ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION (LOP)
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

March 11,1999
StID # 3756

REMEDIAL ACTION COMPLETION CERTIFICATION

ARCO Products Co. c/o
Mr. Kyle Christie
P.O. Box 5077
Buena Park, CA 90622-5077

RE: ARCO Station #276, 10600 MacArthur Blvd., Oakland,CA 94605

Dear Mr. Christie:

This letter confirms the completion of site investigation and remedial action for the five (5) underground tanks; 1-500 gallon waste oil, 3-6,000 gallon UL and 1-10,000 gallon UL at the above described location. Thank you for your cooperation throughout this investigation. Your willingness and promptness in responding to our inquiries concerning the former underground tank is greatly appreciated.

Based upon the available information and with provision that the information provided to this agency was accurate and representative of site conditions, no further action related to the underground tank releases is required.

This notice is issued pursuant to a regulation contained in Title 23, Division 3, Chapter 16, Section 2721 (e) of the California Code of Regulations.

Please contact Barney Chan at (510) 567-6765 if you have any questions regarding this matter.

Sincerely,

Mee Ling Tung
Director, Environmental Health

c: B. Chan, Hazardous Materials Division-files
Chuck Headlee, RWQCB
Mr. Dave Deaner, SWRCB Cleanup Fund
Mr. Leroy Griffin, City of Oakland OES, 505 14th St., Suite 702, Oakland CA 94612

RACC10600MacArthur

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March 11, 1999
StID# 3756

ARCO Products Co. c/o
Mr. Kyle Christie
P.O. Box 5077
Buena Park, CA 90622-5077

RE: Fuel Leak Site Case Closure, ARCO Station #276, 10600 MacArthur Blvd., Oakland, CA 94605

Dear Mr. Christie:

This letter transmits the enclosed underground storage tank (UST) case closure letter in accordance with the Health and Safety Code, Chapter 6.75 (Article 4, Section 25299.37 h). The State Water Resources Control Board adopted this letter on February 20, 1997. As of March 1, 1997, the Alameda County Health Services, Local Oversight Program (LOP) is required to use this case closure letter. We are also enclosing the case closure summary. These documents confirm the completion of the investigation and cleanup of the reported release at the subject site.

Site Investigation and Cleanup Summary:

Please be advised that the following conditions exist at the site:

- 8200 parts per billion (ppb) Total Petroleum Hydrocarbons as gasoline, 110, 260, 410 and 600 ppb ethyl-benzene, xylenes, MTBE and perchloroethylene, respectively remain in groundwater at the site.
- 360 parts per million (ppm) Total Petroleum Hydrocarbons as gasoline, 1.8, 14, 6.7, 43, 500 ppm benzene, toluene, ethyl-benzene, xylenes and TPH as motor oil, respectively remain in soil at the site.

Because of the presence of perchloroethylene in groundwater, a risk management plan (RMP) is in place to account for future subsurface activities at this site.

This site should be included in the City's permit tracking system. Please contact me at (510) 567-6765 if you have any questions.

Sincerely,

Barney M. Chan
Hazardous Materials Specialist

enclosures: Case Closure Letter, Case Closure Summary

c: Mr. L. Griffin, City of Oakland OES, 505 14th St., Suite 702, Oakland CA 94612
B. Chan, files (letter only)

TrLt10600MacArthur

RB # 01-0089

QUALITY CONTROL BOARD

FEB 17 1999

CALIFORNIA REGIONAL WATER

ENVIRONMENTAL PROTECTION

99 MAR -5 PM 4:47

CASE CLOSURE SUMMARY
Leaking Underground Fuel Storage Tank Program

I. AGENCY INFORMATION **Date:** January 28, 1999

Agency name: **Alameda County-HazMat** Address: **1131 Harbor Bay Parkway Rm 250, Alameda CA 94502**

City/State/Zip: **Alameda** Phone: **(510) 567-6700**

Responsible staff person: Barney Chan Title: **Hazardous Materials Spec.**

II. CASE INFORMATION

Site facility name: ARCO Station #276

Site facility address: 10600 MacArthur Blvd., Oakland 94605

RB LUSTIS Case No: **N/A** Local Case No./LOP Case No.: 3756

ULR filing date: 10/14/88 SWEEPS No: **N/A**

Responsible Parties:	Addresses:	Phone Numbers:
ARCO Products Co. c/o c/o Mr. Kyle Christie	P.O. Box 5077 Buena Park, CA 90622-5077	(714) 670-5303

Tank No:	Size in gal.:	Contents:	Closed in-place or removed?:	Date:
1	500	waste oil	Removed	9/29/88
2	6,000	super unleaded	Removed	2/08/90
3	6,000	reg. unleaded	Removed	2/08/90
4	6,000	reg. unleaded	Removed	2/08/90
5	10,000	reg. unleaded	Removed	2/08/90

III RELEASE AND SITE CHARACTERIZATION INFORMATION

Cause and type of release: unknown

Site characterization complete? Yes

Date approved by oversight agency:

Monitoring Wells installed? yes Number: 8

Proper screened interval? Yes

Leaking Underground Fuel Storage Program

Highest GW depth: 13.1'bgs (shallow) Lowest depth: 25.08' bgs (shallow)
25.16'bgs (deep) 39.89' bgs (deep)

Flow direction: shallow gw- west-southwesterly
deep gw- north to southwest (flat)

Most sensitive current use: commercial/residential

Are drinking water wells affected? No Aquifer name: NA

Is surface water affected? No Nearest affected SW name: NA

Off-site beneficial use impacts (addresses/locations): NA

Report(s) on file? **Yes**
Where is report(s)? Alameda County and City of Oakland FSA
1131 Harbor Bay Parkway, 505 14th St. Suite 510
Room 250, Alameda CA 94502-6577 Oakland CA 94612

Treatment and Disposal of Affected Material:

Material	Amount (include units)	Action (Treatment of Disposal w/destination)	Date
Tanks	1-500 gallon	Disposed by Crosby & Overton	9/29/88
	3-6k & 1-10k	Disposed @ H&H, SF	2/8/90
Free Product/	3000 gallon	" " "	"
Water	4800 gallon	" " "	11/22/91
Soil	50 cu yds	Disposed @ Waste Mgmt. Kettleman Hills, CA	?
	564 cy	Disposed	?
Free Product	7801 lbs.	1990-1996 SVE system	

Maximum Documented Contaminant Concentrations - - Before and After Cleanup

Contaminant	Soil (ppm)		Water (ppb)	
Gasoline tanks	Before[1]	After*	[3] Before	After[2]
TPH (gas)	360	360		8200
Benzene	1.8	1.8		ND
Toluene	14	14		ND
Ethylbenzene	6.7	6.7		110
Xylenes	43	43		260
Organic lead	ND			
Others: MTBE				410

Comments (Depth of Remediation, etc.):
1 From 2/08/90 soil sample from removal of gasoline USTs
*** Other soil samples have detected higher concentrations, however, those samples were taken within the capillary zone**
2 MW-2 and MW-7 groundwater samples (6/30/98 monitoring event)
3 Free product found in MW-2 and MW-7 up to 1992

Maximum Documented Contaminant Concentrations - - Before and After Cleanup

Contaminant	Soil (ppm)		Water (ppb)	
waste oil tank	Before[1]	After[2]	Before	After[3]
TPH (gas)	50	NA		440
TPH (diesel)	ND	60		--
Benzene	ND	NA		ND
Toluene	ND	NA		ND
Ethylbenzene	0.2	NA		ND
Xylenes	1.8	NA		NA
Oil and Grease	5600	380	(prior results, ND)	NA
Heavy metals:Cd,Cr,Pb,Zn	ND,53,ND,48			NA
TPHmo	7300	500		NA
TPHss	160	ND		
Semi-volatiles	NA	ND		
Volatile organics (8240)		ND	PCE	600

Comments (Depth of Remediation, etc.):
1 initial soil samples from tank removal (9/29/88)
2 soil samples after over-excavation (11/4/88)
3 MW4 (8/14/97 monitoring event)

IV. **CLOSURE**

Does completed corrective action protect existing beneficial uses per the Regional Board Basin Plan? Undetermined

Does corrective action protect public health for current land use? YES

Site management requirements: An appropriate health and safety plan must be in place when performing any subsurface work in the area near the former USTs.

Should corrective action be reviewed if land use changes? Yes

Monitoring wells Decommisioned: No

Number Decommisioned: 0 Number Retained: 8

List enforcement actions taken: Pre-enforcement hearing 3/28/95

List enforcement actions rescinded: None, no order sent

V. LOCAL AGENCY REPRESENTATIVE DATA

Name: Barney M. Chan Title: Hazardous Materials Specialist

Signature: Barney M Chan Date: 2/19/99

Leaking Underground Fuel Storage Tank Program

Reviewed by

Name: Tom Peacock Title: Manager

Signature: [signature] Date: 2-16-99

Name: Eva Chu Title: Hazardous Materials Specialist

Signature: [signature] Date: 3/5/98

VI. RWQCB NOTIFICATION

Date Submitted to RB: RB Response: [signature]

RWQCB Staff Name: Chuck Headlee Title: EG Date: 3/2/99

VII. ADDITIONAL COMMENTS, DATA, ETC.

see site summary

Site summary for ARCO Station No. 276, 10600 Mac Arthur Blvd., Oakland CA 94605

This site is located at the foothills of the Oakland hills, just west of Interstate 580 on the southeast corner of MacArthur Blvd. and 106th Ave. Neighboring residential properties exist to the east of the site and the parking lot to the Foothill Shopping Square lies to the south. Commercial businesses surround the site in the other directions. The natural topography slopes westerly towards the bay from the Oakland hills. **See Fig. 1**

September 29, 1988- the 500 gallon waste oil tank lying on the east side of the site behind the service station's office was removed. Soil samples, SP-1 and SP-2 were taken from each end of the tank at a depth of 7'. TOG was detected at 5,600 and 3,300 ppm in these samples, respectively. TPHmo was detected at 7,300 and 4,800 ppm, respectively, as well. It is noted that neither sample exhibited perchloroethylene, the solvent which was the basis of future litigation between ARCO and the owners of Foothill Shopping Square. Based upon these results and visual observation, additional excavation occurred on November 4, 1988. The waste oil tank pit was extended to a depth of 10' and samples WO-A and WO-B were taken directly below the original samples. These soil samples were analyzed for heavy metals, semi-volatiles, volatile organics, total oil and grease and low and high boiling hydrocarbons. Up to 220 ppm TOG and 110 ppm TPHmo was exhibited in these samples. The metals analyzed (cadmium, chromium, lead, nickel and zinc) were detected at background levels. No semi-volatiles or volatile organics were detected in these samples. To define the lateral extent of contamination, four sidewall samples (WO-C through WO-F) were taken at a depth of 7'. Total oil and grease in these samples exhibited up to 15, 000 ppm TOG. Overexcavation, where possible, was performed in those directions exhibiting contamination and confirmatory samples taken. With the exception of the west wall, which could not be overexcavated due to its proximity to a building, all other directions were overexcavated to ND TOG. The residual contamination on the west wall was 380 ppm TOG. Fifty (50) tons of excavated soil was disposed at Kettleman Hills landfill. A ULR was issued on October 14, 1988. **See Fig. 2, Tables 1 & 2.**

In October 1988, Kaldveer Associates performed a subsurface investigation on the Foothill Shopping Center adjacent to the ARCO site for Hopkin's Development Company. Fifteen borings were advanced in the shopping center and selected soil and groundwater samples taken for analysis. Because of the location of the ARCO station, one boring, EB-1, was advanced just south of the station in the Foothill Square parking lot. While drilling this boring, gasoline odors were noticed. A grab groundwater

sample from this boring encountered black floating product. The aqueous portion of this sample exhibited pesticides, PCBs, TPHg @ 8,360 ppb and BTEX @ 191, 534, 877 and 150 ppb, respectively. Given these results, it appeared that a gasoline release from the ARCO station occurred and had migrated offsite onto the Foothill Square property. However, the presence of pesticides and PCBs is more likely associated with the past use of the site. The current Foothill Square center was formerly used by Fageol Motors Company, which manufactured tractors, trucks and motor buses for 44 years. Fageol Motors later became Peterbilt Motors. This facility may have used these chemicals. In addition, review of aerial photographs from 1947 and 1953 show areas of drum storage and possible waste disposal. **See Fig. 3, Table 3 and boring log for boring #1.**

In **December 1988** Western Geologic Resources (WGR), continued the investigation of the Foothill Square property. Five monitoring wells were installed. Boring WGR B-3 located approximately 25 feet southeast of the ARCO station, near the former Kaldveer boring EB-1, was converted into MW-3. Though no free product was exhibited in the water sample from MW-3, TPHg at 300ppb, benzene at 0.2ppb, xylenes at 17 ppb and TCA at 0.2 ppb were detected. This is significantly different from the free product observed in the Kaldveer boring, EB-1. **See Figs. 4 & 5, Table 4 and boring log for WGR MW-3.**

In **March 1989** Applied GeoSystems (AGS) installed five monitoring wells on the ARCO site. Monitoring wells MW-1 through MW-5 were installed in borings B-1 through B-5, respectively. Monitoring wells MW-2 and MW-5 were completed as 4" wells and the other wells were 2". MW-2 was advanced to 28.5' and encountered groundwater at approximately 17' bgs. The other wells were advanced to 40-50' bgs and encountered groundwater at approximately 33' bgs. This is when two groundwater levels were identified. Site stratigraphy likely accounts for localized shallow perched water. With the exception of WGR MW-4, the Foothill Square wells were completed within shallow perched groundwater. Soil boring results identified TPH contamination only in borings B2 and B5. These two wells are within 15' of each other and apparently monitor two different water bearing zones. The highest onsite groundwater contamination has been detected in the general area of these two wells.

MW-4 was advanced within the former waste oil tank pit and the waste oil parameters were tested from this groundwater sample. In addition to TPHg and BTEX, PCE was detected in the sample. The detection of chlorinated solvents in this well fueled the continuing argument as to the source of the PCE. Was it from a dry cleaner operating in Foothill Square, from the waste oil UST or both? **See Plate P-2 and Tables 5 & 6 and cross sections.**

Site summary for ARCO Station No. 276, 10600 Mac Arthur Blvd., Oakland CA 94605

In **June 1989**, to a followup the Kaldveer investigation, Pacific Environmental Group (PEG), performed a soil-gas survey to determine the lateral extent of petroleum contamination previously identified on the Foothill Square property (assumed to originate from the ARCO site). A total of sixteen soil gas probes were installed and sampled at two depths. Four onsite probes (P-1 to P-4) were sampled at depths of 14-16' and 19-21'. Twelve probes, extending approximately 200' south of the ARCO station, were set at depths of 17-19' and 22-24'. The difference in sampling depths from onsite to offsite is due to the three foot difference in height of the two sites. An isoconcentration map of soil-vapor TPH and BTEX concentrations was generated from the analytical data. The results show a gasoline release from the southeast portion of the ARCO site, plus possibly another release further south on the Foothill Square property. It should be noted that soil-vapor results do not necessarily correlate with actual soil or groundwater concentrations since vapor volatilization has many dependent variables. The results, however, do indicate the presence of varying levels of contamination. **See Table 7 and isoconcentration diagrams.**

On **August 3, 1989** Applied Geosystems (AGS) drilled nine soil borings to confirm the results of the PEG soil-gas survey. Four to five soil samples were analyzed from each boring. The results of this investigation indicated that the TPHg release near MW-2 and MW-5 onsite extends southeasterly approximately 50' and was detected in offsite borings B-6 and B-7. **See Plate 3 and Tables 8 & 9.**

On **February 8, 1990** the four UL gasoline USTs were removed from the site; 3-6,000 gallon and 1-10,000 gallon. The three 6k tanks were within the same pit, while the 10k was within a separate pit. Nine soil samples were taken from the ends and base of the underground tank pits. In addition, eight soil samples from along the piping run were taken. At the same time as the tank removals, three borings (TPB1-TPB3) were advanced in a northern area where the new underground tanks were to be set. These boring results were unremarkable and indicated that the area of the new tanks was marginally impacted. The spoils from this new tank area, in general exhibited low TPHg and low to ND BTEX. The few spoils which exhibited greater than 100 ppm TPHg were aerated and disposed along with the spoils from the tank removals. The new underground tanks were then set in this area on the north side of the site. No overexcavation of the old tank pits was done since ARCO intended in installing a vapor extraction remediation system. **See Plates 4 & 5 and Tables 10-12.**

In **February 1990**, PEG performed a vapor extraction pilot test in the adjoining Foothill Square parking lot. The test indicated

that vapor extraction would be a viable remediation method. They later installed an in-situ soil venting system consisting of 25 soil vapor probes, one vadose well and a mobile extraction and treatment unit. In general, the vapor extraction test indicated a radius of influence of at least 10 feet from the extraction probes. The vapor extraction cat-ox system began operation in September 1990 and ran until August 1992. **See Figure 6 and Table 13.**

Ongoing groundwater monitoring had identified free product in MW-2 and lower dissolved TPHg concentration in the neaby well, MW-5. The "deep" aquifer gradient was north-northeasterly, contrary to that regional and anticipated gradient. Because of the presence of free product and given the n-nw gradient, on **October 31, 1991** RESNA installed on-site downgradient recovery well, (RW-1), near MW-4, and conducted an aquifer pumping and recovery test. RW-1 was completed as a 6" well and was used to pump from while MW-1 through MW-5 were used as observation wells.

