RESNA
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TRANSMITTAL

TO: Mr. Barney Chan
ACHCSA
Dept of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

DATE: December 28, 1992
PROJECT NUMBER: 60026.06
SUBJECT: ARCO Station 276, 10600 MacArthur Boulevard, Oakland, California

FROM: Robert Campbell
TITLE: Staff Geologist

Reviewed BC

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REMARKS:
Per ARCO's request (Mr. Michael Whelan) this report has been forwarded to you for your review.

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LETTER REPORT
QUARTERLY GROUNDWATER MONITORING
Third Quarter 1992
at
ARCO Station 276
10600 MacArthur Boulevard
Oakland, California

60026.06

RESNA
Working To Restore Nature

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December 28, 1992
1123MWHE
60026.06

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

Subject: Third Quarter 1992 Groundwater Monitoring Report for 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 third quarter 1992 groundwater monitoring performed by ARCO's contractor, EMCON Associates (EMCON) of San Jose, California, at the above-referenced site. The objectives of this quarterly groundwater monitoring are to evaluate changes in the groundwater flow direction and gradient, and changes in concentrations of petroleum hydrocarbons in the local groundwater associated with the former gasoline-storage tanks at the site. This monitoring was also performed to evaluate changes in concentrations of halogenated 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 protocols is beyond RESNA's scope of work. RESNA's scope of work was limited to interpretation of field and laboratory analytical data, which included evaluating trends in reported hydrocarbon and volatile organic compounds (VOCs) concentrations in the local groundwater, the groundwater gradient, and direction of groundwater flow 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 and groundwater monitoring wells are shown on the Generalized Site Plan, Plate 2.

DISCUSSION OF PREVIOUS WORK AND THE PRESENCE OF VOCs

For this quarterly monitoring RESNA reviewed previous environmental work performed in the immediate vicinity of the subject site to evaluate potential sources of VOCs that have been detected in a second, deeper water-bearing unit beneath the site. The following information is based on review of previous environmental work performed onsite and offsite at the Foothill Square Shopping Center. The shopping center property is situated directly southeast of the subject site.

Previous Offsite Work and the Presence of VOCs

Kaldveer Associates (KA) conducted a preliminary environmental assessment of the Foothill Square Shopping Center property (KA, October 3, 1988). This environmental work focused on past and present usage within the vicinity of the shopping center property and included research of public documents and review of aerial photographs dating back to 1947 to assess whether potential adverse environmental conditions exist within ¼ mile radius of the shopping center property. Research by KA indicated former activities at the shopping center site which potentially could have caused negative environmental impact. These former activities include the following: Fageol Motors Company formerly occupied the site and manufactured tractors, trucks, and motor buses from about 1916 to the early-1960's. A dry cleaning facility has been operating at the shopping center since 1961. A USA/Olympic gasoline service station has been operating in the southeastern corner of the shopping center for an unknown time. KA concluded the following concerning possible environmental impact from former usage at the shopping site: "The primary concern is activities previously conducted at the site, primarily the automobile manufacturing plant, which could have resulted in soil or groundwater contamination. These would include contamination by hydrocarbons, paints, polychlorinated biphenyls (PCB's), and metals. The air photos show areas of drum storage, tanks, and possible waste disposal. These areas as well as the manufacturing facilities could be possible sources of contamination. Presently, the USA/Olympic service station is operating and may contain leaking underground storage tanks, although there is no definite evidence of this." KA also concluded that although dry cleaning businesses are often known to be responsible for spills of various halogenated compounds, no apparent evidence of spillage was found at this site.

KA also conducted a subsurface environmental investigation at the shopping center, which included drilling 15 soil borings on the shopping center site, collecting soil samples, collecting "grab" groundwater samples from a seasonally saturated perched water-bearing zone encountered in the borings, and analyzing soil and groundwater samples (KA, October 7, 1988). Analyses of soil and groundwater samples indicated the presence of petroleum hydrocarbons and the presence of pesticides, PCBs, and semi-volatile compounds (semi-

VOCs) primarily in the northwest parking lot area of the shopping center, which is immediately adjacent to ARCO Station 276.

In December 1988, Western Geologic Resources, Inc., (WGR) conducted a subsurface environmental investigation at the Foothill Square Shopping Center, which included constructing five groundwater monitoring wells and analyzing nine soil and five groundwater samples for total petroleum hydrocarbons as gasoline (TPHg), and the gasoline constituents benzene, toluene, ethylbenzene, and total xylenes (BTEX), and VOCs (WGR, January 17, 1989). A groundwater sample was collected for analyses for VOCs from the monitoring well constructed in B-3 (MW-3), located approximately 25 feet southeast of the subject site. The groundwater sample from this well contained 0.2 parts per billion (ppb) trichloroethene.

In August 1989, RESNA (formerly Applied GeoSystems [AGS]), performed a limited environmental investigation at the northwestern portion of the adjacent Foothill Square Shopping Center to delineate the extent of hydrocarbons in the soil offsite and directly southeast of the subject site (AGS, January 17, 1991). This work included drilling nine soil borings, sampling and laboratory analysis of soil samples for TPHg, total petroleum hydrocarbons as diesel (TPHd), and BTEX. Soil samples collected directly above the local water table in six borings (B-1 through B-6), at depths of about 26-1/2 feet, were analyzed for VOCs. Detectable concentrations of VOCs other than benzene were identified in borings B-4 and B-6. The VOCs detected included several unidentified compounds, 2,3-dimethylbutane, 1-ethyl-2-methylbenzene, 1,3,5-trimethylbenzene, and methylcyclohexane at concentrations ranging from 0.030 to 110 ppm.

In June 1992, RESNA initiated a subsurface investigation which included the drilling and installation of two offsite groundwater monitoring wells (MW-6 and MW-7). The results of this investigation will be presented in a forthcoming report.

Previous Onsite Work and the Presence of VOCs

The most likely onsite source of VOCs would have been the former underground waste-oil storage tank that was located behind the station building in the southeastern portion of the site. Between September 29 and December 6, 1988, Pacific Environmental Group, Inc. (PEG) removed the underground waste-oil storage tank at the site, excavated soils from the tank pit, and collected soil samples for analyses for the presence of TPHg, BTEX, total oil and grease (TOG), semi-VOCs and VOCs (PEG, February 6, 1989). Laboratory analysis indicated that semi-VOCs, and VOCs were not detected in the soil in the vicinity of the onsite waste-oil tank. Based on these results, it was concluded the waste-oil tank was not a likely source for VOCs or semi-VOCs.

In March 1989, AGS performed an environmental investigation at the subject site to delineate the extent of hydrocarbons in the soil and groundwater beneath the site. This work included drilling five soil borings (B-1 through B-5), collecting soil samples for laboratory analysis for TPHg and BTEX, installing five groundwater monitoring wells in the borings (MW-1 through MW-5, respectively), and collecting and analyzing groundwater samples for TPHg and BTEX (AGS, August 8, 1989). Monitoring well MW-4 was installed directly southeast of the former waste-oil tank, and an additional groundwater sample from MW-4 was analyzed for TOG and VOCs. The depth to first-encountered groundwater in the borings was approximately 35 feet; except in boring B-2 where groundwater was encountered at a depth of 17 feet in an apparent perched water-bearing zone. Laboratory analyses of groundwater from the deeper water-bearing zone, in MW-4, indicated the presence of 1.5 ppm tetrachloroethane. From data which now exists, it appears that two water-bearing zones are present beneath the subject site and beneath the Foothill Shopping Center. In October 1991, RESNA installed a recovery well (RW-1) and performed an aquifer test in November 1991. Onsite well MW-2 was screened in the shallow water bearing zone and onsite wells MW-1, MW-3, MW-4, MW-5, and RW-1 were screened in the deeper zone (AGS, January 17, 1991).

AGS performed an investigation involving the removal and replacement of underground gasoline storage tanks, which included drilling three soil borings in the new tank pit area, and collecting soil samples for analyses for TPHg and BTEX (AGS, February 11, 1991). Analyses for VOCs were not performed.

In July 1992, RESNA installed an onsite groundwater well and seven onsite vapor extraction wells.

PRESENT WORK

Groundwater Sampling and Gradient Evaluation

Depth to water levels (DTW) were measured by EMCON field personnel on July 15, August 25, and September 9, 1992, and quarterly sampling was performed by EMCON field personnel on September 9, 1992. The results of EMCON's field work on the site, including DTW measurements and subjective analysis for the presence of product in the groundwater in MW-1 through MW-8 and RW-1, are presented on EMCON's Field Reports Summary of Groundwater Monitoring Data, and Summary of Analytical Results. Copies of these reports are included in Appendix A.

The DTW levels, wellhead elevations, groundwater elevations, and subjective observations of product in the groundwater from MW-1 through MW-8, and RW-1 for this quarter and

previous quarterly groundwater monitoring at the site are summarized in Table 1, Cumulative Groundwater Monitoring Data. EMCON's DTW measurements from MW-1 through MW-8 and RW-1 were used to evaluate groundwater elevations. EMCON's field personnel reported 0.05 foot of floating product on the groundwater in well MW-2 on August 25 and September 9, 1992, and 1.31 feet of floating product on the groundwater in well MW-7 on September 9, 1992 (see EMCON's Field Reports for August 25 and September 9, 1992 in Appendix A). Evidence of product or sheen was not observed in the other monitoring wells during this quarter.

Wells penetrating the shallow water-bearing zone (wells MW-2 and MW-7) and wells penetrating the deeper water-bearing zone (wells MW-1, MW-3 through MW-6 and RW-1) indicated average increases in groundwater elevations of approximately 2.36 and 0.52 feet, respectively, between July and September 1992. On September 9, 1992, EMCON Field Technicians could not find offsite well MW-6 because it had recently been paved over. Trenching equipment stored onsite prevented access to monitoring well MW-4 on July 15, 1992. Monitoring well MW-8 was measured for the first time in September 1992 and elevation trends have yet to be established.

Interpreted groundwater gradients and flow directions of the deeper water-bearing zone for this quarter are shown on the Groundwater Gradient Maps, Plates 3 through 5. The groundwater gradients fluctuated between 0.002 to 0.10 and the groundwater flow direction was toward the north-northwest, except for September 9, 1992, in which the flow direction was toward the north-northeast. A DTW level was not taken from MW-6 on September 9, 1992 as discussed above; therefore, data from MW-6 was not used in calculating the gradient and gradient direction. The omission of the DTW level and subsequent groundwater elevation from well MW-6 may account for the change in the interpreted gradient flow direction. These groundwater gradients are within the range of previously interpreted groundwater gradients and flow directions at this site. Offsite well MW-7 and onsite well MW-2 were constructed in the shallow water-bearing zone and were not used to interpret groundwater gradients or to flow directions.

Groundwater monitoring wells MW-1 and MW-3 through MW-5, MW-8, and RW-1 were purged and sampled by EMCON field personnel on September 9, 1992. Monitoring wells MW-2 and MW-7 contained floating product and were not sampled. According to EMCON's Water Sample Field Data Sheets (included in Appendix A), a minimum of five well volumes were purged before collecting groundwater samples. The purge water was removed from the site by a licensed hazardous waste hauler. The Monitoring Well Purge Water Transport Form is also included in Appendix A.

Laboratory Methods and Results

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 and MW-3 through MW-5, MW-8, and RW-1 were analyzed for TPHg and BTEX using modified Environmental Protection Agency (EPA) Methods 5030/8020 DHS LUFT Method. Concentrations of TPHg and benzene in the groundwater are shown on Plate 6, TPHg Concentrations in Groundwater and Plate 7, Benzene Concentrations in Groundwater. Groundwater samples from wells MW-1 and MW-3 through MW-5, 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, Tetrachloroethene Concentrations in Groundwater. In addition, well MW-4 was analyzed for TOG using EPA Method 413.1. The Chain of Custody Records and Laboratory Analysis Reports are attached in Appendix A. Results of these and previous groundwater analyses are summarized in Table 2, Cumulative Results of Laboratory Analyses of Groundwater Samples--TPHg, TPHd, BTEX, and TOG and Table 3, Cumulative Results of Laboratory Analyses of Groundwater Samples--VOCs and Metals.

Results of this quarter's groundwater monitoring indicate:

- Concentrations of TPHg were reported as less than (<) 520 parts per billion (ppb) in well RW-1, <470 ppb in well MW-4, <290 ppb in well MW-3, and <50 ppb in wells MW-1, MW-5, and MW-8. The laboratory raised the TPHg detection limits for the groundwater samples from wells MW-3, MW-4 and RW-1, because the sample matrix reportedly contained a discrete non-fuel peak.

