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93 AUG -4 PM 12:58

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TRANSMITTAL

TO: Mr. Barney Chan
Alameda County Health Care Services
Department of Environmental Health
80 Swan Way, Room 200
Oakland, CA 94521

DATE: July 30, 1993
PROJECT NUMBER: 60026.13
SUBJECT: ARCO Station No. 276

FROM: Mr. Zbigniew Ignatowicz
TITLE: Staff Geologist

WE ARE SENDING YOU:

COPIES	DATED	DESCRIPTION
1	July 30, 1993	Letter Report Quarterly Monitoring and Remediation Performance Evaluation, Second Quarter 1993 at ARCO Station No. 276, 10600 MacArthur Boulevard, Oakland, California.

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REMARKS:

cc: Mr. Michael Whelan, ARCO Products Company
Mr. Julio S. Guerra, City of Merced
Mr. Bryan Newman, CRWCQB, Central Valley Region
Copies: 1 to RESNA project file 60045.09

Zbigniew Ignatowicz

Zbig Ignatowicz, Staff Geologist

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LETTER REPORT
QUARTERLY GROUNDWATER MONITORING AND REMEDIATION PERFORMANCE EVALUATION

Second Quarter 1993
at
ARCO Station 276
10600 MacArthur Boulevard
Oakland, California

60026.13

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July 28, 1993
0712MWHE
60026.13

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

Subject: Letter Report, Quarterly Groundwater Monitoring and Remediation Performance Evaluation, Second Quarter 1993 at ARCO Station 276, 10600 MacArthur Boulevard, Oakland, California.

Mr. Whelan:

As requested by ARCO Products Company (ARCO), RESNA Industries Inc. (RESNA) prepared this letter report summarizing 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 onsite vapor extraction system (VES) has been shut down since early January 1993 to the present. Shut down of the VES was necessary because up to 10 feet of available well screen in the vapor extraction wells was submerged by rising groundwater levels which prevented vapor extraction. Because operation of the VES has been short term the performance of the interim remediation system at the site could not be evaluated.

The objectives of this quarterly groundwater monitoring event are to evaluate changes in the groundwater levels, and changes in concentrations of petroleum hydrocarbons in the local groundwater associated with the former gasoline-storage tanks at the site. This monitoring event was also performed to evaluate changes in concentrations of volatile organic compounds (VOCs) in the local groundwater. The field work and laboratory analyses of groundwater samples during this quarter were 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; evaluation and warrant of their field data and field protocol is beyond

RESNA's scope of work. RESNA's scope of work was limited to the following: inspecting wells MW-2 and MW-7 for the presence of floating product and, if present, removing the product; interpreting field and laboratory analytical data; evaluating trends in reported hydrocarbon and volatile organic compounds (VOCs) concentrations in the local groundwater; measuring groundwater levels; and, evaluating direction of groundwater flow and gradient beneath the site. The operating ARCO Station 276 is located on the southeastern corner of the intersection of 106th Avenue and MacArthur Boulevard in Oakland, California, as shown on the Site Vicinity Map, Plate 1. The locations of the former and existing underground storage tanks, groundwater monitoring wells and vapor extraction wells are shown on the Generalized Site Plan, Plate 2.

Previous environmental work is discussed in prior subsurface investigation reports listed in the References section.

Groundwater Sampling and Gradient Evaluation

Depth to water (DTW) levels in wells MW-1 through MW-8, and RW-1 were measured by EMCON field personnel on April 30, May 12, and June 17, 1993, and quarterly sampling was performed by EMCON field personnel on May 12, 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-8, and RW-1, are presented on EMCON's Field Reports, Summary of Groundwater Monitoring Data, and Water Sample Field Data Sheets. Copies of these reports are included in Appendix A.

The DTW levels, wellhead elevations, groundwater elevations, and subjective observations for the presence of free product in the groundwater from MW-1 through MW-8, and RW-1 for this and previous quarters are summarized in Table 1, Cumulative Groundwater Monitoring Data. EMCON's DTW measurements were used to evaluate groundwater gradients for this quarter. The average groundwater gradient and flow direction for this quarter was 0.004 ft/ft to the northeast.

Floating product 0.01 foot thick was detected in offsite well MW-7 on May 12 and June 17, 1993 and floating product 0.01 foot thick was detected in well MW-2 on May 12, 1993. Floating product was not checked in well MW-7 on April 30, 1993. Because EMCON was unable to open well MW-8, this well was not monitored on June 17, 1993 (see EMCON's Field Reports Appendix A). Evidence of product or sheen was not observed in the other monitoring wells during this quarter. Quantities of floating product and water removed are presented in Table 2, Approximate Cumulative Product Removed. There was no product recovered at the site for this quarter; the total product removed at this site to date by hand bailing is approximately 19 gallons.

Wells MW-1, MW-3, through MW-6, MW-8, and RW-1 were constructed in a deeper water-bearing zone, and offsite well MW-7 and onsite well MW-2 were constructed in a shallow groundwater bearing zone.

Groundwater elevations of the shallow and deep water-bearing zone for this quarter are shown on the Groundwater Gradient Maps, Plates 3 through 5. The contours and flow directions depicted on Plates 3 through 5 are those interpreted for the deeper water-bearing zone.

Groundwater monitoring wells MW-1, MW-3 through MW-6, MW-8, and RW-1 were purged and sampled by EMCON field personnel on May 12, 1993. Monitoring wells MW-2 and MW-7 contained floating product during EMCON's sampling at the site and were not sampled. Purge water generated during purging and sampling of the monitoring wells was transported to Gibson Environmental in Redwood City, California for recycling.

REMEDIAL PERFORMANCE EVALUATION

Onsite Vapor Extraction System Description

The data presented in this section covers the period from April 1, 1993 to June 30, 1993. The system began continuous operation on August 25, 1992. The system was monitored by Pacific Environmental Group (PEG) during third quarter 1992 (from August 25, 1992 to October 5, 1992). The system was in operation from August 25, 1992, to the end of December 1992. The system was shut down in early January 1993 and through the second quarter of 1993 because up to 10 feet of available well screen in all vapor extraction wells was submerged by rising groundwater levels. The onsite vapor extraction system (VES) uses a 1.5 horsepower Rotron vacuum blower to extract petroleum hydrocarbon vapor from subsurface soils associated with the former Underground Storage Tanks (UST's) at the site. Plate 6, VES Schematic, depicts the location of the eight onsite vapor extraction wells (VW-1 through VW-7, and monitoring well MW-2) that are used to extract vapor from hydrocarbon-impacted subsurface soils by use of the Rotron blower. Monitoring well MW-8 is also manifolded to the VES but is shutoff because it is screened in the deeper water-bearing zone. Extracted vapor is directed through piping to a 500 standard cubic feet per minute (scfm at 70 degrees Fahrenheit) gas fired Anguil Catalytic Oxidizer (CatOx) for abatement prior to discharge to the atmosphere. System operation is regulated under the Bay Area Air Quality Management District (BAAQMD) Permit to Operate Number 5998. Sample ports are located influent and effluent to the CatOx, at the wellheads, and in the vapor manifold piping from the extraction wells to the blower, prior to fresh air dilution.

System Monitoring

The onsite VES is monitored every two weeks (when operating) to evaluate the treatment system performance, at which time the following measurements are recorded: applied vacuum on the wells; average extracted air flow rates influent to the blower (prior to fresh air dilution); and extracted hydrocarbon vapor concentrations from the well field, influent to the CatOx, and effluent to the CatOx as measured by a flame-ionization detector (FID). In addition to these measurements, several other parameters such as the process temperature, stack temperature, and flame voltage are also recorded during every site visit for maintenance purposes.

LABORATORY METHODS AND RESULTS

Groundwater Samples

Under the direction of EMCON, groundwater 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 groundwater samples from MW-1, MW-3 through MW-6, MW-8, and RW-1 were analyzed for total petroleum hydrocarbons as gasoline (TPHg) and benzene, toluene, ethylbenzene,and xylenes (BTEX) using modified Environmental Protection Agency (EPA) Methods 5030/8020 /California DHS LUFT Method. Concentrations of TPHg and benzene in groundwater are shown on Plate 7, TPHg/Benzene Concentrations in Groundwater. Groundwater samples from wells MW-1, MW-3 through MW-6, MW-8, and RW-1 were also analyzed for VOCs using EPA Method 624. Concentrations of VOCs in the groundwater are shown on Plate 8, PCE Concentrations in Groundwater. In addition, the sample from well MW-4 was analyzed for total oil and grease (TOG) using Standard Method 5520C/F. The Chain of Custody Records and Laboratory Analysis Reports are included in Appendix A. Results of these and previous groundwater analyses are summarized in Table 3, Cumulative Results of Laboratory Analyses of Groundwater Samples--TPHg, TPHd, BTEX, and TOG and Table 4, Cumulative Results of Laboratory Analyses of Groundwater Samples--VOCs and Metals.

Since the last quarter, floating product has continued to be detected in MW-2 and MW-7 by EMCON and RESNA field personnel. Laboratory analytical results of groundwater samples from wells MW-1, MW-3 through MW-6, MW-8, and RW-1 indicated nondetectable concentrations of TPHg and BTEX. Detection limits for TPHg and BTEX were less than 50 parts per billion [ppb] and less than 0.5 ppb respectively with the exception of samples collected from MW-1, MW-3, MW-4, MW-6 and RW-1, where detection limits were raised due to matrix interference (single peaks, possibly PCE) in the sample.

Concentrations of TOG increased in well MW-4. Concentrations of PCE increased in wells MW-1 and MW-3, decreased in MW-4, MW-5, MW-6 and RW-1, and continued to be non-detectable in well MW-8.

Air Samples

Because the VES remediation system was not operating this quarter due to submerged well screen, air samples were not collected.

RESULTS OF REMEDIAL PERFORMANCE EVALUATION

As previously mentioned, the interim onsite VES system at the site was shut down since January 1993, as a result of rising water levels submerging up to 10 feet of available screen in the vapor extraction wells. As a result the performance of the VES could not be evaluated.

CONCLUSIONS

The shallow water-bearing zone at the site has been impacted by petroleum hydrocarbons. The deeper water-bearing zone has been impacted by VOCs, but does not appear to have been impacted by gasoline hydrocarbons. Floating petroleum product was observed by EMCON and RESNA field personnel in shallow onsite well MW-2 and shallow offsite well MW-7 this quarter. Analytical results of groundwater samples from deeper wells MW-1, MW-3, MW-4, MW-5, MW-6, MW-8 and RW-1 indicated nondetectable TPHg and BTEX. In wells MW-1, MW-3, MW-4, MW-6, and RW-1 the samples reportedly contained a discrete, non-fuel component. This discrete non-fuel component is confirmed by the presence of Tetrachloroethylene (PCE) which is the predominant VOC in the deeper groundwater zone and appears to be migrating beneath the ARCO site from an offsite and upgradient source (near offsite deeper well MW-6). The possibility of an offsite migration was discussed in greater detail in RESNA's recent Additional Subsurface Investigation and Interim Remediation report (RESNA, February 1, 1993). This possibility of an offsite PCE source was evaluated and confirmed by the ACHCSA in their letter to the owners of the adjacent property dated March 23, 1993.

Due to significant rain fall during the fourth quarter of 1992 and first quarter of 1993, the shallow water-bearing zone has recharged. As a result, in early January the vapor extraction system was shut-off because up to 10 feet of available well screen was submerged by rising groundwater. The VES will be re-started once water levels decrease to expose sufficient well screen for vapor extraction at the site. RESNA anticipates that start up of the VES can be initiated in third quarter 1993.

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

Mr. Barney Chan
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, Suite 500
Oakland, California 94612

Mr. Richard Gilcrease
Drake Builders
5201 Sacramento Avenue
Richmond, CA 94804

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

Sincerely,
RESNA Industries Inc.

Zbigniew L. Ignatowicz
Staff Geologist

Valli Voruganti
Project Engineer

REGISTERED GEOLOGIST
JAMES LEWIS NELSON
No. 1463
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

James L. Nelson
C.E.G. No. 1463

Enclosures: References

Plate 1, Site Vicinity Map
Plate 2, Generalized Site Plan
Plate 3, Groundwater Gradient Map, April 30, 1993
Plate 4, Groundwater Gradient Map, May 12, 1993
Plate 5, Groundwater Gradient Map, June 17, 1993
Plate 6, VES Schematic
Plate 7, TPHg and Benzene Concentrations in Groundwater, May 12, 1993
Plate 8, PCE Concentrations in Groundwater, May 12, 1993

Table 1, Cumulative Groundwater Monitoring Data
Table 2, Approximate Cumulative Product Removed
Table 3, Cumulative Results of Laboratory Analyses of Groundwater Samples--TPHg, TPHd, BTEX, and TOG
Table 4, Cumulative Results of Laboratory Analyses of Groundwater Samples--VOCs and Metals

Appendix A: EMCON's Field Reports- Summary of Groundwater Monitoring Data- Certified Analytical Reports with Chain-of-Custody - Water Sample Field Data Sheets

REFERENCES

Alameda County Health Care Services Agency. March 23, 1993. Letter to Drake Builders informing them of perchloroethylene on their property and requesting a work plan to address the problem.

Applied GeoSystems. August 8, 1989. Report Limited Subsurface Environmental Investigation. AGS Job No. 19014-1.

Applied GeoSystems. January 17, 1991. Report Limited Offsite Subsurface Environmental Investigation, ARCO Station 276, 10600 MacArthur Boulevard,Oakland, California. AGS Job 19014.01.

Applied GeoSystems, February 11, 1991. Report Underground Gasoline Storage Tank Removal and Replacement at ARCO Station 276, 10600 MacArthur Boulevard,Oakland, California. AGS Job 19014-5.

Department of Health Services, State of California. October 24, 1990. Summary of California Drinking Water Standards.

Kaldveer Associates. October 3, 1988. Preliminary Environmental Assessment Proposed Foothill Square Oakland, California. Job No. KE812-3, 12056.

