RESNA
Working To Restore Nature

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LETTER REPORT
QUARTERLY GROUNDWATER MONITORING
Second Quarter 1993
at
ARCO Station 374
6407 Telegraph Avenue
Oakland, California

60025.12

07/24/93

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July 24, 1993
0621MWHE
60025.12

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

Subject: Second Quarter 1993 Groundwater Monitoring Report for 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 second 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 are to evaluate changes in the groundwater flow direction and gradient, and changes in concentrations of petroleum hydrocarbons in the local groundwater associated with the former underground gasoline-storage tanks (USTs) at the site. 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.

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 April 27, 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 April 1993 is shown on the Groundwater Gradient Map, Plate 3. The average interpreted groundwater gradient is approximately 0.04 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 April 27, 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 5030/8020/California DHS LUFT Method. 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

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 generally increased in offsite wells MW-3 and MW-5, decreased in onsite well MW-2, and remained approximately the same in well MW-4.

RESNA recommends that copies of this report be forwarded to:

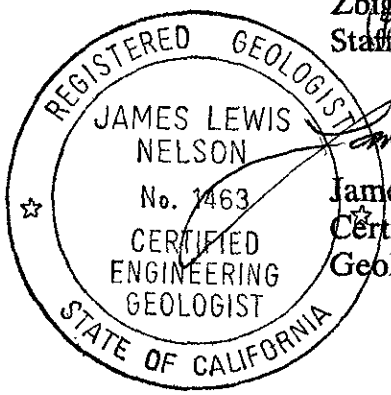
Ms. Susan Hugo
Alameda County Health Care Services Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

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

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, April 27, 1993
Plate 4, TPHg Concentrations In Groundwater, April 27, 1993
Plate 5, Benzene Concentrations In Groundwater, April 27, 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

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.

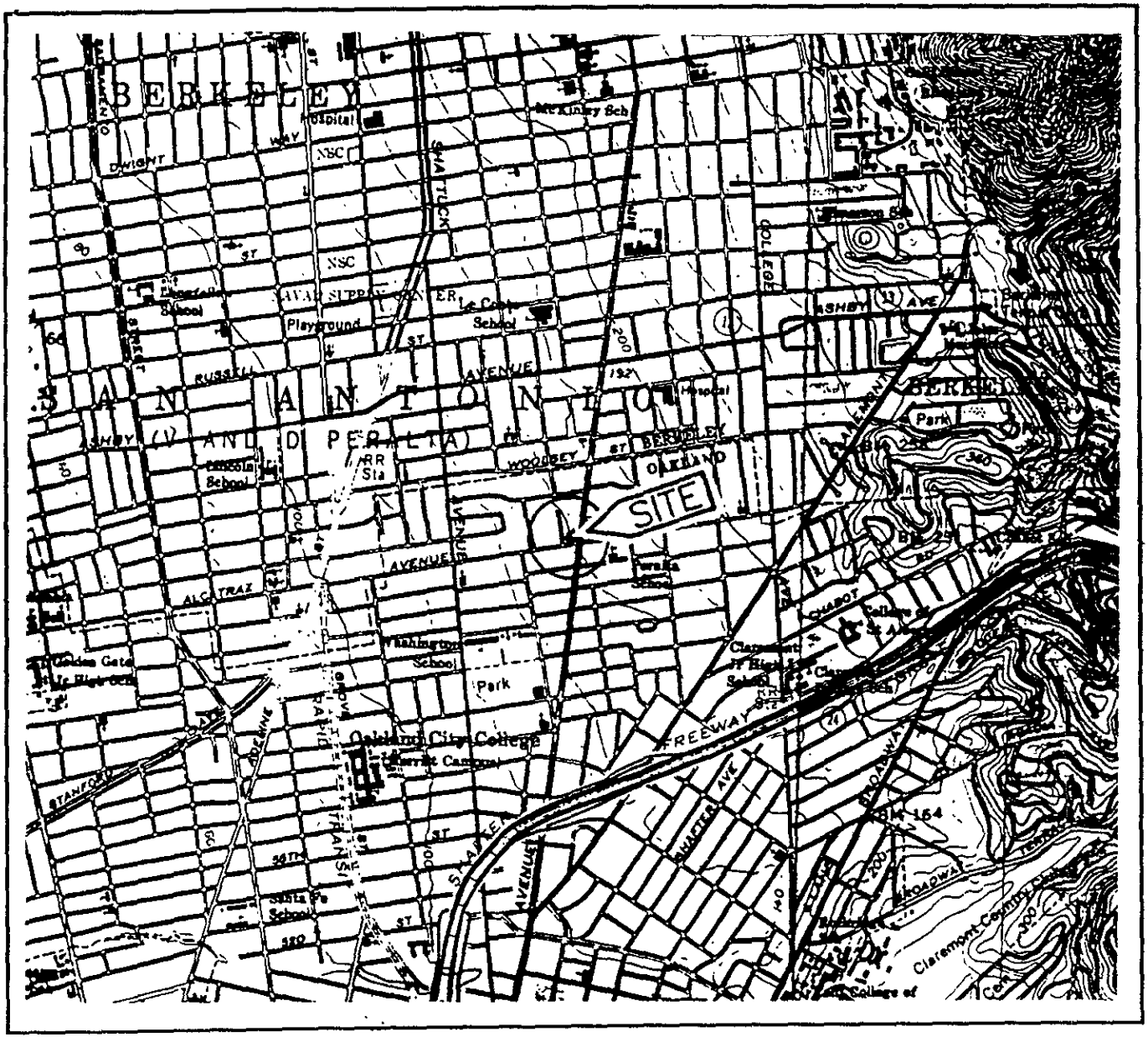
RESNA. August 28, 1992. Letter Report, Quarterly Groundwater Monitoring Second Quarter 1992 at ARCO Station 374, 6407 Telegraph Avenue, Oakland, California. RESNA 60025-7.