June to August 1992 - RESNA installed two off-site groundwater monitoring wells (MW-6 and MW-7 in borings B-10 and B-11), one on-site monitoring well (MW-8 installed in boring B-12) and seven on-site vapor extraction wells within the former UST area. Wells MW-6 and MW-8 were installed in the "deeper" aquifer and MW-7 in the shallow. The vapor extraction wells and groundwater monitoring wells MW-2 and MW-8 were connected to the existing remediation system. The off-site vapor extraction probes were disconnected at this time to optimize the on-site system. The vapor extraction wells, VW-1 through VW-7, were constructed in borings B-13 through B-19. Groundwater in these wells was encountered at depths of 18-23', the "shallow" perched water. These wells were slotted from approximately 7.5'-18' or to first encountered groundwater depth. These wells encountered free product and/or product odor at groundwater depth indicating significant release in the former tank area.

The vapor extraction test of the on-site vapor wells was performed on **August 24, 1992** and included MW-2. A radius of influence from 17-32 feet was estimated. **See Plate 6 & 7 and Table 14.**

During the time of operation of the off-site vapor extraction system, from 1990 to 1992, approximately 754 pounds (113 gallons) of fuel was removed. At the end of this time, the amounts of TPHg and BTEX removed from offsite had declined to asymptotic levels.

The on-site VES system operated from August 25, 1992 to December of 1993 when it was shut down due to low influent concentrations

and shorter exposed screen interval due to rising groundwater elevation. During this time, an estimated 3615 pounds (577 gallons) of gasoline was recovered. The system was pulsed during the first quarter of 1994. The system was then restarted until August 1995 when it was again shut down due to low influent concentrations. **See Figure 7 & 8 and Report 1 to demonstrate free product removal.**

After the system shut down in 1993, the dispute between ARCO and Foothill Square heated up. Because Foothill Square wanted to expand their existing shopping center and was looking to refinance their property, the question of liability for the chlorinated solvent (PCE) plume detected on both properties came to light. A source of PCE had been verified on the Foothill Square property. Young's Dry Cleaner, which operated in the shopping center, verified a PCE release had occurred originating from a leak their sanitary sewer lateral. Interestingly, the main sewer lateral ran east-west towards the Foothill Square parking lot adjacent to the ARCO site. Foothill Square maintained that the ARCO site was well over 300' from the dry cleaner and was actually cross-gradient to the cleaner. In addition, there was no obvious PCE concentration gradient from the cleaner towards the ARCO site. MW-4, located adjacent to the former waste oil tank at the ARCO site continued to exhibit ~2,000 ppb PCE while the other wells around it exhibited lower levels, <100 ppb. However, no soil source of PCE was found at the ARCO site. Foothill Square's case against ARCO in regards to the PCE release was not strong but their case in regards to the gasoline release was. Therefore, Foothill Square pushed strongly to have their site remediated and recommended soil excavation to expedite remediation even though a vapor extraction system had already been installed and operating. Foothill Square argued that the catalytic-oxidation system was not designed for chlorinated solvents. ARCO countered that the influent from the vapor extraction system never detected any chlorinated solvent. **See Historical maps for the Foothill Square property and 4th Qtr. 1994 PCE concentration map.**

A pre-enforcement hearing was held at the County's offices on 3/28/95 in hopes of settling the chlorinated solvent dispute. After much posturing, little was accomplished. Eventually, each side decided that they would proceed independently. Individual risk assessments were prepared instead of determining responsibility.

In regards to the gasoline release, the plume from the former USTs likely did migrate onto the Foothill Square parking lot. Localized free product has been found on- and off-site in MW-2 and

MW-7, respectively. The vapor extraction system both on- and off-site has removed considerable amounts of gasoline so that there is no longer free product in these wells. The cumulative removal of gasoline from both on- and off-site SVE systems from September 1990 to December 22, 1994 is approximately 7,666 pounds or (1,236 gallons). During the first quarter 1995, an additional 23 pounds (3.7 gallons) of gas was removed. The systems, both on- and off-site, were pulsed to optimize gasoline removal. The system was shut down on 3/26/96 due to high groundwater and low levels of gasoline in extracted vapors. A total of 18.5 gallons of free product has been removed manually from these MW-2 and MW-7. In March of 1996, ORC compounds were added to these wells to enhance bioremediation of the dissolved gasoline.

The specific gradient in the deep wells has trended from north to west and most recently has been flat. The shallow gradient as determined through monitoring wells MW-2, MW-3 and WGR wells is southwesterly.

In **May 1997-** a Tier 1 Risk Based Corrective Action evaluation was performed for this site. The evaluation considered both BTEX and PCE as chemicals of concern. The exposure pathways examined as being complete or potentially complete were soil and groundwater volatilization to indoor and outdoor air, commercial setting using a 10E-5 risk. Based upon our risk assessor's evaluation of the risk assessment, no risk to human health is expected under current site conditions. **Included are comments from Madhulla Logan, Risk Assessor and other pertainent RBCA information.**

Groundwater monitoring continued up to the third quarter 1997 at which time it was put on hold pending review of the site for closure. Analysis for MTBE was started in 1996. In 1997, MTBE was detected in MW-2 at higher levels than that found in 1996 (1400 ppb vs 80 ppb). In addition MTBE was detected in MW-7 at 310 ppb. On 6/30/98 both these wells were again sampled and tested for TPHg, BTEX and MTBE(EPA 8260). In MW-2, MTBE was detected at 410 ppb and TPHg and BTEX were ND. In MW-7, MTBE was ND, TPHg, 8200 ppb and E&X were 110 and 260 ppb, respectively. Thus it appears that MTBE is localized near MW-2 and the addition of the ORC socks has had some affect in reducing the TPH concentration. **See attached the recent (1995-98) monitoring data for site.**

This site is recommended for site closure based upon:

1. Adequate site characterization; both petroleum and chlorinated solvent contaminant plume has been delineated. As part of Foothill Square's investigation, off-site borings along MacArthur Blvd. and 106th Ave. down-gradient of both ARCO and Foothill Square were advanced. Grab groundwater sampling results indicate that chlorinated plume is limited in extent and below RBSL. Long term monitoring for chlorinated HC will be done by Foothill Square as part of their MNA approach for the site.

Site summary for ARCO Station No. 276, 10600 Mac Arthur Blvd., Oakland CA 94605

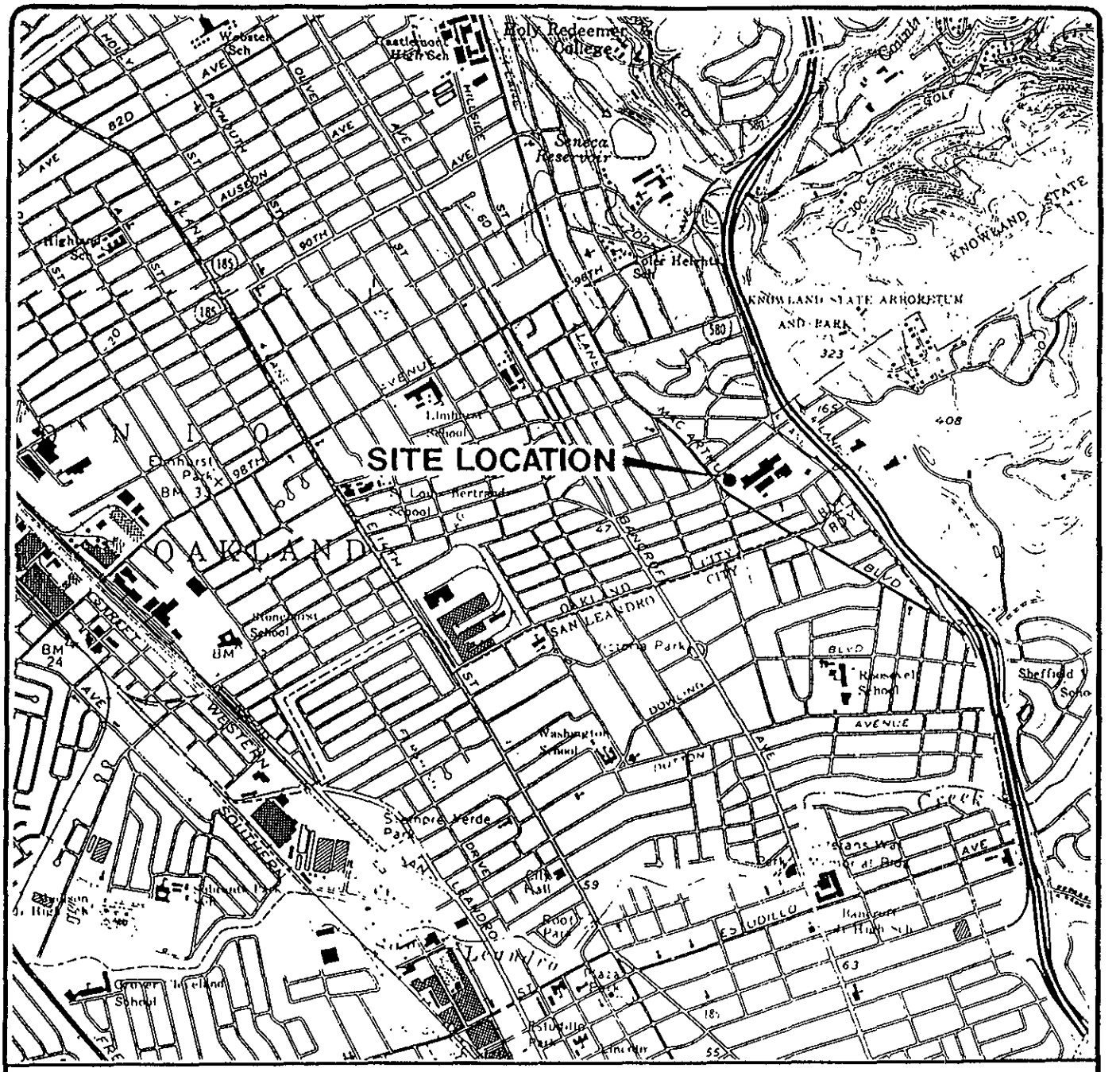
2. Adequate source removal has occurred. Underground tanks and associated piping attributable to the gasoline release have been removed. Approximately 564 cubic yards of spoils was removed. An off-site and on-site vapor extraction system, in operation from 9/90 to 3/96, has removed approximately 8000 lbs of gasoline. Asymptotic levels of petroleum in soil and groundwater have been reached.

3. No risk to human health exists. A Tier 1 RBCA has been submitted and reviewed by the County Risk Assessor, who concurs that no human health risk is anticipated for current and probable future use scenarios.

4. Groundwater in this area of Oakland is not used for drinking water purposes.

5. Passive bioremediation has been encouraged by adding ORC into those wells where free product and later high dissolved concentrations were found. No free product exists currently at this site. Long term monitoring has been performed and equilibrated groundwater concentrations exist.

152753



Base map from USGS 7.5' Quad. Maps:
Oakland East and San Leandro, California.
Photorevised 1980.

Scale : 0 2000 4000 Feet

- N -

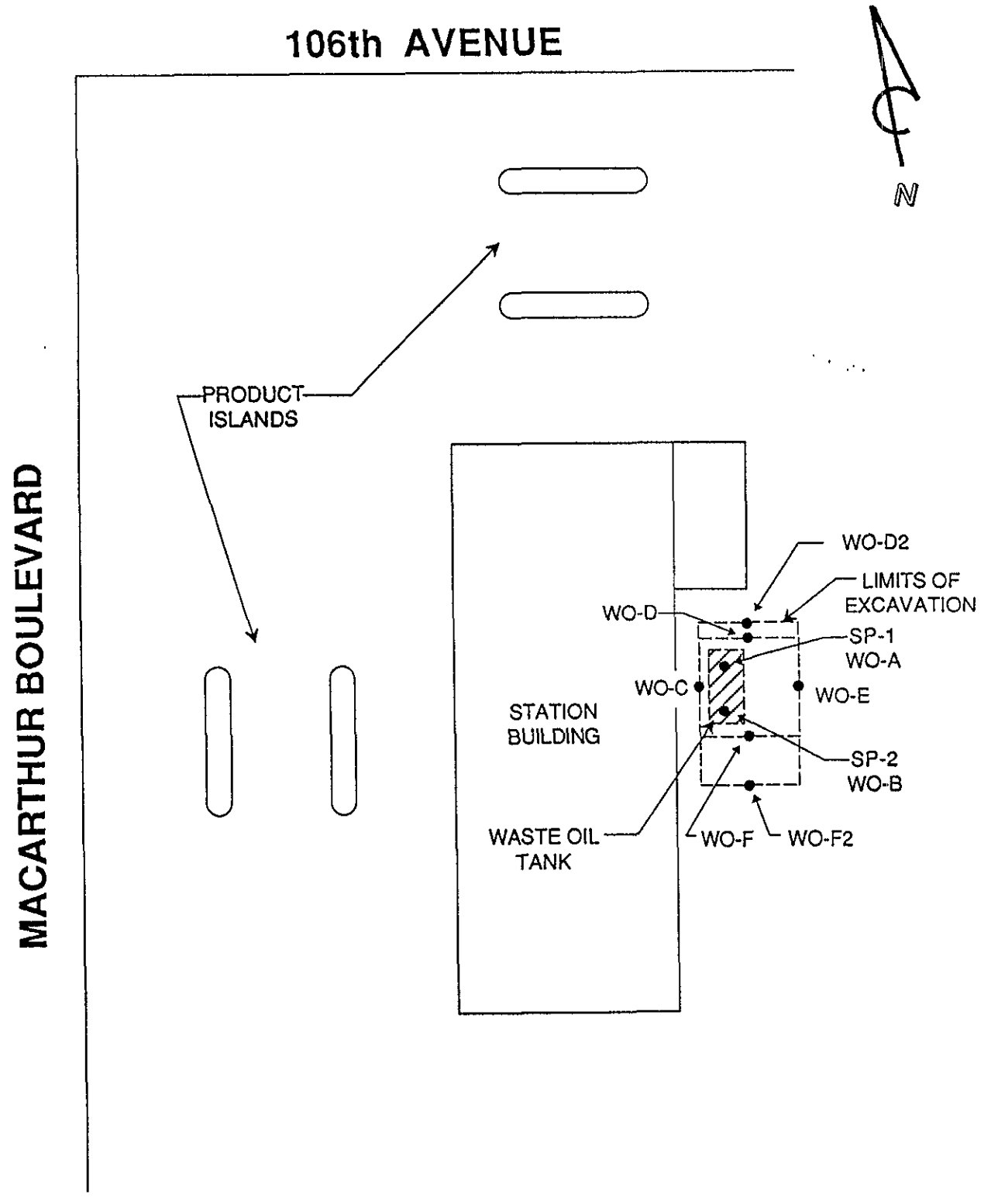
EMCON

10600 AND 10700 MACARTHUR BLVD.
RETAIL SERVICE STATION
OAKLAND, CALIFORINA

SITE LOCATION

FIGURE
1

PROJECT NO.
805-120.07



NOT TO SCALE

PACIFIC ENVIRONMENTAL GROUP, INC.

ARCO STATION #0276
10600 MacArthur Boulevard
Oakland, California

SITE MAP

FIGURE:
2
PROJECT:
330-40.01

TABLE 1

Summary of Analytical Results
Low Boiling Hydrocarbons, High Boiling Hydrocarbons
Soil Samples From Waste Oil Tank Excavation
Results in Parts per Million - Dry Soil Basis

		Low Boiling Hydrocarbons	High Boiling Hydrocarbons			Oil & Grease
Sample ID	Depth	Gasoline	Diesel	Oil	Stoddard	
(Beneath Tank Ends)						
SP-1	7′	40.*	<300.	7,300.	160.	5,600.
WO-A	10′	<5.	<10.	30.	ND	30.
SP-2	7′	50.*	<300.	4,800.	110.	3,300.
WO-B	10′	<5.	10.	110.	ND	220.
(Side Walls)						
WO-C	7′	NT	60.	500.	ND	380.
WO-D	7′	NT	140.	1,100.	ND	880.
WO-E	7′	NT	<10.	<10.	ND	10.
WO-F	7′	NT	2,500.	21,000.	ND	15,000.
WO-D2	7′	NT	<10.	<10.	ND	<20.
WO-F2	7′	NT	<10.	<10.	ND	<20.