- Concentrations of benzene were reported at 3.4 ppb in well MW-8 and <0.50 ppb in wells MW-1, MW-3 through MW-5, MW-8, and RW-1. The concentration of benzene in the groundwater from wells is greater than the California Department of Health Services Maximum Contaminant Level (MCL) of 1 ppb benzene in well MW-8 and less than the MCL in wells MW-1, MW-3 through MW-5 and RW-1.

- Concentrations of toluene were <0.5 ppb in wells MW-1, MW-3 through MW-5, MW-8, and RW-1.

- Concentrations of ethylbenzene were reported as <0.5 ppb in wells MW-1, MW-3 through MW-5, MW-8, and RW-1.

- A concentration of 0.7 ppb total xylenes were reported in MW-8 and concentrations of <0.5 ppb in wells MW-1, MW-3 through MW-5, and RW-1.

- TOG was detected at a concentration of 3.6 ppm in well MW-4.

- Other than BTEX, tetrachloroethene (PCE) was the only VOC detected. PCE was detected at a concentration of 1,500 ppb in recovery well RW-1, 1,300 ppb in well MW-4, 800 ppb in well MW-3, 120 ppb in well MW-5, 37 ppb in well MW-8, and 6 ppb in well MW-1. The detection limits had to be raised in wells MW-3, MW-4, and RW-1 due to high analyte concentrations requiring sample dilution. Concentrations of PCE in the groundwater from wells MW-1, MW-3, MW-4, MW-5, MW-8, and RW-1 are greater than the MCL of 5 ppb PCE in drinking water. Monitoring well MW-1, MW-3 through MW-5, MW-8, and RW-1 are screened in a deeper water-bearing zone which contains the PCE.

Since the last quarter, floating product was detected in MW-2 and MW-7, concentrations of TPHg and BTEX have continued to have nondetectable in wells MW-1, MW-3 through MW-5 and RW-1. Benzene and total xylenes were detected in well MW-8 at concentrations of 3.4 ppb and 0.7 ppb, respectively. Concentrations of TOG were reported at 3600 ppb in MW-4. This is probably due to the method of analysis used which detects naturally occurring carbon along with any petroleum based carbon which may be present. The reported concentrations of PCE have decreased in groundwater from wells MW-1, MW-3, and MW-4 and increased in MW-5 and RW-1. Monitoring well MW-8 was sampled for the first time this quarter and general trends of analytical results have not yet been established.

Monitoring and Removal of Free Product

Floating product was detected in MW-2 and MW-7 this quarterly monitoring. Quantities of floating product and water removed are presented in Table 4, Approximate Cumulative Product Removed. A Horner EZY Floating Product Skimmer was installed in monitoring well MW-2 on December 24, 1991 and removed during subgrade PVC piping installation this quarter. The total cumulative recovered product at the site for this quarter is 0.05 gallons; the total product recovered at this site to date is approximately 18.29 gallons.

CONCLUSIONS

The shallow perched groundwater at the site has been impacted by petroleum hydrocarbons and the deeper groundwater zone has been impacted by VOCs but not gasoline hydrocarbons. Floating product was detected in shallow zone wells MW-2 and MW-7 this quarter. The concentrations of TPHg and BTEX in deeper zone wells MW-1, MW-3

through MW-5, and RW-1 have continued to be nondetectable. TOG should be analyzed by EPA Method 418.1 in MW-4 in future monitorings. PCE is the predominant VOC in the local groundwater and is present at concentrations greater than the MCL of 5 ppb in all of the onsite wells sampled. The extent of petroleum hydrocarbons and VOCs in groundwater has not been defined.

Although concentrations of VOCs have been detected in the deeper water-bearing zone beneath the site VOCs were not detected in soil samples taken in the vicinity of the former waste-oil tank during it's removal (PEG, February 6, 1989). VOCs were detected in soil and groundwater samples from the northwestern portion of the adjoining Foothill Square Shopping Center (southeast of the subject site), which is situated in the interpreted upgradient direction to the subject site (AGS, January 17, 1991). According to an environmental assessment of the shopping center property performed by KA (KA, October 3, 1988), a vehicle manufacturing plant formerly occupied the vicinity of the shopping center from about 1916 to the early-1960s. Evidence from aerial photographs dating from 1947 indicate the presence of stored drums, tanks, and possible waste disposal at the manufacturing plant. These data suggest former use of the adjoining Foothill Square Shopping Center property as a likely source of the VOCs found in the deeper zone at the ARCO site.

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

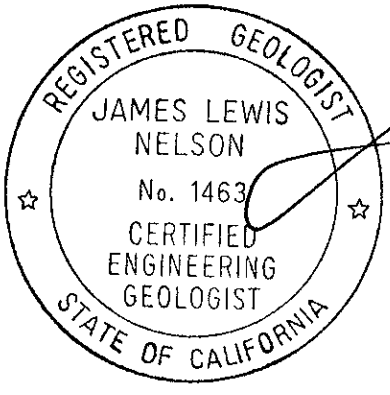
Mr. Barney Chan
Alameda County Health Care Services Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

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

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

Sincerely,
RESNA Industries Inc.

Robert D. Campbell
Staff Geologist



James L. Nelson
Certified Engineering
Geologist No. 1463

Enclosures: References

Plate 1, Site Vicinity Map
Plate 2, Generalized Site Plan
Plate 3, Groundwater Gradient Map, July 15, 1992
Plate 4, Groundwater Gradient Map, August 25, 1992
Plate 5, Groundwater Gradient Map, September 9, 1992
Plate 6, TPHg Concentrations in Groundwater, September 9, 1992
Plate 7, Benzene Concentration in Groundwater, September 9, 1992
Plate 7, Tetrachloroethene Concentrations in Groundwater, September 9, 1992

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

Appendix A: EMCON's Field Reports, Summary of Groundwater Monitoring Data, Summary of Analytical Results, Certified Analytical Reports with Chain-of- Custody, and Water Sample Field Data Sheets
Monitoring Well Purge Water Transport Form

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Applied GeoSystems. March 6, 1989. Site Safety Plan for ARCO Station No. 276, Oakland, California. AGS Job No. 19014-1.

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

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RESNA. June 27, 1991. Work Plan for Subsurface Investigations and Remediation at ARCO Station 276, 10600 MacArthur Boulevard, Oakland, California. AGS 60026-3W.

RESNA. June 27, 1991. Addendum One to Work Plan at ARCO Station 276, 10600 MacArthur Boulevard, Oakland, California. AGS 60026-3.

RESNA/Applied GeoSystems. July 11, 1991. Letter Report Quarterly Ground-Water Monitoring, Second Quarter 1991 at ARCO Station 276, 10600 MacArthur Boulevard, Oakland, California. AGS 60026.02

RESNA. September 23, 1991. Addendum Two to Work Plan at ARCO Station 276, 10600 MacArthur Boulevard, Oakland, California. RESNA Report 60026-5.

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RESNA. March 9, 1992. Letter Report Quarterly Groundwater Monitoring, Fourth Quarter 1991 at ARCO Station 276, 10600 MacArthur Boulevard, Oakland, California. RESNA Report 60026.06

RESNA. March 18, 1992. Addendum Three to Work Plan Interim Groundwater Remediation at ARCO Station 276, 10600 MacArthur Boulevard, Oakland, California. RESNA Report 60026.08

RESNA. April 16, 1992. Addendum Four to Work Plan at ARCO Station 276, 10600 MacArthur Boulevard, Oakland, California. RESNA Report 60026.10

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(continued)

RESNA. May 12, 1992. Letter Report Quarterly Groundwater Monitoring, First Quarter 1992 at ARCO Station 276, 10600 MacArthur Boulevard, Oakland, California. RESNA Report 60026.06

RESNA. September 25, 1992. Letter Report Quarterly Groundwater Monitoring, Second Quarter at ARCO Station 276, 10600 MacArthur Boulevard, Oakland, California. RESNA Report 60026.06.

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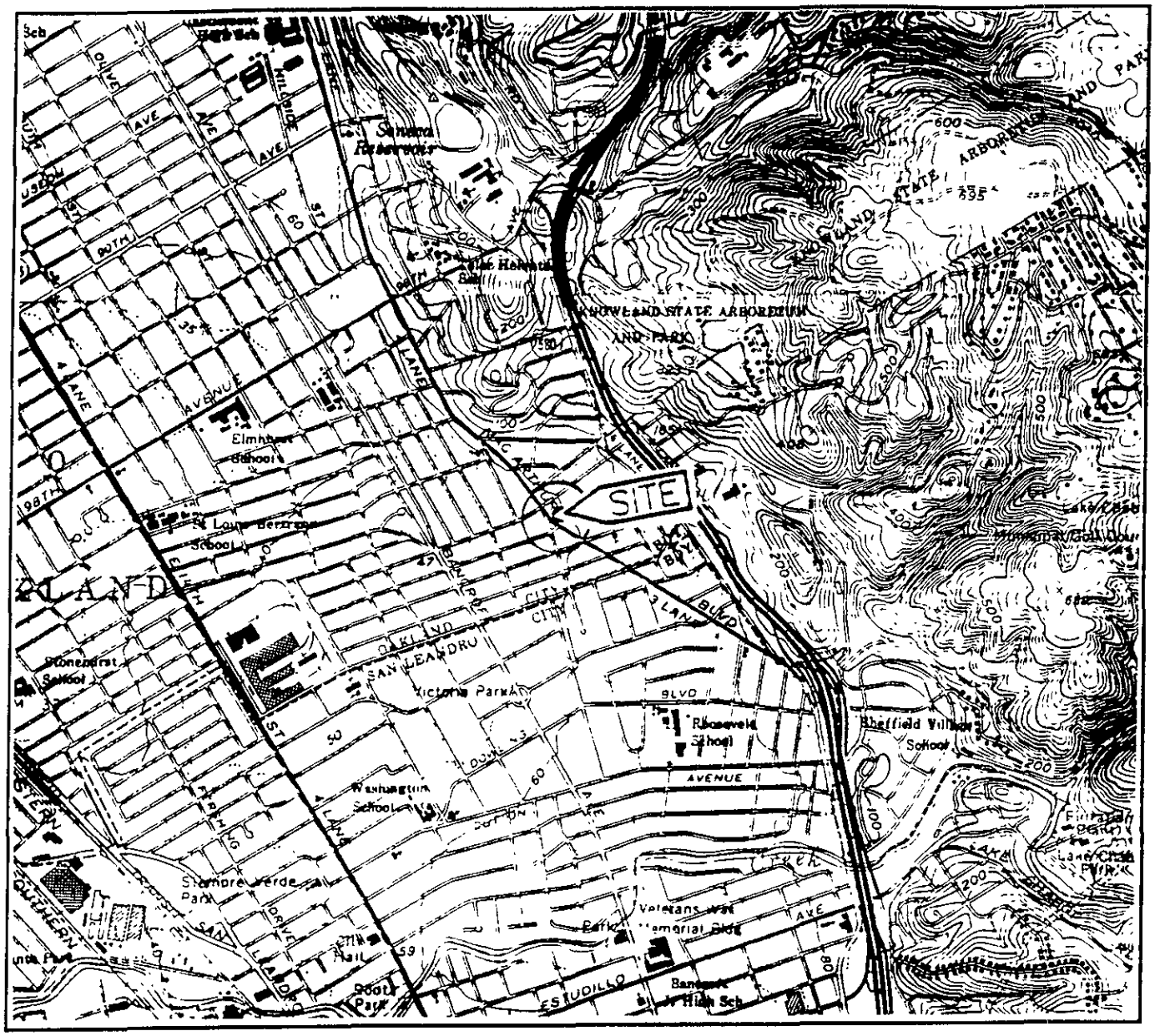

Base: U.S. Geological Survey
7.5-Minute Quadrangles
Oakland East/San Leandro, California
Photorevised 1980