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.



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

LEGEND

(•) = Site Location

Approximate Scale

2000 1000 0 2000 4000

feet

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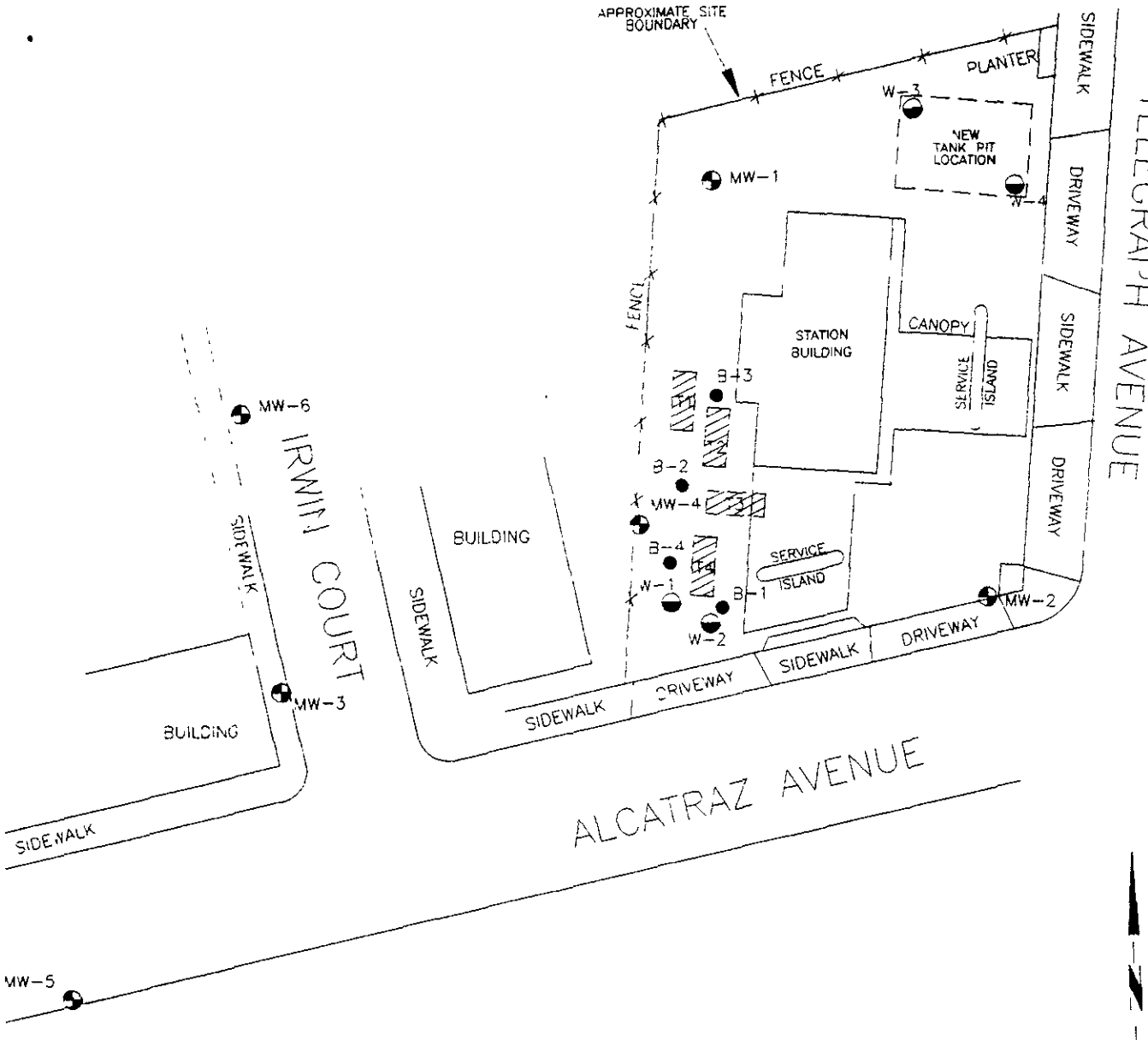
SITE VICINITY MAP
ARCO Station 374
6407 Telegraph Avenue
Oakland, California