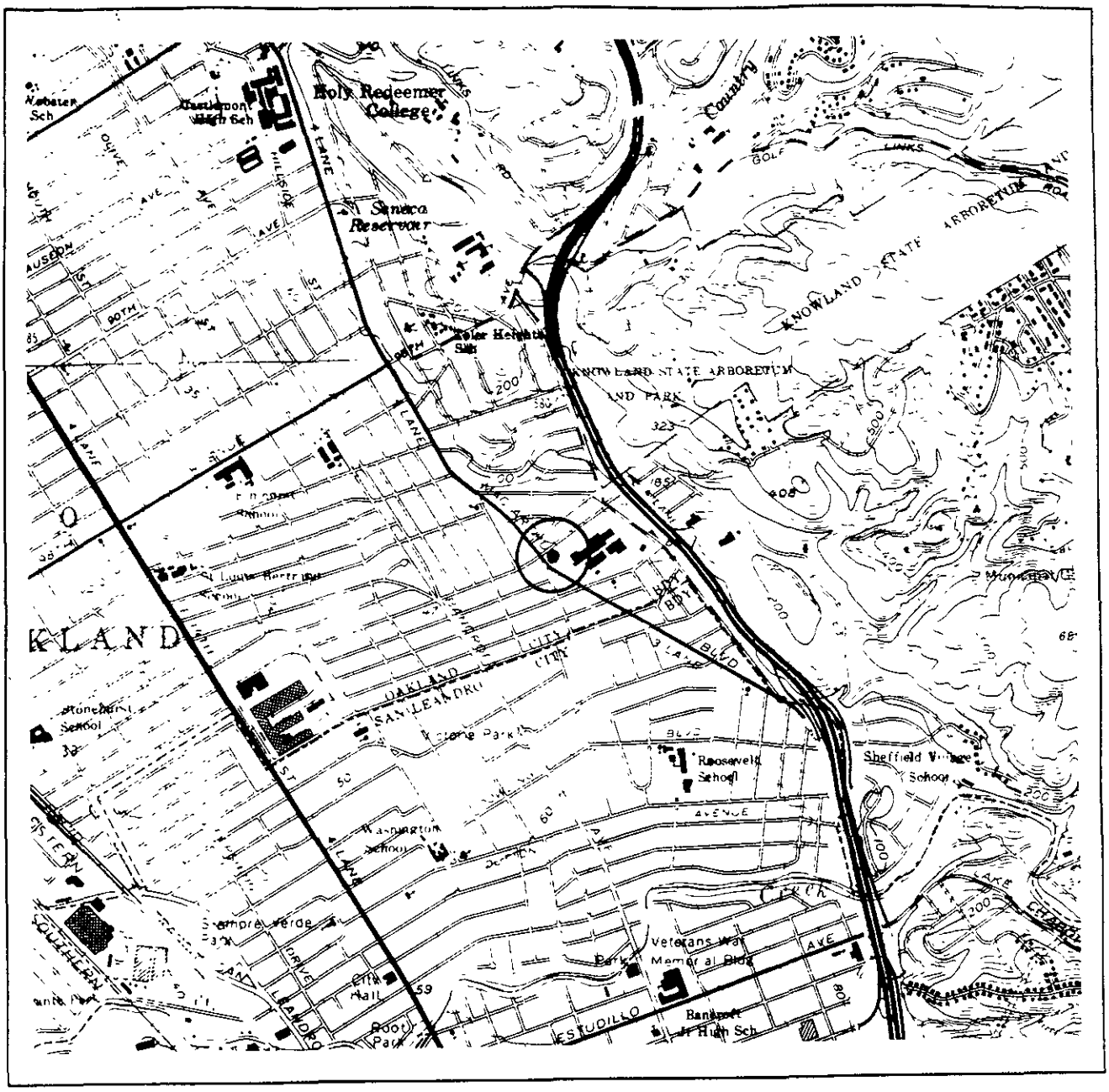
Kaldveer Associates. October 7, 1988. Preliminary Soil And Groundwater Quality Testing Program Foothill Square Oakland, California. Job No. KE812-3A, 12302.

Pacific Environmental Group, Inc., February 6, 1989. Former Waste-Oil Tank Pit Analytical Results and Site Plan of ARCO Station No. 276. Copy of letter sent to Ms. Mary Meirs, Alameda County Environmental Health Department Hazardous Material Division.

Pacific Environmental Group, Inc., April 25, 1989. Letter Report-Removal of Waste-Oil Tank and Soil Sampling at ARCO Station 276, 10600 MacArthur Boulevard, Oakland, California. Job No. 330-40.01

Pacific Environmental Group, Inc., July 17, 1989. Soil Gas Investigation at ARCO Station No. 276.

RESNA. December 28, 1992. Letter Report on Quarterly Groundwater Monitoring Third Quarter 1992 at ARCO Station 276, 10600 MacArthur Boulevard in Oakland, California. RESNA Report 60026.06.



Base U S Geological Survey
7 5-Minute Quadrangles
Oakland East/San Leandro, California
Photorevised 1980

Approximate Scale

2000 1000 0 2000 4000

feet

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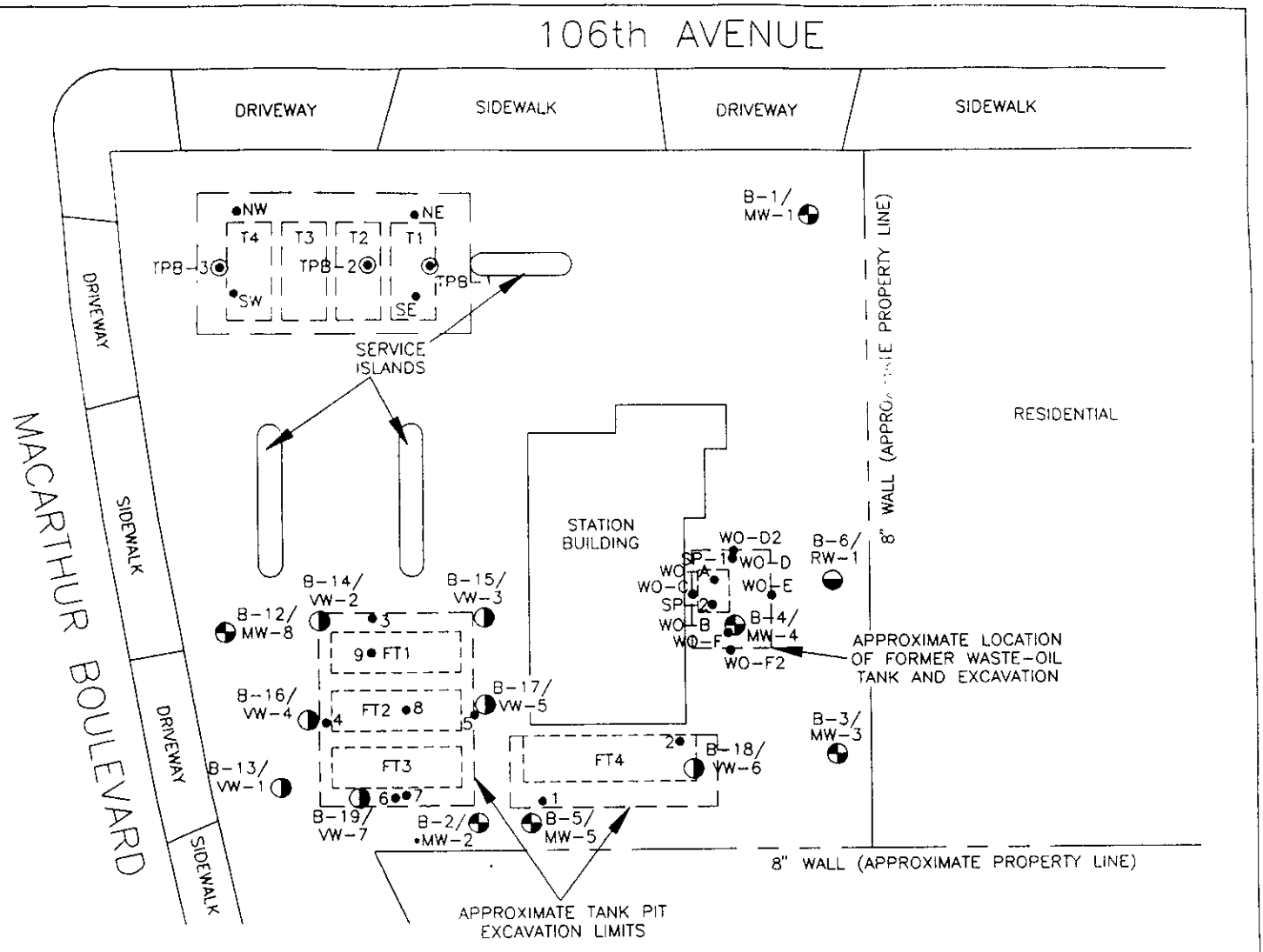
SITE VICINITY MAP
ARCO Station 276
10600 MacArthur Boulevard
Oakland, California

PLATE
1



EXPLANATION

- TPB-3 ◉ = Boring in proposed new tank pit (RESNA, 1990)
- B-19/ VW-7 ◑ = Vapor well (RESNA, 1992)
- B-12/ MW-8 ◕ = Groundwater monitoring well (RESNA, 1989 and 1992)
- B-7/ RW-1 ◒ = Recovery well (RESNA, 1991)
- MW-3 (WGR) ⊗ = Groundwater monitoring well (WGR, 1988)
- • = Well screened in shallow water-bearing zone
- NW • = New tank pit excavation bottom sample (RESNA, 1990)
- 9 • = Former tank pit sample (S7-TP1SW-1 through -9, RESNA, 1990)
- SP-2 WO-F • WO-F2 = Former waste-oil tank pit excavation bottom and sidewall sample (PEG, 1988)
- T4 = Existing underground storage tanks
- FT4 = Former underground storage tanks

B-10/ MW-6

B-11/ •MW-7

MW-3 (WGR)

Approximate Scale

30 15 0 30 60

feet

Source: Modified from plan supplied by ARCO and surveyed by Ron Archer, Civil Engineer, Inc and John Koch, Land Surveyor

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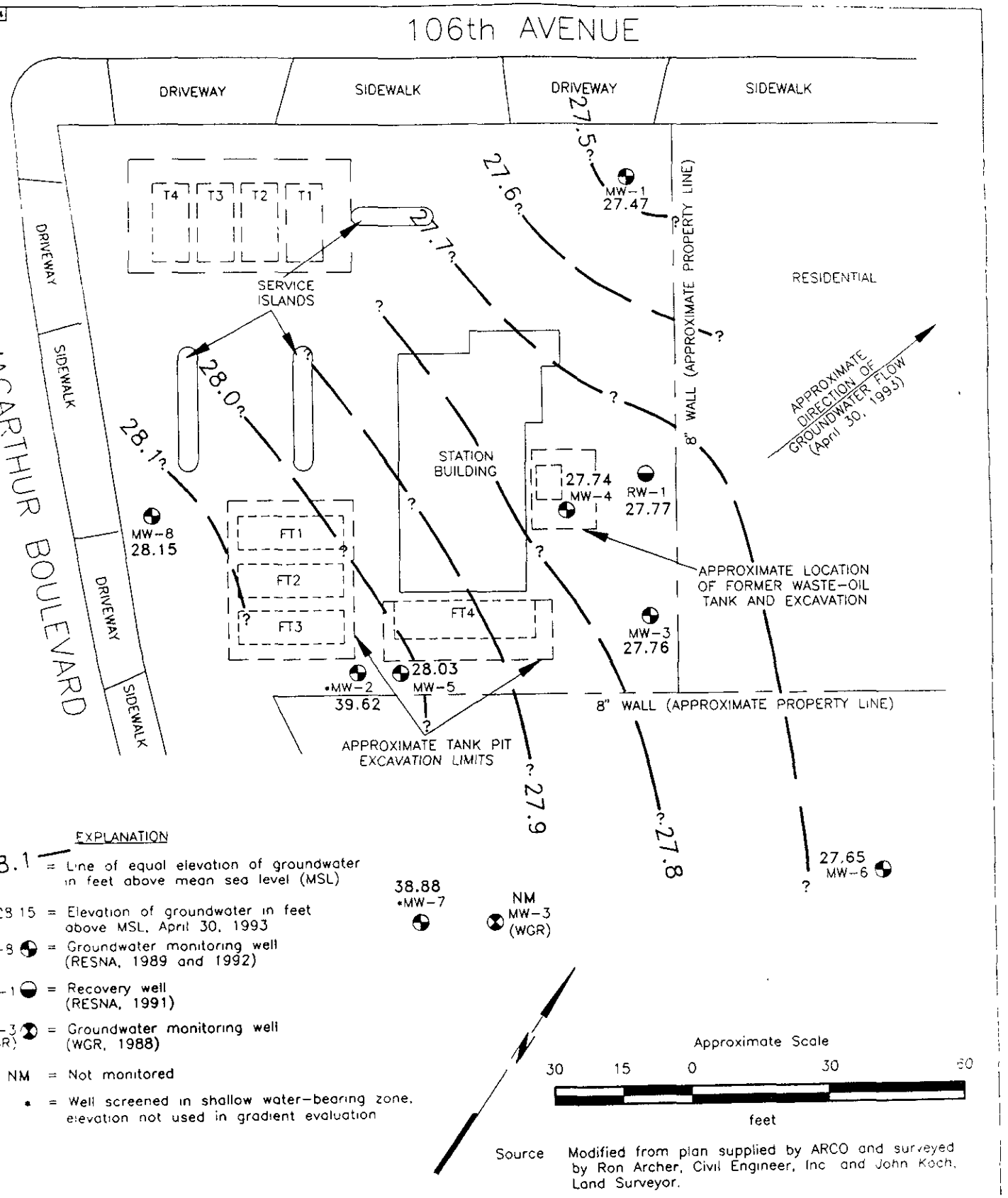
GENERALIZED SITE PLAN
ARCO Station 276
10600 MacArthur Boulevard
Oakland, California

PLATE 2

00261304



Source Modified from plan supplied by ARCO and surveyed by Ron Archer, Civil Engineer, Inc and John Koch, Land Surveyor.

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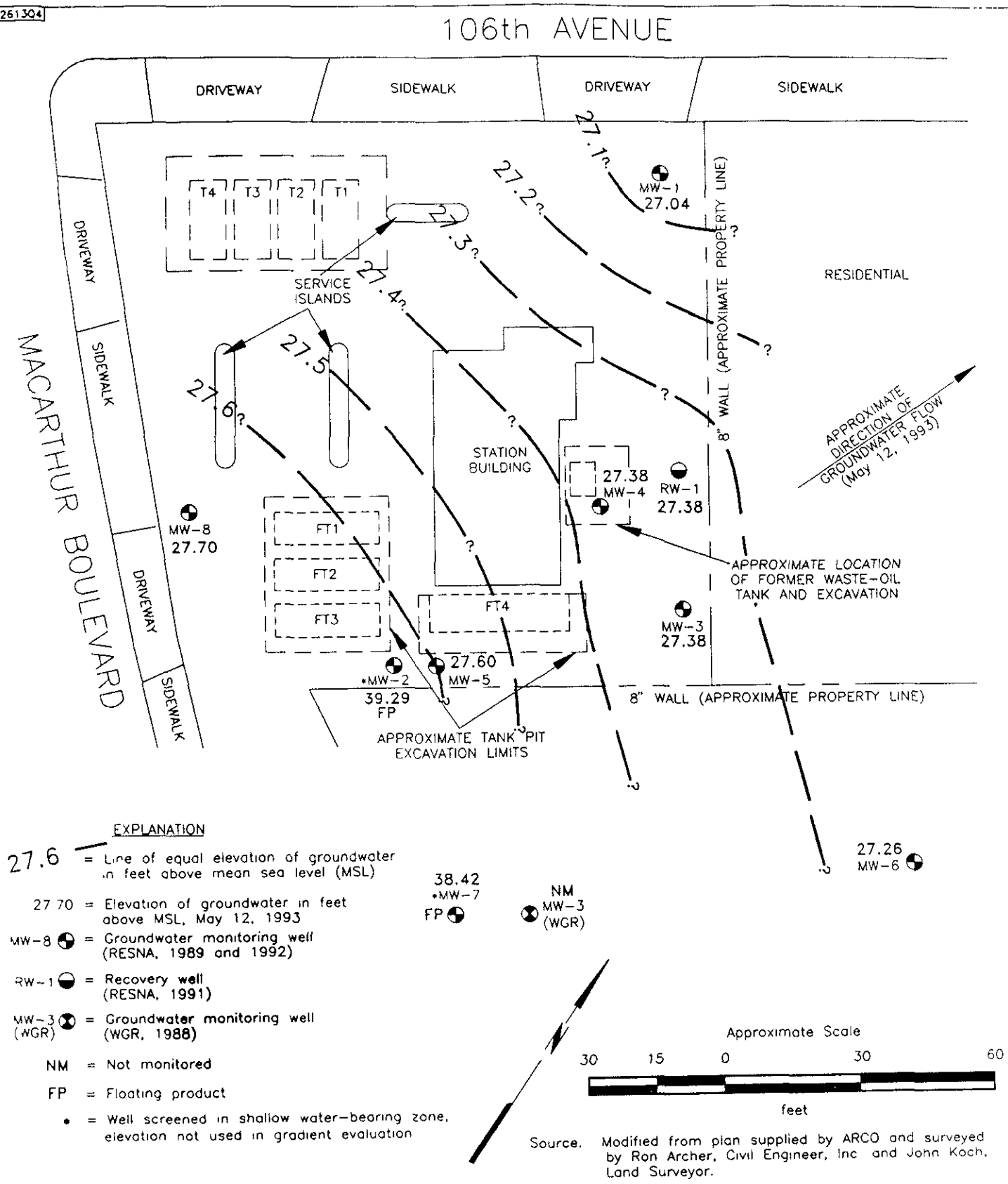
GROUNDWATER GRADIENT MAP
ARCO Station 276
10600 MacArthur Boulevard
Oakland, California