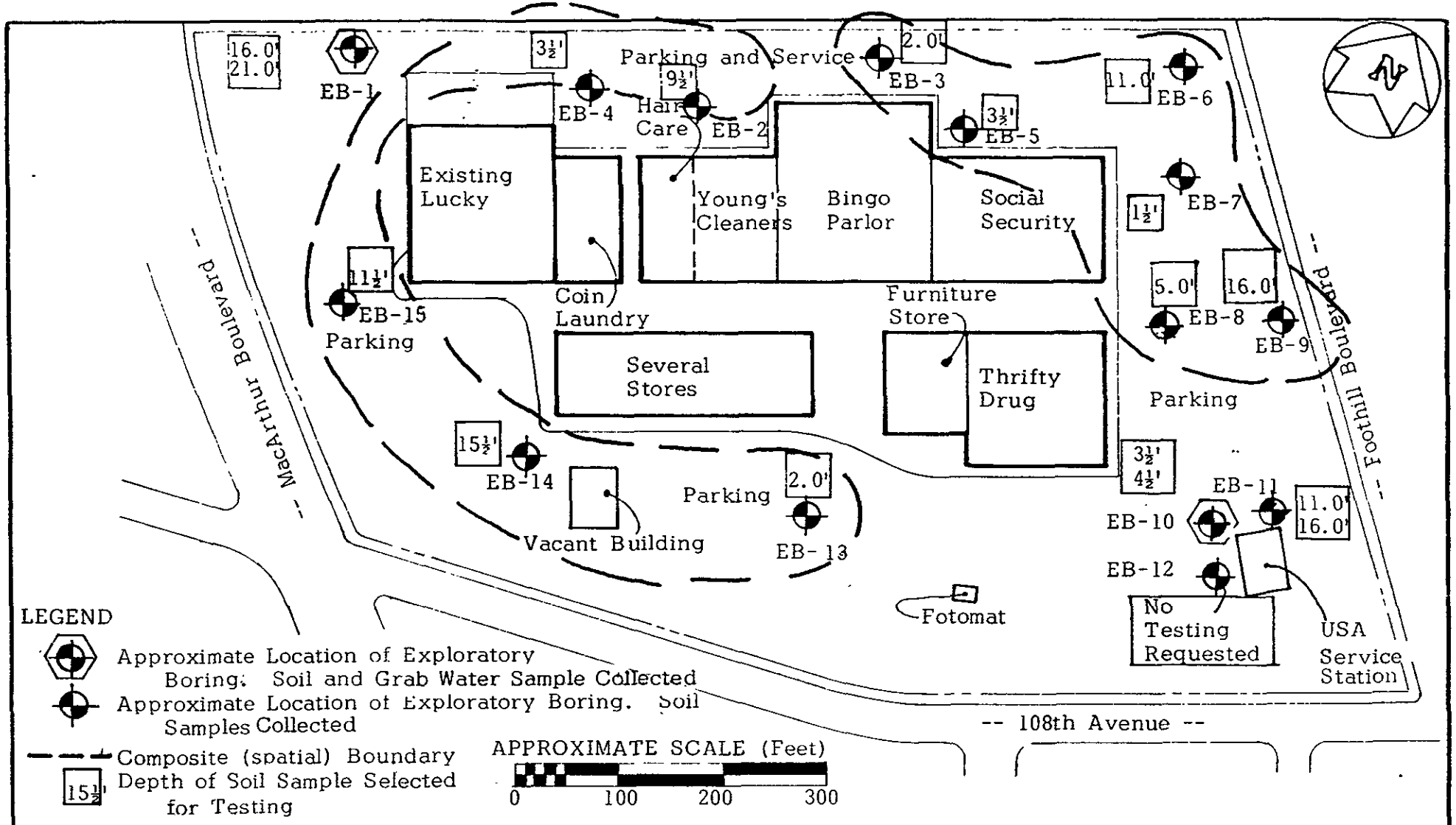
ND = Not Detected
NT = Not Tested
* = Chromatographic pattern of compounds detected and calculated as gasoline does not match that of the gasoline standard.

TABLE 2

Summary of Analytical Results
Volatile Organic Compounds, Semi-volatile Organic Compounds, Metals
Soil Samples from Waste Oil Tank Excavation
Results in Parts per Million - Dry Soil Basis

Sample ID:	SP-1	SP-2	WO-A	WO-B
Volatile Organic Compounds	Toluene: 0.76 Other tested compounds: ND	Xylenes: 0.1 Other tested compounds: ND	ND	ND
Semi-volatile Organic Compounds	NT	NT	ND	ND
Metals				
Cadmium	NT	NT	ND	ND
Chromium	NT	NT	48.	53.
Lead	NT	NT	ND	ND
Zinc	NT	NT	35.	48.

NT = Not tested
ND = None detected. See attached Certified Analytical Report for detection limits.



Base: Foothill Square "Drake Builders", Welton Becket & Associates, undated

Kaldveer Associates
Geoscience Consultants
A California Corporation

SITE PLAN

FOOTHILL SQUARE
Oakland, California

PROJECT NO	DATE	Figure
KE812-3A	October 1988	3

TABLE 3

SUMMARY OF ANALYTICAL TEST RESULTS FOR GROUNDWATER
ABOVE THE DETECTION LIMITS
in parts per billion (ppb)

Chemical Compounds	Sample Identification Numbers (Grab Water Sample From EB-1) 63801	Department of Health Services Drinking Water Standards	Miscellaneous Standards
Hydrocarbons with BTXE Distinction			
Gasoline	8360	*	
Benzene	191	1.0	
Toluene	534	100.0	
Xylene	877	1750.0	
Ethylbenzene	150	680.0	
Pesticides and PCB's			
BHC-alpha	7.89	0.70	
Chlordane	24.5	0.055	
DDE	2.26	*	
Endosulfan 2	1.56		74(4)
PCB's	158.0(1)		0(5)
Semi-volatiles			
Benzidine	9700(2)		120(6)
Fluoranthene	2800(2)		42(4)
Napthalene	67,000(2)		
Phenanthrene	3500(2)		2800(6)
Volatiles			
Ethyl Benzene	1600(3)	680	
Toluene	410(3)	100	
Xylene	1800(3)	1750	

Notes:

* = Not established
BHC = Benzene hexachloride
DDE = Dichlorodiphenyldichoroethylene
(1) = Sample too dirty to allow reliable confirmation by 2nd column GC/ECD or GC/MS at the detection limit for this test.
(2) = Refer to laboratory results in Appendix B for explanation of extractions procedures for this sample.
(3) = Refer to laboratory results in Appendix B for explanation of required dilution procedures for this sample.

DRILL RIG	Continuous Flight Auger	SURFACE ELEVATION	-	LOGGED BY	RB
DEPTH TO GROUNDWATER	27 Feet	BORING DIAMETER	6 inches	DATE DRILLED	8/29/88

DESCRIPTION AND REMARKS	COLOR	CONSIST	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
1" asphalt over 8" baserock CLAY, silty with gravels, no odor, dry	brown	very stiff	CL	1					
				2		23			
(grading to no gravels)				3					
				4		28			
		hard		5		41			
				6					
				7					
(grading to some white specks)				8					
				9					
				10					
(grading to no white specks)		very stiff		11		24			
				12					
(grading with some gravels)				13					
(grading with slight odor)				14					
				15					
				16		26			
				17					
				18					
CLAY, gravelly, very moist	brown-green	very stiff	CL	19					
(strong odor)				20					

Kaldveer Associates
Geoscience Consultants
A California Corporation

EXPLORATORY BORING LOG

FOOTHILL SQUARE
Oakland, California

PROJECT NO.	DATE	BORING NO
KE812-3A	October 1988	EB1

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION -	LOGGED BY RB
DEPTH TO GROUNDWATER 27 Feet	BORING DIAMETER 6 inches	DATE DRILLED 8/29/88

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE						
CLAY, gravelly, very moist, strong odor	brown-green	very stiff	CL	21		30			
				22					
				23					
				24					
				25					
				26		34			
				27			▽		
				28					
				29					
(saturated)				30					
				31		21			
Bottom of Boring = 31½ Feet				32					
				33					
				34					
				35					
				36					
				37					
				38					
				39					
				40					

Notes:
1. The stratification lines represent the approximate boundaries between soil types and the transition may be gradual.
2. These samplers were driven with a fully manual hammer and the penetration resistance values should be converted as explained in Appendix A.
3. Groundwater level was measured at 27 feet at time of drilling.

Kaldveer Associates
Geoscience Consultants
A California Corporation

EXPLORATORY BORING LOG

FOOTHILL SQUARE
Oakland, California

PROJECT NO.	DATE	BORING NO.
KE812-3A	October 1988	EB 1

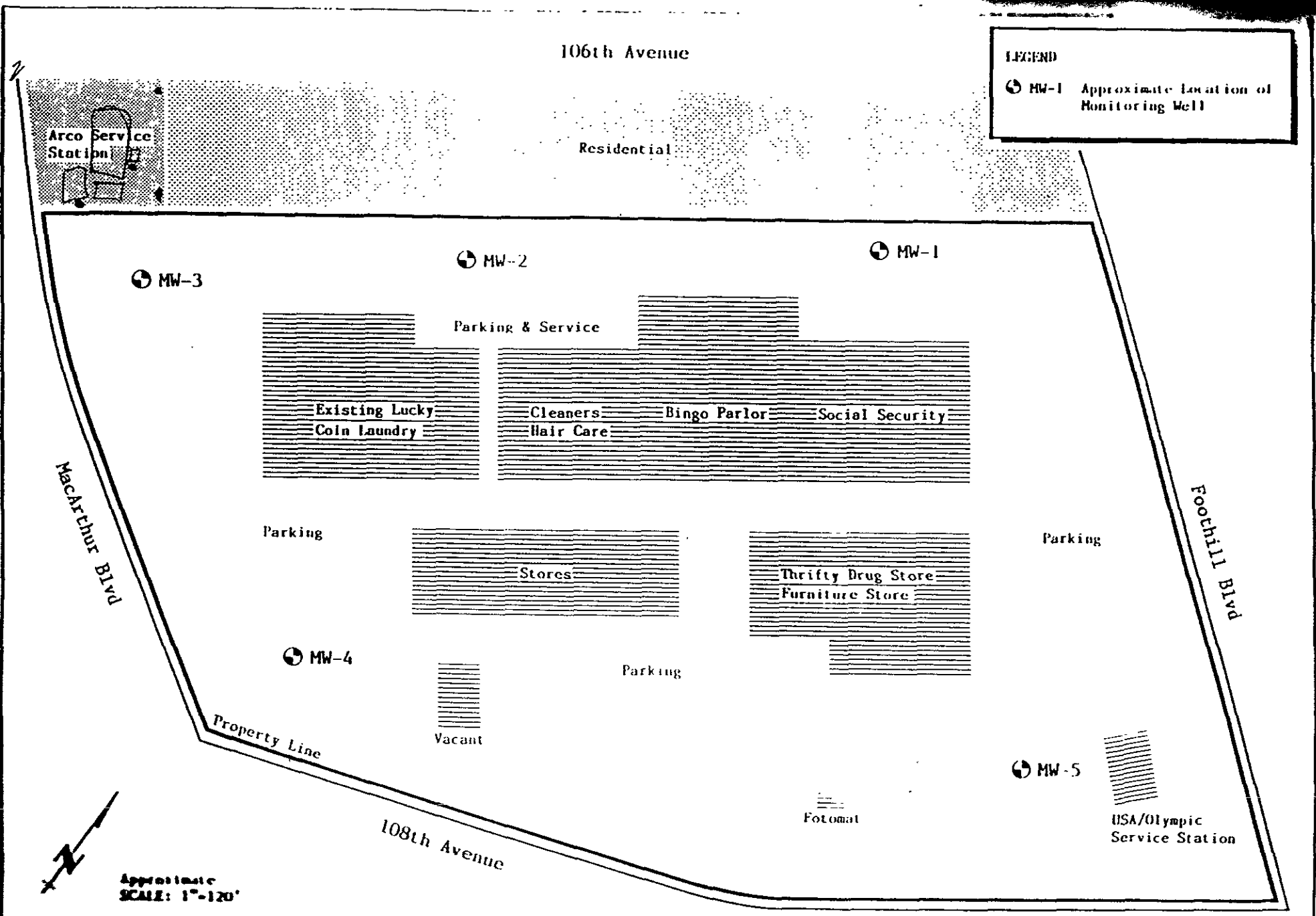


Figure 4. Site Plan, Foothill Square, Oakland, California.

References: Kaldveer Associates

WGR

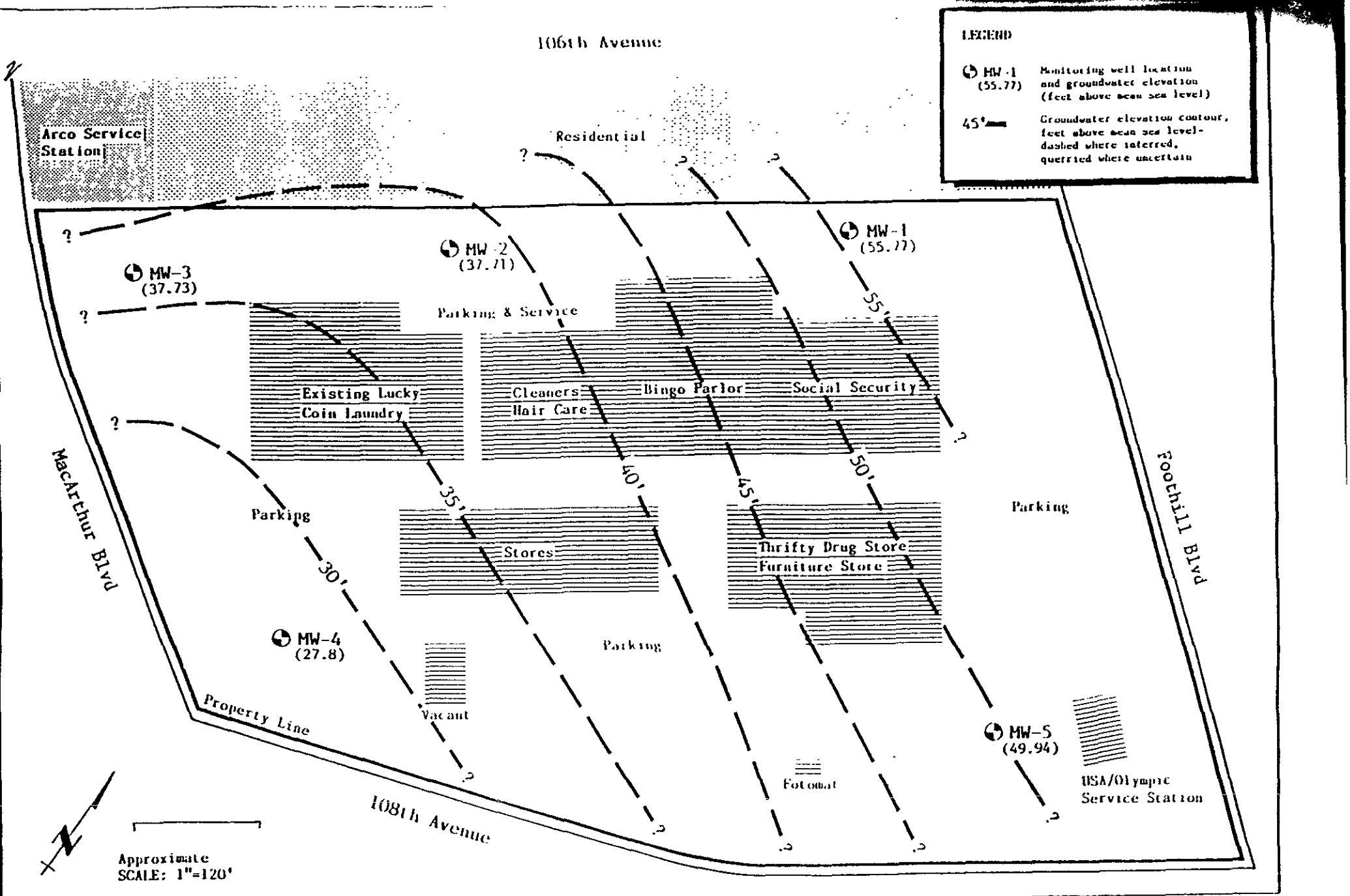


Figure 5. Potentiometric Surface of Shallow Water-Bearing Zone 11 January, 1989. Foothill Square, Oakland, California