PLATE
1

PROJECT **60025.12**



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

Approximate Scale

40 20 0 40 80

feet

Source: Surveyed by John Koch, Licensed Land Surveyor

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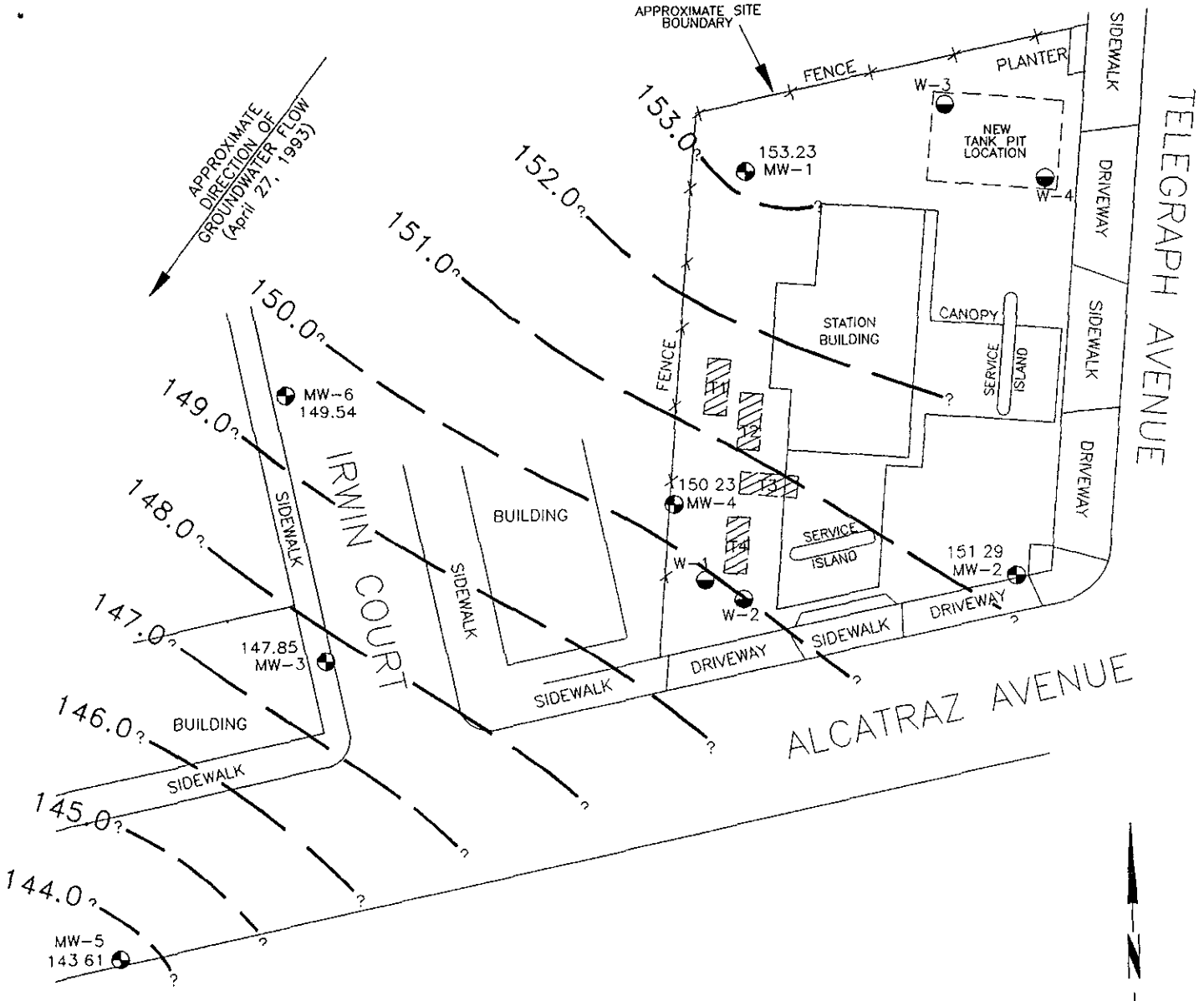
60025-12

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

PLATE
2



EXPLANATION

153.0 = Line of equal elevation of groundwater in feet above mean sea level (MSL)

153.23 = Elevation of groundwater in feet above MSL April 27, 1993

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

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

= Former underground storage tanks

Approximate Scale

40 20 0 40 80

feet

Source: Surveyed by John Koch, Licensed Land Surveyor.