N

LEGEND

⊙ = Site Location

Approximate Scale

2000 1000 0 2000 4000

feet

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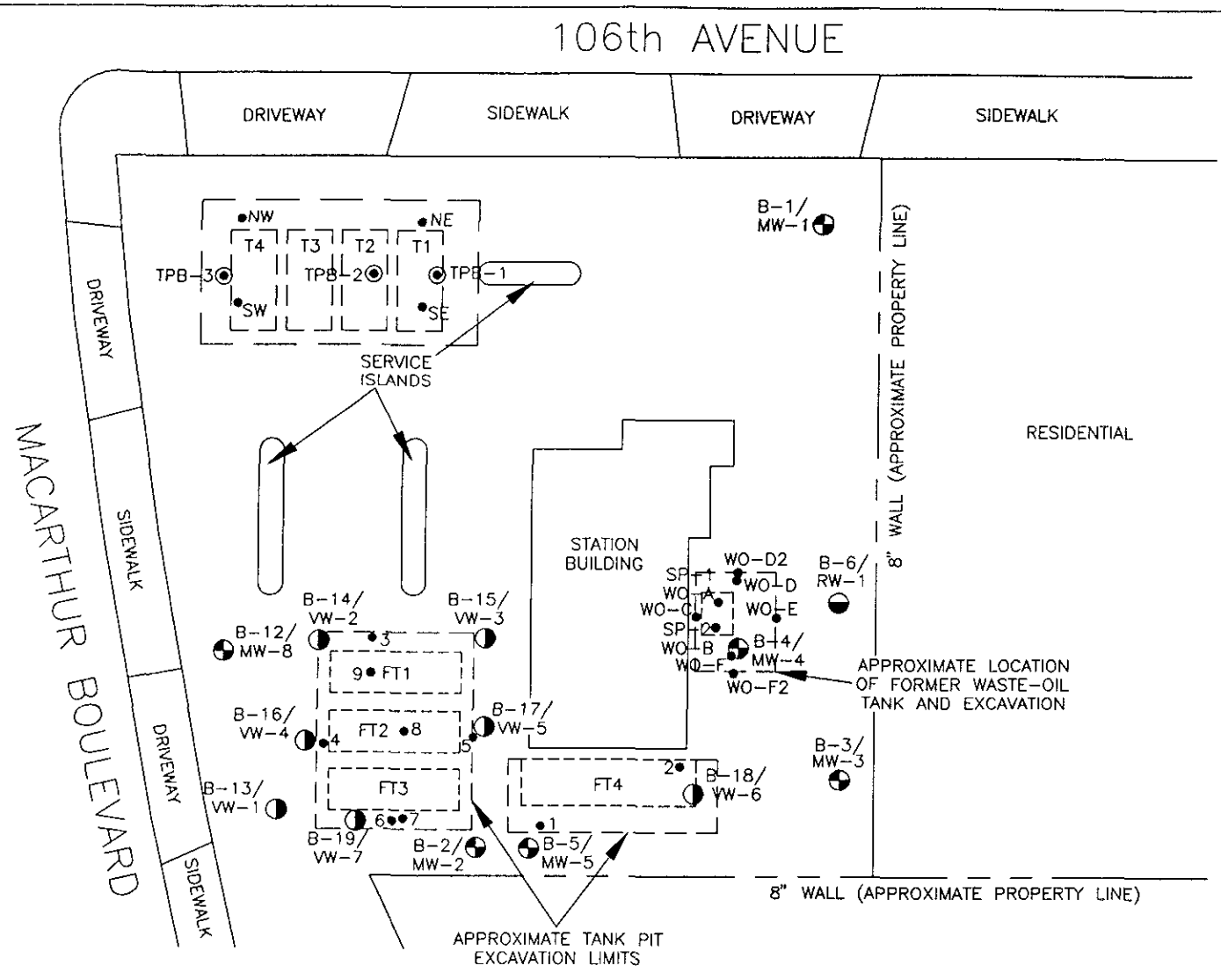
SITE VICINITY MAP
ARCO Station 276
10600 MacArthur Boulevard
Oakland, California

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)

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-11/ MW-7 ◔ MW-3 (WGR) ⊗ B-10/ MW-6 ◔

MW-6 and MW-7 have not been surveyed

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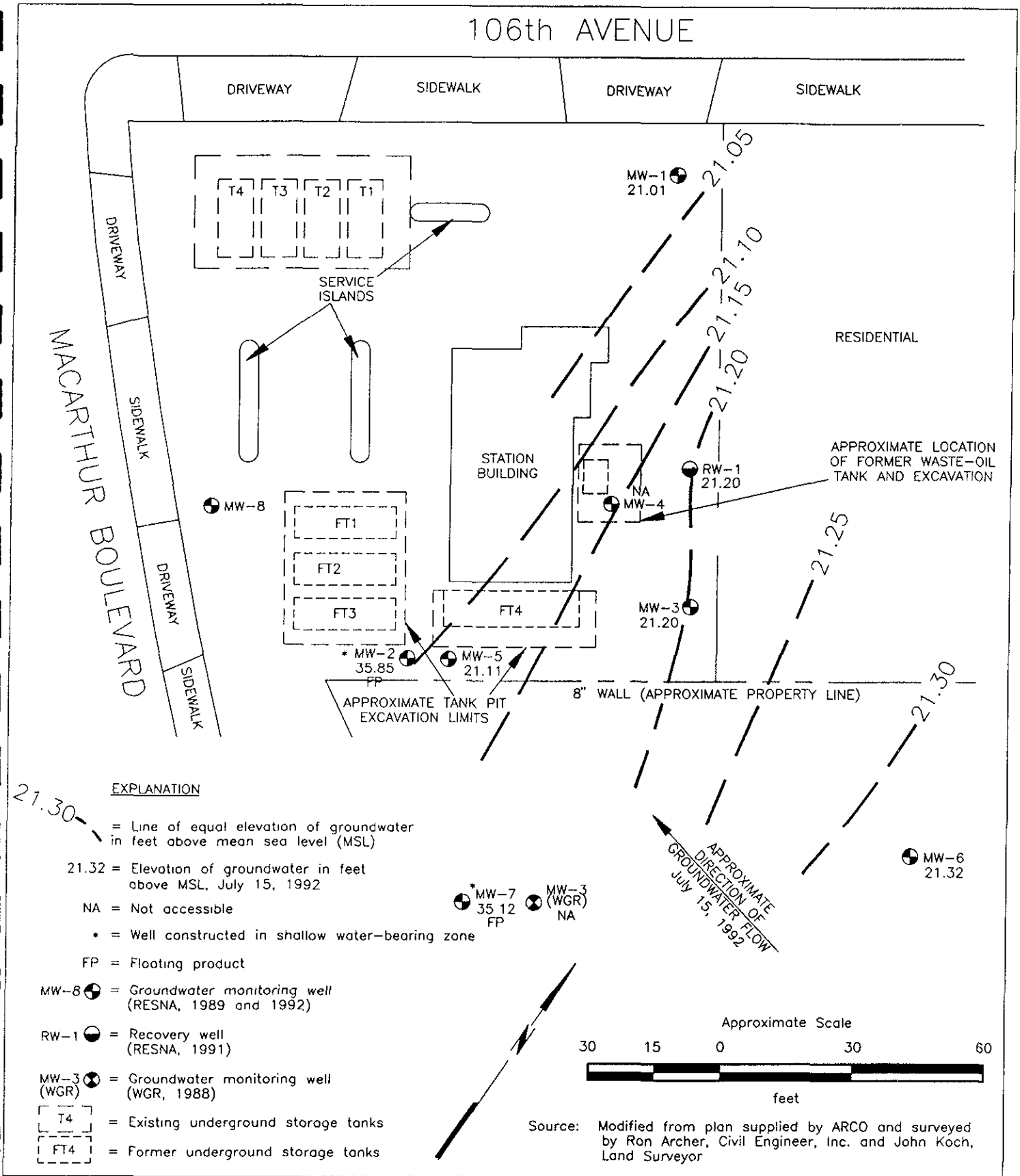
GENERALIZED SITE PLAN
ARCO Station 276
10600 MacArthur Boulevard
Oakland, California

PLATE 2



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

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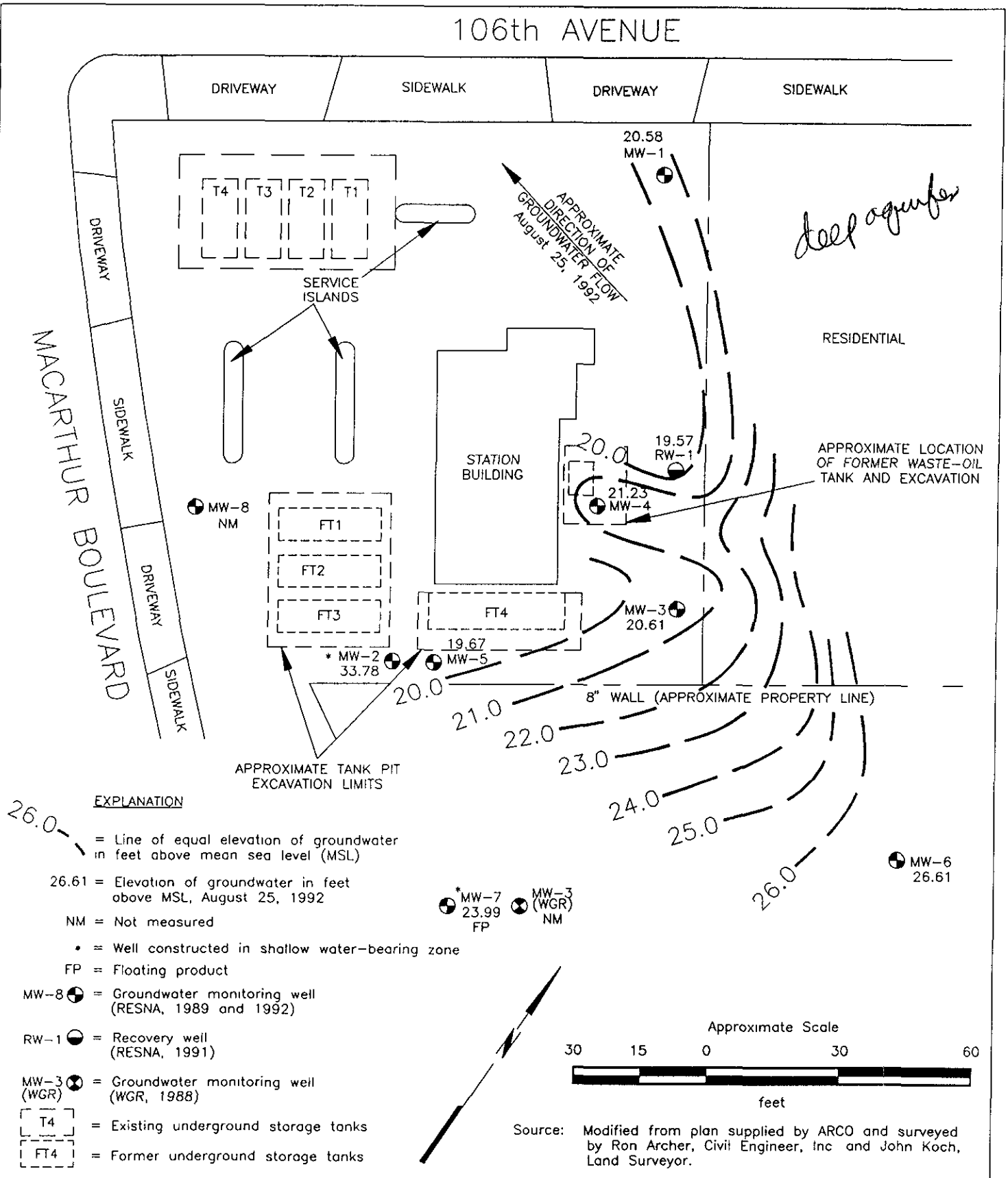
GROUNDWATER GRADIENT MAP
ARCO Station 276
10600 MacArthur Boulevard
Oakland, California