Reference: Kaldveer Associates

WGR

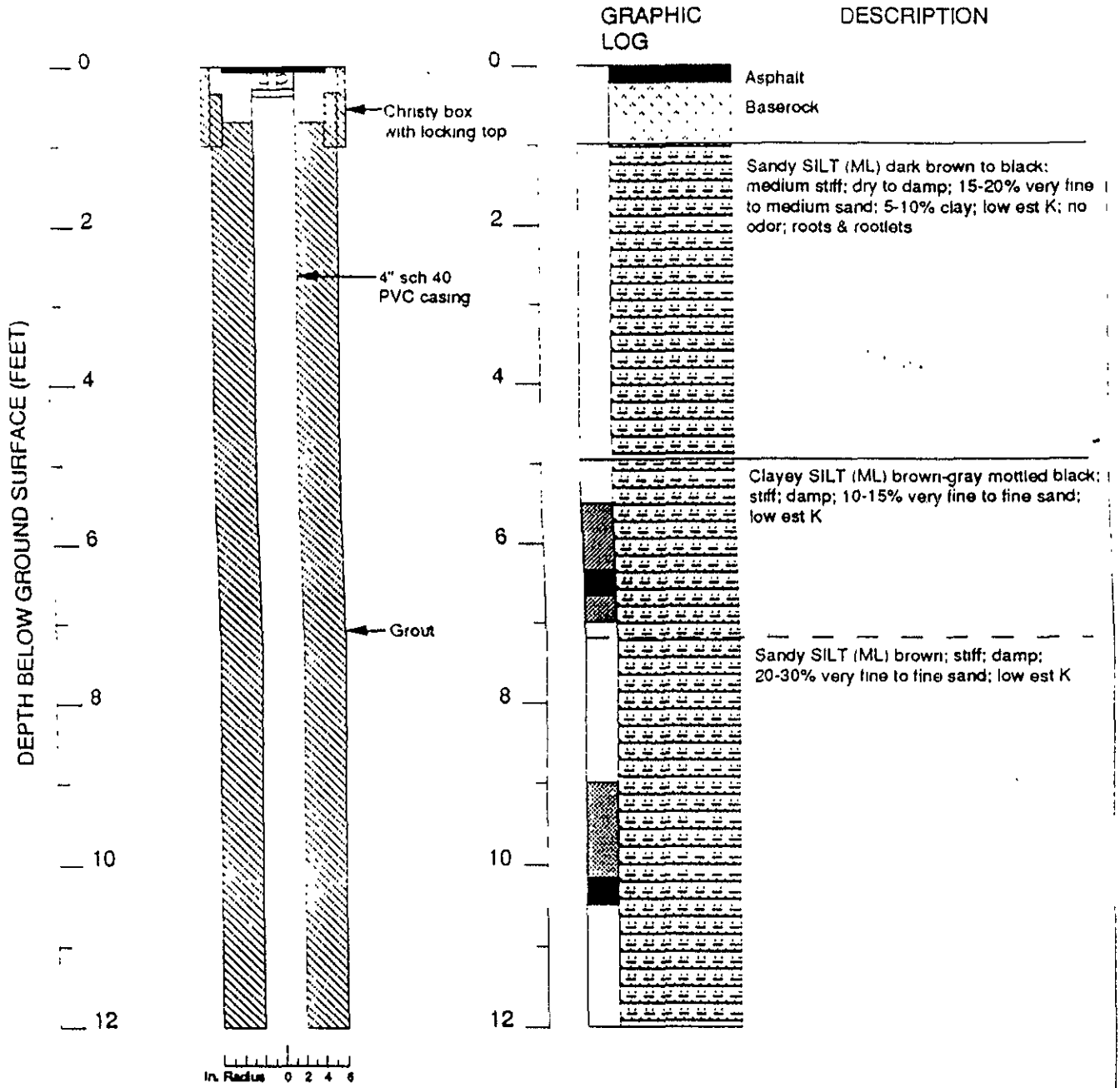
WGR

Table 4. Top-of-Casing and Groundwater Elevations
Foothill Square, Oakland, California

Monitor Well	DATE	TOC	GE	DTW	Elev.-W	REF. PT
MW-1	11 JAN 89	65.95	66.52	10.18	55.77	v-notch
MW-2	11 JAN 89	63.06	63.54	25.32	37.71	v-notch
MW-3	11 JAN 89	57.92	58.42	20.19	37.73	v-notch
MW-4	11 JAN 89	59.68	59.96	31.88	27.80	black mark
MW-5	11 JAN 89	68.94	69.14	19.00	49.94	black mark

TOC= Top-of-Casing Elevation, Liscensed surveyor
GE= Ground Surface Elevation
DTW= Depth-to-Water in feet
Elev.-W= Elevation of Static Water
REF. PT.= Reference Point for TOC elevation

MONITOR WELL MW-3



Continues

EXPLANATION

- Water level during drilling (date)
- Water level (date)
- Contact (dotted where approx.)
- Gradational (hachured), uncertain (dashed) contact
- Location of recovered drive sample
- Location of drive sample sealed for chemical analysis
- Grab sample

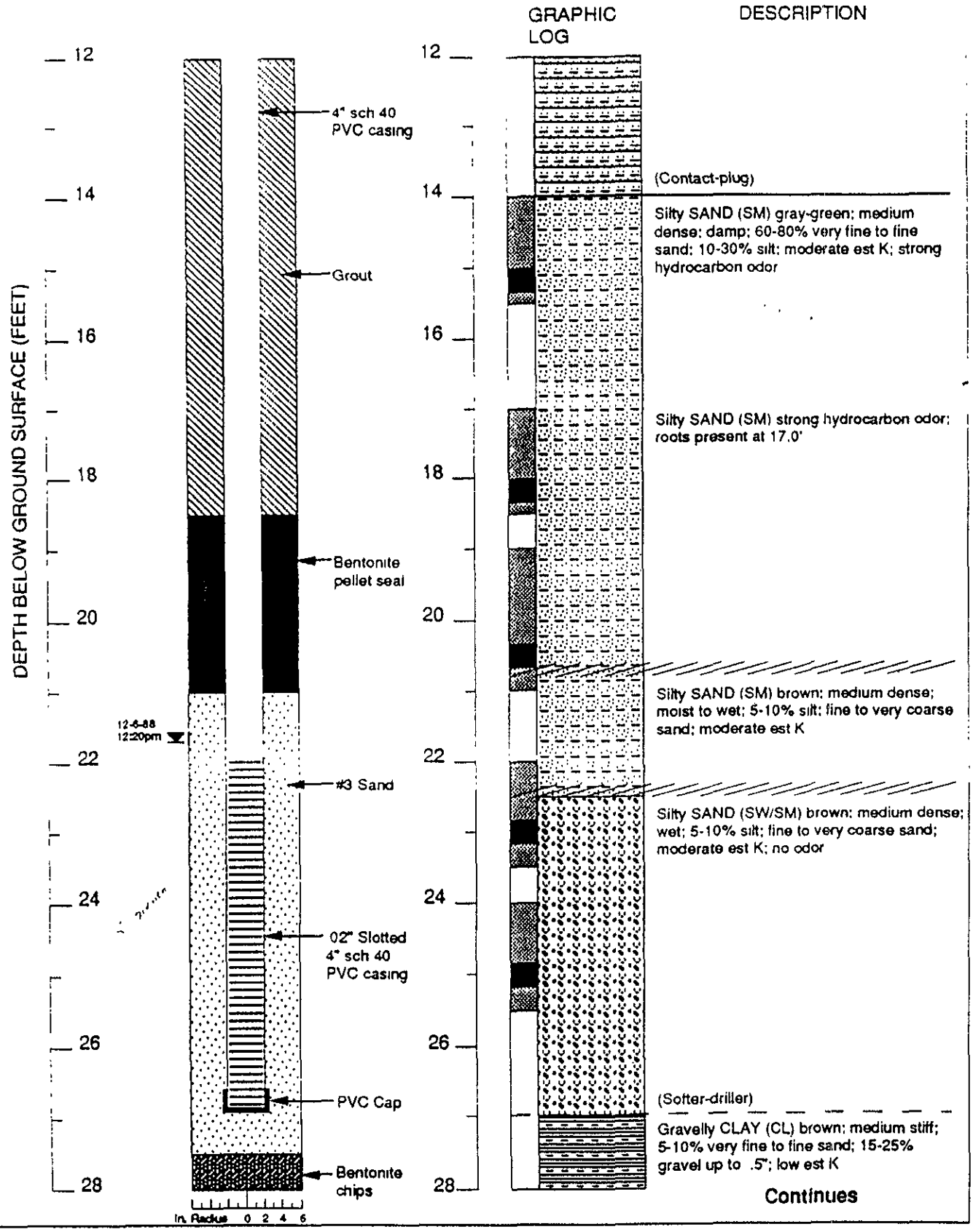
est K = Estimated permeability (hydraulic conductivity)

Logged by: Mike Edmonson
Supervisor: Todd Daniels
Drilling Company: Exploration Geoservices, Inc.
Driller: Dave Yeager
Drilling Method: Hollow stem auger
Dates Drilled: 12/6/88-12/7/88
Well Head Completion: Christy box & locking cap
Type of Sampler: 2" split barrel
TD: Drill depth= 42.0 ft

Boring Log and Well Completion Details MW-3
WGR Project No.: 8-088.01

Foothill Plaza
Oakland, CA

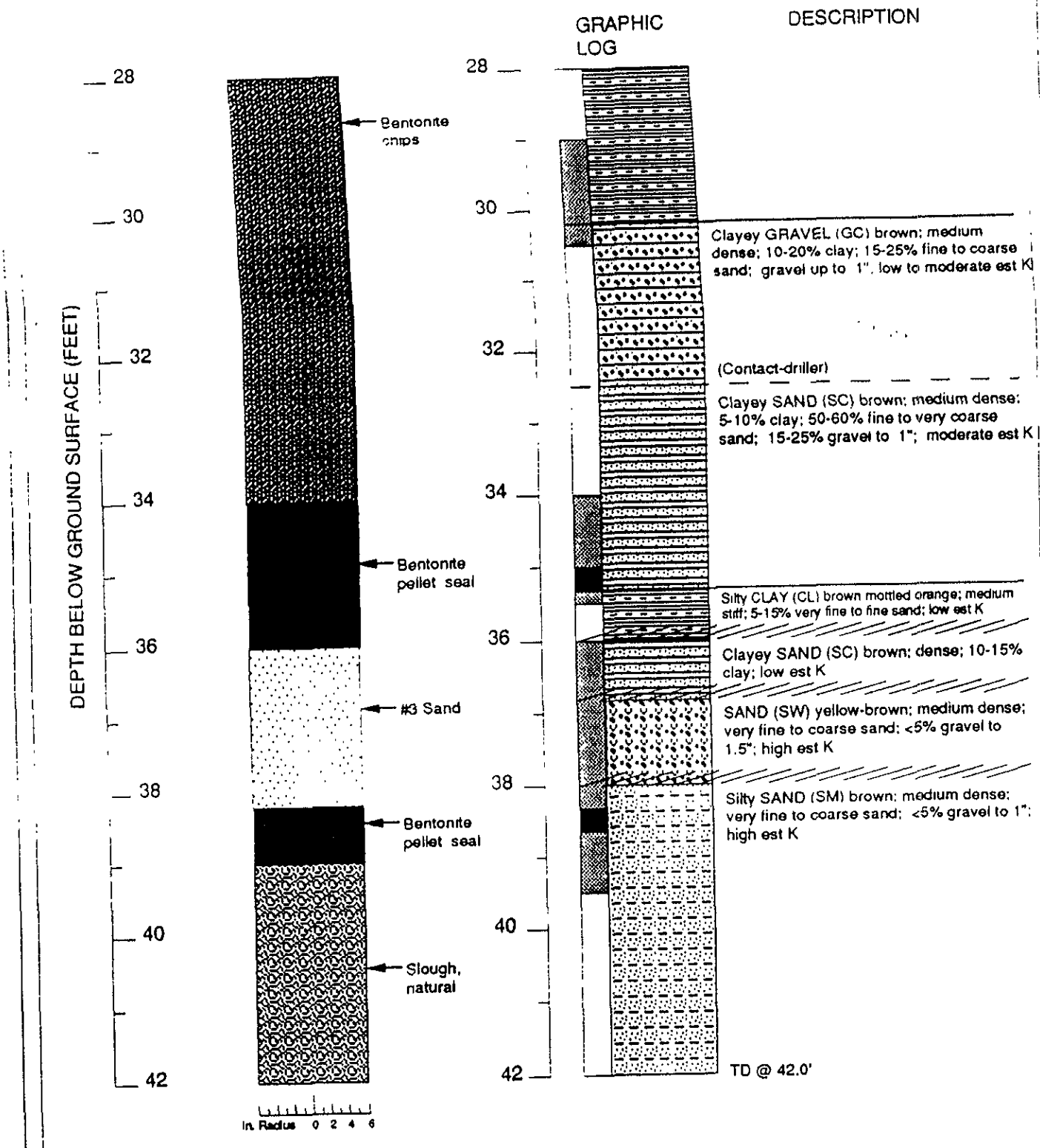
MONITOR WELL MW-3 (cont.)



Boring Log and Well Completion Details MW-3 (cont.)
WGR Project No.: 8-088.01

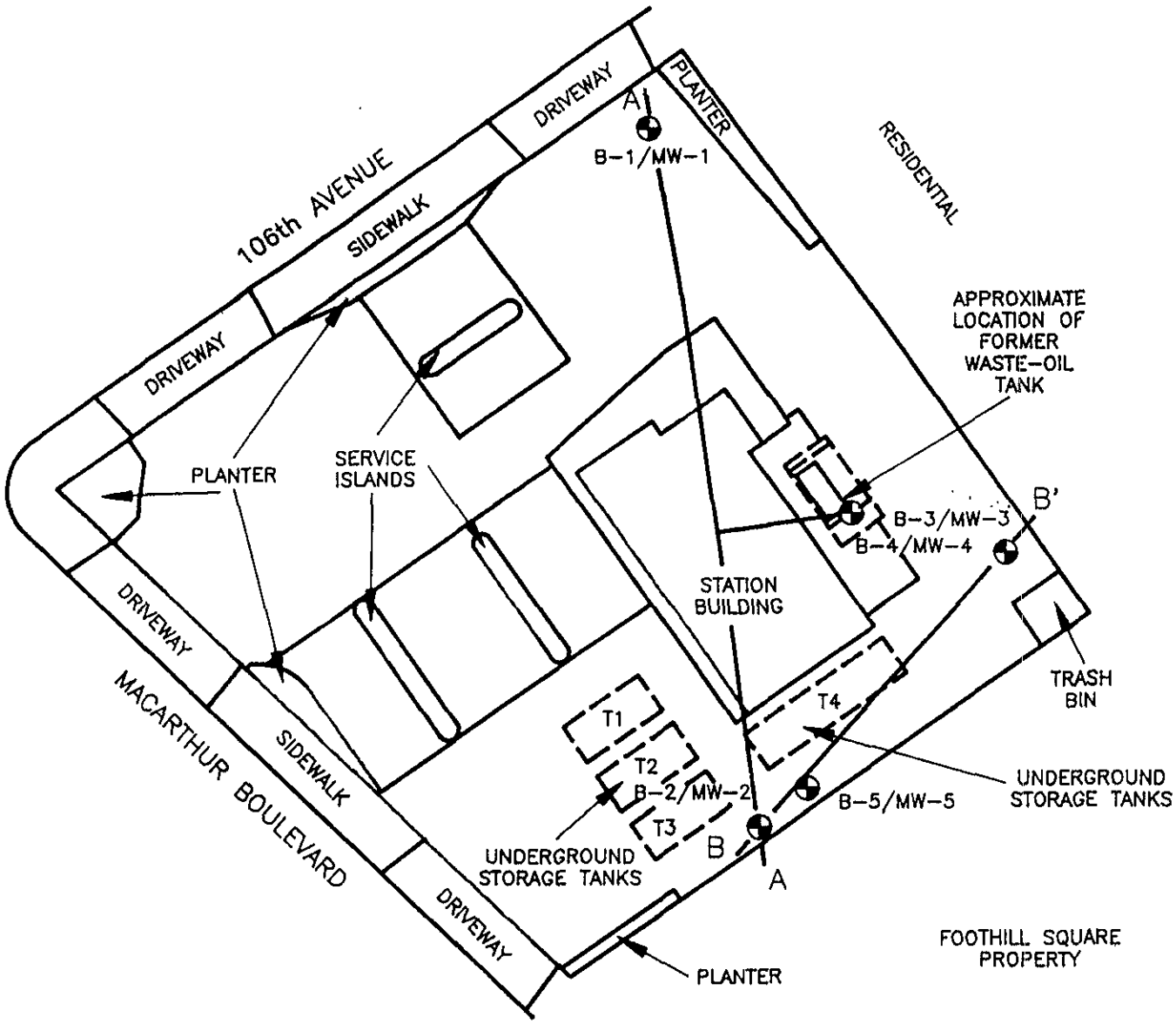
Foothill Plaza
Oakland, CA

MONITOR WELL MW-3 (cont.)



