39	ND.	<50	<0.5	<0.5	<0.5	<0.5	NR.
FB-1 ⁴	08/04/93	NA. ⁵	NA.	<50	<0.5	<0.5	<0.5	<0.5	NR.

1. TPH. = Total petroleum hydrocarbons

2. ND. = Not detected

3. NR. = Not reported, well was not scheduled for sample of the above parameter

4. FB. = Field blank

5. NA. = Not applicable

* = Due to inaccessability on 08/04/93, samples and water level data for wells MW-5 and MW-6 were taken on 08/05/93.

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

August 18, 1993

Service Request No. SJ93-0961

Jim Butera
EMCON Associates
1921 Ringwood Avenue
San Jose, CA 95131

Re: **EMCON Project No. 0G70-004.01**
ARCO Facility No. 374

Dear Mr. Butera:

Attached are the results of the water samples submitted to our lab on August 4, 1993. For your reference, these analyses have been assigned our service request number SJ93-0961.


All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and CAS is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions.

Respectfully submitted:

COLUMBIA ANALYTICAL SERVICES, INC.


Keoni A. Murphy
Laboratory Manager


Annelise J. Bazar
Regional QA Coordinator

KAM/kmh

COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

ASTM	American Society for Testing and Materials
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MRL	Method Reporting Limit
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected at or above the MRL
NR	Not Requested
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
VPH	Volatile Petroleum Hydrocarbons

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-004.01
 ARCO Facility No. 374
Sample Matrix: Water

Date Received: 08/04/93
Date Extracted: 08/10/93
Service Request No.: SJ93-0961

Total Petroleum Hydrocarbons as Diesel
EPA Method 3510/California DHS LUFT Method
µg/L (ppb)

<u>Sample Name</u>	<u>Date Analyzed</u>	<u>TPH as Diesel</u>
MW-4 (25)	08/13/93	1,500. *
Method Blank	08/13/93	ND
MRL		50

* The sample contains a lower boiling point hydrocarbon mixture quantitated as diesel. The chromatogram does not match the typical diesel fingerprint.

Approved by:  Date: August 15, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
 Project: EMCON Project No. OG70-004.01
 ARCO Facility No. 374

Date Received: 08/04/93
 Service Request No.: SJ93-0961
 Sample Matrix: Water

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

Sample Name: MW-1 (25) MW-2 (25) MW-3 (25)
 Date Analyzed: 08/11/93 08/11/93 08/11/93

<u>Analyte</u>	<u>MRL</u>			
Benzene	0.5	ND	2.1	70.
Toluene	0.5	ND	ND	12.
Ethylbenzene	0.5	ND	ND	29.
Total Xylenes	0.5	ND	ND	41.
TPH as Gasoline	50	ND	ND	380.

Sample Name: MW-4 (25) FB-1 Method Blank
 Date Analyzed: 08/11/93 08/11/93 08/11/93

<u>Analyte</u>	<u>MRL</u>			
Benzene	0.5	6,600.	ND	ND
Toluene	0.5	1,700.	ND	ND
Ethylbenzene	0.5	770.	ND	ND
Total Xylenes	0.5	2,600.	ND	ND
TPH as Gasoline	50	23,000.	ND	ND

Approved by: *Keonut Myers* Date: August 18, 1993

APPENDIX A
LABORATORY QC RESULTS

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-004.01
ARCO Facility No. 374

Date Received: 08/04/93
Service Request No.: SJ93-0961
Sample Matrix: Water

Surrogate Recovery Summary
Total Petroleum Hydrocarbons as Diesel
EPA Methods 3510/California DHS LUFT Method

<u>Sample Name</u>	<u>Date Analyzed</u>	<u>Percent Recovery</u> <i>p</i> -Terphenyl
MW-4 (25)	08/13/93	112.
MS	08/13/93	103.
DMS	08/13/93	102.
Method Blank	08/13/93	107.
	CAS Acceptance Criteria	46-133