PLATE 3



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

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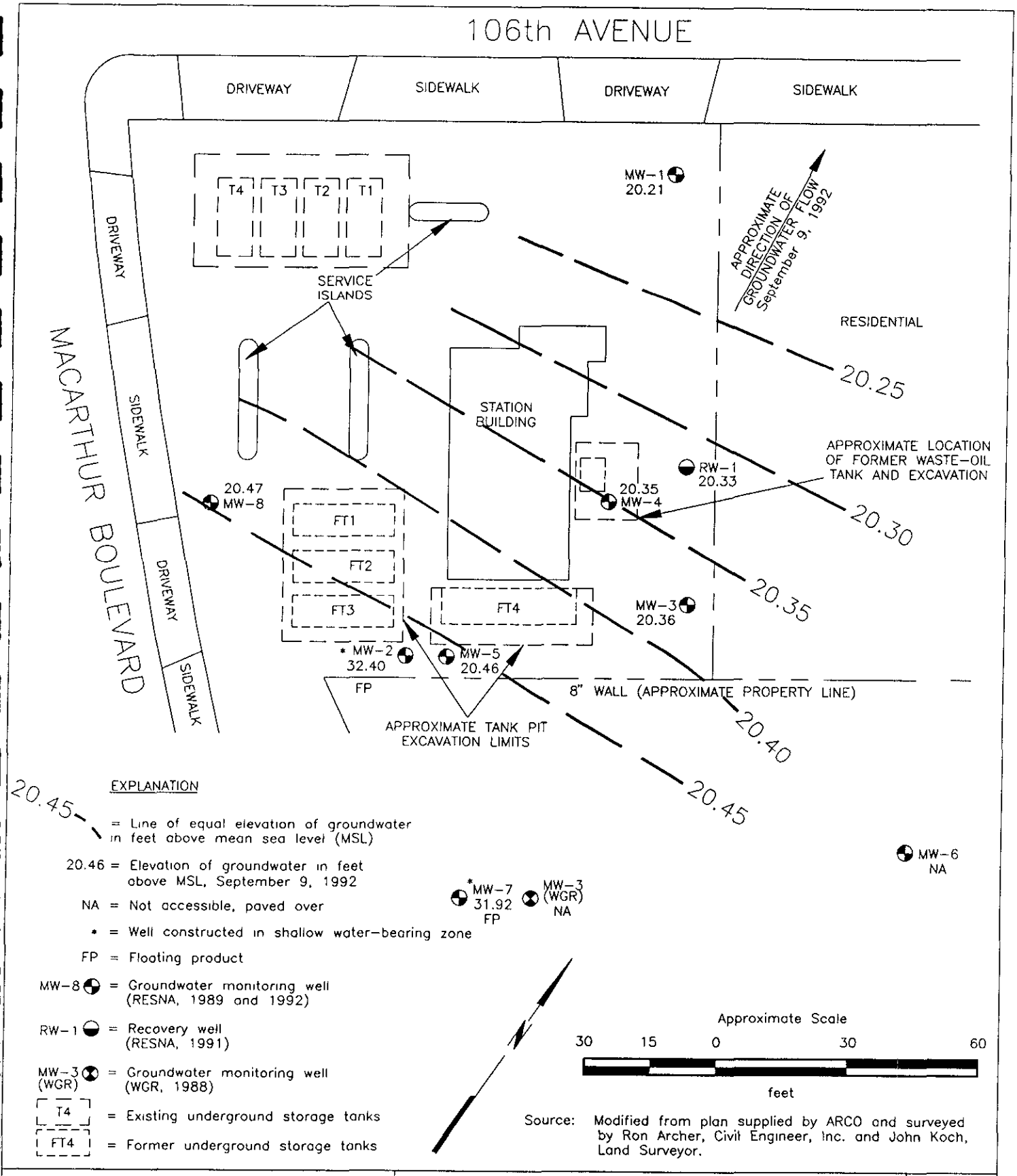
GROUNDWATER GRADIENT MAP
ARCO Station 276
10600 MacArthur Boulevard
Oakland, California

PLATE
4



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

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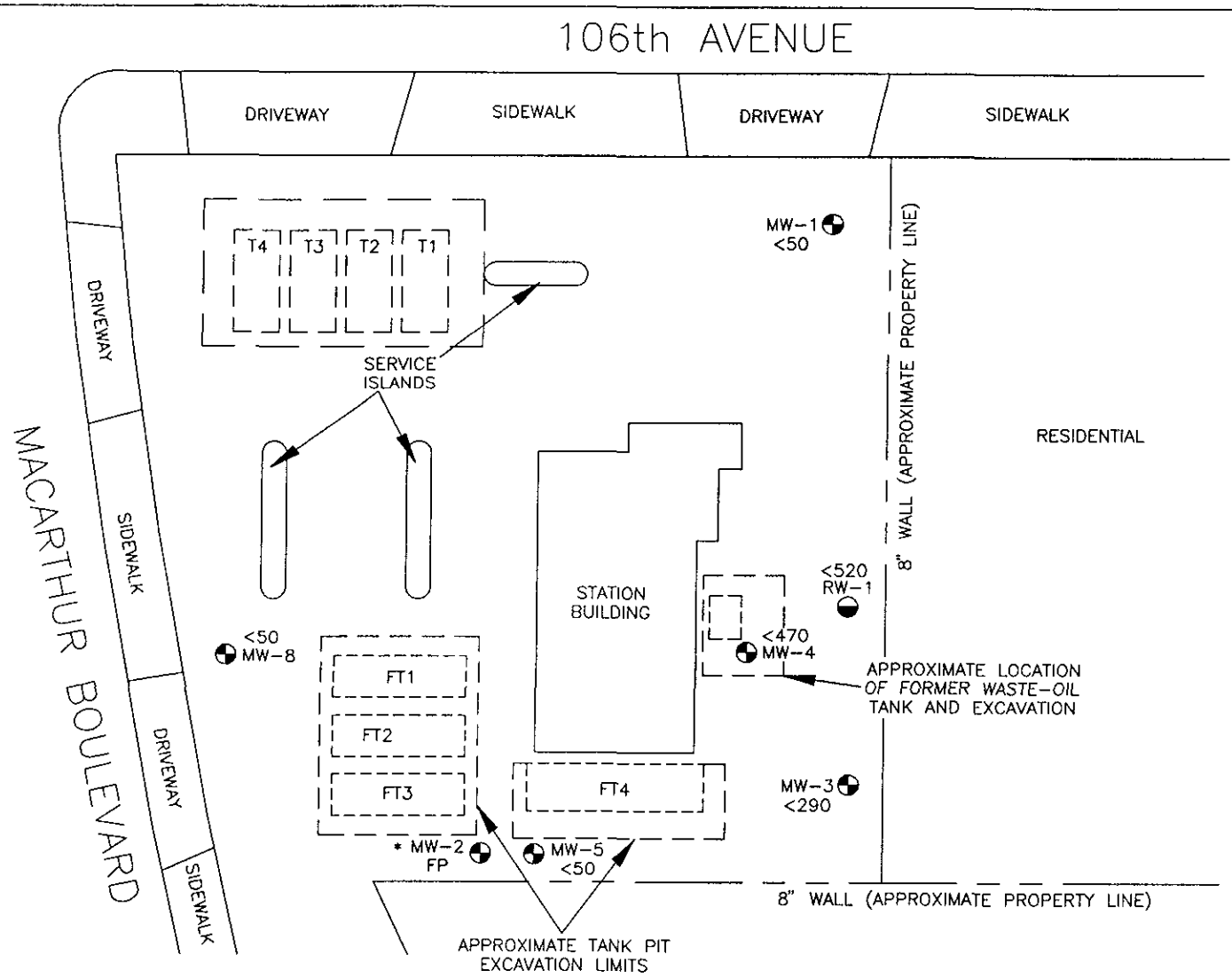
PROJECT 60026.06

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

PLATE
5



EXPLANATION

<520 = Concentration of TPHg in groundwater in parts per billion September 9, 1992

NS = Not sampled

FP = Floating product, well not sampled

IW = Inaccessible well, paved-over

* = Well constructed in shallow water-bearing zone

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

RW-1 = Recovery well (RESNA, 1991)

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

T4 = Existing underground storage tanks

FT4 = Former underground storage tanks

MW-6 IW

*MW-7 FP

MW-3 (WGR) NS

Approximate Scale

30 15 0 30 60

feet

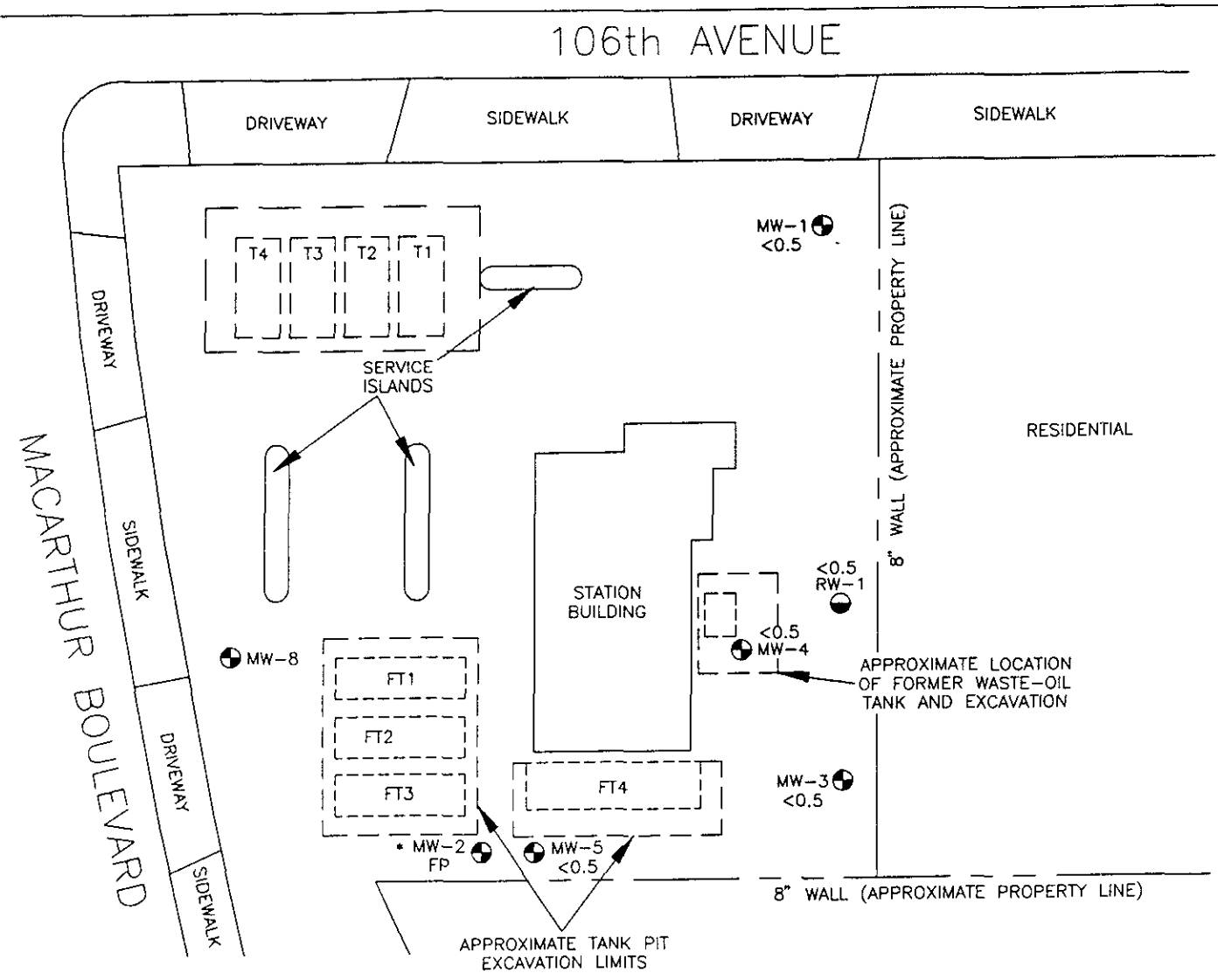
Source: Modified from plan supplied by ARCO and surveyed by Ron Archer, Civil Engineer, Inc. and John Koch, Land Surveyor.