Boring Log and Well Completion Details MW-3 (cont.)
WGR Project No.: 8-088.01

Foothill Plaza
Oakland, CA



B
B' = Cross section location

B-5/MW-5 = Approximate location of boring/monitoring well

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

N

Approximate Scale

30 15 0 30 60

feet

Applied GeoSystems

PROJECT NO. 19014-1

GENERALIZED SITE PLAN
ARCO Station No. 276
10600 MacArthur Boulevard
Oakland, California

PLATE
P - 2

TABLE 5
ANALYTICAL RESULTS OF SOIL SAMPLES
ARCO Service Station 276
10600 MacArthur Boulevard
Oakland, California
(March 1989)

Sample Number	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes
S-26-B1	<2	<0.05	<0.05	<0.05	<0.05
S-31-B1	<2	<0.05	<0.05	<0.05	0.078
S-5.5-B2	<2	<0.05	<0.05	<0.05	<0.05
S-11-B2	<2	<0.05	0.066	<0.05	0.079
S-16-B2	38	0.30	0.91	0.38	2.4
S-20-B2	690	7.4	36	10	62
S-24.5-B2	4.2	<0.05	0.10	<0.05	0.18
S-28-B2	<2	<0.05	<0.05	<0.05	<0.05
S-30.5-B3	<2	<0.05	<0.05	<0.05	<0.05
S-21-B4*	<5.0	<0.05	<0.05	<0.05	<0.05
S-31-B4	<5.0	<0.05	<0.05	<0.05	<0.05
S-11-B5	<5.0	0.13	<0.05	<0.05	<0.05
S-16-B5	220	0.83	3.4	2.2	14
S-18-B5	<5.0	0.23	0.11	<0.05	0.21
S-24-B5	<5.0	0.086	<0.05	<0.05	<0.05
S-31-B5	<5.0	<0.05	<0.05	<0.05	<0.05

Results are in parts per million (ppm)
TPHg = total petroleum hydrocarbons as gasoline
< = below the reporting limits of the analysis
* = Sample S-21-B4 also analyzed for TOG. (Not found)
Sample designation = S-31-B5
- S = Soil sample
- 31 = Sample depth in feet
- B5 = Boring number

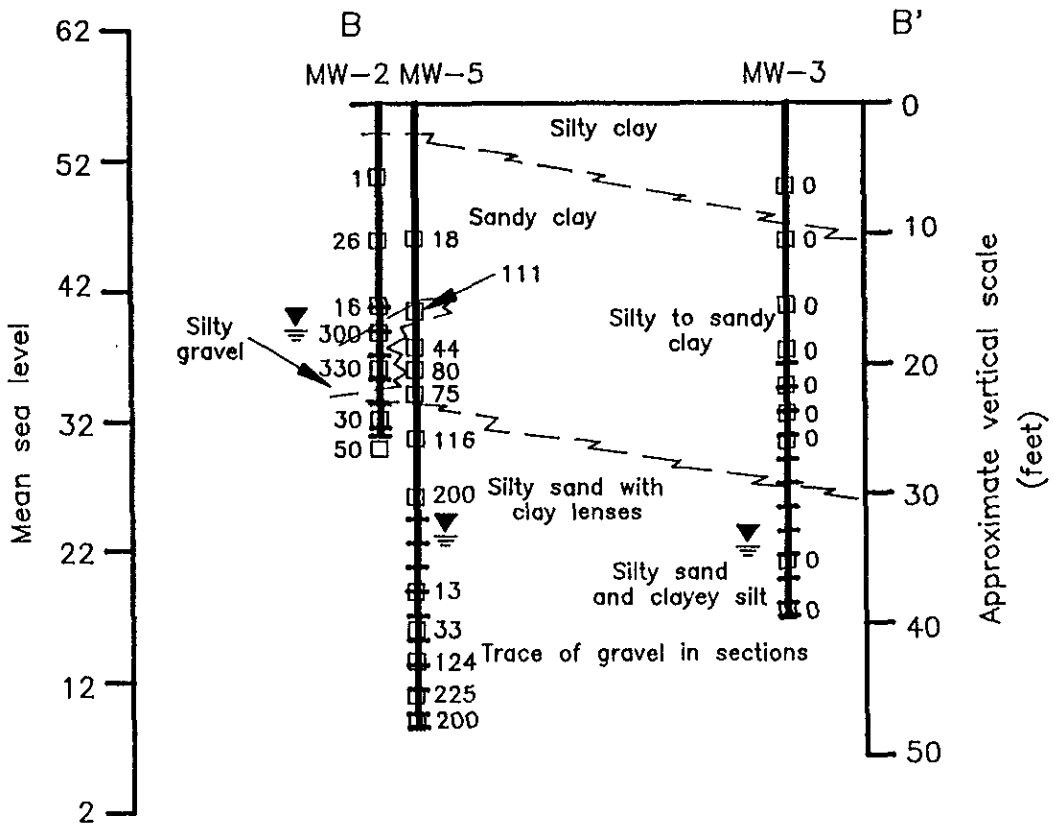
TABLE 6
GROUND-WATER SURFACE ELEVATION DATA
ARCO Products Station No. 276
10600 MacArthur Boulevard
Oakland, California
(data measured on May 8, 1989)

Well No.	Casing Elevation	Depth to Ground Water	Ground-water Elevation
MW-1	55.91	34.06	21.85
MW-2	55.35	17.00	38.35
MW-3	56.55	34.45	22.10
MW-4	55.94	33.88	22.06
MW-5	55.43	33.17	22.26

surements are in feet.
vation measurements are referenced to mean sea level.

DISCUSSION

ckground section of this report discussed an environmental investigation of the Square shopping center property performed by Western Geologic Resources. A of the depth to ground-water in the WGR wells with respect to mean sea level . with the exception of WGR well MW-4, that the ground water encountered by may represent a localized perched water-bearing zones similar to that encountered ed GeoSystems during the drilling boring B-2. The surveyed wellhead and ground-evation data presented in the WGR report are included in Appendix A. This data



EXPLANATION

= OVM reading in ppm

= Well casing

= Well screen

= Static water level measured on May 3, 1989

= Interpreted contact

Approximate Horizontal Scale

30 0 30 60

feet

Approximate Vertical Scale

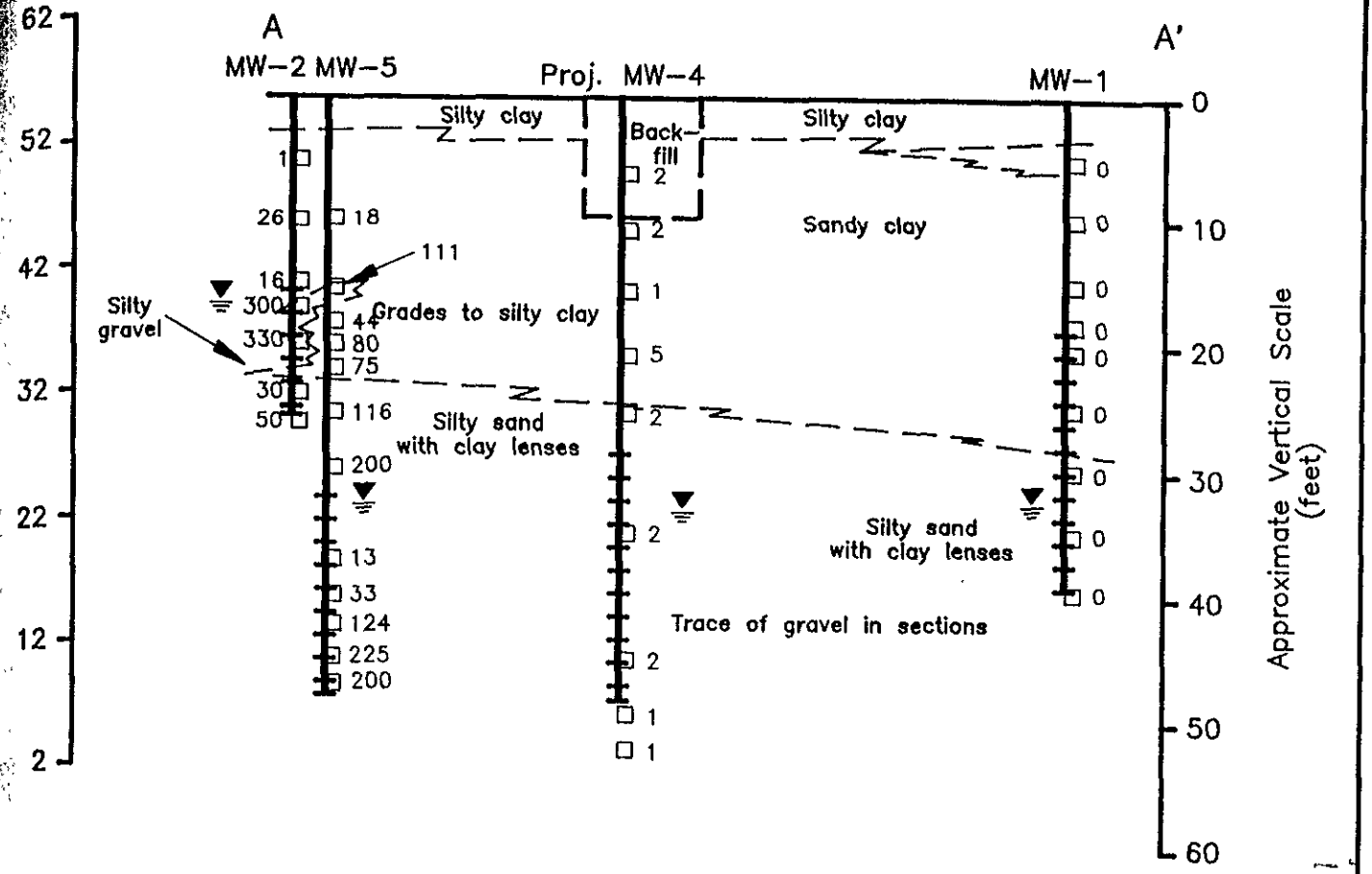
15 0 15 30

feet

Applied GeoSystems

PROJECT NO. 19014-1

CROSS SECTION B - B'
ARCO Station No. 276
10600 MacArthur Boulevard
Oakland, California



EXPLANATION

= OVM reading in ppm

= Well casing

= Well screen

= Static water level measured on May 3, 1989

= Interpreted contact

Approximate Horizontal Scale

30 0 30 60

feet

Approximate Vertical Scale

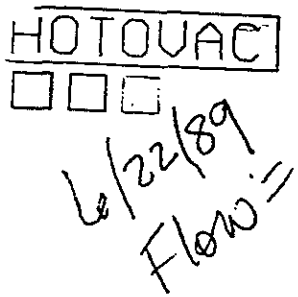
15 0 15 30

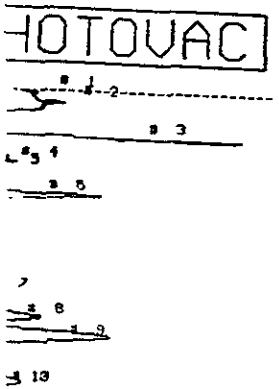
feet

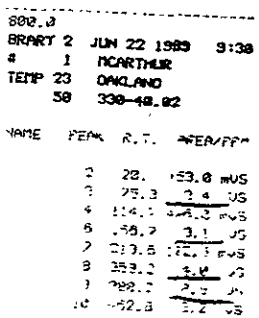
Applied GeoSystems

PROJECT NO. 19014-1

CROSS SECTION A - A'
ARCO Station No. 276
10600 MacArthur Boulevard
Oakland, California







Project No. 330-40.02

TABLE 7
Summary of Soil-Gas results for ARCO Station #0276
Sampled on June 21-22, 1989

PROBE #	DEPTH (in feet)	BENZENE (ppm)	TOLUENE (ppm)	E-BENZENE (ppm)	P,M-XYLENE (ppm)	O-XYLENE (ppm)
1	14-16	EHI	1000	45	190	26
1	19-21	.8	9.3	40	33	14
2	14-16	EHI	63	9.7	47	16
2	19-21	3.2	7.3	1.0	4.1	.6
3	14-16	10	60	7.9	32	5.2
3	19-21	63	9.3	BRL	1.9	BRL
4	14-16	BRL	.8	.4	1.6	.4
4	19-21	.2	.1	.2	1.3	.4
5	17-19	1.3	1.3	BRL	BRL	BRL
5	22-24	130	190	20	17	19
6	17-19	BRL	BRL	BRL	BRL	BRL
6	22-24	130	39	BRL	BRL	BRL
7	17-19	.1	.5	BRL	.2	BRL
7	22-24	BRL	BRL	BRL	BRL	BRL
8	17-19	BRL	BRL	BRL	BRL	BRL
8	22-24	BRL	.2	BRL	BRL	BRL
9	17-19	BRL	BRL	BRL	BRL	BRL
9	22-24	6.7	7.8	15	4.5	BRL
10	17-19	.1	.3	BRL	.1	BRL
10	22-24	1.2	.8	BRL	BRL	BRL
11	17-19	BRL	BRL	BRL	BRL	BRL
11	22-24	.1	9.7	.7	2.2	1.5
12	17-19	BRL	.4	BRL	BRL	BRL
12	22-24	EHI	300	BRL	BRL	BRL
Reporting Limit:		.1	.1	.1	.1	.1

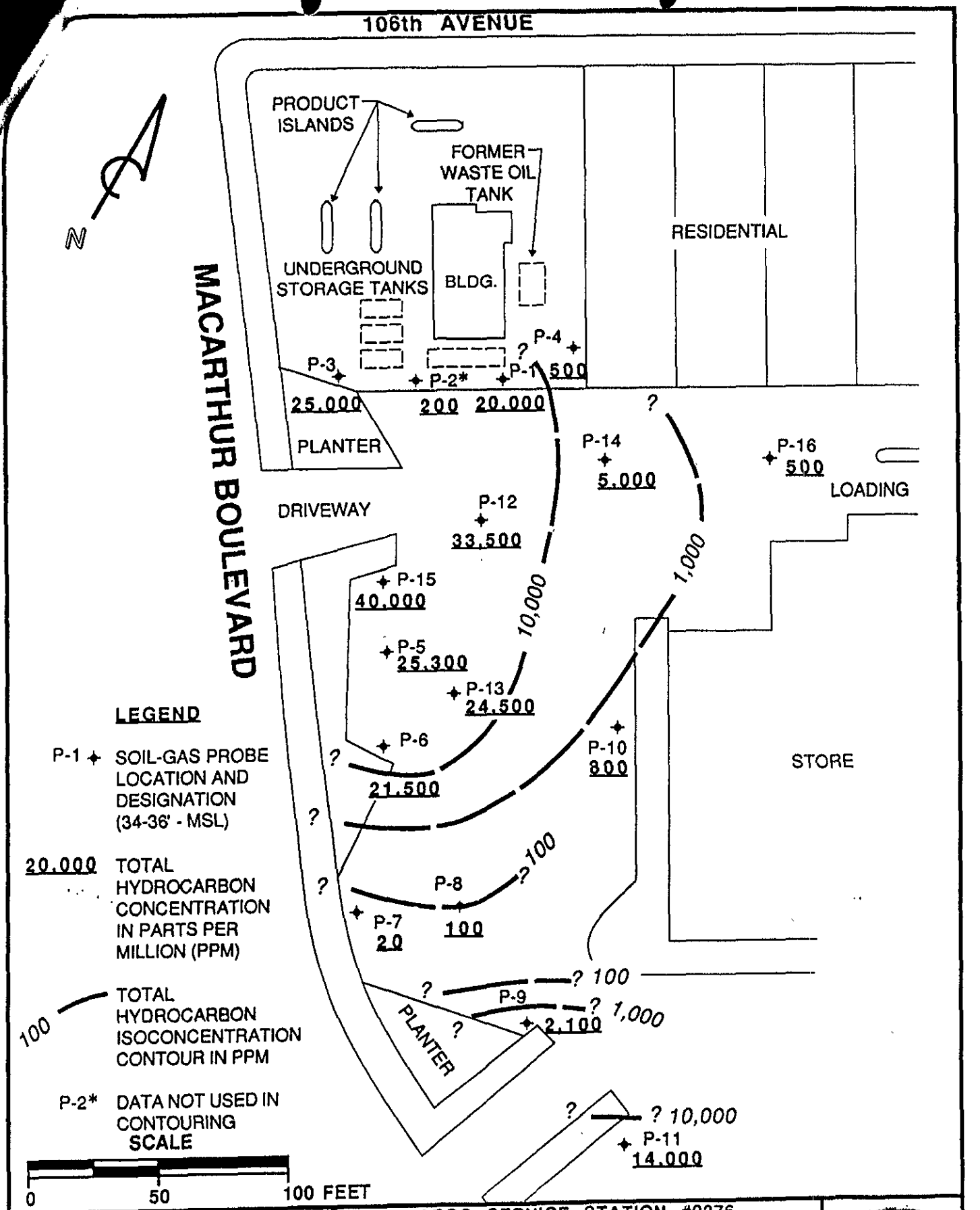
THC: Total Hydrocarbons recorded by Flame Ionization Detector. All other gasoline constituents recorded by gas chromatogra
EHI: Not quantified due to Excessive Hydrocarbon Interference. (Lowest volume of injection and least sensitive gain set f
BRL: Below Reporting Limit.
ppm: parts per million on a volume to volume basis.

Project No. 330-40.02

TABLE 3 (cont.)
Summary of Soil-Gas results for ARCO Station #0276
Sampled on June 21-22, 1989

PROBE #	DEPTH (in feet)	BENZENE (ppm)	TOLUENE (ppm)	E-BENZENE (ppm)	P,M-XYLENE (ppm)	O-XYLENE (ppm)	THC (ppm)	TOTAL BTEX (ppm)
13	17-19	.1	.5	.1	.2	.1	60	1.0
13	22-24	300	190	BRL	25	BRL	24,500	510
14	17-19	.1	.3	.1	.2	.1	50	.8
14	22-24	20	29	1.8	6.3	1.6	5,000	59
15	17-19	100	180	11	7.4	8.7	23,500	300
15	22-24	EHI	2000	79	230	48	40,000	2400
16	17-19	3.1	4.1	.5	.5	BRL	500	8.2
16	22-24	.5	1.2	BRL	.4	.1	500	2.2
Reporting Limit:		.1	.1	.1	.1	.1	5	.1

THC: Total Hydrocarbons recorded by Flame Ionization Detector. All other gasoline constituents recorded by gas chromatograph.
EHI: Not quantified due to Excessive Hydrocarbon Interference. (Lowest volume of injection and least sensitive gain set for gas chromatograph).
BRL: Below Reporting Limit.
ppm: parts per million on a volume to volume basis.