Approved by: Leon Murphy Date: August 16, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-004.01
ARCO Facility No. 374

Date Received: 08/04/93
Service Request No.: SJ93-0961
Sample Matrix: Water

Initial Calibration Verification
Total Petroleum Hydrocarbons as Diesel
EPA Methods 3510/DHS LUFT Method
mg/L (ppm)

Date Analyzed: 08/13/93

<u>Analyte</u>	<u>True Value</u>	<u>Result</u>	<u>Percent Recovery</u>	<u>CAS Percent Recovery Acceptance Criteria</u>
TPH as Diesel	500.	540.	108.	90-110

Approved by:

Keon Murphy

Date:

August 18, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. OG70-004.01
ARCO Facility No. 374

Date Received: 08/04/93
Service Request No.: SJ93-0961
Sample Matrix: Water

Matrix Spike/Duplicate Matrix Spike Summary
Total Petroleum Hydrocarbons as Diesel
EPA Method 3510/DHS LUFT Method
 $\mu\text{g/L}$ (ppb)

Date Analyzed: 08/13/93

<u>Analyte</u>	<u>Spike Level</u>	<u>Sample Result</u>	<u>Spike Result</u>		<u>Percent Recovery</u>		<u>Acceptance Criteria</u>
			<u>MS</u>	<u>DMS</u>	<u>MS</u>	<u>DMS</u>	
Diesel	4,000.	ND	3,900.	4,000.	99.	100.	61-121

Approved by: _____



Date: _____

August 18, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-004.01
ARCO Facility No. 374

Date Received: 08/04/93
Service Request No.: SJ93-0961
Sample Matrix: Water

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

<u>Sample Name</u>	<u>Date Analyzed</u>	<u>Percent Recovery</u> <i>a, a, a</i> -Trifluorotoluene
MW-1 (25)	08/11/93	73.
MW-2 (25)	08/11/93	71.
MW-3 (25)	08/11/93	78.
MW-4 (25)	08/11/93	77.
FB-1	08/11/93	79.
MS	08/11/93	91.
DMS	08/11/93	92.
Method Blank	08/11/93	81.

CAS Acceptance Criteria 70-130

Approved by: _____

Kenneth Murphy

Date: _____

August 18, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-004.01
ARCO Facility No. 374

Date Received: 08/04/93
Service Request No.: SJ93-0961

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

Date Analyzed: 08/11/93

<u>Analyte</u>	<u>True Value</u>	<u>Result</u>	<u>Percent Recovery</u>	<u>CAS Percent Recovery Acceptance Criteria</u>
Benzene	25.	23.9	96.	85-115
Toluene	25.	24.5	98.	85-115
Ethylbenzene	25.	22.4	90.	85-115
Total Xylenes	75.	65.1	87.	85-115
TPH as Gasoline	250.	233.	93.	90-110

Approved by:

K. O'Malley

Date:

August 16, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-004.01
ARCO Facility No. 374

Date Received: 08/04/93
Service Request No.: SJ93-0961
Sample Matrix: Water

Matrix Spike/Duplicate Matrix Spike Summary
TPH as Gasoline
EPA Methods 5030/California DHS LUFT Method
 $\mu\text{g/L}$ (ppb)

Date Analyzed: 08/11/93

Percent Recovery

<u>Analyte</u>	<u>Spike Level</u>	<u>Sample Result</u>	<u>Spike Result</u>		<u>MS</u> <u>DMS</u>		<u>CAS Acceptance Criteria</u>
			<u>MS</u>	<u>DMS</u>	<u>MS</u>	<u>DMS</u>	
TPH as Gasoline	250.	ND	240.	242.	96.	97.	76-130

Approved by:

Kenneth Murphy

Date:

August 18, 1993

APPENDIX B
CHAIN OF CUSTODY

ARCO Products Company

Division of AtlanticRichfield Company

Task Order No. **EMC-93-5**

Chain of Custody

ARCO Facility no **374** City (Facility) **Oakland** Project manager (Consultant) **JIM Butera** Laboratory name **CAS**