PLATE 3

00261304



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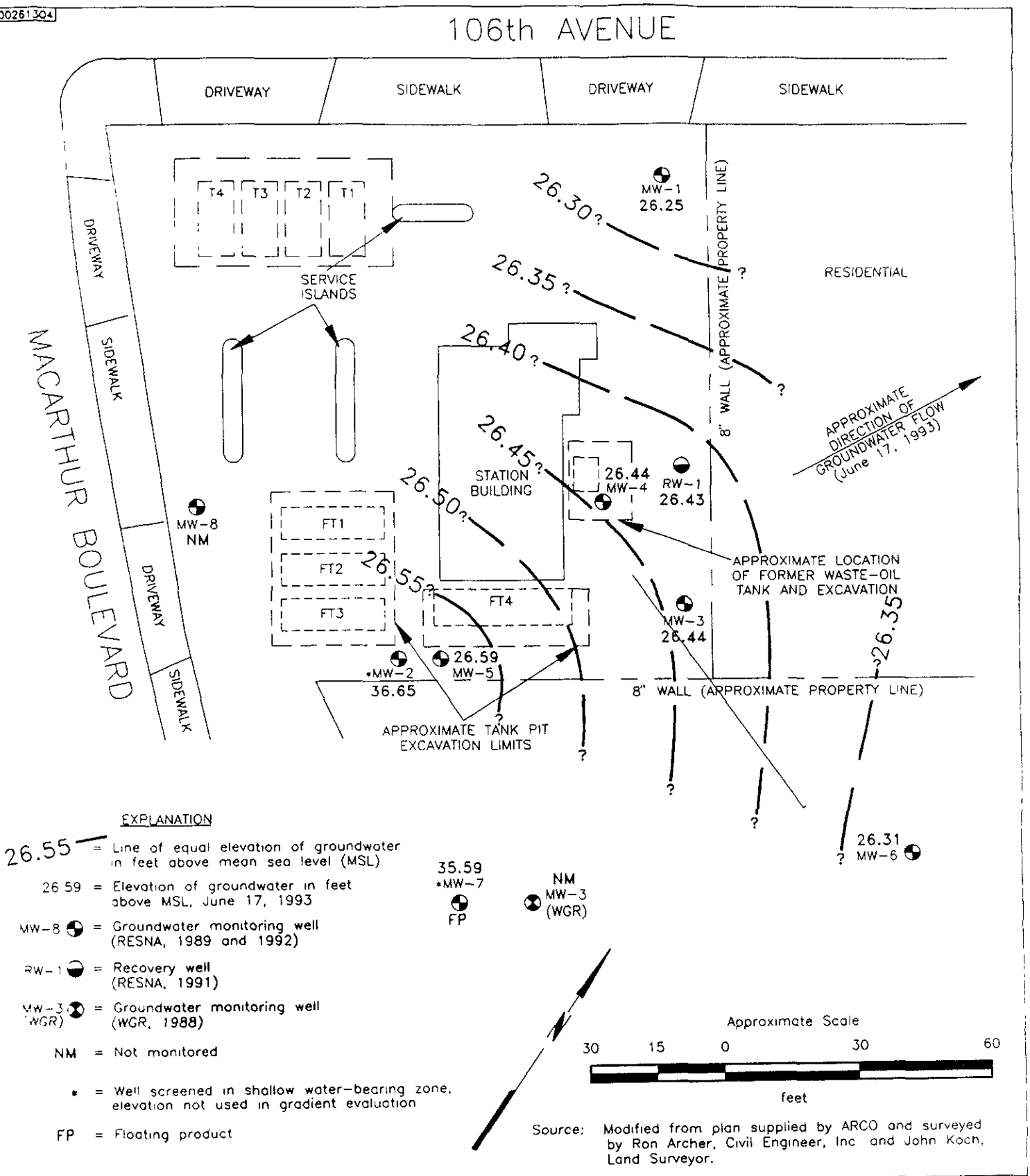
GROUNDWATER GRADIENT MAP
ARCO Station 276
10600 MacArthur Boulevard
Oakland, California

PLATE
4

00261304



Source: Modified from plan supplied by ARCO and surveyed by Ron Archer, Civil Engineer, Inc and John Koch, Land Surveyor.

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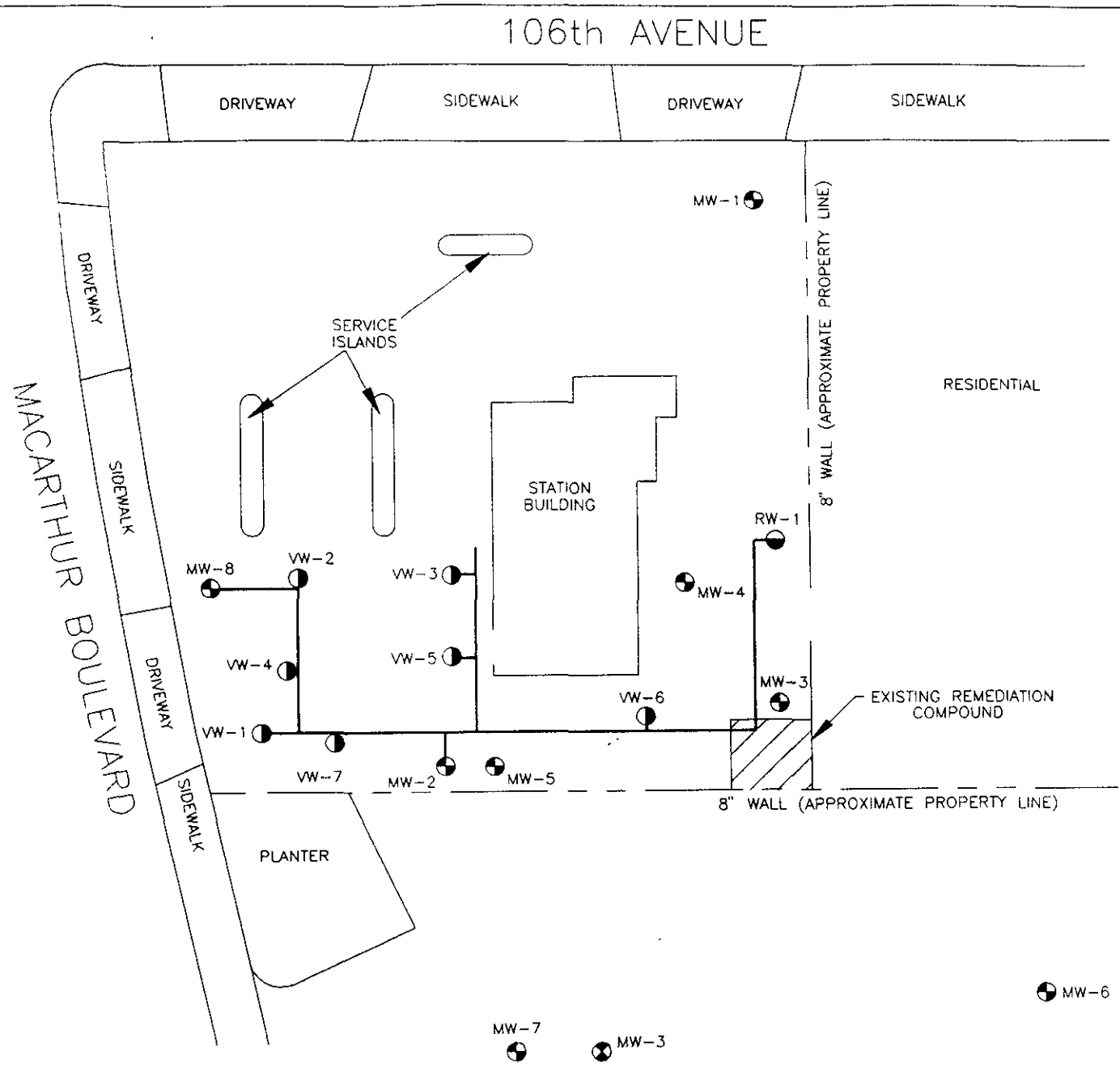
GROUNDWATER GRADIENT MAP
ARCO Station 276
10600 MacArthur Boulevard
Oakland, California

PLATE 5



EXPLANATION

——— = Subgrade 2- & 4-inch diameter VES piping location

VW-7 ◑ = Vapor well

MW-8 ◓ = Groundwater monitoring well

RW-1 ◒ = Groundwater recovery well

Approximate Scale

30 15 0 30 60

feet

Source: Modified from plan supplied by ARCO and surveyed by Ron Archer, Civil Engineer, Inc. and John Koch, Land Surveyor

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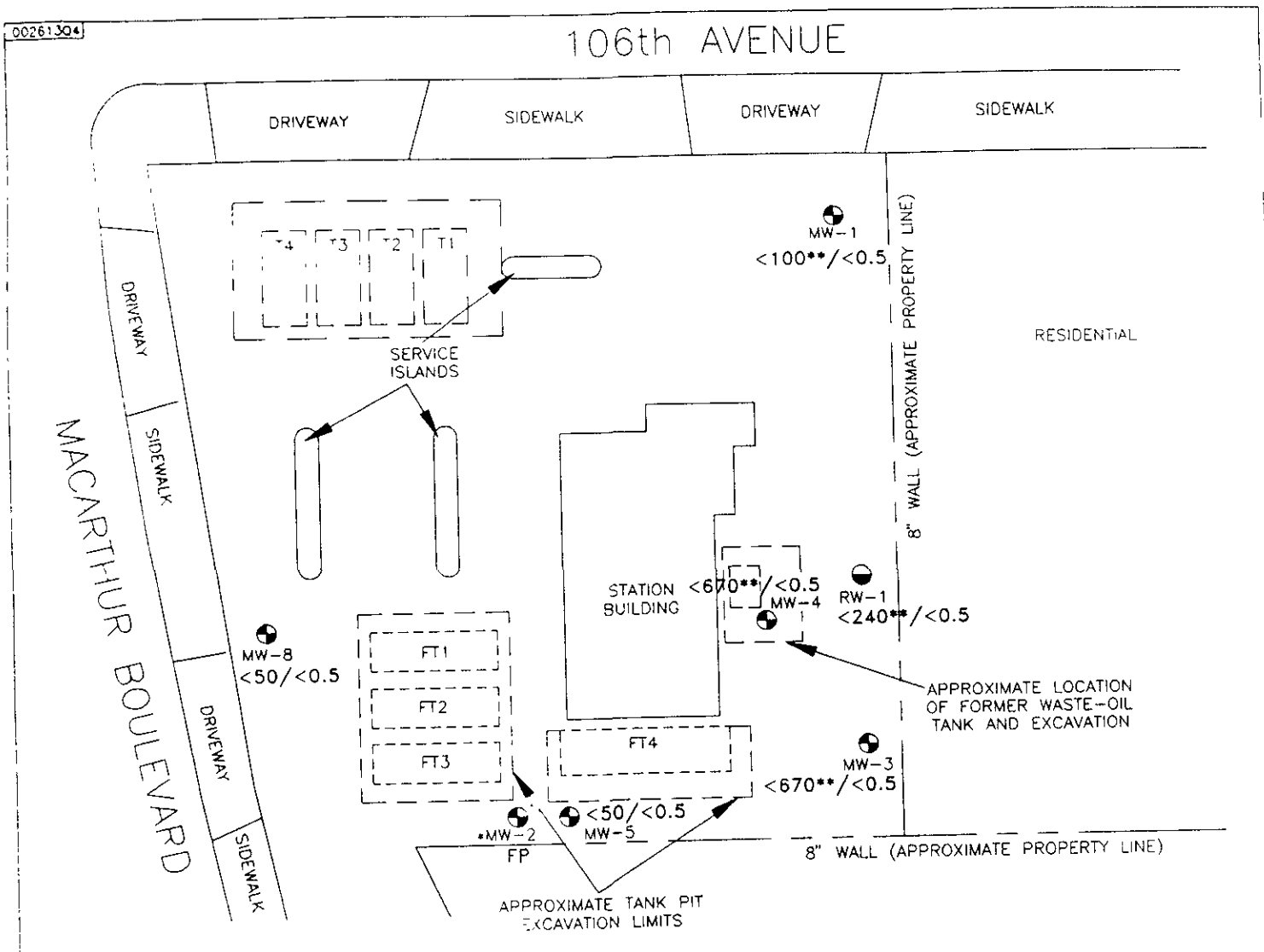
VES SCHEMATIC
ARCO Station 276
10600 MacArthur Boulevard
Oakland, California

PLATE
6

00261304



EXPLANATION

<50/<0.5 = Concentrations of total petroleum hydrocarbons as gasoline (TPHg) and benzene in groundwater in parts per billion, May 12, 1993

MW-8 = Groundwater monitoring well (RESNA, 1989 and 1992)

RW-1 = Recovery well (RESNA, 1991)

MW-3 (WGR) = Groundwater monitoring well (WGR, 1988)

NS = Not sampled

** = Detection limit reportedly raised by laboratory because of matrix interference

FP = Floating product in well, not sampled

* = Well screened in shallow water-bearing zone

FP *MW-7

NS MW-3 (WGR)

MW-6 <1,600**/<2.5**

Approximate Scale

30 15 0 30 60

feet

Source: Modified from plan supplied by ARCO and surveyed by Ron Archer, Civil Engineer, Inc. and John Kocn, Land Surveyor.