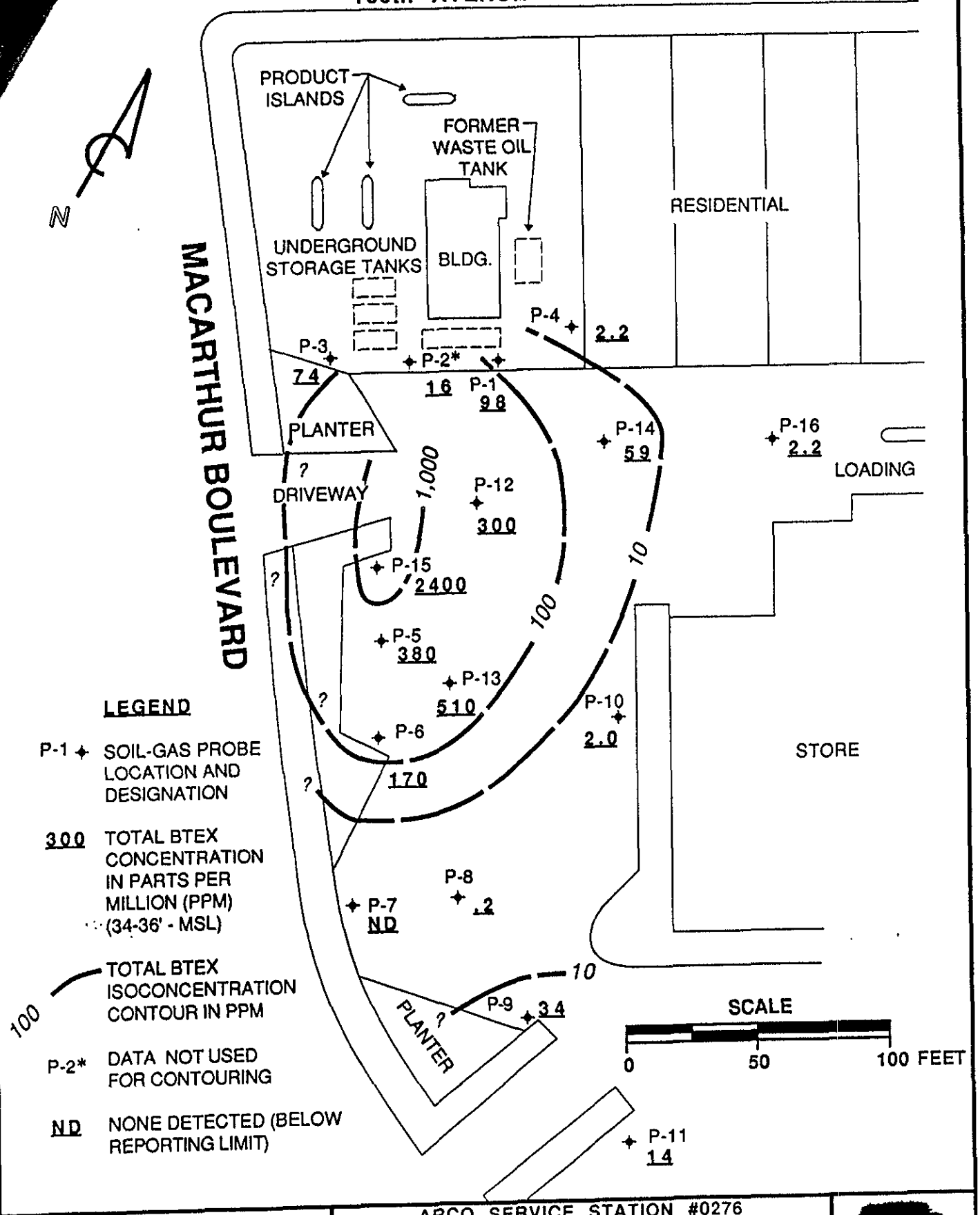


PACIFIC ENVIRONMENTAL GROUP, INC.

ARCO SERVICE STATION #0276
10600 MacArthur Boulevard
Oakland, California

(S-V) TOTAL HYDROCARBON ISOCONCENTRATION MAP AT 34'-36' MSL

[redacted]
PROJECT: 330-40.02

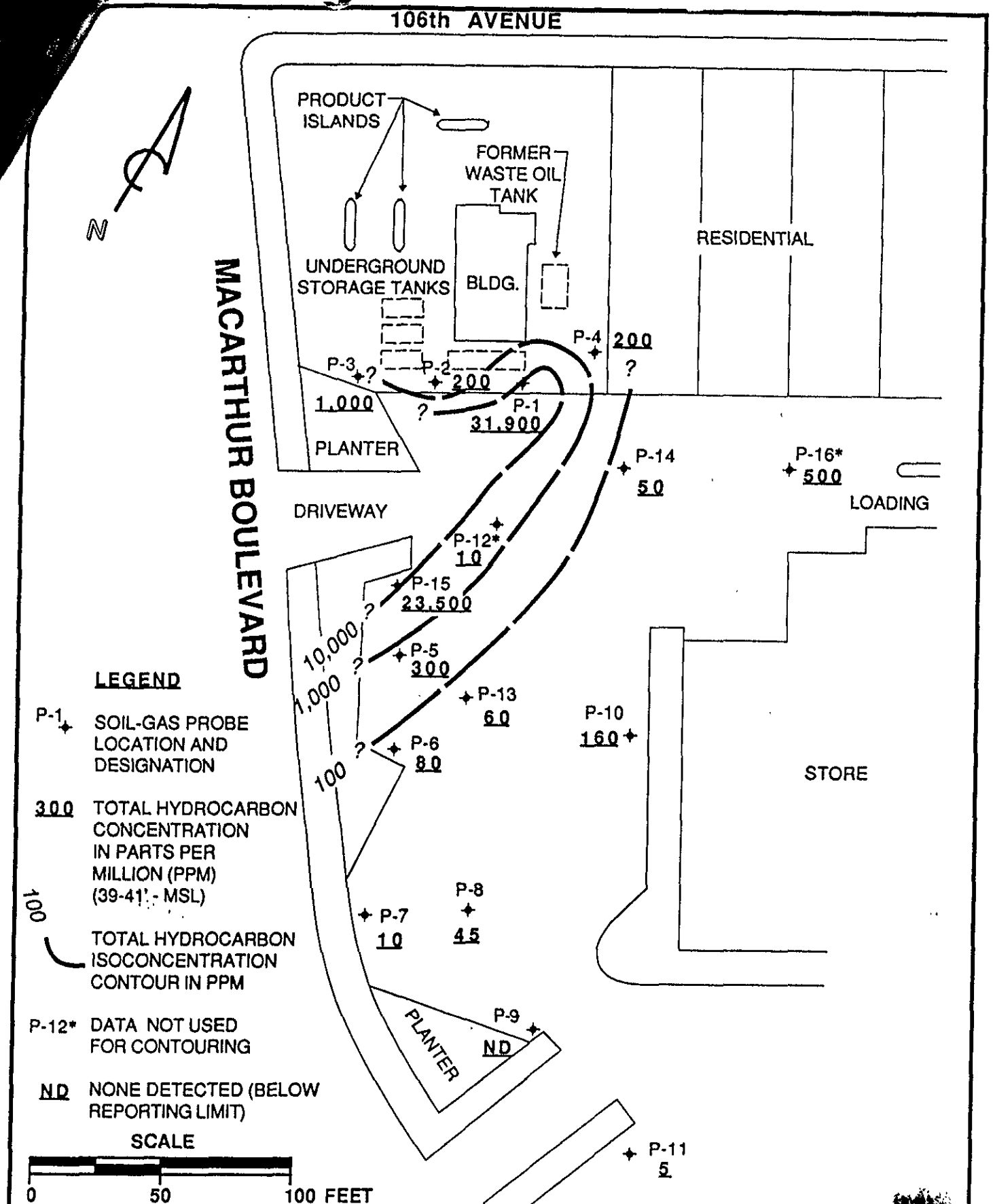


PACIFIC ENVIRONMENTAL GROUP, INC.

ARCO SERVICE STATION #0276
10600 MacArthur Boulevard
Oakland, California

Soil Gas

TOTAL BTEX ISOCONCENTRATION MAP AT 34'-36' MSL



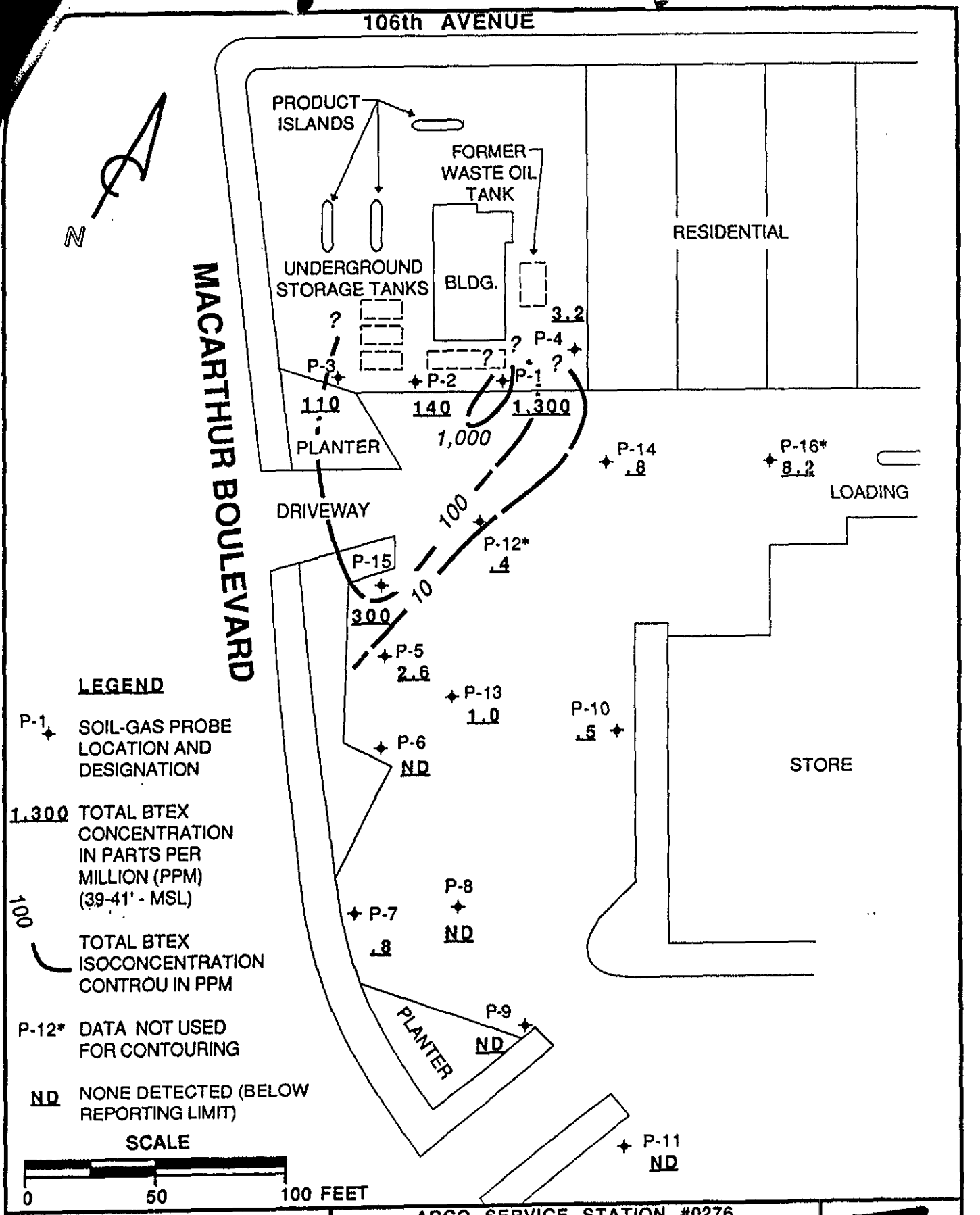
PACIFIC ENVIRONMENTAL GROUP, INC.

ARCO SERVICE STATION #0276
10600 MacArthur Boulevard
Oakland, California

Soil Gas

TOTAL HYDROCARBON ISOCONCENTRATION MAP AT 39-41' - MSL

[redacted]

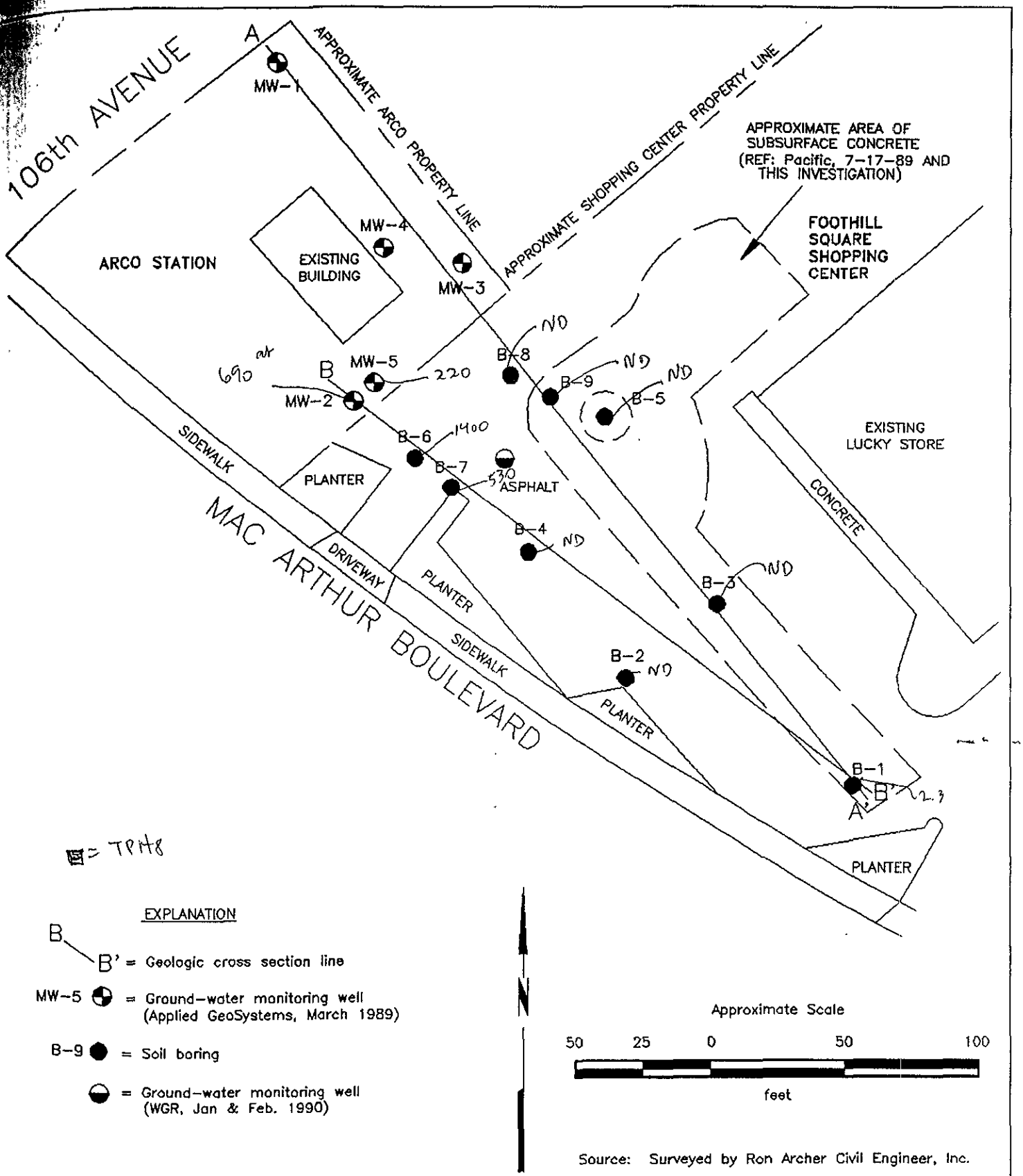


PACIFIC ENVIRONMENTAL GROUP, INC.