ARCO engineer **Kyle Christie** Telephone no. (ARCO) **911-2434** Telephone no. (Consultant) **453-0719** Fax no. (Consultant) **453-0452** Contract number **07077**

Consultant name **EMCON ASSOCIATES** Address (Consultant) **1938 Junction Avenue San Jose** Method of shipment **Sampler will deliver**

Sample ID	Lab no	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX 602/EPA 8020	GAS BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas Diesel	Oil and Grease 413 1 413 2	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 604/8240	EPA 625/8270	TCMP Metals VOA VOA	Semi Metals VOA VOA	CAN Metals EPA 802/07000 ITLC STLC	Lead Org./DHS Lead EPA 7420/7421	Special detection Limit/reporting	
			Soil	Water	Other	Ice	Acid																
AW-1(25)	1-2	2		X		X	HCl	8-4-93	0940		X												Lowest Possible
AW-2(25)	3-4	2		X		X			1028		X												
AW-3(25)	5-6	2		X		X			1207		X												
AW-4(25)	7-8	2		X		X			1122		X												Special QA/QC AS Normal
AW-5()	2	2		X		X					X												
AW-6()	2	2		X		X					X												
FB-1	9-10	2		X		X			1209		X												
AW-4(25)	11-12	2		X		X	NP		1122			X											Remarks 2-40 ml HCl VOA's 2-Liter NP GLASS

Condition of sample: **OK** Temperature received: **COOL**

Relinquished by sampler: *[Signature]* Date: **8-4-93** Time: **1340** Received by: _____

Relinquished by: _____ Date: _____ Time: _____ Received by: _____

Relinquished by: _____ Date: _____ Time: _____ Received by laboratory: **Kern Howard** Date: **8-4-93** Time: **1340**

Lab number: **SJ93-0961**

Turnaround time:
 Priority Rush 1 Business Day
 Rush 2 Business Days
 Expedited 5 Business Days
 Standard 10 Business Days

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

August 18, 1993

Service Request No. SJ93-0971

Jim Butera
EMCON Associates
1921 Ringwood Avenue
San Jose, CA 95131

Re: **EMCON Project No. 0G70-004.01**
ARCO Facility No. 374

Dear Mr. Butera:

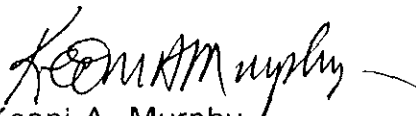
Attached are the results of the water samples submitted to our lab on August 5, 1993. For your reference, these analyses have been assigned our service request number SJ93-0971.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and CAS is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions.

Respectfully submitted:

COLUMBIA ANALYTICAL SERVICES, INC.


Keoni A. Murphy
Laboratory Manager

Annelise J. Bazar
Regional QA Coordinator

KAM/kmh

COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

ASTM	American Society for Testing and Materials
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MRL	Method Reporting Limit
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected at or above the MRL
NR	Not Requested
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
VPH	Volatile Petroleum Hydrocarbons

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-004.01
ARCO Facility No. 374

Date Received: 08/05/93
Service Request No.: SJ93-0971
Sample Matrix: Water

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

Sample Name: MW-5 (23) MW-6 (14) Method Blank
Date Analyzed: 08/12/93 * 08/12/93 * 08/12/93

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

* This sample was part of the analytical batch started on August 12, 1993. However, it was analyzed after midnight so the actual date analyzed is August 13, 1993.

Approved by: K. O. Murphy Date: August 18, 1993

APPENDIX A
LABORATORY QC RESULTS

COLUMBIA ANALYTICAL SERVICES, INC.