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TPHg/BENZENE CONCENTRATIONS IN GROUNDWATER ARCO Station 276 10600 MacArthur Boulevard Oakland, California

PLATE 7

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 276
Oakland, California
(Page 1 of 7)

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
MW-1	55.91			
04/17/89		33.04	22.87	None
04/24/89		33.84	22.07	None
10/13/89		37.19	18.72	None
02/01/90		36.73	19.18	None
07/31/90		36.42	19.49	None
08/01/90		36.41	19.50	None
08/28/90		36.88	19.03	None
10/30/90		37.73	18.18	None
11/20/90		37.92	18.37	None
12/19/90		37.90	18.01	None
01/30/91		38.06	17.85	None
02/27/91		37.66	18.25	None
03/20/91		36.77	19.14	None
04/30/91		34.63	21.28	None
05/31/91		34.83	21.08	None
07/24/91		35.96	19.95	None
08/06/91		36.21	19.70	None
09/03/91		36.74	19.17	None
10/17/91		37.57	18.34	None
11/05/91		37.65	18.26	None
12/24/91		38.14	17.77	None
01/19/92		37.62	18.29	None
02/20/92		36.23	19.68	None
03/10/92		34.58	21.33	None
04/20/92		32.82	23.09	None
05/15/92		33.17	22.74	None
06/30/92		34.55	21.36	None
07/15/92		34.90	21.01	None
08/25/92	55.92	35.34	20.58	None
09/09/92		35.71	20.21	None
10/31/92		36.62	19.30	None
11/20/92		36.90	19.02	None
12/16/92		36.18	19.74	None
01/22/93		32.24	23.68	None
02/12/93		30.65	25.27	None
03/26/93		28.36	27.56	None
04/30/93		28.45	27.47	None
05/12/93		28.88	27.04	None
06/17/93		29.67	26.25	None

See notes on page 7 of 7.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 276
Oakland, California
(Page 2 of 7)

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
MW-2				
04/17/89		17.20	38.15	None
04/24/89		17.83	37.52	None
10/13/89	55.35	20.15*	35.20*	0.03
02/01/90		NM	NM	NM
07/31/90		18.90	36.45	None
08/01/90		18.23*	37.03*	1.04
08/28/90		21.25*	34.10*	0.83
10/30/90		24.21*	31.14*	1.04
11/20/90		25.08*	30.27*	0.60
12/19/90		18.23*	37.12*	None
01/30/91		19.47*	35.88*	0.03
02/27/91		18.84*	36.51*	0.02
03/20/91		16.02*	39.33*	0.01
04/30/91		16.55	38.80	Sheen
05/31/91		18.41*	36.94*	0.01
07/24/91		19.81	35.54	Sheen
08/06/91		20.59*	34.76*	0.14
09/03/91		23.23*	32.12*	0.54
10/17/91		24.81*	30.54*	0.20
11/05/91		18.88*	36.47*	0.01
12/24/91		19.34*	36.01*	0.09
01/19/92		18.00	37.35	Sheen
02/20/92		14.81**	40.54	Skimmer
03/10/92		14.95**	40.40	Skimmer
04/20/92		16.13	39.22	None
05/15/92		17.66	37.69	None
06/30/92		19.11	36.24	Sheen
07/15/92		19.50	35.85	None
08/25/92	55.10	21.35*	33.73*	0.05
09/09/92		22.70*	32.40*	0.05
10/31/92		22.34	32.76	None
11/20/92		19.85*	32.25*	0.02[1]
12/16/92		NM	NM	NM
01/22/93		13.10	42.00	None
02/12/93		14.71	40.39	0.05[1]
03/26/93		Well	Inaccessible	
04/30/93		15.48	39.62	None
05/12/93		15.81*	39.29*	0.01
06/17/93		18.45	36.65	None

See notes on page 7 of 7.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 276
Oakland, California
(Page 3 of 7)

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
MW-3				
04/24/89		34.47	22.08	None
10/13/89	56.55	37.60	18.95	None
02/01/90		37.20	19.35	None
07/31/90		36.90	19.65	None
08/01/90		36.87	19.68	None
08/28/90		37.33	19.22	None
10/30/90		38.15	18.40	None
11/20/90		38.33	18.58	None
12/19/90		38.30	18.25	None
01/30/91			Well Dry	
02/27/91		38.11	18.44	None
03/20/91		37.26	19.29	None
04/30/91		35.02	21.53	None
05/31/91		35.26	21.29	None
07/24/91		36.40	20.15	None
08/06/91		36.66	19.89	None
09/03/91		37.20	19.35	None
10/17/91		38.04	18.51	None
11/05/91		38.08	18.47	None
12/24/91			Well Dry	
01/19/92		38.07	18.48	None
02/20/92		36.71	19.84	None
03/10/92		34.96	21.59	None
04/20/92		33.20	23.35	None
05/15/92		33.70	22.85	None
06/30/92		34.97	21.58	None
07/15/92		35.35	21.20	None
08/25/92	56.55	35.94	20.61	None
09/09/92		36.19	20.36	None
10/31/92		36.13	20.42	None
11/20/92		37.40	19.15	None
12/16/92		36.68	19.87	None
01/22/93		32.58	23.97	None
02/12/93		30.86	25.69	None
03/26/93		28.60	27.95	None
04/30/93		28.79	27.76	None
05/12/93		29.17	27.38	None
06/17/93		30.11	26.44	None

See notes on page 7 of 7.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 276
Oakland, California
(Page 4 of 7)

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
MW-4				
04/17/89		33.87	22.07	None
04/24/89		33.76	22.18	None
10/13/89	55.94	37.03	18.91	None
02/01/90		36.57	19.37	None
07/31/90		36.39	19.55	None
08/01/90		36.32	19.62	None
08/28/90		36.79	19.15	None
10/30/90		37.62	18.32	None
11/20/90		37.82	18.52	None
12/19/90		37.74	18.20	None
01/30/91		37.97	17.97	None
02/27/91		37.52	18.42	None
03/20/91		36.69	19.25	None
04/30/91		34.48	21.46	None
05/31/91		34.73	21.21	None
07/24/91		35.86	20.08	None
08/06/91		36.15	19.79	None
09/03/91		36.66	19.28	None
10/17/91		37.49	18.45	None
11/05/91		37.54	18.40	None
12/24/91		38.01	17.93	None
01/19/92		37.48	18.46	None
02/20/92		36.11	19.83	None
03/10/92		34.96	21.54	None
04/20/92		32.60	23.34	None
05/15/92		33.12	22.82	None
06/30/92		34.06	21.88	None
07/15/92		NR	NR	NR
08/25/92	55.98	35.22	20.76	None
09/09/92		35.63	20.35	None
10/31/92		33.84	22.14	None
11/20/92		36.87	19.11	None
12/16/92		36.09	19.89	None
01/22/93		31.98	24.00	None
02/12/93		30.31	25.59	None
03/26/93		27.97	28.01	None
04/30/93		28.24	27.74	None
05/12/93		28.60	27.38	None
06/17/93		29.54	26.44	None

See notes on page 7 of 7.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 276
Oakland, California
(Page 5 of 7)

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
MW-5				
04/17/89		33.17	22.26	None
04/24/89		33.06	22.37	None
10/13/89	55.43	36.33	19.10	None
02/01/90		35.96	19.47	None
07/31/90		35.70	19.73	None
08/01/90		35.69	19.74	None
08/28/90		36.14	19.29	None
10/30/90		36.94	18.49	None
11/20/90		37.09	18.64	None
12/19/90		37.05	18.38	None
01/30/91		37.26	18.17	None
02/27/91		36.81	18.62	None
03/20/91		36.04	19.39	None
04/30/91		33.75	21.68	None
05/31/91		34.01	21.42	None
07/24/91		35.20	20.23	None
08/06/91		35.48	19.95	None
09/03/91		36.00	19.43	None
10/17/91		36.84	18.59	None
11/05/91		36.86	18.57	None
12/24/91		37.31	18.12	None
01/19/92		36.95	18.48	None
02/20/92		35.39	20.04	None
03/10/92		33.67	21.76	None
04/20/92		31.80	23.63	None
05/15/92		32.37	23.06	None
06/30/92		34.00	21.43	None
07/15/92		34.32	21.11	None
08/25/92	55.43	35.76	19.67	None
09/09/92		34.97	20.46	None
10/31/92		35.97	19.46	None
11/20/92		36.26	19.17	None
12/16/92		35.45	19.98	None
01/22/93		31.05	24.38	None
02/12/93		29.42	26.01	None
03/26/93		27.07	28.36	None
04/30/93		27.40	28.03	None
05/12/93		27.83	27.60	None
06/17/93		28.84	26.59	None

See notes on page 7 of 7.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 276
Oakland, California
(Page 6 of 7)

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
MW-6	61.21			
06/30/92		35.50	25.71	None
07/15/92		39.89	21.32	None
08/25/92		34.90	26.31	None
09/09/92		NM	NM	NM
10/31/92		NM	NM	NM
11/20/92		NM	NM	NM
12/16/92		NM	NM	NM
01/22/93		36.52	24.69	None
02/12/93		35.65	25.56	None
03/28/93		33.33	27.88	None
04/30/93		33.56	27.65	None
05/12/93		33.95	27.26	None
06/17/93		34.90	26.31	None
MW-7	58.22			
06/30/92		23.70	34.52	None
07/15/92		23.10	35.12	None
08/25/92		34.23	23.99	None
09/09/92		26.30*	31.92*	1.31
10/31/92		35.44	22.78	None
11/20/92		23.47*	34.75*	0.02
12/16/92		19.07*	39.15*	0.04
01/22/93		16.56*	41.66*	0.02
02/12/93		18.22*	40.00*	0.04
03/26/93		18.04	40.18	None
04/30/93		19.34	38.88	NM
05/12/93		19.80*	38.42*	0.01
06/17/93		22.63*	35.59*	0.01
MW-8	53.65			
08/25/92		NR	NR	NR
09/09/92		33.20	20.45	None
10/31/92		37.12	16.53	None
11/24/92		34.45	19.20	None
12/16/92		NM	NM	NM
01/22/93		28.59	25.06	None
02/12/93		27.57	26.08	None
03/26/93		25.16	28.49	None
04/30/93		25.50	28.15	None
05/12/93		25.95	27.70	None
06/17/93		NM	NM	NM

See notes on page 7 of 7.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 276
Oakland, California
(Page 7 of 7)

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
RW-1				
11/05/91	56.32	37.89	18.43	None
12/24/91		38.35	17.97	None
01/19/92		37.82	18.50	None
02/20/92		36.42	19.90	None
03/10/92		34.74	21.58	None
04/20/92		32.90	23.42	None
05/15/92		33.43	22.89	None
06/30/92		34.74	21.58	None
07/15/92		35.12	21.20	None
08/25/92		36.75	19.57	None
09/09/92		35.99	20.33	None
10/31/92		34.32	22.00	None
11/20/92		37.11	19.21	None
12/16/92		36.40	19.92	None
01/22/93		32.30	24.02	None
02/12/93		30.64	25.68	None
03/26/93		28.32	28.00	None
04/30/93		28.55	27.77	None
05/12/93		28.94	27.38	None
06/17/93		29.89	26.43	None

Notes:
Depths are in feet below top of each well casing.
Elevations are referenced in feet above mean sea level.
Floating product thickness reported in feet.
* = Depth to water and water elevation adjusted as followed: The thickness of the floating product and the ground-water depths were recorded. The recorded thickness of the floating product was then multiplied by 0.80 to obtain an approximate value for the displacement of water by the floating product. This approximate displacement value was then subtracted from the measured depth to water to obtain a calculated depth to water (potentiometric surface).
1 = Floating product was detected after purging well.
NM = Not monitored.

TABLE 2
APPROXIMATE CUMULATIVE PRODUCT REMOVED
ARCO Station 276
Oakland, California

Year		Floating Product Removed (gallons)
1991	TOTAL:	18.15
1992		0.39

Date	Floating Product Removed (gallons)
1993	
MW-2	
01-29-93	Sheen - Not Removed
02-26-93	Sheen - Not Removed
03-24-93	Sheen - Not Removed
05-12-93	Sheen - Not Removed
MW-7	
01-29-93	Sheen - Not Removed
02-26-93	Sheen - Not Removed
03-24-93	Sheen - Not Removed
05-12-93	Sheen - Not Removed
1993 Total:	0.00 Gallons
Product Removed to Date:	18.54 gallons

TABLE 3
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER SAMPLES--TPHg, TPHd, BTEX, and TOG
ARCO Station 276
Oakland, California
(Page 1 of 4)

Date/Well	TPHg (ppb)	TPHd (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	TOG (ppb)
MW-1							
04/24/89	<50	NA	<0.50	<0.50	<0.50	<0.50	NA
10/13/89	<20	NA	<0.50	<0.50	<0.50	<0.50	NA
02/01/90#	91	NA	<0.30	<0.30	<0.30	0.36	NA
07/31/90	<20	NA	<0.50	<0.50	<0.50	<0.50	NA
10/30/90	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
01/30/91	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
04/30/91	<30	NA	<0.30	<0.30	<0.30	<0.30	NA
08/06/91	<30	NA	<0.30	<0.30	<0.30	<0.30	NA
11/05/91	<30	NA	<0.30	<0.30	<0.30	<0.30	NA
03/10/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
06/30/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
09/09/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
11/20/92	<50	<0.5	<0.5	<0.5	<0.5	<0.5	NA
02/12/93	<50	<0.5	<0.5	<0.5	<0.5	<0.5	NA
05/12/93	<100*	NA	<0.5	<0.5	<0.5	<0.5	NA
MW-2							
04/24/89	165,000	NA	13,000	21,000	2,100	12,700	NA
10/13/89		Not sampled--floating product					
02/01/90		Not sampled--sheen					
07/31/90	240,000	NA	14,000	24,000	3,000	17,000	NA
10/30/90		Not sampled--floating product					
01/30/91		Not sampled--floating product					
04/30/91		Not sampled--sheen					
08/06/91		Not sampled--floating product					
11/05/91		Not sampled--floating product					
03/10/92	220,000	NA	8,200	13,000	4,500	22,000	NA
06/30/92	130,000	NA	10,000(9,300)	16,000(18,000)	4,700(4,200)	24,000(27,000)	NA
09/09/92		Not sampled--floating product					
11/20/92		Not sampled--floating product					
		Not sampled--floating product					
02/12/93		Not sampled--floating product					
05/12/93		Not sampled--floating product					
MW-3							
04/24/89#	560	NA	0.54	0.75	<0.50	<0.50	NA
10/13/89#	450	NA	<0.50	<0.50	<0.50	<0.50	NA
02/01/90#	360	NA	<0.30	<0.30	<0.30	0.85	NA
08/01/90#	440	NA	<0.50	<0.50	<0.50	<0.50	NA
10/30/90#	340	NA	<0.5	<0.5	<0.5	<0.5	NA
01/30/91		Not sampled--well dry					
04/30/91		Not sampled--well inaccessible due to construction					
08/06/91#	430	NA	<0.30	<0.30	<0.30	<0.30	NA

See notes on Page 4 of 4.