RESNA
Working to Restore Nature

PROJECT 60026.06

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

PLATE 6



EXPLANATION

<0.5 = Concentration of benzene in groundwater in parts per billion September 9, 1992

NS = Not sampled

FP = Floating product, well not sampled

IW = Inaccessible well, paved over

* = Well constructed in shallow water-bearing zone

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

RW-1 = Recovery well (RESNA, 1991)

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

T4 = Existing underground storage tanks

FT4 = Former underground storage tanks

MW-6 IW

*MW-7 FP

MW-3 (WGR) NS

Approximate Scale

30 15 0 30 60

feet

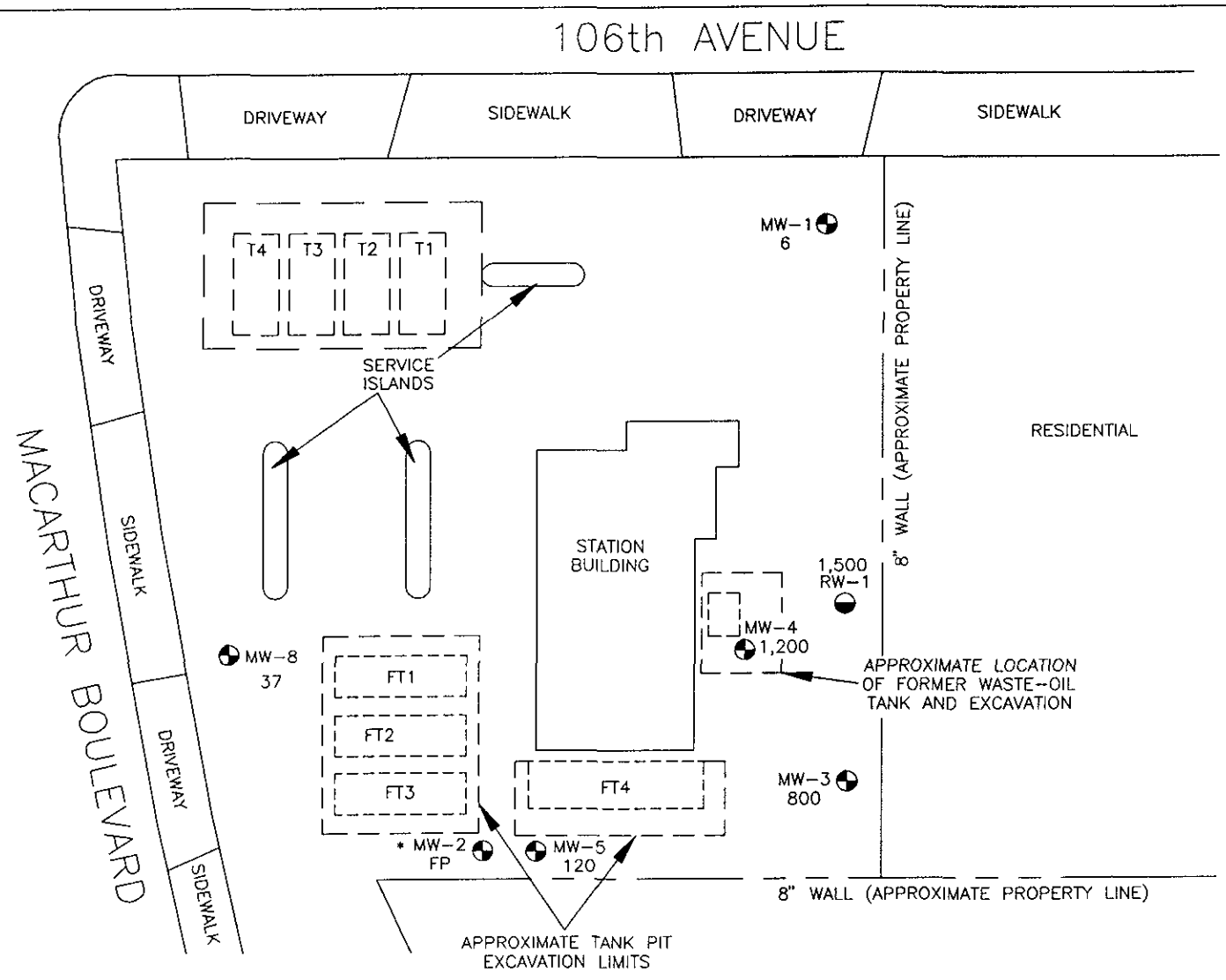
Source: Modified from plan supplied by ARCO and surveyed by Ron Archer, Civil Engineer, Inc. and John Koch, Land Surveyor.

RESNA
Working to Restore Nature

PROJECT 60026.06

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

PLATE 7



EXPLANATION

1,500 = Concentration of Tetrachloroethene in groundwater in parts per billion, September 9, 1992, by EPA method 624

NS = Not sampled

FP = Floating product, well not sampled

IW = Inaccessible well, paved over

* = Well constructed in shallow water-bearing zone

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

RW-1 = *Recovery well* (RESNA, 1991)

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

T4 = Existing underground storage tanks

FT4 = Former underground storage tanks

MW-6 IW

* MW-7 FP

MW-3 (WGR) NS

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.

RESNA
Working to Restore Nature

PROJECT 60026.06

TETRACHLOROETHENE CONCENTRATIONS IN GROUNDWATER
ARCO Station 276
10600 MacArthur Boulevard
Oakland, California

PLATE 8

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

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
MW-1				
04/17/89		33.04	22.87	None
04/24/89		33.84	22.07	None
10/13/89	55.91	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
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	Sheen
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

See notes on page 5 of 5.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 276
Oakland, California
(Page 2 of 5)

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
MW-2 Cont.				
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
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

See notes on page 5 of 5.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 276
Oakland, California
(Page 3 of 5)

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
MW-3 Cont.				
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
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

See notes on page 5 of 5.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 276
Oakland, California
(Page 4 of 5)

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
MW-6				
06/30/92		35.50	25.71	None
07/15/92		39.89	21.32	None
08/25/92	61.21	34.90	26.31	None
09/09/92		NR	NR	NR
MW-7	58.22			
06/30/92		23.70	34.52	None
07/15/92		23.10	35.12	None
08/25/92	58.22	34.23	23.99	None
09/09/92		26.30*	31.92*	1.31

See notes on page 5 of 5.

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

Date Well Measured	Well Elevation	Depth to Water	Water Elevation	Floating Product
MW-8				
08/25/92	53.65	NR	NR	NR
09/09/92		33.20	20.45	None
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	56.32	36.75	19.57	None
09/09/92		35.99	20.33	None

Depths are in feet below top of each well casing.
Elevations are referenced in feet above mean sea level.
Floating product 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).
NR = Not recorded.

TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER SAMPLES--TPHg, TPHd, BTEX, and TOG
ARCO Station 276
Oakland, California
(Page 1 of 3)

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
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						
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
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
MW-4							
04/24/89#	2,500	NA	270	1.4	<0.50	85	NA

See notes on Page 3 of 3.

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

Date/Well	TPHg (ppb)	TPHd (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	TOG (ppb)
MW-4 Cont.							
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[1]
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
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
MW-6							
06/30/92	<850**	NA	<0.5	<0.5	<0.5	<0.5	NA
09/09/92	NR	NR	NR	NR	NR	NR	NR
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					
MW-8							
09/09/92	<50	NA	3.4(4)	<0.5	<0.5	0.7	NA
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

See notes on page 3 of 3.

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

January 1990							
MCLs	—	—	1.0	—	680	1,750	—
DWAL	—	—	—	100	—	—	—

Results in parts per billion (ppb).
TPHg: Total petroleum hydrocarbons as gasoline by EPA method 8015.
TPHd: Total petroleum hydrocarbons as diesel by EPA method 3550/3510.
B: Benzene, T: Toluene, E: Ethylbenzene, T: Total Xylene isomers
BTEX: Measured by EPA method 8020/602.
NA: Not analyzed.
<: Results reported as less than detection limit.
#: Based on new results, the previous data is being re-evaluated to determine a single peak hydrocarbon.
*: Detection limit reportedly raised by laboratory due to matrix interference.
**: Detections limit reportedly raised by laboratory because matrix contains a discrete non-fuel peak.
( ): BTEX as measured by EPA Method 624
1: Analyte concentration is an estimate because this analyte was also found in the method blank.
MCL: Maximum contaminant level
DWAL: Drinking water action level

TABLE 3
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER SAMPLES--VOCs and Metals
ARCO Station 276
Oakland, California
(Page 1 of 2)

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
MW-2							
09/03/91	----------	Not sampled--floating product					
11/06/91	----------	Not sampled--floating product					
03/10/92	Tetrachlorethene	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					
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
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
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	1,360*	NA	NA	NA	NA	NA

See notes on Page 2 of 2.

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

Date/Well	Compound	VOCs (ppb)	Cd (ppm)	Cr (ppm)	Pb (ppm)	Zn (ppm)	Ni (ppm)
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
MW-6							
06/30/92**	Tetrachloroethene	2,400*	NA	NA	NA	NA	NA
09/09/92	----------		Inaccessible well--paved over				
MW-7							
06/30/92**	All Compounds	<1000	NA	NA	NA	NA	NA
09/09/92	----------		Not sampled--floating product				
MW-8							
09/09/92	Tetrachloroethene	37*	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*					
06/30/92**	Tetrachloroethene	1,100*	NA	NA	NA	NA	NA
09/09/92	Tetrachloroethene	1,500*	NA	NA	NA	NA	NA
MCLs			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 by EPA method 601/8010. Compounds not shown were not detected.
Cd: Cadmium by EPA method 200.7.
Cr: Chromium by EPA method 200.7.
Pb: Lead by EPA method 239.7.
Zn: Zinc by EPA method 200.7.
Ni: Nickel by 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 tetrachloroethene.
MCLs: Maximum Contaminant Levels as reported by the California Department of Health Services 10/24/90.
**: Raised Method Reporting Limit (MRL) due to high analyte concentration requiring sample dilution.

TABLE 4
APPROXIMATE CUMULATIVE PRODUCT REMOVED
ARCO Station 276
Oakland, California

Year		Floating Product Removed (gallons)
1991	TOTAL:	18.15

Date	Floating Product Removed (gallons)
1992	
MW-2	
01-29-92	0.09
02-28-92	None present
03-25-92	None present
06-30-92	None present
07-31-92	None present
08-26-92	0.05
1992 Total:	0.14 Gallons
Product Removed to Date	18.29 gallons

APPENDIX A

EMCON'S FIELD REPORTS (3)
SUMMARY OF GROUNDWATER MONITORING DATA
CERTIFIED ANALYTICAL REPORTS WITH CHAIN-OF-CUSTODY
AND WATER SAMPLE FIELD DATA SHEETS
MONITORING WELL PURGE WATER DISPOSAL FORM

EMCON ASSOCIATES
Consultants in Wastes Management and Environmental Control

Date July 20, 1992
Project G70-02.01

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
	July 1992 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.

Reviewed by:

Jim Butera JB

6/30/92

Robert Porter, Senior Project Engineer.

1938 Junction Avenue San Jose California 95131-2102, (408) 453-0770 Fax (408) 453-0452

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : G70-02.01 STATION ADDRESS : 10600 MacArthur Blvd. Oakland DATE : 7.15.92

ARCO STATION # : 276 FIELD TECHNICIAN : P. Schaffer DAY : Wed.

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-1	Yes	Yes	Yes	3259	Yes	34.90	34.90	N.D	N.D	39.21	—
2	MW-5	Yes	Yes	Yes	3259	Yes	34.32	34.32	N.D	N.D	47.61	—
3	MW-3	Yes	Yes	Yes	3259	Yes	35.35	35.35	N.D	N.D	38.98	—
4	RW-1	Yes	Yes	Yes	NO	NO	35.12	35.12	N.D	N.D	49.1	—
5	MW-4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	Construction crews covered FL-ES-7 with plastic, cancel trip
6	MW-6	Yes	Yes	Yes	NO	Yes	39.83	39.83	N.D	N.D	54.9	—
7	MW-7	Yes	Yes	Yes	NO	Yes	23.10	23.10	N.D	N.D	37.30	—
8	MW-2	Yes	Yes	Yes	3259	Yes	19.50	19.50	N.D	N.D	26.20	Skimmer/NO product

SURVEY POINTS ARE TOP OF WELL CASINGS

EMCON ASSOCIATES
Consultants in Wastes Management and Environmental Control

Date Sept 01, 1992
Project G70-02.01

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
	August 1992 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.

Reviewed by:

Jim Butera JB

Robert Porter, Senior Project Engineer.

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

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : G70-02.01 STATION ADDRESS : 10600 MacArthur Blvd. Oakland DATE : 8.25-92

ARCO STATION # : 276 FIELD TECHNICIAN : Rich Schaeffer DAY : TUES.

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-1	FINE	YES	NONE	3259	YES	35.34	35.34	N.D	N.D	39.2	-
2	MW-5	FINE	YES	NONE	3259	YES	35.76	35.76	N.D	N.D	47.6	-
3	MW-3	FINE	YES	NONE	3259	YES	35.94	35.94	N.D	N.D	38.7	-
4	RW-1	**	YES	NONE	NONE	NONE	36.75	36.75	N.D	N.D	48.8	-
5	MW-4	FINE	YES	NONE	3259	YES	35.22	35.22	N.D	N.D	48.9	-
6	MW-6	FINE	YES	FINE	3259	YES	34.90	34.90	N.D	N.D	55.9	-
7	MW-7	FINE	YES	FINE	3259	YES	34.23	34.23	N.D	N.D	37.3	-
8	MW-2	** FINE	YES	FINE	NONE	NO	21.36	21.36	21.31	3/16" IN TEFLON BAILER	25.5	*
	* M.W-2 IS	NOW AN	EXTRACTION	WELL	TO	REMEDIATION	SYSTEM					**
	ON	SITE	THERE IS	NO	SKIMMER	ANY	LONGER.					
	**	NEW	LIDS BY	RESNA	Require	a special	Key	to	OPEN			
		RESNA	TECH	WAS	ON	SITE	HE	LOANED	ME	HIS.	I	have
		his	Business	card.	WE	CAN	call	him	+	have	him	Send us A Key.