QA/OC Report

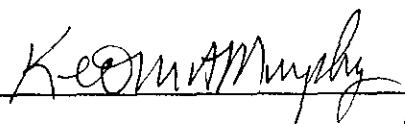
Client: EMCON Associates
Project: EMCON Project No. 0G70-004.01
ARCO Facility No. 374

Date Received: 08/05/93
Service Request No.: SJ93-0971
Sample Matrix: Water

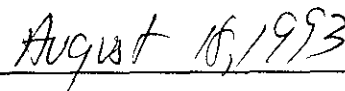
Surrogate Recovery Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method

<u>Sample Name</u>	<u>Date Analyzed</u>	<u>Percent Recovery</u> <i>α,α,α-Trifluorotoluene</i>
MW-5 (23)	08/12/93	88.
MW-6 (14)	08/12/93	87.
MS	08/12/93	88.
DMS	08/12/93	89.
Method Blank	08/12/93	88.
	CAS Acceptance Criteria	70-130

Approved by:



Date:



COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
 Project: EMCON Project No. 0G70-004.01
 ARCO Facility No. 374

Date Received: 08/05/93
 Service Request No.: SJ93-0971

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

Date Analyzed: 08/12/93

<u>Analyte</u>	<u>True Value</u>	<u>Result</u>	<u>Percent Recovery</u>	<u>CAS Percent Recovery Acceptance Criteria</u>
Benzene	25.	24.3	97.	85-115
Toluene	25.	25.0	100.	85-115
Ethylbenzene	25.	23.4	94.	85-115
Total Xylenes	75.	70.8	94.	85-115
TPH as Gasoline	250.	238.	96.	90-110

Approved by: *Keon M. Myung* Date: *August 18, 1993*

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-004.01
ARCO Facility No. 374

Date Received: 08/05/93
Service Request No.: SJ93-0971
Sample Matrix: Water

Matrix Spike/Duplicate Matrix Spike Summary
BTE
EPA Methods 8010/8020
 $\mu\text{g/L}$ (ppb)

Date Analyzed: 08/12/93

Percent Recovery

<u>Analyte</u>	<u>Spike Level</u>	<u>Sample Result</u>	<u>Spike Result</u>		<u>MS</u> <u>DMS</u>		<u>CAS Acceptance Criteria</u>
			<u>MS</u>	<u>DMS</u>	<u>MS</u>	<u>DMS</u>	
Benzene	25.	ND	22.5	22.9	90.	92.	76-122
Toluene	25.	ND	22.7	23.3	91.	93.	75-127
Ethylbenzene	25.	ND	21.1	21.5	84.	86.	70-135

Approved by:

Kenneth Murphy

Date:

August 18, 1993

APPENDIX B
CHAIN OF CUSTODY



EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

PROJECT NO: OG70-004.01

SAMPLE ID: MW-1 (25)

PURGED BY: IAN GRAHAM

CLIENT NAME: ARCO # 374

SAMPLED BY: IAN GRAHAM

LOCATION: OAKLAND, CA.

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

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

CASING ELEVATION (feet/MSL):	<u>NR</u>	VOLUME IN CASING (gal.):	<u>12.27</u>
DEPTH TO WATER (feet):	<u>7.91</u>	CALCULATED PURGE (gal.):	<u>36.82</u>
DEPTH OF WELL (feet):	<u>26.7</u>	ACTUAL PURGE VOL. (gal.):	<u>37.0</u>

DATE PURGED:	<u>8-4-93</u>	Start (2400 Hr)	<u>0905</u>	End (2400 Hr)	<u>0935</u>
DATE SAMPLED:	<u>8-4-93</u>	Start (2400 Hr)	<u>0940</u>	End (2400 Hr)	<u>0940</u>

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µ mhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>0915</u>	<u>12.5</u>	<u>6.47</u>	<u>1097</u>	<u>70.9</u>	<u>CLEAR</u>	<u>LIGHT</u>
<u>0925</u>	<u>25.5</u>	<u>6.41</u>	<u>1236</u>	<u>68.8</u>	<u>"</u>	<u>"</u>
<u>0935</u>	<u>37.0</u>	<u>6.38</u>	<u>1246</u>	<u>68.0</u>	<u>"</u>	<u>"</u>
_____	_____	_____	_____	_____	_____	_____