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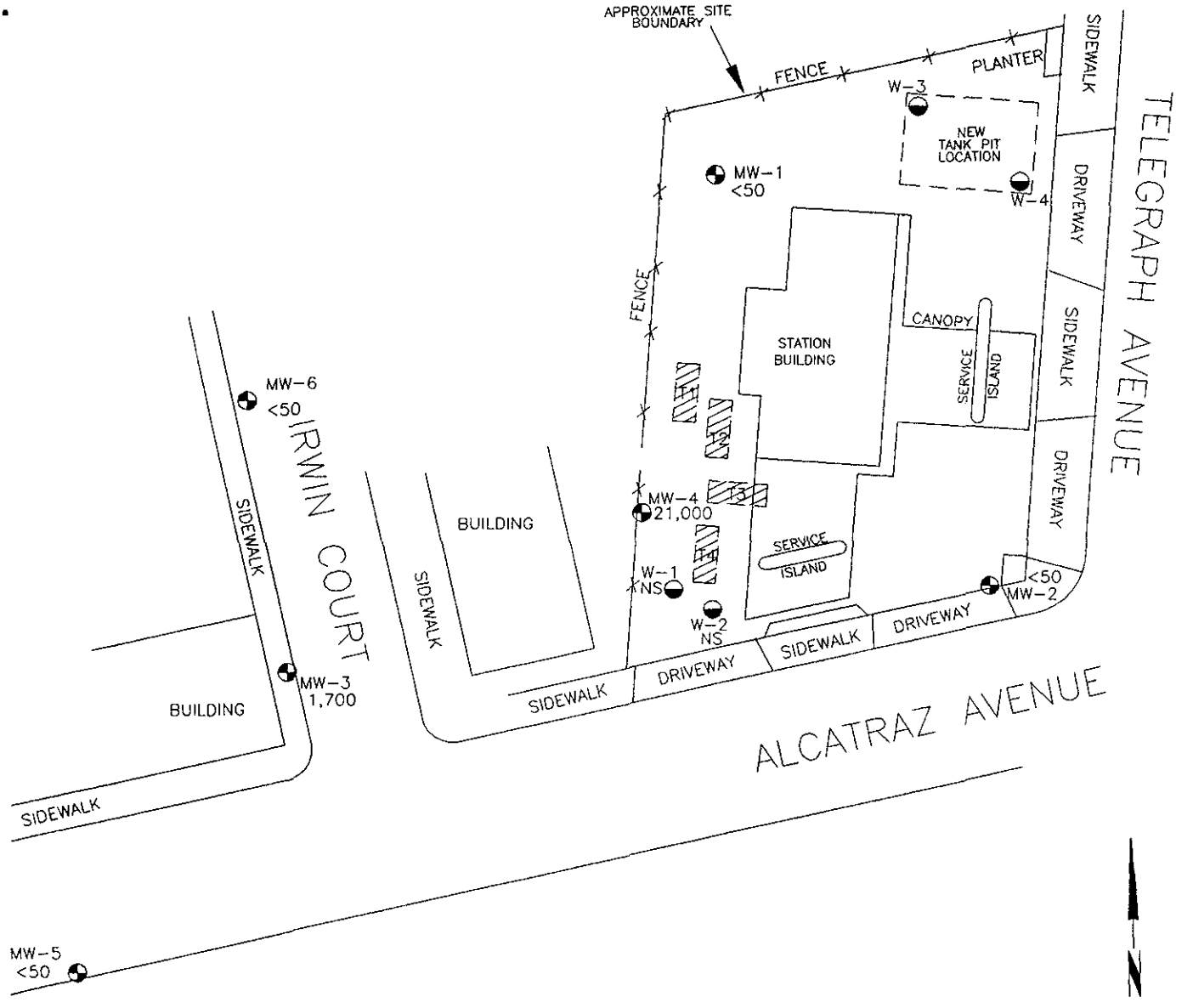
60025-04

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

PLATE 3



EXPLANATION

21,000 = Concentration of TPHg in groundwater in parts per billion, April 27, 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

40 20 0 40 80

feet

Source. Surveyed by John Koch, Licensed Land Surveyor.

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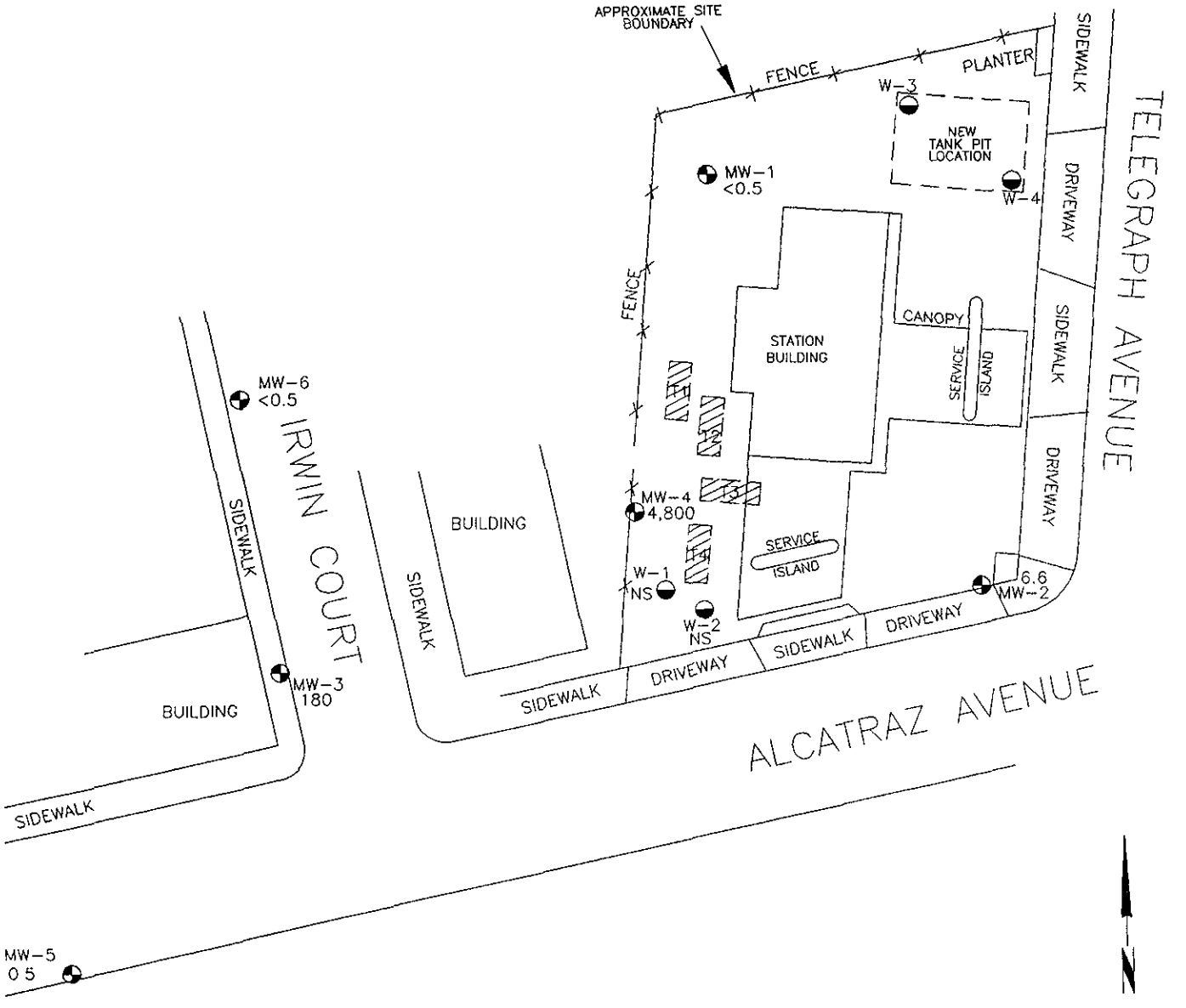
TPHg CONCENTRATIONS IN GROUNDWATER
ARCO Station 374
6407 Telegraph Avenue
Oakland, California