SURVEY POINTS ARE TOP OF WELL CASINGS

EMCON ASSOCIATES
Consultants in Wastes Management and Environmental Control

RECEIVED
1992
RESNA SAN JOSE

Date October 1, 1992
Project G70-02.01

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

We are enclosing:

Copies	Description
1	Depth To Water / Floating Product Survey Results
2	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 third quarter 1992 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 ENVIRONMENTAL ASSESSOR
No: 9004
Exp. 6/30/94
INDUSTRIAL
STATE OF CALIFORNIA

Robert Porter, Senior Project Engineer.

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

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : G70-02.01 STATION ADDRESS : 10600 MacArthur Blvd. Oakland DATE : September 9, 1992

ARCO STATION # : 276 FIELD TECHNICIAN : Mark Adler / Steve Horton DAY : Wednesday

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-1	good	yes	na	3259	yes	35.71	35.72	ND	NR	38.80	—
2	MW-5	good	yes	na	3259	yes	34.97	34.98	ND	NR	47.00	—
3	RW-1	good	yes	na	none	no	35.99	35.99	ND	NR	48.80	—
4	MW-3	good	yes	na	3259	yes	36.19	36.19	ND	NR	36.60	—
5	MW-4	good	yes	na	3259	yes	35.63	35.64	ND	NR	48.60	—
6	MW-6	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	could not locate, appears to have been paved over
7	MW-7	good	yes	na	none	yes	27.35	27.35	26.04 ~~ND~~	1.31 ~~NR~~	37.00	installed 3257 lock
8	MW-2	good	yes	na	none	no	22.74	22.74	22.69	.05	25.50	—
9	MW-8	good	yes	na	none	no	* 33.20	33.20	* 33.18	.02	47.80	* measured .02 w/MMC but found no product w/teflon bailer

SURVEY POINTS ARE TOP OF WELL CASINGS

Summary of Groundwater Monitoring Data
Third Quarter 1992
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)	Total Oil and Grease[2] (ppb)
MW-1(38)	09/09/92	35.71	ND.[3]	<50	<0.5	<0.5	<0.5	<0.5	NR.[4]
MW-2	09/09/92	22.74	0 05	FP.[5]	FP.	FP.	FP.	FP.	NR.
MW-3(38)	09/09/92	36.19	ND.	<290.	<0.5	<0.5	<0.5	<0.5	NR.
MW-4(48)	09/09/92	35.63	ND.	<470.	<0.5	<0.5	<0.5	<0.5	3,600.
MW-5(47)	09/09/92	34.97	ND.	<50	<0.5	<0.5	<0.5	<0.5	NR
MW-6	09/09/92	IW.[6]	IW.	IW.	IW.	IW.	IW.	IW.	NR.
MW-7(36)	09/09/92	27.35	1.31	FP	FP	FP	FP	FP	NR.
MW-8(47)	09/09/92	33.20	ND.	<50.	3.4	<0.5	<0.5	0.7	NR.
RW-1(48)	09/09/92	35.99	ND.	<520.	<0.5	<0.5	<0.5	<0.5	NR.
FB-1[7]	09/09/92	NA.[8]	NA.	<50	<0.5	<0.5	<0.5	<0.5	NR.

1. TPH. = Total petroleum hydrocarbons
2. TOG was reported as parts per million, it has been converted to parts per billion on this summary sheet
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. IW. = Inaccessable well, well could not be located, no samples were taken
7. FB = Field blank
8. NA. = Not applicable

Summary of Analytical Results
Volatile Organic Compounds by EPA[1] Methods 624
Third Quarter 1992
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	Benzene (ppb)	PCE[2] (ppb)
MW-1(38)	09/09/92	<1.	6.
MW-2	09/09/92	FP.[3]	FP.
MW-3(38)	09/09/92	<20	800.
MW-4(48)	09/09/92	<20.	1,300.
MW-5(47)	09/09/92	<1.	120.
MW-6	09/09/92	IW.[4]	IW.
MW-7	09/09/92	FP.	FP.
MW-8(47)	09/09/92	4.	37.
RW-1(48)	09/09/92	<20.	1,500.
FB-1[5]	09/09/92	<1.	<1.

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

Columbia Analytical Services, Inc.

September 24, 1992

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

Re: **EMCON Project No. G70-02.01**
Arco Facility No. 276

Dear Mr. Butera:

Enclosed are the results of the water samples submitted to our lab on September 10, 1992. For your reference, our service request number for this work is SJ92-1134.

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

Please call if you have any questions.

Respectfully submitted:

COLUMBIA ANALYTICAL SERVICES, INC.

Carol J Klein for
Keoni A. Murphy
Laboratory Manager

Annelise J. Bazar
Regional QA Coordinator

le/KAM

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

Analytical Report

Client:	EMCON Associates	**Date Received:**	09/10/92
Project:	EMCON Project No. G70-02.01	**Work Order #:**	SJ92-1134
	Arco Facility No. 276	**Sample Matrix:**	Water

Inorganic Parameters[1]
mg/L (ppm)

Sample Name:		MW-4 (48)	Method Blank
Date Sampled:		09/09/92	
Analyte	**Method**	**MRL**	
Total Oil and Grease	413.1	0.5	3.6 *	0.5

MRL Method Reporting Limit

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

* Analyte concentration is an estimate because this analyte was also found in the method blank.

Approved by Carol Klein Date 9-24-92

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

Analytical Report

Client:	EMCON Associates	**Date Received:**	09/10/92
Project:	EMCON Project No. G70-02.01	**Work Order #:**	SJ92-1134
	Arco Facility No. 276	**Sample Matrix:**	Water

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

Sample Name:		MW-1 (38)	MW-3(38)	MW-4(48)
Date Analyzed:		09/14/92	09/14/92	09/14/92
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	<290. *	<470. *

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit
* Raised MRL due to matrix interference. This sample contains discrete non-fuel components.

Approved by Carol Klein Date 9-24-92

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

Analytical Report

Client:	EMCON Associates	**Date Received:**	09/10/92
Project:	EMCON Project No. G70-02.01	**Work Order #:**	SJ92-1134
	Arco Facility No. 276	**Sample Matrix:**	Water

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

Sample Name:		MW-5(47)	MW-8(47)	RW-1(48)
Date Analyzed:		09/14/92	09/14/92	09/14/92
Analyte	**MRL**			
Benzene	0.5	ND	3.4	ND
Toluene	0.5	ND	ND	ND
Ethylbenzene	0.5	ND	ND	ND
Total Xylenes	0.5	ND	0.7	ND
TPH as Gasoline	50	ND	ND	<520. *

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit
* Raised MRL due to matrix interference. This sample contains discrete non-fuel components.

Approved by Carol Klein Date 9-24-92

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

Analytical Report

Client:	EMCON Associates	**Date Received:**	09/10/92
Project:	EMCON Project No. G70-02.01	**Work Order #:**	SJ92-1134
	Arco Facility No. 276	**Sample Matrix:**	Water

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

Sample Name:		FB-1	Method Blank
Date Analyzed:		09/14/92	09/14/92
Analyte	**MRL**		
Benzene	0.5	ND	ND
Toluene	0.5	ND	ND
Ethylbenzene	0.5	ND	ND
Total Xylenes	0.5	ND	ND
TPH as Gasoline	50	ND	ND

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

Approved by Carol Klein Date 9-24-92

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

Analytical Report

Client: EMCON Associates
Project: EMCON Project No. G70-02.01
Arco Facility No. 276

Date Received: 09/10/92
Work Order #: SJ92-1134
Sample Matrix: Water

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

Sample Name:		MW-1(38)	MW-3(38) *	MW-4(48) *
Date Analyzed:		09/15/92	09/15/92	09/15/92
Analyte	MRL			
Chloromethane	1	ND	<20.	<20.
Vinyl Chloride	1	ND	<20.	<20.
Bromomethane	1	ND	<20.	<20.
Chloroethane	1	ND	<20.	<20.
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	6.	800.	1,300.
Dibromochloromethane	1	ND	<20.	<20.
Chlorobenzene	1	ND	<20.	<20.
Ethylbenzene	1	ND	<20.	<20.
Styrene	1	ND	<20.	<20.
Total Xylenes	1	ND	<20.	<20.
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 Carol Klein Date 9-24-92

4921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

Analytical Report

Client: EMCON Associates
Project: EMCON Project No. G70-02.01
Arco Facility No. 276

Date Received: 09/10/92
Work Order #: SJ92-1134
Sample Matrix: Water

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

Sample Name:		MW-5(47)	MW-8(47)	RW-1(48) *
Date Analyzed:		09/15/92	09/15/92	09/15/92
Analyte	MRL			
Chloromethane	1	ND	ND	<20.
Vinyl Chloride	1	ND	ND	<20.
Bromomethane	1	ND	ND	<20.
Chloroethane	1	ND	ND	<20.
Trichlorofluoromethane (Freon 11)	1	ND	ND	<20.
Trichlorotrifluoroethane (Freon 113)	10	ND	ND	<200.
1,1-Dichloroethene	1	ND	ND	<20.
Acetone	20	ND	ND	<400.
Carbon Disulfide	1	ND	ND	<20.
Methylene Chloride	10	ND	ND	<200.
trans-1,2-Dichloroethene	1	ND	ND	<20.
cis-1,2-Dichloroethene	1	ND	ND	<20.
2-Butanone (MEK)	10	ND	ND	<200.
1,1-Dichloroethane	1	ND	ND	<20.
Chloroform	1	ND	ND	<20.
1,1,1-Trichloroethane (TCA)	1	ND	ND	<20.
Carbon Tetrachloride	1	ND	ND	<20.
Benzene	1	ND	4.	<20.
1,2-Dichloroethane	1	ND	ND	<20.
Vinyl Acetate	10	ND	ND	<200.
Trichloroethene (TCE)	1	ND	ND	<20.
1,2-Dichloropropane	1	ND	ND	<20.
Bromodichloromethane	1	ND	ND	<20.
2-Chloroethyl Vinyl Ether	10	ND	ND	<200.
trans-1,3-Dichloropropene	1	ND	ND	<20.
2-Hexanone	10	ND	ND	<200.
4-Methyl-2-pentanone (MIBK)	10	ND	ND	<200.
Toluene	1	ND	ND	<20.
cis-1,3-Dichloropropene	1	ND	ND	<20.
1,1,2-Trichloroethane	1	ND	ND	<20.
Tetrachloroethene (PCE)	1	120.	37.	1,500.
Dibromochloromethane	1	ND	ND	<20.
Chlorobenzene	1	ND	ND	<20.
Ethylbenzene	1	ND	ND	<20.
Styrene	1	ND	ND	<20.
Total Xylenes	1	ND	ND	<20.
Bromoform	1	ND	ND	<20.
1,1,2,2-Tetrachloroethane	1	ND	ND	<20.
1,3-Dichlorobenzene	1	ND	ND	<20.
1,4-Dichlorobenzene	1	ND	ND	<20.
1,2-Dichlorobenzene	1	ND	ND	<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 Carol Klein Date 9-24-92

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

Analytical Report

Client: EMCON Associates
Project: EMCON Project No. G70-02.01
Arco Facility No. 276