D. O. (ppm): NR ODOR: ND COLOR: NR TURBIDITY: NR
(COBALT 0 - 100) (NTU 0 - 200)

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

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 checked="" type="checkbox"/> Centrifugal Pump	<input type="checkbox"/> Bailer (PVC)	<input type="checkbox"/> DDL Sampler	<input type="checkbox"/> Bailer (Stainless Steel)
<input 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: _____	Other: _____	Other: _____	Other: _____

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: _____

Meter Calibration: Date: 8-4-93 Time: 0900 Meter Serial #: 9105 Temperature °F: 78.0
 (EC 1000 1010 / 1000) (DI 3.80) (pH 7 7.01 / 7.00) (pH 10 9.90 / 10.00) (pH 4 3.90 / _____)

Location of previous calibration: _____

Signature: [Signature] Reviewed By: [Signature] Page 1 of 6



EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

PROJECT NO: OG70-004.01

SAMPLE ID: MW-2 (25)

PURGED BY: IAN GRAHAM

CLIENT NAME: ARCO # 374

SAMPLED BY: IAN GRAHAM

LOCATION: OAKLAND, CA.

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

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

CASING ELEVATION (feet/VMSL):	<u>NR</u>	VOLUME IN CASING (gal.):	<u>11.94</u>
DEPTH TO WATER (feet):	<u>8.02</u>	CALCULATED PURGE (gal.):	<u>35.82</u>
DEPTH OF WELL (feet):	<u>26.3</u>	ACTUAL PURGE VOL. (gal.):	<u>36.0</u>

DATE PURGED:	<u>8-4-93</u>	Start (2400 Hr)	<u>0955</u>	End (2400 Hr)	<u>1025</u>
DATE SAMPLED:	<u>8-4-93</u>	Start (2400 Hr)	<u>1028</u>	End (2400 Hr)	<u>1028</u>

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1005</u>	<u>12.0</u>	<u>7.00</u>	<u>693</u>	<u>71.6</u>	<u>CLEAR</u>	<u>LIGHT</u>
<u>1015</u>	<u>24.0</u>	<u>6.89</u>	<u>701</u>	<u>68.9</u>	<u>"</u>	<u>"</u>
<u>1025</u>	<u>36.0</u>	<u>6.80</u>	<u>711</u>	<u>68.1</u>	<u>"</u>	<u>"</u>
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

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

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NONE

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 checked="" type="checkbox"/> Centrifugal Pump	<input type="checkbox"/> Bailer (PVC)	<input type="checkbox"/> DDL Sampler	<input type="checkbox"/> Bailer (Stainless Steel)
<input 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: _____	_____	Other: _____	_____

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: _____

Meter Calibration: Date: 8-4-93 Time: 0900 Meter Serial #: 9105 Temperature °F: _____
(EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)

Location of previous calibration: MW-1

Signature: [Signature] Reviewed By: [Signature] Page 1 of 6



EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

PROJECT NO: OG70-004.01

SAMPLE ID: MW-3 (25)

PURGED BY: IAN GRAHAM

CLIENT NAME: ARCO # 374

SAMPLED BY: IAN GRAHAM

LOCATION: OAKLAND, CA.

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

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

CASING ELEVATION (feet/MSL):	<u>NR</u>	VOLUME IN CASING (gal.):	<u>12.77</u>
DEPTH TO WATER (feet):	<u>7.25</u>	CALCULATED PURGE (gal.):	<u>38.31</u>
DEPTH OF WELL (feet):	<u>20.8</u>	ACTUAL PURGE VOL. (gal.):	<u>39.0</u>

DATE PURGED:	<u>8-4-93</u>	Start (2400 Hr)	<u>1135</u>	End (2400 Hr)	<u>1205</u>
DATE SAMPLED:	<u>8-4-93</u>	Start (2400 Hr)	<u>1207</u>	End (2400 Hr)	<u>1207</u>