ARCO SERVICE STATION #0276
10600 MacArthur Boulevard
Oakland, California

SOIL GAS

TOTAL BTEX ISOCONCENTRATION MAP
AT 39-41' - MSL



Applied GeoSystems

PROJECT 19014-3

8/89 SOIL BORINGS

GENERALIZED SITE PLAN
ARCO Station 276 +OFFSITE
10600 Mac Arthur Boulevard
Oakland, California

PLATE 2

TABLE 8
ANALYTICAL RESULTS OF SOIL SAMPLES
ARCO Service Station 276
10600 MacArthur Boulevard
Oakland, California
Page 1 of 2
(August 1989)

Sample ID	TPHg	TPHd	B	T	E	X
S-16.5-B1	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-21.5-B1	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-24.0-B1	<1	<10	<0.005	<0.005	<0.005	<0.005
S-29.0-B1	2.3	NA	0.27	0.087	0.054	0.15
S-06.5-B2	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-16.5-B2	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-24.0-B2	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-24/26-B2	NA	<10	NA	NA	NA	NA
S-29.0-B2	<1	NA	<0.005	<0.005	<0.005	<0.005
S-11.5-B3	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-16.5-B3	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-21.5-B3	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-26.5-B3	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-29.0-B3	<1	NA	<0.005	<0.005	<0.005	<0.005
S-06.5-B4	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-16.5-B4	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-21.5-B4	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-26.5-B4	4	<10	0.41	0.07	0.08	0.16
S-29.0-B4	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-06.5-B5	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-16.5-B5	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-21.5-B5	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-26.5-B5	<1	NA	0.032	<0.005	<0.005	<0.005
S-29.0-B5	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-06.5-B6	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-16.5-B6	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-21.5-B6	<2.0	NA	0.22	0.14	0.13	0.56
S-26.5-B6	1400	320	<2	19	12	63
S-31.5-B6	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-16.0-B7	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-21.0-B7	530	NA	1.1	5.8	5.8	30
S-26.0-B7	<2.0	NA	0.084	<0.050	<0.050	<0.050
S-31.0-B7	15	NA	0.61	0.57	0.24	0.92
S-36.0-B7	<2.0	NA	<0.050	<0.050	<0.050	<0.050

See notes on page 2 of 2

TABLE 8
ANALYTICAL RESULTS OF SOIL SAMPLES
ARCO Service Station 276
10600 MacArthur Boulevard
Oakland, California
Page 2 of 2
(August 1989)

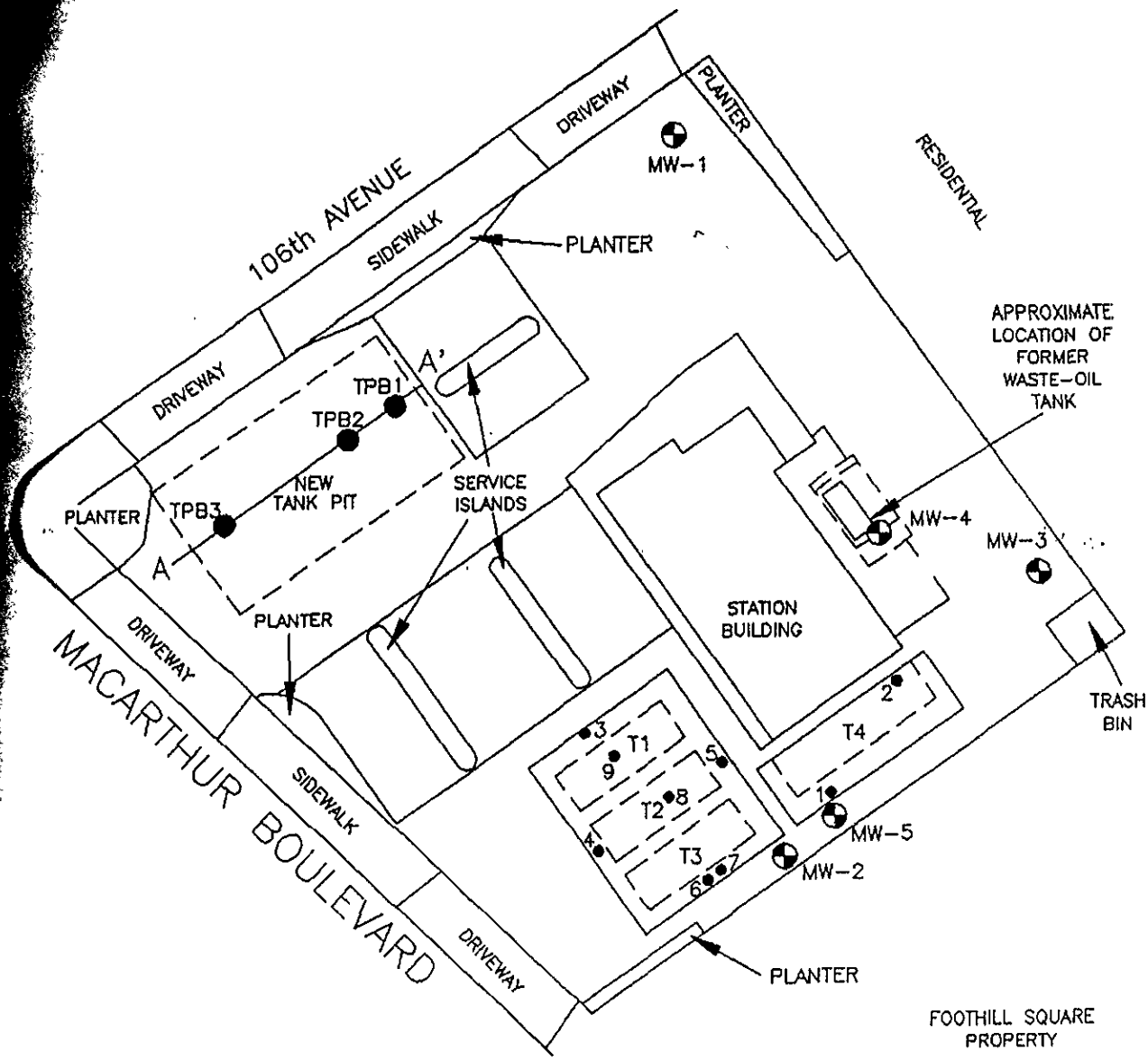
Sample ID	TPHg	TPHd	B	T	E	X
S-16.0-B8	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-21.0-B8	<2.0	NA	0.18	<0.050	0.72	<0.050
S-23.0-B8	<2.0	NA	0.11	<0.050	<0.050	0.075
S-26.0-B8	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-31.0-B8	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-16.0-B9	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-21.0-B9	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-26.0-B9	<2.0	NA	<0.050	<0.050	<0.050	<0.050
S-31.0-B9	<2.0	NA	<0.050	<0.050	<0.050	<0.050

Results are in parts per million (ppm)
TPHg = total petroleum hydrocarbons as gasoline
TPHd = total petroleum hydrocarbons as diesel
B = benzene
T = toluene
E = ethylbenzene
X = total xylenes
NA = not analyzed
< = below the reporting limits of the analysis
Sample designation = S-31.0-B9
- S = Soil sample
- 31.0 = Sample depth in feet
- B9 = Boring number

TABLE 2
COMPOUNDS DETECTED IN SOIL SAMPLES
FOR VOC ANALYSIS
ARCO Service Station 276
10600 MacArthur Boulevard
Oakland, California
(August 1989)

Sample	Compound	Amount Detected
B-4	Benzene	0.220
	Toluene	0.040
	Ethylbenzene	0.043
	Total Xylenes	0.100
	* unknown	0.070
	* 2,3-dimethylbutane	0.070
	* unknown	0.060
	* 1-ethyl-2-methylbenzene	0.030
	* 1,3,5-trimethylbenzene	0.040
B-5	Benzene	0.007
B-6	Benzene	5
	Toluene	20
	Ethylbenzene	16
	Total Xylenes	88
	* unknown	110
	* unknown	100
	* methylcyclohexane	30
	* 1-ethyl-2-methylbenzene	40
	* 1,3,5-trimethylbenzene	60

Results are in parts per million (ppm).
"*" denotes Tentatively Identified Compounds (TICs).
All samples obtained at 26-1/2 feet below surface grade.



EXPLANATION

A' = Geologic cross section

= Monitoring well (Applied GeoSystems, 1989)

= Boring in proposed tank pit

= Former tank pit sample location (S-7-TP1SW-1 through S-13-TP-2BN-9)

T4 = Former tank pits

N

Approximate Scale

30 15 0 30 60

feet

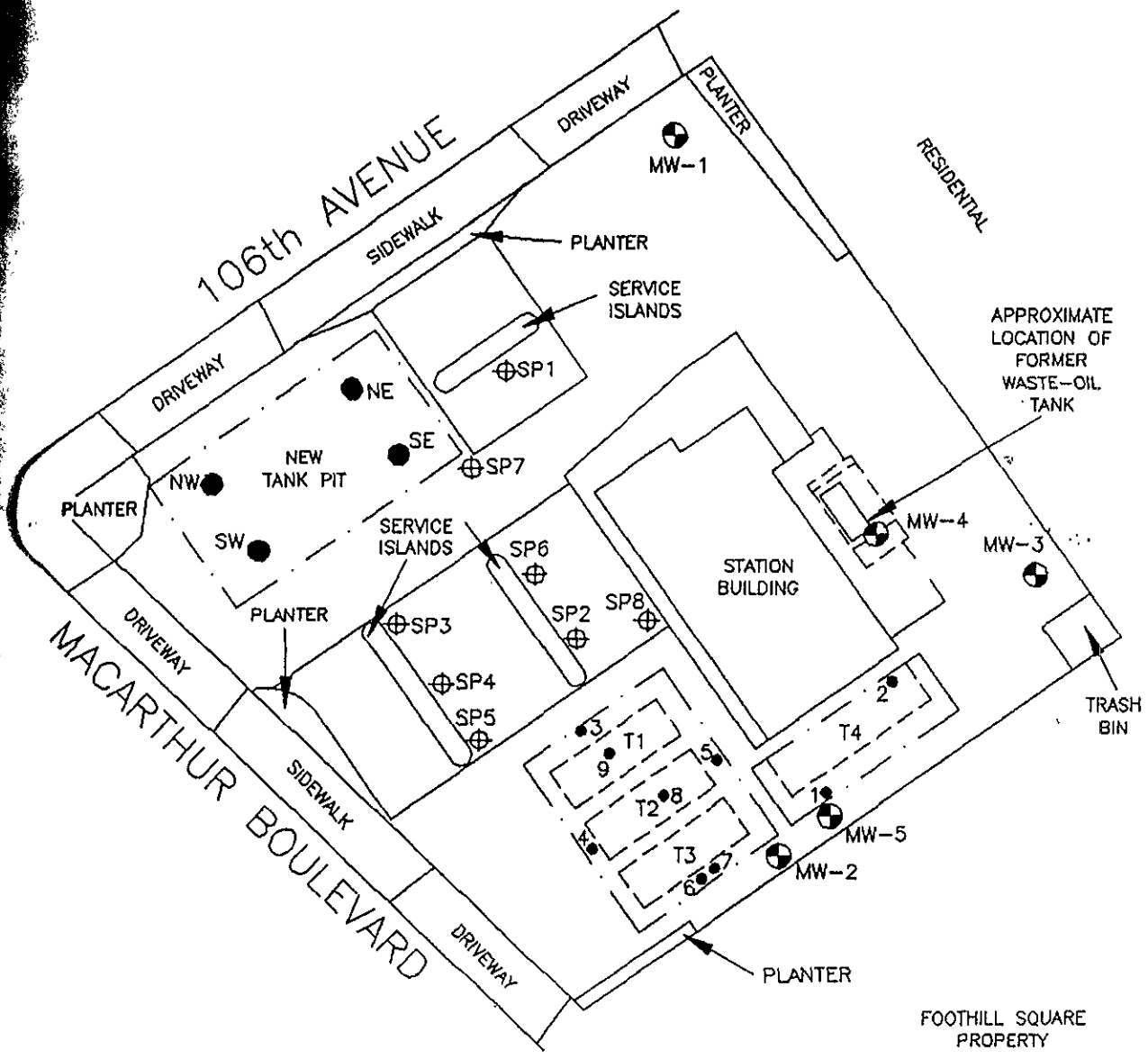
Source: Modified from plan supplied by ARCO and surveyed by Ron Archer Civil Engineer, Inc.

Applied GeoSystems

PROJECT 19014-5

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

PLATE 4



EXPLANATION

- T4 = Former tank pits
- = Monitoring well (Applied GeoSystems, 1989)
- = New tank pit excavation bottom sample location
- = Former tank pit sample location (S7-TP1SW-1 through S-13-TP2BN-9)
- = Product line trench sample location (S-0529-SP1 through S-0613-SP8)

N

Approximate Scale

30 15 0 30 60

feet

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

Applied GeoSystems

PROJECT 19014-5

SOIL SAMPLE LOCATION MAP
ARCO Station 276
10600 MacArthur Boulevard
Oakland, California

PLATE 5

TABLE 10
ANALYTICAL RESULTS OF SOIL SAMPLES
FROM BORINGS TPB-1 THROUGH TPB-3 IN NEW TANK PIT
ARCO Station No. 276
10600 MacArthur Boulevard
Oakland, California

Sample	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes
S-9.5-TPB1	<2	<0.05	<0.05	<0.05	<0.05
S-15-TPB1	290	0.19	0.47	3.3	6.6
S-18.5-TPB1	58	<0.05	0.069	0.14	0.22
S-21-TPB1	<2	<0.05	<0.05	<0.05	<0.05
S-11-TPB2	<2	<0.05	<0.05	<0.05	<0.05
S-16-TPB2	<2	<0.05	<0.05	<0.05	<0.05
S-18.5-TPB2	<2	<0.05	<0.05	<0.05	<0.05
S-5-TPB3	<2	<0.05	<0.05	<0.05	<0.05
S-10-TPB3	<2	0.075	<0.05	<0.05	<0.05
S-15-TPB3	<2	<0.05	<0.05	<0.05	<0.05
S-20-TPB3	2.1	0.46	<0.05	0.086	<0.05

Results are in parts per million (ppm).
TPHg = Total petroleum hydrocarbons as gasoline.
< = Less than method detection limit.
Sample designation = S-9.5-TPB1

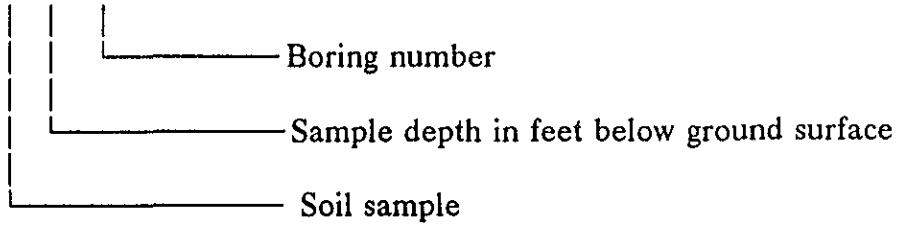


TABLE 11
ANALYTICAL RESULTS OF SOIL SAMPLES
FROM FORMER TANK PITS T1, T2, T3, AND T4
ARCO Station No. 276
10600 MacArthur Boulevard
Oakland, California

Sample	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes
S-7-TP1SW-1	<2	0.13	<0.05	<0.05	0.15
S-8-TP1NE-2	<2	0.088	<0.05	<0.05	<0.05
S-13-TP2N-3	45	0.32	0.46	0.083	0.68
S-13-TP2W-4	3.9	0.24	0.15	0.094	0.67
S-13-TP2E-5	23	0.43	0.95	0.36	3.7
S-10-TP2S-6	2.5	0.13	0.10	<0.05	0.29
S-12-TP2S-7	210	1.8	14	3.4	29
S-12-TP2BM-8	42	0.33	1.2	0.77	6.1
S-13-TP2BN-9	360	0.86	5.5	6.7	43

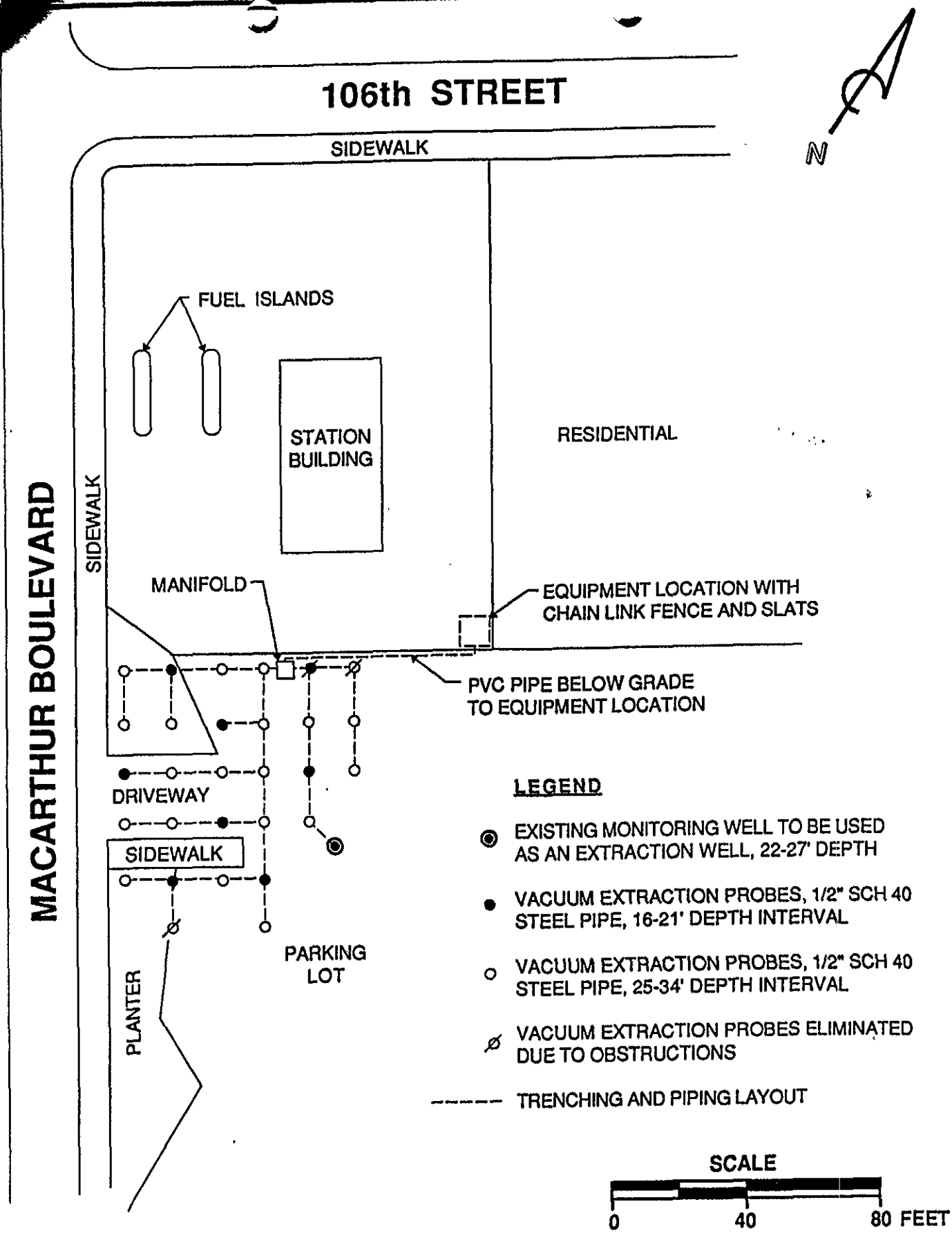
Results are in parts per million (ppm).
TPHg = Total petroleum hydrocarbons as gasoline.
< = Less than method detection limit.
Sample designation = S-10 - TP2S-6
- S-10: Soil sample
- TP2S: Sample depth in feet below surface
- 6: Sample location