TABLE 3
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER SAMPLES--TPHg, TPHd, BTEX, and TOG
ARCO Station 276
Oakland, California
(Page 2 of 4)

Date/Well	TPHg (ppb)	TPHd (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	TOG (ppb)
MW-3 Cont.							
11/05/91#	290	NA	<1.5	<1.5	<1.5	<1.5	NA
03/10/92	<360*	NA	<0.5	<0.5	<0.5	<0.5	NA
06/30/92	<530*	NA	<0.5	<0.5	<0.5	<0.5	NA
09/09/92	<290*	NA	<0.5	<0.5	<0.5	<0.5	NA
11/20/92	<270*	NA	<0.5	<0.5	<2.4*	<1.8*	NA
02/12/93	<500*	NA	<0.5	<0.5	<0.5	<0.5	NA
05/12/93	<670*	NA	<0.5	<0.5	<0.5	<0.5	NA
MW-4							
04/24/89#	2,500	NA	270	1.4	<0.50	85	NA
10/13/89#	760	NA	0.86	<0.50	1.2	<0.50	NA
02/01/90#	680	NA	<0.30	<0.30	<0.30	1.6	NA
07/31/90#	470	240	<0.50	<0.50	<0.50	<0.50	<5,000
10/30/90#	430	<100	<0.5	<0.5	<0.5	<0.5	<5,000
01/30/91	<50	<100	<0.5	<0.5	1.2	<0.5	<5,000
04/30/91#	600	NA	<0.30	0.30	<0.30	0.43	NA
08/06/91#	520	NA	<0.30	<0.30	<0.30	<0.30	NA
11/05/91#	900	NA	<3.0	<3.0	<3.0	<3.0	NA
03/10/92	<730*	NA	<0.5	<0.5	<0.5	<0.5	<2500
06/30/92	<670*	NA	<0.5	<0.5	<2.3*	500	500
09/09/92	<470*	NA	<0.5	<0.5	<0.5	<0.5	3,600
11/20/92	<680*	NA	<0.5	<0.5	<6.3*	<3.2*	800
02/12/93	<860*	NA	<0.5	<0.5	<0.5	<0.5	25,000
05/12/93	<670*	NA	<0.5	<0.5	<1.4*	<1.3*	120,000
MW-5							
04/24/89#	130	NA	0.67	<0.50	<0.50	<0.50	NA
10/13/89#	75	NA	<0.50	<0.50	<0.50	<0.50	NA
02/01/90#	81	NA	0.94	0.88	<0.30	1.8	NA
07/31/90#	110	NA	<0.50	<0.50	<0.50	<0.50	NA
10/30/90	<50	NA	<0.5	<0.5	<0.5	<0.5	NA

See notes on page 4 of 4.

TABLE 3
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER SAMPLES–TPHg, TPHd, BTEX, and TOG
ARCO Station 276
Oakland, California
(Page 3 of 4)

Date/Well	TPHg (ppb)	TPHd (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	TOG (ppb)
MW-5 Cont.							
01/30/91	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
04/30/91#	120	NA	<0.30	<0.30	<0.30	<0.30	NA
08/06/91	<30	NA	<0.30	<0.30	<0.30	<0.30	NA
11/05/91#	77	NA	1.0	3.6	0.60	2.6	NA
03/10/92	<110*	NA	<0.5	<0.5	<0.5	<0.6*	NA
06/30/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
09/09/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
11/24/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
02/12/93	<150*	NA	<0.5	<0.5	<0.5	<0.5	NA
05/12/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
MW-6							
06/30/92	<850*	NA	<0.5	<0.5	<0.5	<0.5	NA
09/09/92	NS	NS	NS	NS	NS	NS	NS
11/20/92	NS	NS	NS	NS	NS	NS	NS
02/12/93	<1,900*	NA	<2.5*	<2.5*	<2.5*	<2.5*	NA
05/12/93	<1,600*	NA	<2.5*	<2.5*	<2.5*	<2.5*	NA
MW-7							
06/30/92	71,000	NA	5,100(5,100)	6,600(6,800)	2,300(2,300)	14,000(16,000)	NA
09/09/92		Not sampled–floating product					
11/20/92		Not sampled–floating product					
02/12/93		Not sampled–floating product					
05/12/93		Not sampled–floating product					
MW-8							
09/09/92	<50	NA	3.4(4)	<0.5	<0.5	0.7	NA
11/24/92	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
02/12/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA
05/12/93	<50	NA	<0.5	<0.5	<0.5	<0.5	NA

See notes on page 4 of 4.

TABLE 3
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER SAMPLES--TPHg, TPHd, BTEX, and TOG
ARCO Station 276
Oakland, California
(Page 4 of 4)

Date/Well	TPHg (ppb)	TPHd (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	TOG (ppb)
RW-1							
11/05/91#	750	NA	4.8	3.7	<3.0	<3.0	NA
03/10/92	<140*	NA	<0.5	<0.5	<0.5	<0.6*	NA
06/30/92	<400*	NA	<0.5	<0.5	<0.5	<0.5	NA
09/09/92	<520*	NA	<0.5	<0.5	<0.5	<0.5	NA
11/24/92	<650*	NA	<0.5	<0.5	<8.6*	<7.2*	NA
02/12/93	<260*	NA	<0.5	<0.5	<0.5	<0.5	NA
05/12/93	<240*	NA	<0.5	<0.5	<0.5	<0.5	NA
January 1990							
MCLs	---	---	1.0	---	680	1,750	---
DWAL	---	---	---	100	---	---	---

Results in parts per billion (ppb).
TPHg and
BTEX: Total petroleum hydrocarbons as gasoline and benzene, toluene, ethylbenzene, and xylenes using EPA method 5030/8020/California DHS LUFT Method.
TPHd: Total petroleum hydrocarbons as diesel using EPA method 3550/3510.
B: Benzene, T: Toluene, E: Ethylbenzene, T: Total Xylene isomers
BTEX: Measured using EPA method 8020/602.
TOG: Total oil and grease using Standard Method 5520 C&F.
NA: Not analyzed.
NS: Not sampled.
<. Results reported as less than detection limit.
#: Based on new results, the chromatograph peaks previously interpreted to be TPHg and BTEX have been reinterpreted to be a single peak hydrocarbon possibly (PCE).
*: Detection limit reportedly raised by laboratory due to matrix interference.
( ): BTEX as measured using EPA Method 624
1: Anality concentration is an estimate because this anality was also found in the method blank.
MCL: Maximum contaminant level
DWAL: Drinking water action level

TABLE 4
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER SAMPLES--VOCs and Metals
ARCO Station 276
Oakland, California
(Page 1 of 3)

Date/Well	Compound	VOCs (ppb)	Cd (ppm)	Cr (ppm)	Pb (ppm)	Zn (ppm)	Ni (ppm)
MW-1							
09/03/91	Tetrachloroethene	4.5	NA	NA	NA	NA	NA
11/06/91	All Compounds	<2.0	NA	NA	NA	NA	NA
03/10/92	Tetrachloroethene	8.2	NA	NA	NA	NA	NA
06/30/92	Tetrachloroethene	15	NA	NA	NA	NA	NA
09/09/92	Tetrachloroethene	6	NA	NA	NA	NA	NA
11/20/92	Tetrachloroethene	2	NA	NA	NA	NA	NA
02/12/93	Tetrachloroethene	92	NA	NA	NA	NA	NA
05/12/93	Tetrachloroethene	280	NA	NA	NA	NA	NA
MW-2							
09/03/91	———	Not sampled--floating product					
11/06/91	———	Not sampled--floating product					
03/10/92	Tetrachloroethene	0.9	NA	NA	NA	NA	NA
	1,2-Dichloroethene	5.4					
06/30/92**	All Compounds	<2,000	NA	NA	NA	NA	NA
09/09/92	———	Not sampled--floating product					
11/20/92	———	Not sampled--floating product					
02/12/93	———	Not sampled--floating product					
05/12/93		Not sampled--floating product					
MW-3							
09/03/91	Tetrachloroethene	1,600	NA	NA	NA	NA	NA
11/06/91	Tetrachloroethene	400	NA	NA	NA	NA	NA
03/10/92	Freon 12	3.4	NA	NA	NA	NA	NA
	cis-1,2-Dichloroethene	1.0					
	Trichloroethene	5.6					
	Tetrachloroethene	980					
06/30/92**	Tetrachloroethene	1,500	NA	NA	NA	NA	NA
09/09/92	Tetrachloroethene	800	NA	NA	NA	NA	NA
11/20/92	Tetrachloroethene	690	NA	NA	NA	NA	NA
02/12/93	Tetrachloroethene	1,200	NA	NA	NA	NA	NA
05/12/93	Tetrachloroethene	1,600	NA	NA	NA	NA	NA
MW-4							
07/31/90	Trichloroethene	7.5	NA	NA	NA	NA	NA
	Tetrachloroethene	1600	NA	NA	NA	NA	NA
	1,2 Dichloroethene	0.7	NA	NA	NA	NA	NA
10/30/90	Trichloroethene	8.1	NA	NA	NA	NA	NA
	Tetrachloroethene	3600	NA	NA	NA	NA	NA
	1,2 Dichloroethene	0.7	NA	NA	NA	NA	NA
01/30/91	Trichloroethene	12	NA	NA	NA	NA	NA
	Tetrachloroethene	4,900	NA	NA	NA	NA	NA
04/30/91	Tetrachloroethene	2,200	NA	NA	NA	NA	NA
08/06/91	Tetrachloroethene	1,700	<0.010	0.065	0.0067	0.14	0.096
09/03/91	Tetrachloroethene	2,000	NA	NA	NA	NA	NA

See notes on Page 3 of 3.

TABLE 4
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER SAMPLES--VOCs and Metals
ARCO Station 276
Oakland, California
(Page 2 of 3)

Date/Well	Compound	VOCs (ppb)	Cd (ppm)	Cr (ppm)	Pb (ppm)	Zn (ppm)	Ni (ppm)
MW-4 Cont.							
11/06/91	Tetrachloroethene	1,000	NA	NA	NA	NA	NA
	Trichloroethene	6.3	NA	NA	NA	NA	NA
03/10/92	cis-1,2-Dichloroethene	4.0	NA	NA	NA	NA	NA
	Trichloroethene	13					
	Tetrachloroethene	2,300					
06/30/92**	Tetrachloroethene	1,800	NA	NA	NA	NA	NA
09/09/92	Tetrachloroethene	1,300	NA	NA	NA	NA	NA
11/20/92	Tetrachloroethene	1,700	NA	NA	NA	NA	NA
02/12/93	Tetrachloroethene	1,800	NA	NA	NA	NA	NA
05/12/93	Tetrachloroethene	1,500	NA	NA	NA	NA	NA
MW-5							
08/06/91	Tetrachloroethene	7.3	NA	NA	NA	NA	NA
09/03/91	Tetrachloroethene	25	NA	NA	NA	NA	NA
11/06/91	Tetrachloroethene	12	NA	NA	NA	NA	NA
03/10/92	Trichloroethene	1.3	NA	NA	NA	NA	NA
	Tetrachloroethene	300					
06/30/92	Tetrachloroethene	30	NA	NA	NA	NA	NA
09/09/92	Tetrachloroethene	120	NA	NA	NA	NA	NA
11/24/92	Tetrachloroethene	93	NA	NA	NA	NA	NA
02/12/93	Tetrachloroethene	210	NA	NA	NA	NA	NA
05/12/93	Tetrachloroethene	50	NA	NA	NA	NA	NA
MW-6							
06/30/92**	Tetrachloroethene	2,400	NA	NA	NA	NA	NA
09/09/92	----------		Inaccessible well--paved over				
11/20/92	----------		Inaccessible well--paved over				
02/12/93	Tetrachloroethene	4,200	NA	NA	NA	NA	NA
05/12/93	Tetrachloroethene	3,500	NA	NA	NA	NA	NA
MW-7							
06/30/92**	All Compounds	<1000	NA	NA	NA	NA	NA
09/09/92	----------		Not sampled--floating product				
11/20/92	----------		Not sampled--floating product				
02/12/93	----------		Not sampled--floating product				
05/12/93	----------		Not sampled--floating product				
MW-8							
09/09/92	Tetrachloroethene	37	NA	NA	NA	NA	NA
11/24/92	Tetrachloroethene	2					
02/12/93	Tetrachloroethene	<1	NA	NA	NA	NA	NA
05/12/93	Tetrachloroethene	<1	NA	NA	NA	NA	NA
RW-1							
11/06/91	Tetrachloroethene	980	NA	NA	NA	NA	NA
03/10/92	Trichloroethene	1.7	NA	NA	NA	NA	NA
	Tetrachloroethene	400					

See notes on Page 3 of 3.

TABLE 4
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER SAMPLES--VOCs and Metals
ARCO Station 276
Oakland, California
(Page 3 of 3)

Date/Well	Compound	VOCs (ppb)	Cd (ppm)	Cr (ppm)	Pb (ppm)	Zn (ppm)	Ni (ppm)
RW-1 Cont.							
06/30/92**	Tetrachloroethene	1,100	NA	NA	NA	NA	NA
09/09/92	Tetrachloroethene	1,500	NA	NA	NA	NA	NA
11/24/92	Tetrachloroethene	1,500	NA	NA	NA	NA	NA
02/12/93	Tetrachloroethene	620	NA	NA	NA	NA	NA
05/12/93	Tetrachloroethene	500	NA	NA	NA	NA	NA
MCLs		5	0.010	0.05	0.05	5.0	

Results in parts per billion (ppb), except heavy metals which are in parts per million (ppm).
VOCs: Halogenated Volatile Organic Compounds using EPA method 601/8010 and 624. Compounds not shown were not detected.
Cd: Cadmium using EPA method 200.7.
Cr: Chromium using EPA method 200.7.
Pb: Lead using EPA method 239.7.
Zn: Zinc using EPA method 200.7.
Ni: Nickel using EPA method 200.7.
<: Results reported as less than the detection limit.
NA: Not analyzed. Compounds not shown not detected.
*: Exceeds the MCL of 5 ppb concentration of tetrachloroethane.
MCLs: Maximum Contaminant Levels as reported by the California Department of Health Services 10/24/90.
**: Raised Method Reporting Limit (MRL) due to high anality concentration requiring sample dilution.

APPENDIX A

EMCON'S FIELD REPORTS-
SUMMARY OF GROUNDWATER MONITORING DATA
CERTIFIED ANALYTICAL REPORTS WITH CHAIN-OF-CUSTODY
AND WATER SAMPLE FIELD DATA SHEETS

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-002.01 STATION ADDRESS : 10600 MacArthur Blvd. Oakland DATE : 4-30-93

ARCO STATION # : 276 FIELD TECHNICIAN : J BUTERA DAY : FRIDAY

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	VW-1	OK	YES	NA	NA	NA	14.98	14.93	NA	NA	NR	
2	VW-2	OK	YES	NA	NA	NA	DRY	DRY	NA	NA	NR	Probe hit mud at 13.0 ft
3	VW-3	OK	YES	NA	NA	NA	14.47	14.47	NA	NA	NR	
4	VW-4	OK	YES	NA	NA	NA	15.15	15.15	NA	NA	NR	
5	VW-5	OK	YES	NA	NA	NA	14.66	14.66	NA	NA	NR	
6	VW-6	OK	YES	NA	NA	NA	DRY	DRY	NA	NA	NR	Probe hits mud at 8 ft feet
7	VW-7	OK	YES	NA	NA	~~SLIP~~ NA	15.51	15.51	NA	NA	NR	BOX HAD WATER INSIDE
8	MW-5	OK	YES	YES	3499	YES	27.40	27.40	ND	ND	47.1	HEX SCREWS REPLACED
9	MW-1	OK	YES	YES	3259	YES	28.45	28.45	ND	ND	38 8	REPLACED 1 HEX NUT
10	MW-6	OK	YES	YES	NO	YES	35.56	33.56	ND	ND	54.2	
11	MW-8	OK	YES	NA	NA	SLIP	25.50	25.50	ND	ND	47.8	
12	MW-3	OK	YES	YES	3259	YES	28.79	28.79	ND	ND	48 8	SQUARE CAP
13	MW-4	OK	YES	YES	3259	YES	28.24	28.24	ND	ND	48.9	
14	RW-1	OK	YES	NA	NA	SLIP	28.55	28.55	ND	ND	48 8	SLIP CAP NEED REPLACING SQUARE CAP

SURVEY POINTS ARE TOP OF WELL CASINGS

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-002.01 STATION ADDRESS : 10600 MacArthur Blvd. Oakland DATE : 4-30-93

ARCO STATION # : 276 FIELD TECHNICIAN : J. BUTERA DAY : FRIDAY

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
15	MW-2	OK	YES	GOOD	NA	SLIP	15.48	15.48	ND	ND	25.5	SQUARE LID STUCK
16	MW-7	OK	YES	GOOD	NA	SLIP	19.34	19.34	*	*	55.0	Product was present in well. It did not go into bailer but coated the outside. Therefore a thickness could not be measured.