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1145</u>	<u>13.0</u>	<u>6.56</u>	<u>706</u>	<u>69.4</u>	<u>CLEAR</u>	<u>TRACE</u>
<u>1155</u>	<u>26.0</u>	<u>6.49</u>	<u>711</u>	<u>68.8</u>	<u>11</u>	<u>11</u>
<u>1205</u>	<u>39.0</u>	<u>6.56</u>	<u>730</u>	<u>68.2</u>	<u>11</u>	<u>11</u>
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

D. O. (ppm): NR ODOR: STRONG NR NR
(COBALT 0 - 100) (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"/> Bailor (Teflon®)	<input type="checkbox"/> 2" Bladder Pump	<input checked="" type="checkbox"/> Bailor (Teflon®)
<input checked="" type="checkbox"/> Centrifugal Pump	<input type="checkbox"/> Bailor (PVC)	<input type="checkbox"/> DDL Sampler	<input type="checkbox"/> Bailor (Stainless Steel)
<input type="checkbox"/> Submersible Pump	<input type="checkbox"/> Bailor (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: _____	_____	Other: _____	_____

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: _____

Meter Calibration: Date: 8-4-93 Time: 0900 Meter Serial #: 9105 Temperature °F: _____
 (EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)
 Location of previous calibration: MW-1

Signature: [Signature] Reviewed By: [Signature] Page 3 of 6



EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

PROJECT NO: OG70-004.01

SAMPLE ID: MW-4 (25)

PURGED BY: IAN GRAHAM

CLIENT NAME: ARCO # 374

SAMPLED BY: IAN GRAHAM

LOCATION: OAKLAND, CA.

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

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

CASING ELEVATION (feet/MSL):	<u>NR</u>	VOLUME IN CASING (gal.):	<u>12.34</u>
DEPTH TO WATER (feet):	<u>7.70</u>	CALCULATED PURGE (gal.):	<u>37.04</u>
DEPTH OF WELL (feet):	<u>26.6</u>	ACTUAL PURGE VOL. (gal.):	<u>37.5</u>

DATE PURGED:	<u>8-4-93</u>	Start (2400 Hr)	<u>1045</u>	End (2400 Hr)	<u>1120</u>
DATE SAMPLED:	<u>8-4-93</u>	Start (2400 Hr)	<u>1122</u>	End (2400 Hr)	<u>1122</u>

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1055</u>	<u>12.5</u>	<u>6.55</u>	<u>1797</u>	<u>68.6</u>	<u>CLEAR</u>	<u>LIGHT</u>
<u>1105</u>	<u>25.0</u>	<u>6.51</u>	<u>1806</u>	<u>68.7</u>	<u>"</u>	<u>"</u>
<u>1120</u>	<u>37.5</u>	<u>6.55</u>	<u>1802</u>	<u>68.6</u>	<u>CLOUDY</u>	<u>MODERATE</u>
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

D. O. (ppm): NR ODOR: MOD / STRONG NR NR
(COBALT 0 - 100) (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NONE

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 checked="" type="checkbox"/> Centrifugal Pump | <input type="checkbox"/> Bailer (PVC) | <input type="checkbox"/> DDL Sampler | <input type="checkbox"/> Bailer (Stainless Steel) |
| <input 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 _____ | Other _____ | Other _____ | Other _____ |

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: _____

Meter Calibration: Date: 8-4-93 Time: 0900 Meter Serial #: 9105 Temperature °F: _____
 (EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)

Location of previous calibration: MW-1

Signature: [Signature] Reviewed By: [Signature] Page 4 of 4



EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

PROJECT NO: CG70-004.01
PURGED BY: K REICHELDERFER
SAMPLED BY: ✓

SAMPLE ID: MW-5 (23)
CLIENT NAME: ARCO 374
LOCATION: 6407 TELEGRAPH AVE
OAKLAND, 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.): 9.43
DEPTH TO WATER (feet): 8.66 CALCULATED PURGE (gal.): 28.30
DEPTH OF WELL (feet): 23.1 ACTUAL PURGE VOL. (gal.): 28.50