Date Received: 09/10/92
Work Order #: SJ92-1134
Sample Matrix: Water

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

Sample Name:		FB-1	Method Blank
Date Analyzed:		09/15/92	09/15/92
Analyte	**MRL**		
Chloromethane	1	ND	ND
Vinyl Chloride	1	ND	ND
Bromomethane	1	ND	ND
Chloroethane	1	ND	ND
Trichlorofluoromethane (Freon 11)	1	ND	ND
Trichlorotrifluoroethane (Freon 113)	10	ND	ND
1,1-Dichloroethene	1	ND	ND
Acetone	20	ND	ND
Carbon Disulfide	1	ND	ND
Methylene Chloride	10	ND	ND
trans-1,2-Dichloroethene	1	ND	ND
cis-1,2-Dichloroethene	1	ND	ND
2-Butanone (MEK)	10	ND	ND
1,1-Dichloroethane	1	ND	ND
Chloroform	1	ND	ND
1,1,1-Trichloroethane (TCA)	1	ND	ND
Carbon Tetrachloride	1	ND	ND
Benzene	1	ND	ND
1,2-Dichloroethane	1	ND	ND
Vinyl Acetate	10	ND	ND
Trichloroethene (TCE)	1	ND	ND
1,2-Dichloropropane	1	ND	ND
Bromodichloromethane	1	ND	ND
2-Chloroethyl Vinyl Ether	10	ND	ND
trans-1,3-Dichloropropene	1	ND	ND
2-Hexanone	10	ND	ND
4-Methyl-2-pentanone (MIBK)	10	ND	ND
Toluene	1	ND	ND
cis-1,3-Dichloropropene	1	ND	ND
1,1,2-Trichloroethane	1	ND	ND
Tetrachloroethene (PCE)	1	ND	ND
Dibromochloromethane	1	ND	ND
Chlorobenzene	1	ND	ND
Ethylbenzene	1	ND	ND
Styrene	1	ND	ND
Total Xylenes	1	ND	ND
Bromoform	1	ND	ND
1,1,2,2-Tetrachloroethane	1	ND	ND
1,3-Dichlorobenzene	1	ND	ND
1,4-Dichlorobenzene	1	ND	ND
1,2-Dichlorobenzene	1	ND	ND

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

Approved by Carol Klein Date 9-24-92

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APPENDIX A

LABORATORY QC RESULTS

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

Client: EMCON Associates
Project: EMCON Project No. G70-02.01
Arco Facility No. 276

Date Received: 09/10/92
Work Order #: SJ92-1134

QA/QC Report
Initial Calibration Verification
BTEX and TPH as Gasoline
EPA Methods 5030/8020/DHS LUFT Method
Nanograms

Date Analyzed: 09/14/92

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Benzene	250.	260.	104.	85-115
Toluene	250.	280.	112.	85-115
Ethylbenzene	250.	273.	109.	85-115
Total Xylenes	750.	840.	112.	85-115
TPH as Gasoline	2,500.	2705.	108.	90-110

TPH Total Petroleum Hydrocarbons

Approved by Carol Klein Date 9-24-92

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Client: EMCON Associates
Project: EMCON Project No. G70-02.01
Arco Facility No. 276

Date Received: 09/10/92
Work Order #: SJ92-1134
Sample Matrix: Water

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

Sample Name	Date Analyzed	Percent Recovery α,α,α-Trifluorotoluene
MW-1(38)	09/14/92	110.
MW-3(38)	09/14/92	111.
MW-4(48)	09/14/92	107.
MW-5(47)	09/14/92	109.
MW-8(47)	09/14/92	106.
RW-1(48)	09/14/92	110.
FB-1	09/14/92	104.
MW-1(38)MS	09/14/92	112.
MW-1(38)DMS	09/14/92	111.
Method Blank	09/14/92	97.
	CAS Acceptance Criteria	70-130

TPH Total Petroleum Hydrocarbons

Approved by Carol Klein Date 9-24-92

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

Client: EMCON Associates
Project: EMCON Project No. G70-02.01
Arco Facility No. 276

Date Received: 09/10/92
Work Order #: SJ92-1134
Sample Matrix: Water

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

Sample Name: MW-1(38)
Date Analyzed: 09/14/92

Analytes	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	Acceptance Criteria
Benzene	25.	ND	25.2	26.6	101.	106.	39-150
Toluene	25.	ND	25.9	27.2	104.	109.	46-148
Ethylbenzene	25.	ND	26.2	27.4	105.	110.	32-160

ND None Detected at or above the method reporting limit

Approved by Carol Klein Date 9-24-92

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Client: EMCON Associates
Project: EMCON Project No. G70-02.01
Arco Facility No. 276

Date Received: 09/10/92
Work Order #: SJ92-1134

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

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Chloromethane	50	50.2	100.	70-130
Vinyl Chloride	50	49.9	100.	70-130
Bromomethane	50	52.4	105.	70-130
Chloroethane	50	50.7	101.	70-130
Acetone	50	51.8	104.	70-130
1,1-Dichloroethene	50	50.9	102.	70-130
Carbon Disulfide	50	49.0	98.	70-130
Methylene Chloride	50	51.0	102.	70-130
trans-1,2-Dichloroethene	50	50.2	100.	70-130
cis-1,2-Dichloroethene	50	50.6	101.	70-130
1,1-Dichloroethane	50	49.5	99.	70-130
Vinyl Acetate	50	50.6	101.	70-130
2-Butanone	50	51.7	103.	70-130
Chloroform	50	50.1	100.	70-130
1,1,1-Trichloroethane (TCA)	50	48.6	97.	70-130
Carbon Tetrachloride	50	47.3	95.	70-130
Benzene	50	52.4	105.	70-130
1,2-Dichloroethane	50	52.0	104.	70-130
Trichloroethene (TCE)	50	50.8	102.	70-130
1,2-Dichloropropane	50	53.6	107.	70-130
Bromodichloromethane	50	53.5	107.	70-130
2-Chloroethyl Vinyl Ether	50	48.9	98.	70-130
2-Hexanone	50	55.8	112.	70-130
trans-1,3-Dichloropropene	50	52.9	106.	70-130
Toluene	50	52.6	105.	70-130
cis-1,3-Dichloropropene	50	54.7	109.	70-130
1,1,2-Trichloroethane	50	54.6	109.	70-130
Tetrachloroethene (PCE)	50	47.1	94.	70-130
Dibromochloromethane	50	51.8	104.	70-130
Chlorobenzene	50	51.1	102.	70-130
Ethylbenzene	50	51.7	103.	70-130
o Xylene	50	51.4	103.	70-130
Styrene	50	52.4	105.	70-130
Bromoform	50	50.3	101.	70-130
1,1,2,2-Tetrachloroethane	50	56.2	112.	70-130

Approved by Carol Klein Date 9-24-92

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Client: EMCON Associates
Project: EMCON Project No. G70-02.01
Arco Facility No. 276

Date Received: 09/10/92
Work Order #: SJ92-1134
Sample Matrix: Water

QA/QC Report
Surrogate Recovery Summary
Volatile Organic Compounds
EPA Method 624

		Percent Recovery		
		1,2-Dichloroethane - D_4	Toluene - D_8	4-Bromofluorobenzene
Sample Name	Date Analyzed			
MW-1(38)	09/15/92	103.	101.	104.
MW-3(38)	09/15/92	100.	100.	103.
MW-4(48)	09/15/92	101.	100.	103.
MW-5(47)	09/15/92	101.	100.	103.
MW-8(47)	09/15/92	100.	101.	103.
RW-1(48)	09/15/92	100.	100.	104.
FB-1	09/15/92	99.	101.	103.
MW-1(38)MS	09/15/92	97.	100.	99.
MW-1(38)DMS	09/15/92	96.	100.	100.
Method Blank	09/15/92	101.	100.	103.
EPA Acceptance Criteria		76-114	88-110	86-115

Approved by Carol Klein Date 9-24-92

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Client: EMCON Associates
Project: EMCON Project No. G70-02.01
Arco Facility No. 276

Date Received: 09/10/92
Work Order #: SJ92-1134
Sample Matrix: Water

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

Sample Name: MW-1(38)
Date Analyzed: 09/15/92

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	50	ND	56.2	57.2	112.	114.	61-145	2.
Trichloroethene	50	ND	44.2	47.9	88.	96.	71-120	8.
Chlorobenzene	50	ND	49.4	52.5	99.	105.	75-130	6.
Toluene	50	ND	46.2	49.8	92.	100.	76-125	8.
Benzene	50	ND	47.0	49.9	94.	100.	76-127	6.

ND None Detected at or above the method reporting limit

Approved by Carol Klein Date 9-24-92

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APPENDIX B

CHAIN OF CUSTODY

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

APPENDIX B

CHAIN OF CUSTODY

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. EMCGC-92-1

Chain of Custody

ARCO Facility no: 376	City (Facility): OAKLAND	Project manager (Consultant): Jim Butera	Laboratory name: CAS
ARCO engineer: Kyle Christie	Telephone no. (ARCO): 415 571-2434	Telephone no (Consultant): 408 453-0719	Fax no. (Consultant): 408-453-0452
Consultant name: EMCON ASSOCIATES	Address (Consultant): 1938 JUNCTION AVE San Jose		Contract number: 07077

Method of shipment: sampler will deliver

Special detection Limit/reporting: Lowest Possible

Special QA/QC: AS Normal

Remarks: 4 40ml VOA's HCl; 2-liter HCl GLASS; G70-0201

Lab number: SJ92-1134

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 EPA M602/8020/8015 GAS	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 ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
MW-1(38)	1-4	4		X		X	HCl	9/9/92	1313		X					X				
MW-2( )		4		X		X	HCl				X	no sample well contained product				X				
MW-3(35)	5-8	4		X		X	HCl	9/9/92	1354		X					X				
MW-4(45)	9-14	6		X		X	HCl	9/9/92	1507		X		X			X				
MW-5(47)	15-18	4		X		X	HCl	9/9/92	13:35		X					X				
MW-6( )		4		X		X	HCl				X	no sample unable to locate well possibly paved over								
MW-7( )		4		X		X	HCl				X	no sample well contained product				X				
MW-8(47)	19-22	4		X		X	HCl	9/9/92	16:20		X					X				
RW-1(48)	23-26	4		X		X	HCl	9/9/92	15:05		X					X				
FB-1	27-30	4		X		X	HCl	9/9/92	1416		X					X				

Condition of sample: OK		Temperature received: cool	
Relinquished by sampler	Date 9/10/92	Time	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory: Date 9-10-92 Time 08:40

Turnaround time

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

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant
APPC-3292 (2-91)

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 676-02-01 SAMPLE ID: MW-1 (38)

PURGED BY: M Adler CLIENT NAME: Arco 276

SAMPLED BY: M Adler LOCATION: 10600 MacArthur 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.): .5

DEPTH TO WATER (feet): 35.72 CALCULATED PURGE (gal.): 2.52

DEPTH OF WELL (feet): 38.8 ACTUAL PURGE VOL. (gal.): 2.5

DATE PURGED: 9.7.92 Start (2400 Hr) 1257 End (2400 Hr) 1309

DATE SAMPLED: 9.7.92 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)
1259	.5	6.37	2970	69.0	TAN	heavy
1301	1.0	6.79	3000	67.6	TAN	heavy
1303	1.5	6.45	2990	67.1	TAN	heavy
1305	2.0	6.54	3010	66.8	TAN	heavy
1309	2.5	6.49	3650	66.1	TAN	heavy

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

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	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: Good LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 9-9-92 Time: 12:35 Meter Serial #: 9112 Temperature °F: 71.6

(EC 1000 1013 / 1000) (DI 22.5) (pH 7 6.93 / 7.00) (pH 10 10.001 / 10.00) (pH 4 3.93 / ___)

Location of previous calibration: MW-1 (38)

Signature: M Adler Reviewed By: JB Page 1 of 9

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 670-02.01 SAMPLE ID: MW-2

~~PURGED~~ BY: Madison CLIENT NAME: Arco 276

SAMPLED BY: _____ LOCATION: Arco MacArthur 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):	NA	VOLUME IN CASING (gal.):	NA
DEPTH TO WATER (feet):	/	CALCULATED PURGE (gal.):	/
DEPTH OF WELL (feet):		ACTUAL PURGE VOL. (gal.):	

DATE ~~PURGED~~: 9-9-92 Start (2400 Hr) NA End (2400 Hr) NA

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

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
	No Samples - Product in well					

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

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

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: NA		Other: NA	

WELL INTEGRITY: Good LOCK #: 3259

REMARKS: .05 product in well

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

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

Location of previous calibration: _____

Signature: _____ Reviewed By: JB Page 2 of 9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 670-12.01 SAMPLE ID: MW-3 (38)

PURGED BY: M Adler CLIENT NAME: Arco 276

SAMPLED BY: M Adler LOCATION: 10600 MacArthur 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.): .39

DEPTH TO WATER (feet): 36.19 CALCULATED PURGE (gal.): 1.97

DEPTH OF WELL (feet): 38.6 ACTUAL PURGE VOL. (gal.): 2.0

DATE PURGED: 9-9-92 Start (2400 Hr) 1339 End (2400 Hr) 1348

DATE SAMPLED: 9-9-92 Start (2400 Hr) 1354 End (2400 Hr) 1356

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1339	.4	6.07	1332	67.4	TAN	moderate
1343	.8	6.49	1227	66.5	TAN	heavy
1342	1.2	6.48	1221	65.9	TAN	heavy
1346	1.6	6.46	1233	65.5	TAN	heavy
1348	2.0	6.50	1284	65.5	TAN	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): FB-1