PLATE 4



EXPLANATION

4,800 = Concentration of benzene in groundwater in parts per billion, April 27, 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

40 20 0 40 80

feet

Source: Surveyed by John Koch, Licensed Land Surveyor.

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

PLATE 5

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
MW-1				
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
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

See notes on page 5 of 5

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 (Cont.)				
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

See notes on page 5 of 5

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
MW-3				
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
MW-4				
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

See notes on page 5 of 5

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
MW-4 (Cont.)				
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
MW-5				
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

See notes on page 5 of 5

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Quarterly Groundwater Monitoring
ARCO Station 374, Oakland, California

July 24, 1993
60025.12

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
MW-6				
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

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.

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
MW-1							
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
MW-2							
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
MW-3							
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

See notes on page 3 of 3.

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
MW-3 cont							
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
MW-4							
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
MW-5							
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

See notes on page 3 of 3.

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
MW-6							
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
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).

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)
MW-4						
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

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

Date May 13, 1993
Project 0G70-004.01

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

We are enclosing:

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

For your: X Information Sent by: X Mail

Comments:

Enclosed are the data from the second 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, Senior Project Engineer.

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-004.01 STATION ADDRESS : 6407 Telegraph Hill, Oakland, CA DATE : 04-27-95

ARCO STATION # : 374 FIELD TECHNICIAN : J. Williams DAY : Thurs

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap OK	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-5	OK	YES	OK	3254	~~3259~~	7.72	7.72	NO	NO	23.0	—
2	MW-6	OK	YES	OK	3259	OK	4.30	4.30	ND	ND	14.6	—
3	MW-1	OK	YES	OK	3254	OK	5.68	5.68	ND	ND	26.7	—
4	MW-2	OK	YES	OK	3259	OK	6.63	6.63	ND	ND	26.3	—
5	MW-3	OK	YES	OK	3259	OK	5.79	5.79	NO	ND	26.8	—
6	MW-4	BAD	YES	OK	3254	OK	6.30	6.30	ND	ND	26.6	NEED LID BROKEN

WELL SURVEY POINTS ARE TOP OF CASING

Summary of Groundwater Monitoring Data
Second Quarter 1993
ARCO Service Station 374
6407 Telegraph Hill, Oakland, California
micrograms per liter (µg/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(26)	04/27/93	5.68	ND.[2]	<50	<0.5	<0.5	<0.5	0.5	NR.[3]
MW-2(26)	04/27/93	6.63	ND.	<50.	6.6	<0.5	0.7	1.1	NR.
MW-3(26)	04/27/93	5.79	ND.	1,700.	180.	83.	64.	100.	NR.
MW-4(26)	04/27/93	6.30	ND.	21,000.	4,800.	1,200.	630.	2,400.	1,100.
MW-5(23)	04/27/93	7.72	ND.	<50	0.5	1.0	<0.5	0.8	NR.
MW-6(14)	04/27/93	4.30	ND.	<50	<0.5	<0.5	<0.5	<0.5	NR.
FB-1[4]	04/27/93	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

Columbia Analytical Services, Inc.

May 11, 1993

Service Request No. SJ93-0573

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 April 28, 1993. For your reference, these analyses have been assigned our service request number SJ93-0573.

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.