SURVEY POINTS ARE TOP OF WELL CASINGS

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

Date June 3, 1993
Project 0G70-002.01

To:
Mr. John Young
RESNA
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
9	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 276, 10600 MacArthur Boulevard, Oakland, CA. Groundwater monitoring is conducted consistent with applicable regulatory guidelines. Please call if you have any questions: (408) 453-2266.

Jim Butera JB

Reviewed by:

REGISTERED PROFESSIONAL ENGINEER No: 4[illegible] Exp. 6/30/96 INDUSTRIAL STATE OF CALIFORNIA

Robert Porter, Senior Project Engineer.

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-002.01 STATION ADDRESS : 10600 MacArthur Blvd. Oakland DATE : 5 12 93

ARCO STATION # : 276 FIELD TECHNICIAN : REICHELDERFER/WILLIAMS 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	**VW-1**	OK	YES	YES	NO	NO	15.40	15.41	ND	NA	16.2	—
2	**VW-2**	OK	YES	YES	NO	NO	DRY	DRY	ND	NA	12.9	—
3	**VW-3**	OK	YES	YES	NO	NO	14.98	14.98	ND	NA	16.1	—
4	**VW-4**	OK	YES	YES	NO	NO	15.62	15.62	ND	NA	17.5	—
5	**VW-5**	OK	YES	YES	NO	NO	15.19	15.19	ND	NA	16.6	—
6	**VW-6**	OK	YES	YES	NO	NO	DRY	DRY	ND	NA	3.7	—
7	**VW-7**	OK	YES	YES	NO	NO	15.92	15.91 R	ND	NA	17.4	GAUGE IS BROKEN - READS 17 P.S.I. / WATER IN BOX
8	**MW-5**	OK	YES	YES	3499	OK	27.83	27.83	ND	NA	47.0	—
9	**MW-1**	OK	YES	YES	3259	OK	28.88	28.89	ND	NA	38.8	ONE HEX BOLT IS SNAPPED OFF IN LOCK
10	**MW-6**	OK	YES	OK	3616	OK	33.95	33.95	ND	NA	53.9	NO LOCK ON LWC. → INSTALLED 3616 LOCK WATER IN BOX, BELOW LWC
11	**MW-8**	OK	YES	OK	NO	NO	25.95	25.95	ND	NA	47.8	—
12	**MW-3**	OK	YES	OK	3259	OK	29.17	29.17	ND	NA	~~29.17~~ 38.6	LWC WAS EXTREMELY LOOSE
13	**MW-4**	OK	YES	OK	3259	OK	28.60	28.60	ND	NA	48.2	—
14	**RW-1**	OK	YES	OK	NO LOCK	NO LOCKING CAP	28.94	28.94	ND	ND	48.8	(NEED SLIP) NO LOCKING CAP

SURVEY POINTS ARE TOP OF WELL CASINGS

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-002.01 STATION ADDRESS : 10600 MacArthur Blvd. Oakland DATE : 5-12 93

ARCO STATION # : 276 FIELD TECHNICIAN : REICHELDERFER / WILLIAMS 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
15	**MW-2**	OK	YES	OK	NO	NO	15.82	15.82	15.81	0.01	25.5	0.01 PRODUCT IN BAILER
16	**MW-7**	OK	YES	OK	3259 OK	OK	19.81	19.81	19.80	0.01	55.0	0.01 PRODUCT IN BAILER

SURVEY POINTS ARE TOP OF WELL CASINGS

Summary of Groundwater Monitoring Data
Second Quarter 1993
ARCO Service Station 276
10600 MacArthur Boulevard, 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)	TOG[2] Grease 5520C/F (ppm)
MW-1(38)	05/12/93	28.88	ND.[3]	<100.	<0.5	<0.5	<0.5	<0.5	NR.[4]
MW-2	05/12/93	15.82	0.01	FP.[5]	FP	FP.	FP.	FP.	NR.
MW-3(38)	05/12/93	29.17	ND.	<670.	<0.5	<0.5	<0.5	<0 5	NR.
MW-4(48)	05/12/93	28 60	ND	<670.	<0.5	<0.5	<1.4	<1 3	120/100*
MW-5(46)	05/12/93	27.83	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR.
MW-6(53)	05/12/93	33.95	ND.	<1,600	<2 5	<2.5	<2.5	<2 5	NR.
MW-7	05/12/93	19.81	0.01	FP.	FP.	FP.	FP.	FP.	NR.
MW-8(47)	05/12/93	25.95	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR
RW-1(48)	05/12/93	28.94	ND.	<240.	<0.5	<0.5	<0.5	<0.5	NR.
FB-1[6]	05/12/93	NA.[7]	NA.	<50	<0.5	<0.5	<0.5	<0.5	NR.

1. TPH = Total petroleum hydrocarbons
2. TOG. = Total Oil and Grease
3. ND. = Not detected
4. NR. = Not reported; sample was not scheduled for analysis of the selected parameter
5. FP. = Floating product detected in well, no samples were taken
6. FB. = Field blank
7. NA. = Not applicable

* = Please note result is reported as parts per million

Summary of Analytical Results
Volatile Organic Compounds by EPA[1] Methods 624
Second Quarter 1993
ARCO Service Station 276
10600 MacArthur Boulevard, Oakland, California
micrograms per liter (µg/l) or parts per billion (ppb)

Well ID and Sample Depth	Sampling Date	PCE[2] (ppb)
MW-1(38)	05/12/93	280.
MW-2	05/12/93	FP.[3]
MW-3(38)	05/12/93	1,600.
MW-4(48)	05/12/93	1,500.
MW-5(46)	05/12/93	50.
MW-6(53)	05/12/93	3,500.
MW-7	05/12/93	FP.
MW-8(47)	05/12/93	<1.
RW-1(48)	05/12/93	500.
FB-1[4]	05/12/93	<1.

1. EPA = United States Environmental Protection Agency
2. PCE = Tetrachloroethene
3. FP. = Floating product detected in well, no samples were taken
4. FB = Field blank

Columbia Analytical Services, Inc.

May 28, 1993 Service Request No. SJ93-0657

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

Re: **EMCON Project No. 0G70-002.01**
ARCO Facility No. 276

Dear Mr. Butera:

Attached are the results of the water samples submitted to our lab on May 13, 1993. For your reference, these analyses have been assigned our service request number SJ93-0657.

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/drf

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	Date Received:	05/13/93
Project:	EMCON Project No. 0G70-002 01	Service Request No.:	SJ93-0657
	ARCO Facility No 276	Sample Matrix:	Water

Inorganic Parameters[1]
mg/L (ppm)

Sample Name:		MW-4 (48)	Method Blank
Date Sampled:		05/12/93	
Analyte	Method	MRL	
Total Oil and Grease	SM 5520C	0 5	120. ND
Hydrocarbons, IR	SM 5520F	0.5	100. ND

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit
SM *Standard Methods for the Examination of Water and Wastewater*, 17th Ed., 1989
Unless otherwise noted, all analyses were performed within EPA recommended maximum holding times specified in *Test Methods for Evaluating Solid Waste*, (SW-846, 3rd Edition) and *Methods for Chemical Analysis of Water and Waste* (EPA-600/4-79-020, Revised March 1983).

Approved by: Kevin Murphy Date: May 27, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	Date Received:	05/13/93
Project:	EMCON Project No. 0G70-002 01	Service Request No.:	SJ93-0657
	ARCO Facility No. 276	Sample Matrix:	Water

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

Sample Name:		MW-1 (38)	MW-3 (38)	MW-4 (48)
Date Analyzed:		05/20/93	05/21/93	05/20/93 *
Analyte	**MRL**			
Benzene	0.5	ND	ND	ND
Toluene	0.5	ND	ND	ND
Ethylbenzene	0.5	ND	ND	<1.4 **
Total Xylenes	0.5	ND	ND	<1.3 **
TPH as Gasoline	50	<100. ***	<670. ***	<670. ***

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit
* This sample was part of the analytical batch started on May 20, 1993. However, it was analyzed after midnight so the actual date analyzed is May 21, 1993.
** Raised MRL due to matrix interference.
*** Raised MRL due to matrix interference. The sample contains a single non-fuel component eluting in the gasoline range. The chromatogram does not match the typical gasoline fingerprint.

Approved by: Kenneth Murphy Date: May 27, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	Date Received:	05/13/93
Project:	EMCON Project No. 0G70-002 01	Service Request No.:	SJ93-0657
	ARCO Facility No. 276	Sample Matrix:	Water

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

Sample Name:		MW-5 (46)	MW-6 (53)	MW-8 (47)
Date Analyzed:		05/20/93 *	05/20/93 *	05/20/93 *
Analyte	MRL			
Benzene	0.5	ND	<2.5 **	ND
Toluene	0.5	ND	<2.5 **	ND
Ethylbenzene	0.5	ND	<2.5 **	ND
Total Xylenes	0.5	ND	<2.5 **	ND
TPH as Gasoline	50	ND	<1,600. ***	ND

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit
* This sample was part of the analytical batch started on May 20, 1993. However, it was analyzed after midnight so the actual date analyzed is May 21, 1993.
** Raised MRL due to non-target analyte concentration requiring sample dilution.
*** Raised MRL due to matrix interference. The sample contains a single non-fuel component eluting in the gasoline range. The chromatogram does not match the typical gasoline fingerprint.

Approved by: Kevin Murphy Date: May 27, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	Date Received:	05/13/93
Project:	EMCON Project No 0G70-002 01	Service Request No.:	SJ93-0657
	ARCO Facility No 276	Sample Matrix:	Water

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

Sample Name:		RW-1 (48)	FB-1	Method Blank
Date Analyzed:		05/20/93 *	05/20/93 *	05/20/93
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	<240. **	ND	ND

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit
* This sample was part of the analytical batch started on May 20, 1993. However, it was analyzed after midnight so the actual date analyzed is May 21, 1993.
** Raised MRL due to matrix interference. The sample contains a single non-fuel component eluting in the gasoline range. The chromatogram does not match the typical gasoline fingerprint.

Approved by: Kevin Murphy Date: May 27, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	Date Received:	05/13/93
Project:	EMCON Project No. 0G70-002 01	Service Request No.:	SJ93-0657
	ARCO Facility No. 276	Sample Matrix:	Water

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

Sample Name:		Method Blank
Date Analyzed:		05/21/93
Analyte	**MRL**	
Benzene	0.5	ND
Toluene	0.5	ND
Ethylbenzene	0.5	ND
Total Xylenes	0.5	ND
TPH as Gasoline	50	ND

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

Approved by: Kevin Mighty Date: May 27, 1993

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:**	05/13/93
Project:	EMCON Project No. 0G70-002 01 ARCO Facility No. 276	**Service Request No.:** **Sample Matrix:**	SJ93-0657 Water

Volatile Organic Compounds
EPA Method 624
µg/L (ppb)

Sample Name: Date Analyzed:		MW-1 (38) 05/21/93	MW-3 (38) * 05/21/93	MW-4 (48) * 05/21/93
Analyte	**MRL**			
Chloromethane	10	ND	<200.	<200.
Vinyl Chloride	10	ND	<200.	<200.
Bromomethane	10	ND	<200.	<200.
Chloroethane	10	ND	<200.	<200.
Trichlorofluoromethane (Freon 11)	1	ND	<20.	<20.
Trichlorotrifluoroethane (Freon 113)	10	ND	<200.	<200.
1,1-Dichloroethene	1	ND	<20.	<20.
Acetone	20	ND	<400.	<400.
Carbon Disulfide	1	ND	<20.	<20.
Methylene Chloride	10	ND	<200.	<200.
trans-1,2-Dichloroethene	1	ND	<20.	<20.
cis-1,2-Dichloroethene	1	ND	<20.	<20.
2-Butanone (MEK)	10	ND	<200.	<200.
1,1-Dichloroethane	1	ND	<20.	<20.
Chloroform	1	ND	<20.	<20.
1,1,1-Trichloroethane (TCA)	1	ND	<20.	<20.
Carbon Tetrachloride	1	ND	<20.	<20.
Benzene	1	ND	<20.	<20.
1,2-Dichloroethane	1	ND	<20.	<20.
Vinyl Acetate	10	ND	<200.	<200.
Trichloroethene (TCE)	1	ND	<20.	<20.
1,2-Dichloropropane	1	ND	<20.	<20.
Bromodichloromethane	1	ND	<20.	<20.
2-Chloroethyl Vinyl Ether	10	ND	<200.	<200.
trans-1,3-Dichloropropene	1	ND	<20.	<20.
2-Hexanone	10	ND	<200.	<200.
4-Methyl-2-pentanone (MIBK)	10	ND	<200.	<200.
Toluene	1	ND	<20.	<20.
cis-1,3-Dichloropropene	1	ND	<20.	<20.
1,1,2-Trichloroethane	1	ND	<20.	<20.
Tetrachloroethene (PCE)	1	280.	1,600.	1,500.
Dibromochloromethane	1	ND	<20.	<20.
Chlorobenzene	1	ND	<20.	<20.
Ethylbenzene	1	ND	<20.	<20.
Styrene	1	ND	<20.	<20.
Total Xylenes	5	ND	<100.	<100.
Bromoform	1	ND	<20.	<20.
1,1,2,2-Tetrachloroethane	1	ND	<20.	<20.
1,3-Dichlorobenzene	1	ND	<20.	<20.
1,4-Dichlorobenzene	1	ND	<20.	<20.
1,2-Dichlorobenzene	1	ND	<20.	<20.

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit
* Raised MRL due to high analyte concentration requiring sample dilution.