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: Good LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 9-9-92 Time: 1235 Meter Serial #: 9 1L Temperature °F: ___

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

Location of previous calibration: MW-1 (38)

Signature: M Adler Reviewed By: JB Page 3 of 9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 670-02.01 SAMPLE ID: MW-4 (48)

PURGED BY: M Adler CLIENT NAME: Arco 276

SAMPLED BY: M Adler LOCATION: 10600 MacArthur 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.): 2.11

DEPTH TO WATER (feet): 35.70 CALCULATED PURGE (gal.): 10.57

DEPTH OF WELL (feet): 48.6 ACTUAL PURGE VOL. (gal.): 11.0

DATE PURGED: 9 9 92 Start (2400 Hr) 1441 End (2400 Hr) 1503

DATE SAMPLED: 9.9.92 Start (2400 Hr) 1507 End (2400 Hr) 1513

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1447	2.5	6.77	1735	67.6	brown	low
1451	5.0	7.31	1750	66.9		
1456	7.5	7.54	1743	66.5		
1501	10.0	7.49	1716	66.0		
1503	11.0	7.54	1733	65.8	∇	∇

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	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: Good LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 9.9.92 Time: 1235 Meter Serial #: 9112 Temperature °F: ___

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

Location of previous calibration: MW-1 (38)

Signature: M Adler Reviewed By: JB Page 4 of 9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 670-02.01 SAMPLE ID: MW-5 (47)

PURGED BY: S. Horton CLIENT NAME: ARCO #276

SAMPLED BY: S. Horton LOCATION: 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.): 7.88

DEPTH TO WATER (feet): 34.98 CALCULATED PURGE (gal.): 39.42

DEPTH OF WELL (feet): 47.00 ACTUAL PURGE VOL. (gal.): 39.50

DATE PURGED: 9/9/92 Start (2400 Hr) 13:03 End (2400 Hr) 13:29

DATE SAMPLED: 9/9/92 Start (2400 Hr) 13:34 End (2400 Hr) 13:35

TIME (2400 Hr)	VOLUME (gal)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
13:10	8.0	6.32	445	72.4	clear	trace
13:14	16.0	6.30	487	71.1	cloudy	slight
13:17	24.0	6.31	491	70.4	cloudy	moderate
13:21	32.0	6.36	498	70.4	cloudy	moderate
13:25	39.5	6.42	492	70.1	cloudy	moderate

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

WELL INTEGRITY: Good LOCK #: 3259

REMARKS ___

Meter Calibration: Date: 9/9/92 Time: 12:45 Meter Serial #: 9704 Temperature °F: 75.1

(EC 1000 1127 / 1000) (DI ___) (pH 7 6.98 / 7.00) (pH 10 9.93 / 10.00) (pH 4 4.00 / ___)

Location of previous calibration: ___

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

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: GTC-02.01 SAMPLE ID: MW-6

~~PURGED~~ BY: M.A. CLIENT NAME: Arco 276

SAMPLED BY: _____ LOCATION: 10600 MacArthur Oakland, CA

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

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

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

DEPTH TO WATER (feet): / CALCULATED PURGE (gal.): /

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

DATE ~~PURGED~~: 9-9-92 Start (2400 Hr) NA / End (2400 Hr) NA /

DATE SAMPLED: _____ Start (2400 Hr) / End (2400 Hr) /

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
	NA	Sampler - Could not find well				

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

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

WELL INTEGRITY: NA LOCK #: NA

REMARKS: Could not find well - possibly abandoned over.

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

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

Location of previous calibration: _____

Signature: _____ Reviewed By: JB Page 6 of 9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: G70 - 02.01 SAMPLE ID: MW-7

~~PURGED~~ BY: M Adler CLIENT NAME: Arco 276

SAMPLED BY: _____ LOCATION: 1660 MacArthur 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): NA / VOLUME IN CASING (gal.): NA /

DEPTH TO WATER (feet): ____ / CALCULATED PURGE (gal.): ____ /

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

DATE ~~PURGED~~: 9-9-92 Start (2400 Hr) NA / End (2400 Hr) NA /

DATE SAMPLED: ____ Start (2400 Hr) ____ / End (2400 Hr) ____ /

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
	N/C Sampled - Product in well					

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

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

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: NA		Other: NA	

WELL INTEGRITY: good LOCK #: 2357

REMARKS: 1.31' product in well

installed new lock - it didn't have any lock

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

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

Location of previous calibration: ____

Signature: T Miller Reviewed By: JB Page 7 of 9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: G70-02 C1 | SAMPLE ID: MW-8 (47)

PURGED BY: S. Horton | CLIENT NAME: ARCO #276

SAMPLED BY: S. Horton | LOCATION: 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.): 9.59

DEPTH TO WATER (feet): 33.18 | CALCULATED PURGE (gal.): 47.95

DEPTH OF WELL (feet): 47.8 | ACTUAL PURGE VOL. (gal.): 48.00

DATE PURGED: 9/9/92 | Start (2400 Hr) 15:43 | End (2400 Hr) 16:02

DATE SAMPLED: 9/9/92 | Start (2400 Hr) 16:19 | End (2400 Hr) 16:20

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
15:52	10.0	7.08	710	71.8	brown	moderate
16:02	~~49.5~~ recharge	Well Dried At 16.5 Gallons				
16:20	~~54.0~~	6.99	582	71.7	brown	heavy
	38.5					
	48.0					

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

WELL INTEGRITY: Good | LOCK #: none

REMARKS: DTW @ 16:15 = 38.51

Meter Calibration: Date: 9/9/92 Time: ___ Meter Serial #: 9704 Temperature °F: ___

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

Location of previous calibration: MW-5

Signature: [signature] | Reviewed By: JB | Page 8 of 9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 670-02.01 SAMPLE ID. RW-1 (48?)

PURGED BY: S. Horton CLIENT NAME: ARCO #276

SAMPLED BY: S. Horton LOCATION: Oakland, CA

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

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

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	18.8C
DEPTH TO WATER (feet):	35.99	CALCULATED PURGE (gal.):	94.02
DEPTH OF WELL (feet):	48.8	ACTUAL PURGE VOL. (gal.):	94.5C

DATE PURGED: 9/9/92 Start (2400 Hr) 14:2C End (2400 Hr) 14:57

DATE SAMPLED: 9/9/92 Start (2400 Hr) 15 C4 End (2400 Hr) 15:05

TIME (2400 Hr)	VOLUME (gal)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
14:29	19	6.69	1370	69.1	clear	trace
14:36	38	6.81	1373	65.5	clear	trace
14:46	57	6.73	1364	68.3	clear	trace
14:52	76	6.84	1366	68.3	clear	trace
14:57	94.5	6 9C	1369	68.3	clear	trace

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	X Bailer (Teflon®)
___ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
X Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other ___		Other ___	

WELL INTEGRITY: good LOCK #: none

REMARKS: ___

Meter Calibration: Date: 9/9/92 Time: ___ Meter Serial #: 9204 Temperature °F: ___

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

Location of previous calibration: MW-5

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

MONITORING WELL PURGE WATER TRANSPORT FORM

GENERATOR INFORMATION

NAME: ARCO PRODUCTS

ADDRESS: P.O. BOX 5811

CITY,STATE,ZIP: SAN MATEO, CA 94402 PHONE #: (415) 571-2434

DESCRIPTION OF WATER: PURGE WATER GENERATED DURING SAMPLING OR DEVELOPMENT OF MONITORING WELLS LOCATED AT VARIOUS SITES. AUGER RINSATE GENERATED DURING THE INSTALLATION OF MONITORING WELLS AT VARIOUS SITES. THE WATER MAY CONTAIN DISSOLVED HYDROCARBONS.

THE GENERATOR CERTIFIES THAT THIS WATER AS DESCRIBED IS NON-HAZARDOUS

Kyle Christie by Don DeFoe 7-8-92
(Typed or printed full name & signature) (Date)

SITE INFORMATION

	STA #	JOB #	ADDRESS	GALS
1	A-6095	20722-PW	2329 NO. TEXAS ST., FAIRFIELD, CA	36
2	A-2180	20723-PW	3000 TRAVIS BLVD., FAIRFIELD, CA	126
3	A-4931	20756&20685	731 W. MACARTHUR BLVD., OAKLAND, CA	951
4	A-276	20735-PW	10600 MACARTHUR BLVD., OAKLAND, CA	268
5	A-6113	20734&20694	785 E. STANLEY BLVD., LIVERMORE, CA	442
6	A-5334	20719-PW	707 SO. MATHILDA AVE., SUNNYVALE, CA	39
7	A-2135	20594-PW	440 THIRD ST., SAN RAFAEL, CA	99
8	A-2112	20686-DW	1260 PARK ST., ALAMEDA, CA	221
9	A-6064	20670-PW	3611 SO. MOONEY BLVD., VISALIA, CA	69
10	A-1316	20725-DW	1800 OLIVE DR., DAVIS, CA	188
			TOTAL GALLONS:	2,439

TRANSPORTER INFORMATION

NAME: BALCH PETROLEUM

ADDRESS: 930 AMES AVE.

CITY,STATE,ZIP: MILPITAS, CA 95035 PHONE #: (408) 942-8686

TRUCK ID #: PETERBILT HURSCHEL WARD Hurschel Ward 7-8-92
(Typed or printed full name & signature) (Date)

TSD FACILITY INFORMATION

NAME: GIBSON OIL & REFINING

ADDRESS: 475 SEAPORT BLVD

CITY,STATE,ZIP: REDWOOD CITY, CA 94063 PHONE #: (415) 368-5511

RELEASE #: 11320 Bill Lewin Bill Lewin 7-8-92
(Typed or printed full name & signature) (Date)

GOR 1114

MONITORING WELL PURGE WATER TRANSPORT FORM

RECEIVED
OCT 3 2 1992
RESNA
SAN JOSE

GENERATOR INFORMATION

NAME: ARCO PRODUCTS

ADDRESS: P.O. BOX 5811

CITY,STATE,ZIP: SAN MATEO, CA 94402 PHONE #: (415) 571-2434

DESCRIPTION OF WATER: PURGE WATER GENERATED DURING SAMPLING OR DEVELOPMENT OF MONITORING WELLS LOCATED AT VARIOUS SITES. AUGER RINSATE GENERATED DURING THE INSTALLATION OF MONITORING WELLS AT VARIOUS SITES. THE WATER MAY CONTAIN DISSOLVED HYDROCARBONS.

THE GENERATOR CERTIFIES THAT THIS WATER AS DESCRIBED IS NON-HAZARDOUS

Kyle Christensen for Tom Peterson 8-27-92
(Typed or printed full name & signature) (Date)

SITE INFORMATION

	STA #	JOB #	ADDRESS	GALS
1	A-2067	20935-PW	310 ORANGE DR., VACAVILLE, CA	151
2	A-551	20819-DW	1391 FLORIN RD., SACRAMENTO, CA	635
3	A-2096	20878-DW	2460 FLORIN RD., SACRAMENTO, CA	443
4	A-2130	20938-DW	7906 NO. EL DORADO ST., STOCKTON, CA	318
5	A-276	20817-DW	10600 MACARTHUR BLVD., OAKLAND, CA	31
6	A-2032	20936-DW	1001 SAN PABLO AVE., ALBANY, CA	98
7	A-319	20972-PW	5101 MISSION ST., SAN FRANCISCO, CA	44
8				
9				
10				
			TOTAL GALLONS:	1,720

TRANSPORTER INFORMATION

NAME: BALCH PETROLEUM

ADDRESS: 930 AMES AVE.

CITY,ST.ATE,ZIP: MILPITAS, CA 95035 PHONE #: (408) 942-8686

TRUCK ID #: PETERBILT HURSCHEL WARD 8-27-92
(Typed or printed full name & signature) (Date)

TSD FACILITY INFORMATION

NAME: GIBSON ENVIRONMENTAL

ADDRESS: 3300 TRUXTON AVE. , SUITE 200

CITY,STATE,ZIP: BAKERSFIELD, CA 93301 PHONE #: (800) 582-3935

RELEASE #: 13813 Cameron Hoop Cameron Hoop 8-27-92
(Typed or printed full name & signature) (Date)