Carol Klein for

Keoni A. Murphy
Laboratory Manager

Annelise J. Bazar
Regional QA Coordinator

KAM/ajb

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	04/28/93
Project:	EMCON Project No. 0G70-004.01	**Date Extracted:**	05/05/93
	ARCO Facility No. 374	**Date Analyzed:**	05/06/93
Sample Matrix:	Water	**Service Request No.:**	SJ93-0573

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

Sample Name	MRL	TPH as Diesel
MW-4 (26)	50	1,100. *
Method Blank	50	ND

MRL Method Reporting Limit
TPH Total Petroleum Hydrocarbons
ND None Detected at or above the method reporting limit
** The sample contains components eluting in the diesel range that were quantitated as diesel. The chromatogram does not match the typical diesel fingerprint.

Approved by: Carol Klein Date: 5-11-93

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	04/28/93
Project:	EMCON Project No. 0G70-004.01	**Service Request No.:**	SJ93-0573
	ARCO Facility No. 374	**Sample Matrix:**	Water

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

Sample Name:		MW-1 (26)	MW-2 (26)	MW-3 (26)
Date Analyzed:		05/04/93	05/05/93	05/04/93
Analyte	**MRL**			
Benzene	0.5	ND	6.6	180.
Toluene	0.5	ND	ND	83.
Ethylbenzene	0.5	ND	0.7	64.
Total Xylenes	0.5	ND	1.1	100.
TPH as Gasoline	50	ND	ND	1,700.

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

Approved by: Carol Klein Date: 5-11-93

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	04/28/93
Project:	EMCON Project No. 0G70-004.01	**Service Request No.:**	SJ93-0573
	ARCO Facility No. 374	**Sample Matrix:**	Water

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

Sample Name:		MW-4 (26)	MW-5 (23)	MW-6 (14)
Date Analyzed:		05/04/93	05/05/93	05/05/93
Analyte	**MRL**			
Benzene	0.5	4,800.	0.5	ND
Toluene	0.5	1,200.	1.0	ND
Ethylbenzene	0.5	630.	ND	ND
Total Xylenes	0.5	2,400	0.8	ND
TPH as Gasoline	50	21,000.	ND	ND

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

Approved by: Carol Klein Date: 5-11-93

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	04/28/93
Project:	EMCON Project No. 0G70-004.01	**Service Request No.:**	SJ93-0573
	ARCO Facility No. 374	**Sample Matrix:**	Water

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

Sample Name:		FB-1	Method Blank	Method Blank
Date Analyzed:		05/05/96	05/04/93	05/05/93
Analyte	**MRL**			
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

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

Approved by: Paul Klein Date: 5-11-93

APPENDIX A

LABORATORY QC RESULTS

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	04/28/93
Project:	EMCON Project No. 0G70-004.01	**Service Request No.:**	SJ93-0573
	ARCO Facility No. 374	**Sample Matrix:**	Water

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

Date Analyzed: 05/06/93

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
TPH as Diesel	500.	502.	100.	90-110

TPH Total Petroleum Hydrocarbons

Approved by: David Klein Date: 5-11-93

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	04/28/93
Project:	EMCON Project No. 0G70-004.01	**Service Request No.:**	SJ93-0573
	ARCO Facility No. 374	**Sample Matrix:**	Water

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

Sample Name	Date Analyzed	Percent Recovery *p*-Terphenyl
MW-4 (26)	05/06/93	79.
MS	05/06/93	99.
DMS	05/06/93	102.
Method Blank	05/06/93	104.
	CAS Acceptance Criteria	46-133

Approved by: Carol Klein Date: 5-11-93

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Date Received: 04/28/93
Service Request No.: SJ93-0573
Sample Matrix: Water

Matrix Spike/Duplicate Matrix Spike Summary
Total Petroleum Hydrocarbons as Diesel
EPA Method 3510/DHS LUFT Method
µg/L (ppb)

Date Analyzed: 05/06/93

Analyte	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	Acceptance Criteria
Diesel	2,000.	ND	2,100.	2,050.	105.	102.	61-121

ND None Detected at or above the method reporting limit

Approved by: Carol Klein Date: 5-11-93

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Date Received: 04/28/93
Service Request No.: SJ93-0573

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

Date Analyzed: 05/04/93

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Benzene	25.	23.6	94.	85-115
Toluene	25.	24.8	99.	85-115
Ethylbenzene	25.	24.2	97.	85-115
Total Xylenes	75.	76.3	102.	85-115
TPH as Gasoline	250.	264.	106.	90-110

TPH Total Petroleum Hydrocarbons

Approved by: Carol Klein Date: 5-11-93

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	04/28/93
Project:	EMCON Project No. 0G70-004.01	**Service Request No.:**	SJ93-0573
	ARCO Facility No. 374	**Sample Matrix:**	Water

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

Sample Name	Date Analyzed	Percent Recovery α,α,α-Trifluorotoluene
MW-1 (26)	05/04/93	88.
MW-2 (26)	05/05/93	89.
MW-3 (26)	05/04/93	94.
MW-4 (26)	05/04/93	88.
MW-5 (23)	05/05/93	87.
MW-6 (14)	05/05/93	88.
FB-1	05/05/93	88.
MS	05/04/93	93.
DMS	05/04/93	91.
Method Blank	05/04/93	82.
Method Blank	05/05/93	93.
CAS Acceptance Criteria		70-130