Approved by: _____ Date: May 27, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	Date Received:	05/13/93
Project:	EMCON Project No. 0G70-002.01	Service Request No.:	SJ93-0657
	ARCO Facility No. 276	Sample Matrix:	Water

Volatile Organic Compounds
EPA Method 624
µg/L (ppb)

Sample Name:		MW-5 (46)	MW-6 (53) *	MW-8 (47)
Date Analyzed:		05/21/93	05/21/93	05/21/93
Analyte	**MRL**			
Chloromethane	10	ND	<500.	ND
Vinyl Chloride	10	ND	<500.	ND
Bromomethane	10	ND	<500.	ND
Chloroethane	10	ND	<500.	ND
Trichlorofluoromethane (Freon 11)	1	ND	<50.	ND
Trichlorotrifluoroethane (Freon 113)	10	ND	<500.	ND
1,1-Dichloroethene	1	ND	<50.	ND
Acetone	20	ND	<1,000.	ND
Carbon Disulfide	1	ND	<50.	ND
Methylene Chloride	10	ND	<500.	ND
trans-1,2-Dichloroethene	1	ND	<50.	ND
cis-1,2-Dichloroethene	1	ND	<50.	ND
2-Butanone (MEK)	10	ND	<500.	ND
1,1-Dichloroethane	1	ND	<50.	ND
Chloroform	1	ND	<50.	ND
1,1,1-Trichloroethane (TCA)	1	ND	<50.	ND
Carbon Tetrachloride	1	ND	<50.	ND
Benzene	1	ND	<50.	ND
1,2-Dichloroethane	1	ND	<50.	ND
Vinyl Acetate	10	ND	<500.	ND
Trichloroethene (TCE)	1	ND	<50.	ND
1,2-Dichloropropane	1	ND	<50.	ND
Bromodichloromethane	1	ND	<50.	ND
2-Chloroethyl Vinyl Ether	10	ND	<500.	ND
trans-1,3-Dichloropropene	1	ND	<50.	ND
2-Hexanone	10	ND	<500.	ND
4-Methyl-2-pentanone (MIBK)	10	ND	<500.	ND
Toluene	1	ND	<50.	ND
cis-1,3-Dichloropropene	1	ND	<50.	ND
1,1,2-Trichloroethane	1	ND	<50.	ND
Tetrachloroethene (PCE)	1	50.	3,500.	ND
Dibromochloromethane	1	ND	<50.	ND
Chlorobenzene	1	ND	<50.	ND
Ethylbenzene	1	ND	<50.	ND
Styrene	1	ND	<50.	ND
Total Xylenes	5	ND	<250.	ND
Bromoform	1	ND	<50.	ND
1,1,2,2-Tetrachloroethane	1	ND	<50.	ND
1,3-Dichlorobenzene	1	ND	<50.	ND
1,4-Dichlorobenzene	1	ND	<50.	ND
1,2-Dichlorobenzene	1	ND	<50.	ND

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit
* Raised MRL due to high analyte concentration requiring sample dilution.

Approved by: Kristine Murphy Date: May 27, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	Date Received:	05/13/93
Project:	EMCON Project No. 0G70-002.01	Service Request No.:	SJ93-0657
	ARCO Facility No. 276	Sample Matrix:	Water

Volatile Organic Compounds
EPA Method 624
µg/L (ppb)

Sample Name:		RW-1 (48)	FB-1	Method Blank
Date Analyzed:		05/21/93	05/21/93	05/21/93
Analyte	**MRL**			
Chloromethane	10	<200.	ND	ND
Vinyl Chloride	10	<200.	ND	ND
Bromomethane	10	<200.	ND	ND
Chloroethane	10	<200.	ND	ND
Trichlorofluoromethane (Freon 11)	1	<20.	ND	ND
Trichlorotrifluoroethane (Freon 113)	10	<200.	ND	ND
1,1-Dichloroethene	1	<20.	ND	ND
Acetone	20	<400.	ND	ND
Carbon Disulfide	1	<20.	ND	ND
Methylene Chloride	10	<200.	ND	ND
trans-1,2-Dichloroethene	1	<20.	ND	ND
cis-1,2-Dichloroethene	1	<20.	ND	ND
2-Butanone (MEK)	10	<200.	ND	ND
1,1-Dichloroethane	1	<20.	ND	ND
Chloroform	1	<20.	ND	ND
1,1,1-Trichloroethane (TCA)	1	<20.	ND	ND
Carbon Tetrachloride	1	<20.	ND	ND
Benzene	1	<20.	ND	ND
1,2-Dichloroethane	1	<20.	ND	ND
Vinyl Acetate	10	<200.	ND	ND
Trichloroethene (TCE)	1	<20.	ND	ND
1,2-Dichloropropane	1	<20.	ND	ND
Bromodichloromethane	1	<20.	ND	ND
2-Chloroethyl Vinyl Ether	10	<200.	ND	ND
trans-1,3-Dichloropropene	1	<20.	ND	ND
2-Hexanone	10	<200.	ND	ND
4-Methyl-2-pentanone (MIBK)	10	<200.	ND	ND
Toluene	1	<20.	ND	ND
cis-1,3-Dichloropropene	1	<20.	ND	ND
1,1,2-Trichloroethane	1	<20.	ND	ND
Tetrachloroethene (PCE)	1	500.	ND	ND
Dibromochloromethane	1	<20.	ND	ND
Chlorobenzene	1	<20.	ND	ND
Ethylbenzene	1	<20.	ND	ND
Styrene	1	<20.	ND	ND
Total Xylenes	5	<100.	ND	ND
Bromoform	1	<20.	ND	ND
1,1,2,2-Tetrachloroethane	1	<20.	ND	ND
1,3-Dichlorobenzene	1	<20.	ND	ND
1,4-Dichlorobenzene	1	<20.	ND	ND
1,2-Dichlorobenzene	1	<20.	ND	ND

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit
* Raised MRL due to high analyte concentration requiring sample dilution.

Approved by: _____ Date: May 27 1993

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APPENDIX A

LABORATORY QC RESULTS

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No 0G70-002.01
Arco Facility No. 276

Date Received: 05/13/93
Service Request No.: SJ93-0657
Sample Matrix: Water

Continuing Calibration Summary
Inorganics
SM5520C
mg/L

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Total Oil and Grease	40.	41.1	103.	90-110

Approved by: _____ Date: May 27, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-002 01
Arco Facility No 276

Date Received: 05/13/93
Service Request No.: SJ93-0657
Sample Matrix: Water

Matrix Spike Summary
Inorganic Parameters
mg/L (ppm)

Sample Name: MW-4 (48)

Analyte	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Criteria
Total Oil and Grease	4.	120.	152.	142.	NA	NA	56-151

NA Not applicable because the analyte concentration in the sample is 30 times greater than the spike level.

Approved by: _____ Date: May 27, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

QA QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-002.01
ARCO Facility No 276

Date Received: 05/13/93
Service Request No.: SJ93-0657

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

Date Analyzed: 05/20/93

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Benzene	25.	24.6	98.	85-115
Toluene	25.	26.2	105.	85-115
Ethylbenzene	25.	25.7	103.	85-115
Total Xylenes	75.	76.2	102.	85-115
TPH as Gasoline	250.	248.	99.	90-110

TPH Total Petroleum Hydrocarbons

Approved by: _____ Date: May 27, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	Date Received:	05/13/93
Project:	EMCON Project No. 0G70-002 01	Service Request No.:	SJ93-0657
	ARCO Facility No. 276	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 *a,a,a*-Trifluorotoluene
MW-1 (38)	05/20/93	90.
MW-3 (38)	05/21/93	98.
MW-4 (48)	05/20/93	95.
MW-5 (46)	05/20/93	91.
MW-6 (53)	05/20/93	93.
MW-8 (47)	05/20/93	93.
RW-1 (48)	05/20/93	95.
FB-1	05/20/93	94.
MS	05/20/93	109.
DMS	05/20/93	107.
Method Blank	05/20/93	91.
Method Blank	05/21/93	89.
CAS Acceptance Criteria		70-130

TPH Total Petroleum Hydrocarbons

Approved by: Kevin Murphy Date: May 27, 1993

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No 0G70-002 01
ARCO Facility No 276

Date Received: 05/13/93
Service Request No.: SJ93-0657
Sample Matrix: Water

Matrix Spike/Duplicate Matrix Spike Summary
TPH as Gasoline
EPA Methods 5030/California DHS LUFT Method
µg/L (ppb)

Date Analyzed: 05/20/93

Analyte	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Criteria
TPH as Gasoline	1,250.	3,260.	4,510.	4,450.	100.	95.	76-130

TPH Total Petroleum Hydrocarbons

Approved by: Kathleen Murphy Date: May 27, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-002.01
ARCO Facility No. 276

Date Received: 05/13/93
Service Request No.: SJ93-0657

Initial Calibration Verification
Volatile Organic Compounds
EPA Method 624
µg/L (ppb)

Date Analyzed: 05/21/93

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Chloromethane	50	44.9	90.	70-130
Vinyl Chloride	50	44.6	89.	70-130
Bromomethane	50	46.5	93.	70-130
Chloroethane	50	47.4	95.	70-130
Acetone	50	54.5	109.	70-130
1,1-Dichloroethene	50	47.3	95.	70-130
Carbon Disulfide	50	44.0	88.	70-130
Methylene Chloride	50	48.7	97.	70-130
trans-1,2-Dichloroethene	50	47.2	94.	70-130
cis-1,2-Dichloroethene	50	45.6	91.	70-130
1,1-Dichloroethane	50	44.6	89.	70-130
Vinyl Acetate	50	31.1	62.	70-130
2-Butanone	50	53.7	107.	70-130
Chloroform	50	45.7	91.	70-130
1,1,1-Trichloroethane (TCA)	50	45.7	91.	70-130
Carbon Tetrachloride	50	45.9	92.	70-130
Benzene	50	46.9	94.	70-130
1,2-Dichloroethane	50	46.4	93.	70-130
Trichloroethene (TCE)	50	49.4	99.	70-130
1,2-Dichloropropane	50	45.6	91.	70-130
Bromodichloromethane	50	46.7	93.	70-130
2-Chloroethyl Vinyl Ether	50	52.5	105.	70-130
2-Hexanone	50	51.8	104.	70-130
trans-1,3-Dichloropropene	50	47.4	95.	70-130
Toluene	50	49.6	99.	70-130
cis-1,3-Dichloropropene	50	48.2	96.	70-130
1,1,2-Trichloroethane	50	49.5	99.	70-130
Tetrachloroethene (PCE)	50	48.2	96.	70-130
Dibromochloromethane	50	48.2	96.	70-130
Chlorobenzene	50	48.6	97.	70-130
Ethylbenzene	50	48.6	97.	70-130
o-Xylene	50	49.8	100.	70-130
Styrene	50	49.7	99.	70-130
Bromoform	50	51.1	102.	70-130
1,1,2,2-Tetrachloroethane	50	48.6	97.	70-130

Approved by: Kenneth Murphy Date: May 27, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-002 01
ARCO Facility No. 276

Date Received: 05/13/93
Service Request No.: SJ93-0657
Sample Matrix: Water

Surrogate Recovery Summary
Volatile Organic Compounds
EPA Method 624

Sample Name	Date Analyzed	Percent Recovery		
		1,2-Dichloroethane - D_4	Toluene - D_8	4-Bromofluorobenzene
MW-1 (38)	05/21/93	95.	104.	100.
MW-3 (38)	05/21/93	98.	100.	99.
MW-4 (48)	05/21/93	94.	102.	98.
MW-5 (46)	05/21/93	96.	102.	98.
MW-6 (53)	05/21/93	95.	102.	99.
MW-8 (47)	05/21/93	97.	100.	100.
RW-1 (48)	05/21/93	99.	101.	100.
FB-1	05/21/93	95.	100.	100.
MW-3 (38) MS	05/21/93	95.	101.	99.
MW-3 (38) DMS	05/21/93	98.	101.	99.
Method Blank	05/21/93	94.	98.	99.
	EPA Acceptance Criteria	76-114	88-110	86-115

Approved by: Kenneth Murphy Date: May 27, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-002.01
ARCO Facility No. 276

Date Received: 05/13/93
Service Request No.: SJ93-0657
Sample Matrix: Water

Matrix Spike/Duplicate Matrix Spike Summary
Volatile Organic Compounds
EPA Method 624
µg/L (ppb)

Sample Name: MW-3 (38)
Date Analyzed: 05/21/93

Analyte	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	EPA Acceptance Criteria	Relative Percent Difference
1,1-Dichloroethene	1,000.	ND	1,020.	1,110.	102.	111.	61-145	8.
Trichloroethene	1,000.	ND	894.	954.	89.	95.	71-120	6.
Chlorobenzene	1,000.	ND	860.	920.	86.	92.	75-130	7.
Toluene	1,000.	ND	918.	970.	92.	97.	76-125	6.
Benzene	1,000.	ND	876.	936.	88.	94.	76-127	7.

ND None Detected at or above the method reporting limit

Approved by: Kevin Murphy Date: May 27, 1993

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APPENDIX B

CHAIN OF CUSTODY

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

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. EMC-93-5

Chain of Custody

ARCO Facility no: 276	City (Facility): OAKLAND	Project manager (Consultant): JIM BUTERA	Laboratory name: CAS
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		Contract number: 07077

Method of shipment: SAMPLER WILL DELIVER

Sample ID	Lab no	Container no	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	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 624/8240	EPA 625/8270	TCLP Metals VOA / Sem. VOA	CAM Metals EPA 6010/7000 TTLC / STLC	Lead Org./DHS / Lead EPA 7420/7421	
MW-1(38)	1-4	4		X		X	HCl	5-12-93	1403		X					X					
MW-2( )		2									X	NO SAMPLES TAKEN, PRODUCT IN WELL									
MW-3(38)	5-8	4						5-12-93	1542		X					X					
MW-4(48)	9-12	8							1618		X		X			X					
MW-5(46)	17-20	4							1415		X					X					
MW-6(53)	21-24	4							1454		X					X					
MW-7( )		2									X	NO SAMPLES TAKEN, PRODUCT IN WELL									
MW-8(47)	25-28	4						5-12-93	1515		X					X					
MW-1(48)	29-32	4							1630		X					X					
FB-1	33-34 (2)	4							1410		X					X					

Special detection Limit/reporting: LOWEST POSSIBLE

Special QA/QC: AS NORMAL

Remarks: 4-40ml HCl VOAs; 4-LITER HCl GLASS

Lab number: SJ93-0657

Turnaround time

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

Condition of sample: OK

Temperature received: COOL

	Date	Time		Date	Time
Relinquished by sampler	5-13-93	0925	Received by: Kevin Howard		
Relinquished by			Received by		
Relinquished by			Received by laboratory: Kevin Howard	5-13-93	0930

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 - 002.01 | SAMPLE ID: MW-1 (38)

PURGED BY: K REICHELDERFER | CLIENT NAME: ARCO 276

SAMPLED BY: ↓ | LOCATION: 1060 MacARTHUR BLVD, OAKLAND, CA

TYPE: Ground Water X | Surface Water ___ | Treatment Effluent ___ | Other ___

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

CASING ELEVATION (feet/MSL)	NR	VOLUME IN CASING (gal.)	1.62
DEPTH TO WATER (feet)	28.88	CALCULATED PURGE (gal.)	4.86
DEPTH OF WELL (feet)	38.8	ACTUAL PURGE VOL (gal.)	5.00

DATE PURGED: 5-12-93 | Start (2400 Hr) 1344 | End (2400 Hr) 1358

DATE SAMPLED: 5-12-93 | Start (2400 Hr) 1403 | End (2400 Hr) 1405

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1347	2.00	6.58	3130	68.9	LT BROWN	MODERATE
1355	3.50	6.70	3260	67.1	↓	↓
1358	5.00	6.61	3140	66.8	↓	↓