DATE PURGED: 8-5-93 Start (2400 Hr) 1042 End (2400 Hr) 1058
DATE SAMPLED: 8-5-93 Start (2400 Hr) 1105 End (2400 Hr) 1107

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1046</u>	<u>9.50</u>	<u>6.63</u>	<u>627</u>	<u>69.5</u>	<u>CLEAR</u>	<u>TRACE</u>
<u>1050</u>	<u>19.00</u>	<u>6.84</u>	<u>637</u>	<u>67.5</u>	<u>↓</u>	<u>↓</u>
<u>1058</u>	<u>28.50</u>	<u>6.87</u>	<u>665</u>	<u>66.8</u>	<u>↓</u>	<u>↓</u>
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
D. O. (ppm): <u>NR</u>	ODOR: <u>NONE</u>	_____	_____	_____	<u>NR</u> (COBALT 0 - 100)	<u>.NR</u> (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 checked="" type="checkbox"/> Centrifugal Pump | <input type="checkbox"/> Bailer (PVC) | <input type="checkbox"/> DDL Sampler | <input type="checkbox"/> Bailer (Stainless Steel) |
| <input 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: _____ | | Other: _____ | |

WELL INTEGRITY: OK LOCK #: 3499

REMARKS: _____

Meter Calibration: Date: 8-5-93 Time: 0951 Meter Serial #: 9203 Temperature °F: _____
(EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)

Location of previous calibration: MW-6

Signature: Kevin Reichelderfer Reviewed By: JB Page 5 of 6



EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

PROJECT NO: CG70-004.01

SAMPLE ID: MW-6 (14)

PURGED BY: K REICHELDERFER

CLIENT NAME: ARCO 374

SAMPLED BY: ✓

LOCATION: 6407 TELEGRAPH AVE OAKLAND, CA

TYPE: Ground Water Surface Water Treatment Effluent Other

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

CASING ELEVATION (feet/MSL):	<u>NR</u>	VOLUME IN CASING (gal.):	<u>6.02</u>
DEPTH TO WATER (feet):	<u>5.39</u>	CALCULATED PURGE (gal.):	<u>18.05</u>
DEPTH OF WELL (feet):	<u>14.6</u>	ACTUAL PURGE VOL (gal.):	<u>18.50</u>

DATE PURGED:	<u>8-5-93</u>	Start (2400 Hr)	<u>0957</u>	End (2400 Hr)	<u>1008</u>
DATE SAMPLED:	<u>8-5-93</u>	Start (2400 Hr)	<u>1013</u>	End (2400 Hr)	<u>1015</u>

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1000</u>	<u>6.50</u>	<u>6.11</u>	<u>527</u>	<u>71.4</u>	<u>CLOUDY</u>	<u>LIG HT</u>
<u>1004</u>	<u>13.00</u>	<u>6.35</u>	<u>593</u>	<u>68.8</u>	<u>BROWN</u>	<u>MODERATE</u>
<u>1008</u>	<u>18.50</u>	<u>6.39</u>	<u>560</u>	<u>68.1</u>	<u>↓</u>	<u>↓</u>
D. O. (ppm):	<u>NR</u>	ODOR:	<u>NONE</u>		<u>NR</u>	<u>.NR</u>
					(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 checked="" type="checkbox"/> Centrifugal Pump | <input type="checkbox"/> Bailer (PVC) | <input type="checkbox"/> DDL Sampler | <input type="checkbox"/> Bailer (Stainless Steel) |
| <input 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: _____ | | Other: _____ | |

WELL INTEGRITY: OK LOCK #: 0464

REMARKS: _____

Meter Calibration: Date: 8-5-93 Time: 0951 Meter Serial #: 9203 Temperature °F: 77.2
 (EC 1000 1066, 1000) (DI 7.12) (pH 7.02, 7.00) (pH 10 9.99, 10.00) (pH 4 3.91, —)

Location of previous calibration: _____

Signature: Karl Reichelderfer Reviewed By: JB Page 6 of 6