TPH Total Petroleum Hydrocarbons

Approved by: Carol Klein Date: 5-11-93

1924 Rogwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Date Received: 04/28/93
Service Request No.: SJ93-0573
Sample Matrix: Water

Matrix Spike/Duplicate Matrix Spike Summary
BTE
EPA Methods 5030/8020
μg/L (ppb)

Date Analyzed: 05/04/93

					Percent Recovery		
			Spike Result				CAS Acceptance Criteria
Analyte	Spike Level	Sample Result	MS	DMS	MS	DMS	
Benzene	25.	ND	23.4	23.7	94.	95.	76-122
Toluene	25.	ND	24.5	24.9	98.	100.	75-127
Ethylbenzene	25.	ND	23.9	24.4	96.	98.	70-135

ND None Detected at or above the method reporting limit

Approved by: Carol Klein Date: 5-11-93

APPENDIX B

CHAIN OF CUSTODY

1024 Dingwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. ~~EMCGC-92-1~~ EMC-93-5

Chain of Custody

ARCO Facility no. 374 | City (Facility) OAKLAND | Project manager (Consultant) JIM BUTERA

ARCO engineer Kyle Christie | Telephone no. (ARCO) 571-2434 | Telephone no. (Consultant) 453-0719 | Fax no. (Consultant) 453-0452

Consultant name EMCON ASSOCIATES | Address (Consultant) 1938 Junction Avenue San Jose

Laboratory name: CAS

Contract number: 07077

Method of shipment: Sampler will deliver

Sample I.D.	Lab no	Container no	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH GAS 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 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ VOA ☐ Semi	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	
MW-1 (26)	1-2	2		X		X	HCl	4-27-93	1412		X										
MW-2 (26)	3-4	2		↓		↓	↓	4-27-93	1456		X										
MW-3 (26)	5-6	2		↓		↓	↓	4-27-93	1553		X										
MW-4 (26)	7-8	2		↓		↓	↓	4-27-93	1642		X										
MW-5 (23)	9-10	2		↓		↓	↓	4-27-93	1237		X										
MW-6 (14)	11-12	2		↓		↓	↓	4-27-93	1314		X										
FB-1	13-14	2		↓		↓	↓	4-27-93	1653		X										
MW-4 (26)	15-16	2		X		X	NP	4-27-93	1642		~~X~~ EF 4-29-93	X									

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: 2-40ml HCl VOA's

2-Liter NP Glass

Lab number: 5593-0573

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: COO

Relinquished by	Date	Time	Received by
Relinquished by sampler: [signature]	4-28-93	9:36	Received by: Kevin Howard
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory — Date 4-28-93 Time 9:45

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-004.01 SAMPLE ID: MW-1

PURGED BY: J. Williams CLIENT NAME: ARCO 374

SAMPLED BY: J. Williams 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.):	23.73
DEPTH TO WATER (feet):	5.68	CALCULATED PURGE (gal.):	41.19
DEPTH OF WELL (feet):	26.7	ACTUAL PURGE VOL. (gal.):	41

DATE PURGED: 04-27-93 Start (2400 Hr) 1354 End (2400 Hr) 1408

DATE SAMPLED: 04-27-93 Start (2400 Hr) 1410 End (2400 Hr) 1412

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1357	14	6.50	1326	65.1	CLEAR	CLEAR
1403	28	6.47	1475	64.3	CLEAR	CLEAR
1408	41	6.47	1480	64.4	CLEAR	CLEAR

D. O. (ppm): NR ODOR: NO COLOR (COBALT 0 - 100): NR TURBIDITY (NTU 0 - 200): NR

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

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	✓ Bailer (Teflon®)
✓ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: OK LOCK #: 2209

REMARKS: ___

Meter Calibration: Date: 4-27-93 Time: ___ Meter Serial #: ___ Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: ___

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

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-004.01 SAMPLE ID: MW-2

PURGED BY: J. Williams CLIENT NAME: ARCO 374

SAMPLED BY: J. Williams 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.):	12.85
DEPTH TO WATER (feet):	6.63	CALCULATED PURGE (gal.):	38.55
DEPTH OF WELL (feet):	26.3	ACTUAL PURGE VOL. (gal.):	39

DATE PURGED: 04-27-93 Start (2400 Hr) 1439 End (2400 Hr) ~~0~~ 1453

DATE SAMPLED: 04-27-93 Start (2400 Hr) 1455 End (2400 Hr) ~~0~~ 1459

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1442	13	6.88	6.53	66.8	CLEAR	CLEAR
1447	26	6.83	693	66.0	CLEAR	CLEAR
1453	39	6.90	691	66.0	CLEAR	CLEAR

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

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

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	✓ Bailer (Teflon®)
✓ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: OK LOCK #: [redacted] 8259

REMARKS: ___

Meter Calibration: Date: 4-27-93 Time: ___ Meter Serial #: ___ Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: ___

Signature: [signature] Reviewed By: SK Page 2 of 6

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-004.01 SAMPLE ID: MW-3

PURGED BY: J. Williams CLIENT NAME: ARCO 374

SAMPLED BY: J. Williams 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.):	13.72
DEPTH TO WATER (feet):	5.79	CALCULATED PURGE (gal.):	41.17
DEPTH OF WELL (feet):	26.8	ACTUAL PURGE VOL. (gal.):	41