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

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): FB-1 @ 1410

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon &)	___ 2" Bladder Pump	X Bailer (Teflon &)
___ Centrifugal Pump	X 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: ONE HEX BOLT IS SNAPPED OFF IN HOLE

Meter Calibration: Date: 5-12-93 Time: 1320 Meter Serial #: 9203 Temperature °C: 77.9

(EC 1000 959 / 1000) (DI 5.51) (pH 7 7.06 / 7.00) (pH 10 10.04 / 10.00) (pH 4 3.96 / —)

Location of previous calibration: ___

Signature: Kevin Reichelderfer | Reviewed By: [illegible] | Page 1 of 9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0970-002.01 SAMPLE ID: MW-2 (NA)

PURGED BY: K REICHELDERFER CLIENT NAME: ARCO 276

SAMPLED BY: NA LOCATION: 10600 MacARTHUR B OAKLAND, CA

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): NA

DEPTH TO WATER (feet): 15.82 CALCULATED PURGE (gal.): NA

DEPTH OF WELL (feet): 25.5 ACTUAL PURGE VOL. (gal.): NA

DATE PURGED: 5-12-93 Start (2400 Hr) NA End (2400 Hr) NA

DATE SAMPLED: NA Start (2400 Hr) NA End (2400 Hr) NA

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
NO SAMPLES TAKEN - PRODUCT IN WELL						

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

___ 2" Bladder Pump
___ Centrifugal Pump
___ Submersible Pump
___ Well Wizard™
___ Bailer (Teflon®)
___ Bailer (PVC)
___ Bailer (Stainless Steel)
___ Dedicated
Other: NA

SAMPLING EQUIPMENT

___ 2" Bladder Pump
___ DDL Sampler
___ Dipper
___ Well Wizard™
___ Bailer (Teflon®)
___ Bailer (Stainless Steel)
___ Submersible Pump
___ Dedicated
Other: NA

WELL INTEGRITY: OK LOCK #: NONE

REMARKS: NO SAMPLES TAKEN - PRODUCT IN WELL

Meter Calibration: Date: 5-12-93 Time: ___ Meter Serial #: ___ Temperature °F: ___

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

Location of previous calibration: ___

Signature: Kevin Reichelderfer Reviewed By: JB

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: CG70-002.01 SAMPLE ID: MW-3(38)

PURGED BY: K REICHELDERFER CLIENT NAME: ARCO 276

SAMPLED BY: ↓ LOCATION: 10600 MacARTHUR BL OAKLAND, CA

TYPE. Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

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

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	1.54
DEPTH TO WATER (feet):	29.18	CALCULATED PURGE (gal.):	4.62
DEPTH OF WELL (feet):	38.6	ACTUAL PURGE VOL (gal.):	5.0C

DATE PURGED: 5-12-93 Start (2400 Hr) 1525 End (2400 Hr) 1537

DATE SAMPLED: 5-12-93 Start (2400 Hr) 1542 End (2400 Hr) 1544

TIME (2400 Hr)	VOLUME (gal)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1528	2.00	6.82	1645	67.3	BROWN	HEAVY
1533	3.50	6.85	1588	65.9	↓	↓
1537	5.00	6.81	1573	65.9		

D. O. (ppm): NR ODOR: NONE COLOR: NR (COBALT 0 - 100) TURBIDITY: 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	X Bailer (Teflon &)
___ Centrifugal Pump	X 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: LWC WAS EXTREMELY LOOSE

Meter Calibration: Date: 5-12-93 Time: 1330 Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: MW-1

Signature: Kevin Reichelderfer Reviewed By: ___ Page 3 of 9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: OG70-002.01 SAMPLE ID: MW-4 (48)

PURGED BY: K REICHELDERFER CLIENT NAME: ARCO 276

SAMPLED BY: ↓ LOCATION: 10600 MacARTHUR B OAKLAND, CA

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

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

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	3.19
DEPTH TO WATER (feet):	28.64	CALCULATED PURGE (gal.):	9.58
DEPTH OF WELL (feet):	48.2	ACTUAL PURGE VOL. (gal.):	10.00

DATE PURGED: 5-12-93 Start (2400 Hr) 1557 End (2400 Hr) 1612

DATE SAMPLED: 5-12-93 Start (2400 Hr) 1618 End (2400 Hr) 1625

TIME (2400 Hr)	VOLUME (gal)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1602	3.50	7.06	1308	66.2	BROWN	HEAVY
1607	7.00	7.11	1252	65.8	↓	↓
1612	10.00	7.03	1246	66.5		

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

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

PURGING EQUIPMENT

___ 2" Bladder Pump
___ Centrifugal Pump
___ Submersible Pump
___ Well Wizard™
___ Bailer (Teflon®)
X Bailer (PVC)
___ Bailer (Stainless Steel)
___ Dedicated
Other: ___

SAMPLING EQUIPMENT

___ 2" Bladder Pump
___ DDL Sampler
___ Dipper
___ Well Wizard™
X Bailer (Teflon®)
___ Bailer (Stainless Steel)
___ Submersible Pump
___ Dedicated
Other: ___

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 5-12-93 Time: 1330 Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: MW-1

Signature: Kevin Reichelderfer Reviewed By: JB Page 9 of 9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-002-01 SAMPLE ID: MW-5

PURGED BY: J Williams CLIENT NAME: ARCO 276

SAMPLED BY: J Williams LOCATION: 10600 MacArthur Blvd. 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.): 12.52

DEPTH TO WATER (feet): 27.83 CALCULATED PURGE (gal.): 37.57

DEPTH OF WELL (feet): 47.0 ACTUAL PURGE VOL. (gal.): 38

DATE PURGED: 05-12-93 Start (2400 Hr) 1357 End (2400 Hr) 1409

DATE SAMPLED: 05-12-93 Start (2400 Hr) 1413 End (2400 Hr) 1415

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1403	13	6.08	542	69.5	BROWN	HEAVY
1405	26	6.41	572	67.2	"	MOD
1407	38	6.42	574	67.2	"	"

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 #: ___

REMARKS: ___

Meter Calibration: Date: 05-12-93 Time: 1330 Meter Serial #: 3912 Temperature °F: 70.5

(EC 1000 382 / 1000) (DI ___) (pH 7 6.93 / 7.00) (pH 10 9.88 / 10.01) (pH 4 3.97 / ___)

Location of previous calibration: MW-

Signature: [signature] Reviewed By: [signature] Page 5 of 9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-002.01 SAMPLE ID: MW-6(53)

PURGED BY: K REICHELDERFER CLIENT NAME: ARCO 276

SAMPLED BY: ↓ LOCATION: 10600 MacARTHUR Blvd OAKLAND, CA

TYPE. Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

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

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	3.26
DEPTH TO WATER (feet):	33.97	CALCULATED PURGE (gal.):	9.77
DEPTH OF WELL (feet):	53.9	ACTUAL PURGE VOL. (gal.):	10.00

DATE PURGED: 5-12-93 Start (2400 Hr) 1433 End (2400 Hr) 1449

DATE SAMPLED: 5-12-93 Start (2400 Hr) 1454 End (2400 Hr) 1456

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1439	3.50	7.02	2160	66.7	BROWN	HEAVY
1444	7.00	7.06	2020	64.8	↓	↓
1449	10.00	7.02	1914	64.9	↓	↓

D. O. (ppm): NR ODOR: NONE COLOR: NR (COBALT 0 - 100) TURBIDITY: 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	X Bailer (Teflon®)
___ Centrifugal Pump	X 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 #: NO

REMARKS: NO LOCK ON LWC - INSTALLED 3616 LOCK (ONLY LOCK I HAD)
WATER IN BOX, BELOW LWC

Meter Calibration: Date: 5-12-93 Time: 1330 Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: MW-1

Signature: Kevin Reichelderfer Reviewed By: JB

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-002.01 SAMPLE ID: MW-7(NA)

PURGED BY: K REICHELDERFER CLIENT NAME: ARCO 276

SAMPLED BY: NA LOCATION: 10600 MacARTHUR BLVD OAKLAND, CA

TYPE. Ground Water X Surface Water ____ Treatment Effluent ____ Other ____

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

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	NA
DEPTH TO WATER (feet):	19.81	CALCULATED PURGE (gal.):	NA
DEPTH OF WELL (feet):	55.0	ACTUAL PURGE VOL. (gal.):	NA

DATE PURGED: 5-12-93 Start (2400 Hr) NA End (2400 Hr) NA

DATE SAMPLED: NA Start (2400 Hr) NA End (2400 Hr) NA

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
NO SAMPLES TAKEN - PRODUCT IN WELL						

D. O. (ppm): NR ODOR: NA 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™ NA	____ Dedicated	____ Well Wizard™ NA	____ Dedicated
Other:		Other:	

WELL INTEGRITY: OK LOCK #: 3259

REMARKS:

Meter Calibration: Date: 5-12-93 Time: ____ Meter Serial #: ____ Temperature °F: ____

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

Location of previous calibration:

Signature: Kevin Reichelderfer Reviewed By: NB

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-002.01 SAMPLE ID: MW-8

PURGED BY: J. Williams CLIENT NAME: ARCO 276

SAMPLED BY: J. Williams LOCATION: 10600 MacArthur Blvd. 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.): 14.27

DEPTH TO WATER (feet): 25.95 CALCULATED PURGE (gal.): 42.82

DEPTH OF WELL (feet): 47.8 ACTUAL PURGE VOL. (gal.): 43

DATE PURGED: 05-12-93 Start (2400 Hr) 1454 End (2400 Hr) 1507

DATE SAMPLED: 05-12-93 Start (2400 Hr) 1513 End (2400 Hr) 1515

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1459	15	6.44	600	67.3	BROWN	HEAVY
1503	29	6.45	660	66.6	11	11
1507	43	6.51	669	66.9	11	11

D. O. (ppm): NR ODOR: NONE

COLOR: NR (COBALT 0 - 100) TURBIDITY: 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 #: ___

REMARKS: ___

Meter Calibration: Date: 05-12-93 Time: 1330 Meter Serial #: ___ Temperature °F: ___

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

Location of previous calibration: MW-5

Signature: Joe Williams Reviewed By: JJ Page 8 of 9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

4.4

EMCON ASSOCIATES

PROJECT NO: 0670-002-01 SAMPLE ID: RW-1

PURGED BY: J. Williams CLIENT NAME: ARCO 276

SAMPLED BY: J. Williams LOCATION: 10600 MacArthur Blvd. 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.): 29.19

DEPTH TO WATER (feet): 28.94 CALCULATED PURGE (gal.): 87.58

DEPTH OF WELL (feet): 48.8 ACTUAL PURGE VOL (gal.): 89.0

DATE PURGED: 05-12-93 Start (2400 Hr) 1555 End (2400 Hr) 1626

DATE SAMPLED: 05-12-93 Start (2400 Hr) 1630 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1607	29.5	6.81	1077	66.2	CLEAR	CLEAR
1614	59	6.82	1050	65.0	"	"
1626	89	6.83	1064	65.1	"	"

D. O. (ppm): NR ODOR: None

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

___ 2" Bladder Pump
___ Centrifugal Pump
✓ Submersible Pump
___ Well Wizard™
___ Bailer (Teflon®)
___ Bailer (PVC)
___ Bailer (Stainless Steel)
___ Dedicated
Other ___

SAMPLING EQUIPMENT

___ 2" Bladder Pump
___ DDL Sampler
___ Dipper
___ Well Wizard™
✓ Bailer (Teflon®)
___ Bailer (Stainless Steel)
___ Submersible Pump
___ Dedicated
Other ___

WELL INTEGRITY: BAD CAP LOCK #: NA

REMARKS: ___

Meter Calibration: Date: 05-12-93 Time: 1330 Meter Serial #: ___ Temperature °F: ___

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

Location of previous calibration: MW-5

Signature: Joe Williams Reviewed By: JB Page 9 of 9

EMCON Associates

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

Date June 21, 1993
Project 0G70-002.01

To:

Mr. John Young
RESNA
3315 Almaden Expressway, Suite 34
San Jose, California 95118

We are enclosing:

Copies	Description
1	Depth To Water/Floating Product Survey Results
	June 1993 monthly water level survey, ARCO
	station 276, 10600 MacArthur Boulevard, Oakland, CA

For your: X Information Sent by: X Mail

Comments:

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

Jim Butera JB

Reviewed by:

INDUSTRIAL
STATE OF CALIFORNIA
No. 4034
Exp. 6/30/96

Robert Porter, Senior Project Engineer.

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-002.01 STATION ADDRESS : 10600 MacArthur Blvd. Oakland DATE : 6/17/93

ARCO STATION # : 276 FIELD TECHNICIAN : L. DATH DAY : THURSDAY

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	VW-1	OK	VAULT	OK	NONE	GAGE	17.51	17.51	NA	NA	18.3	—
2	VW-2	OK	VAULT	OK	NONE	GAGE	DRY	DRY	NA	NA	14.8	VAULT VERY HARD TO OPEN
3	VW-3	OK	VAULT	OK	NONE	GAGE	17.70	17.70	NA	NA	18.1	VAULT VERY HARD TO OPEN
4	VW-4	OK	VAULT	OK	NONE	GAGE	18.22	18.22	NA	NA	19.4	VAULT VERY HARD TO OPEN
5	VW-5	OK	VAULT	OK	NONE	GAGE	17.90	17.90	NA	NA	18.0	—
6	VW-6	OK	VAULT	OK	NONE	GAGE	DRY	DRY	NA	NA	10.6	—
7	VW-7	OK	VAULT	OK	NONE	GAGE	18.18	18.18	NA	NA	19.4	WATER IN BOX / MISSING BOLT VAULT BOX HARD TO OPEN
8	MW-5	OK	YES	OK	3499	OK	28.84	28.84	ND	ND	47.1	—
9	MW-1	OK	*YES	OK	3259	OK	29.67	29.67	ND	ND	38.8	Diversified Bolt Broken inside threads. *
10	MW-8+	NR	——	——	NONE	SLIP	——					UNABLE TO OPEN BOX
11	RW-1	OK	YES	OK	NONE	SLIP	29.89	29.89	ND	ND	48.9	6" SLIP CAP BROKEN
12	MW-3	OK	YES	OK	3259	OK	30.11	30.11	ND	ND	38.6	—
13	MW-4	OK	YES	OK	3259	OK	29.54	29.54	ND	ND	48.3	—
14	MW-6	OK	YES	OK	3616	OK	34.90	34.90	ND	ND	54.1	—

SURVEY POINTS ARE TOP OF WELL CASINGS

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-002.01 STATION ADDRESS : 10600 MacArthur Blvd. Oakland DATE : 6 / 17 / 93

ARCO STATION # : 276 FIELD TECHNICIAN : L RATH DAY : THURSDAY

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
15	MW-2*	OK	YES*	OK	NONE	Slip	18.15	18.15	ND	ND	27.6	Lid found without Bolt Unable to thread Bolt into well lid.
16	MW-7	OK	YES	OK	3259	OK	22.64	22.64	22.63	0.1	—	

SURVEY POINTS ARE TOP OF WELL CASINGS