DATE PURGED: 04-27-93 Start (2400 Hr) 1531 End (2400 Hr) 1547

DATE SAMPLED: 04-27-93 Start (2400 Hr) 1552 End (2400 Hr) 1553

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1537	14	6.54	7.31	65.9	CLEAR	MOD
1542	28	6.64	781	64.6	"	CLEAR
1547	41	6.57	763	64.2	CLEAR	HIGHLY

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

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

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	✓ Bailer (Teflon®)
✓ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 4-27-93 Time: ___ Meter Serial #: ___ Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: ___

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

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-004-01 SAMPLE ID: MW-4

PURGED BY: J Williams CLIENT NAME: ARCO 374

SAMPLED BY: J Williams LOCATION: 6407 Telegraph Hill 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.):	13.26
DEPTH TO WATER (feet):	6.30	CALCULATED PURGE (gal.):	39.78
DEPTH OF WELL (feet):	26.6	ACTUAL PURGE VOL. (gal.):	40

DATE PURGED: 04-27-93 Start (2400 Hr) 1616 End (2400 Hr) 1632

DATE SAMPLED: 04-27-93 Start (2400 Hr) 1639 End (2400 Hr) 1642

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1622	14	6.57	1911	64.4	GRAY	TRACE
1626	27	6.58	1873	63.4	GREY	HEAVY
1632	40	6.62	1820	66.3	GREY	HEAVY

D. O. (ppm): NR ODOR: STRONG

COLOR (COBALT 0 - 100): NR

TURBIDITY (NTU 0 - 200): NR

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

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	✓ Bailer (Teflon®)
✓ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: NEEDS NEW LID LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: ___ Time: ___ Meter Serial #: ___ Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: ___

Signature: [signature] Reviewed By: [signature] Page 4 of 6

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

1.96

EMCON ASSOCIATES

PROJECT NO: 0670-004.01 SAMPLE ID: MW-5

PURGED BY: J. Williams CLIENT NAME: ARCO 374

SAMPLED BY: J. Williams 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.):	9.98
DEPTH TO WATER (feet):	7.72	CALCULATED PURGE (gal.):	29.94
DEPTH OF WELL (feet):	23.0	ACTUAL PURGE VOL. (gal.):	25

DATE PURGED: 04-27-93 Start (2400 Hr) 1221 End (2400 Hr) 1231

DATE SAMPLED: 04-27-93 Start (2400 Hr) 1236 End (2400 Hr) 1237

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1224	10	6.40	659	67.5	CLEAR	CLEAR
1227	20	6.82	691	65.6	BROWN	HEAVY
	DRIED	1231				
1242	Recharge		682	66.9	BROWN	HEAVY

D. O. (ppm): NR ODOR: None NR (COBALT 0 - 100) NR (NTU 0 - 200)

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

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	✓ Bailer (Teflon®)
✓ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: OK LOCK #: 3255

REMARKS: WELL DRID AFTER 25 GALLON Time 1231

Meter Calibration: Date: 4-27-93 Time: 1204 Meter Serial #: ___ Temperature °F: 76.6

(EC 1000 976 / 10.00) (DI ___) (pH 7 6.93 / 7.00) (pH 10 10.11 / 10.00) (pH 4 3.93 / ___)

Location of previous calibration: ___

Signature: [signature] Reviewed By: [signature] Page 5 of 6

17

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-004.01 SAMPLE ID: MW-6

PURGED BY: J. Williams CLIENT NAME: ARCO 374

SAMPLED BY: J. Williams 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.): 6.72

DEPTH TO WATER (feet): 4.30 CALCULATED PURGE (gal.): 20.18

DEPTH OF WELL (feet): 14.6 ACTUAL PURGE VOL. (gal.): 20

DATE PURGED: 04-27-93 Start (2400 Hr) 1301 End (2400 Hr) 1309

DATE SAMPLED: 04-27-93 Start (2400 Hr) 1313 End (2400 Hr) 1314

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1303	7	6.95	611	63.3	BROWN	MOD
1306	14	6.79	616	61.3	BROWN	HEAVY
1309	20	6.80	620	60.6	BROWN	HEAVY

D. O. (ppm): NR ODOR: NONE NR (COBALT 0 - 100) NR (NTU 0 - 200)

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

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	✓ Bailer (Teflon®)
✓ Centrifugal Pump	___ Bailer (PVC)	___ ODL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 4-27-93 Time: 1204 Meter Serial #: ___ Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: MW-5

Signature: [signature] Reviewed By: SK Page 6 of 6

RESNA
Working To Restore Nature

93 JUL 29 PM 2:19

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San Jose, CA 95118
Phone: (408) 264-7723
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TRANSMITTAL

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

DATE: July 26, 1993
PROJECT NUMBER: 60025.12
SUBJECT: ARCO Station No. 374

FROM: Zbigniew L. Ignatowicz

WE ARE SENDING YOU:

COPIES	DATED	DESCRIPTION
1	7/26/93	Final Second Quarter 1993 Groundwater Monitoring Report for ARCO Station No. 374, 6407 Telegraph Avenue, Oakland, California.

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REMARKS:
Copies: 1 to RESNA project file no. 60025.12

Zbigniew L. Ignatowicz, Staff Geologist