TABLE 12
ANALYTICAL RESULTS OF SOIL SAMPLES
FROM STOCKPILED SOILS AND PRODUCT-LINE TRENCHES
FROM FORMER TANK PITS T1, T2, T3, T4
ARCO Station No. 276
10600 MacArthur Boulevard
Oakland, California

Sample	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes
Stockpile					
S-0322-1(A-D)	9.6	<0.05	<0.05	<0.05	0.054
S-0322-2(A-D)	67	<0.05	<0.05	<0.05	1.6
S-0322-3(A-D)	110	<0.05	<0.05	<0.05	0.071
S-0322-3(A-D)*	59	<0.05	<0.05	<0.05	<0.05
S-0326-4(A-D)	69	<0.05	<0.05	<0.05	0.13
Product Lines					
S-0529-SP1	<2	<0.05	<0.05	<0.05	<0.05
S-0529-SP2	<2	<0.05	<0.05	<0.05	0.076
S-0529-SP3	<2	<0.05	<0.05	<0.05	<0.05
S-0529-SP4	<2	<0.05	<0.05	<0.05	<0.05
S-0529-SP5	14	0.41	0.14	0.17	1.1
S-0530-SP6	6.8	0.19	0.17	0.07	0.24
S-0530-SP7	<1	<0.005	<0.005	<0.005	<0.005
S-0613-SP8	<2	<0.05	<0.05	<0.05	0.062

Results are in parts per million (ppm).
TPHg = Total petroleum hydrocarbons as gasoline.
< = Less than method detection limit.
* = Second sample collected after aeration for several days.
1(A-D) = Stockpile sample location.
SP4 = Product-line trench sample location.
Sample designation = S-0322-4-A-D)

- S-0322-4-A-D) — Sample location
- S-0322-4-A-D) — Sample date
- S-0322-4-A-D) — Soil



PACIFIC ENVIRONMENTAL GROUP, INC.

ARCO SERVICE STATION #0276
10600 MacArthur Boulevard
Oakland, California

SOIL VENT SYSTEM

FIGURE: 6

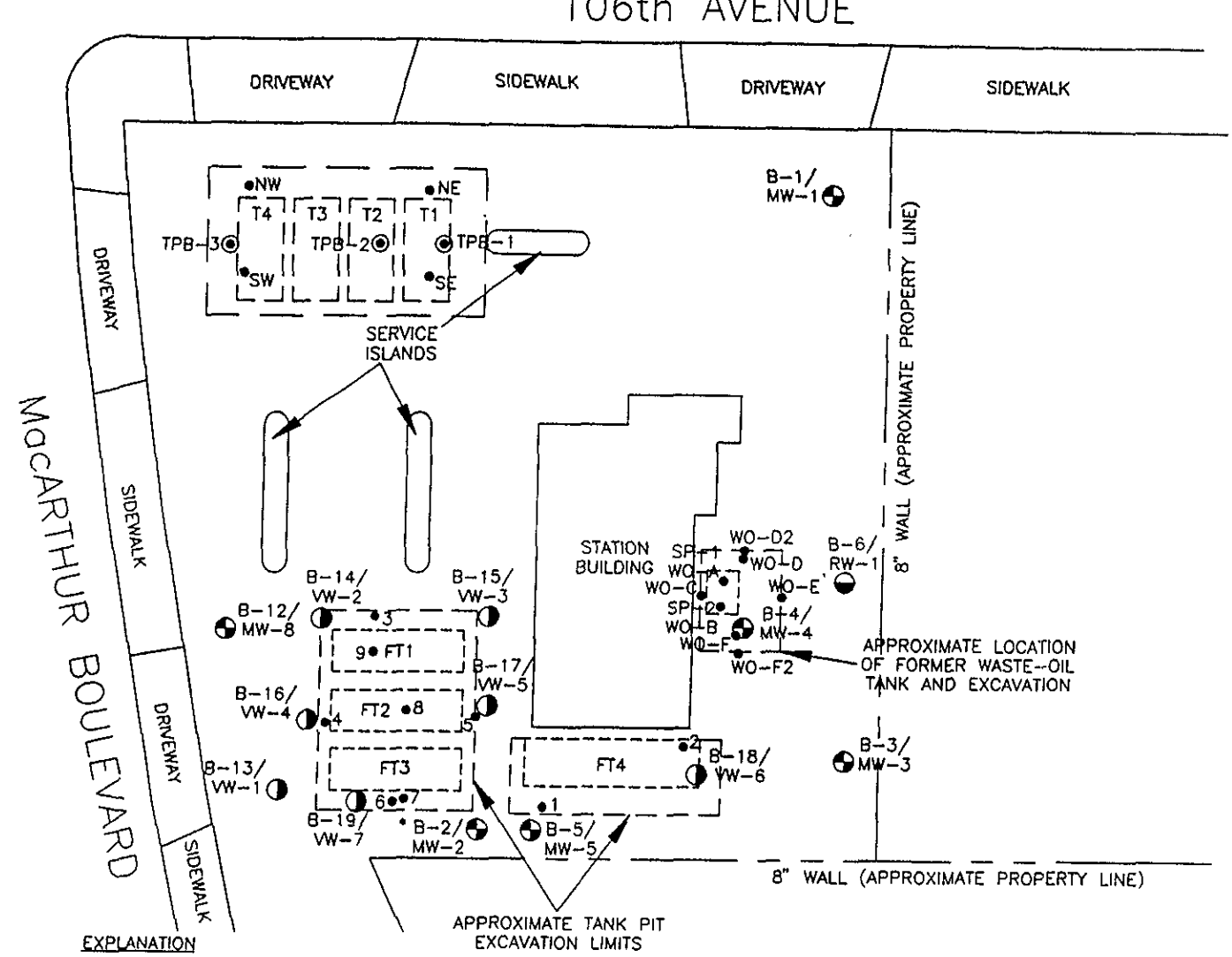
PROJECT: 330-40.03

Table 13
Soil Vapor Extraction Data Evaluation

ARCO Service Station 276 Off site
10600 MacArthur Boulevard
Oakland, California

Sample Date	t (days)	td (days)	TVH-g (ug/L)	Benzene (ug/L)	Sample Flow Rate (scfm)	Well Flow Rate (scfm)	TVH-g (lb/day)	Benzene (lb/day)	Hours of Operation	TVH-g Net (lb)	Benzene Net (lb)	TVH-g Total (lb)	Benzene Total (lb)
06/12/91	0	0	0	0.1	500	25	0.00	0.00	0.0	0.0	0.0	0.0	0.0
06/19/91	7	0	140	2.8	500	25	3.15	0.06	168.0	22.1	0.9	22.1	0.9
07/11/91	22	0	140	4.0	500	25	6.30	0.15	528.0	138.6	4.0	160.7	4.8
08/22 91	42	0	130	3.4	500	25	6.08	0.17	1008.0	255.2	6.4	415.8	11.3
09/05/91	14	0	86	3.2	500	25	4.86	0.15	336.0	68.0	2.0	483.8	13.3
11/22/91	78	48	130	2.5	500	25	4.86	0.13	720.0	145.8	3.4	629.6	16.7
12/06/91	14	2	35	0.5	500	25	3.71	0.07	288.0	44.6	0.3	674.2	16.9
12/20/91	14	0	32	0.4	500	25	1.51	0.02	336.0	21.1	0.3	695.3	17.2
01/03/92	14	0	7.5	0.1	500	25	0.89	0.01	336.0	12.4	0.1	707.7	17.2
01/17/92	14	0	6	0.1	500	25	0.30	0.00	336.0	4.3	0.0	712.0	17.3
02/03/92	17	0	7.5	0.1	500	25	0.30	0.00	408.0	5.2	0.1	717.2	17.4
02/18/92	15	0	6	0.1	500	25	0.30	0.00	360.0	4.6	0.0	721.7	17.4
03/02/92	13	13	9.7	0.1	500	25	0.35	0.00	0.0	0.0	0.0	721.7	17.4
03/17/92	15	0	6	0.1	500	25	0.35	0.00	360.0	5.3	0.0	727.0	17.4
03/31/92	14	8	6	0.1	500	25	0.27	0.00	144.0	1.6	0.0	728.6	17.5
04/27/92	27	6	6	0.1	500	25	0.27	0.00	504.0	5.7	0.1	734.3	17.5
05/11/92	14	8	8.2	0.1	500	25	0.32	0.00	144.0	1.9	0.0	736.2	17.5
05/27/92	16	16	0	0.0	500	25	0.18	0.00	0.0	0.0	0.0	736.2	17.5
06/08/92	12	12	7.8	0.2	500	25	0.18	0.00	0.0	0.0	0.0	736.2	17.5
06/24/92	16	4	6.5	0.1	500	25	0.32	0.01	288.0	3.9	0.0	740.1	17.6
07/06/92	12	0	5	0.1	500	25	0.26	0.00	288.0	3.1	0.0	743.2	17.6
TOTAL POUNDS REMOVED:												743.2	17.6
TOTAL GALLONS REMOVED:												111.4	
TOTAL HOURS OF OPERATION:									6552				
% OF OPERABLE HOURS:									70%				

t = time of period since last sampling
td = down time during period since last sampling
TVH-g = total volatile hydrocarbons (calculated as gasoline)
ug/L = micrograms per liter
scfm = standard cubic feet per minute
lb/day = pounds per day
Net = net pounds removed during period
Total = total pounds removed to date



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)

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)

T4 = Existing underground storage tanks

FT4 = Former underground storage tanks

B-10/ MW-6

* B-11/ MW-7

MW-3 (WGR)

* = Screened in a shallow water-bearing zone

Approximate Scale

30 15 0 30 60

feet

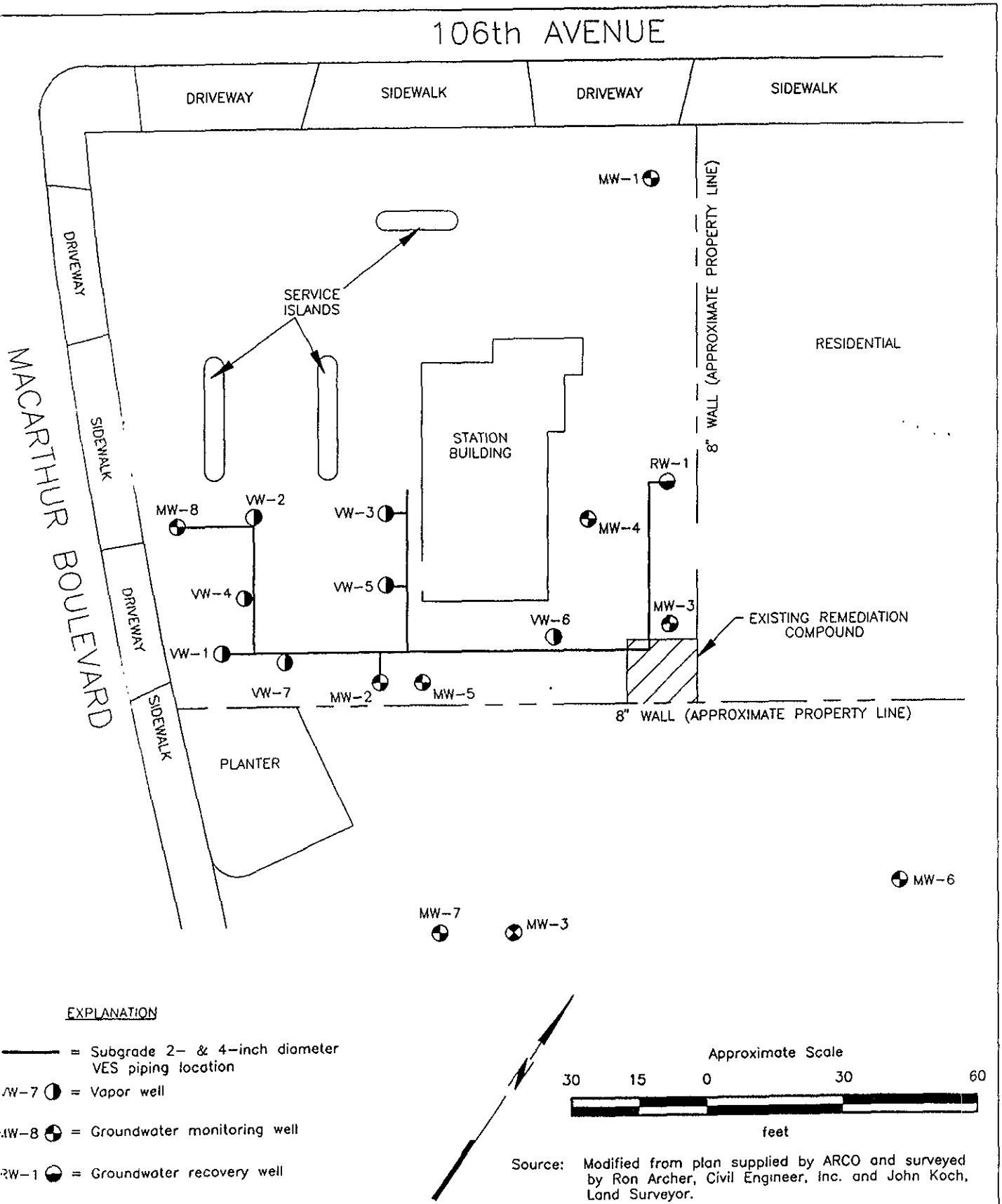
Source: Modified from plan supplied by ARCO and Surveyed by Ron Archer, Civil Engineer, Inc. and John Koch, Land Surveyor.

RESNA
Working to Restore Nature

PROJECT 60026.06

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

PLATE 6



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 60026.05

VES SCHEMATIC
ARCO Station 276
10600 MacArthur Boulevard
Oakland, California

PLATE 7

Table 14
ARCO Station 276 - Oakland, California
Summary of Soil Analyses
Hydrocarbon Results
(continued)

Units: mg/kg

Sample ID	Depth (ft)	TPHG	Benzene	Toluene	Ethyl-benzene	Xylenes	TPHD	Oil	Stoddard Solvent	Oil & Grease
Onsite Borings (continued)										
B5 / MW-5	11	<5.0	0.13	<0.05	<0.05	<0.05	NA	NA	NA	NA
B5 / MW-5	16	220	0.83	3.4	2.2	14	NA	NA	NA	NA
B5 / MW-5	18	<5.0	0.23	0.11	<0.05	0.21	NA	NA	NA	NA
B5 / MW-5	24	<5.0	0.086	<0.05	<0.05	<0.05	NA	NA	NA	NA
B5 / MW-5	31	<5.0	<0.050	<0.05	<0.05	<0.05	NA	NA	NA	NA
B6 / RW-1	15.5	<1.0	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA
B6 / RW-1	25.5	<1.0	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA
B6 / RW-1	35.5	<1.0	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA
B6 / RW-1	51	<1.0	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA
B12 / MW-8	9.5	<1.0	0.22	<0.0050	0.031	0.034	NA	NA	NA	NA
B12 / MW-8	15.5	6.6	0.90	0.78	0.17	0.78	NA	NA	NA	NA
B12 / MW-8	19	2.8	1.2	0.79	0.043	0.23	NA	NA	NA	NA
B12 / MW-8	24.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
B12 / MW-8	29	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
B12 / MW-8	50	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
B13 / VW-1	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
B13 / VW-1	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
B13 / VW-1	15	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
B13 / VW-1	18	<1.0	0.084	0.013	0.034	0.14	NA	NA	NA	NA
B14 / VW-2	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
B14 / VW-2	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
B14 / VW-2	15	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
B14 / VW-2	17.5	83	0.14	0.40	1.0	5.0	NA	NA	NA	NA
B15 / VW-3	5	<1.0	0.21	<0.0050	0.014	0.027	NA	NA	NA	NA
B15 / VW-3	10	<1.0	0.16	<0.0050	0.065	0.11	NA	NA	NA	NA
B15 / VW-3	15	6.5	0.83	0.47	0.22	0.81	NA	NA	NA	NA
B15 / VW-3	18	<1.0	0.21	0.47	0.021	0.11	NA	NA	NA	NA
B16 / VW-4	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
B16 / VW-4	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
B16 / VW-4	15	94	0.16	0.18	2.1	11	NA	NA	NA	NA
B16 / VW-4	19	<1.0	0.28	0.018	0.048	0.082	NA	NA	NA	NA

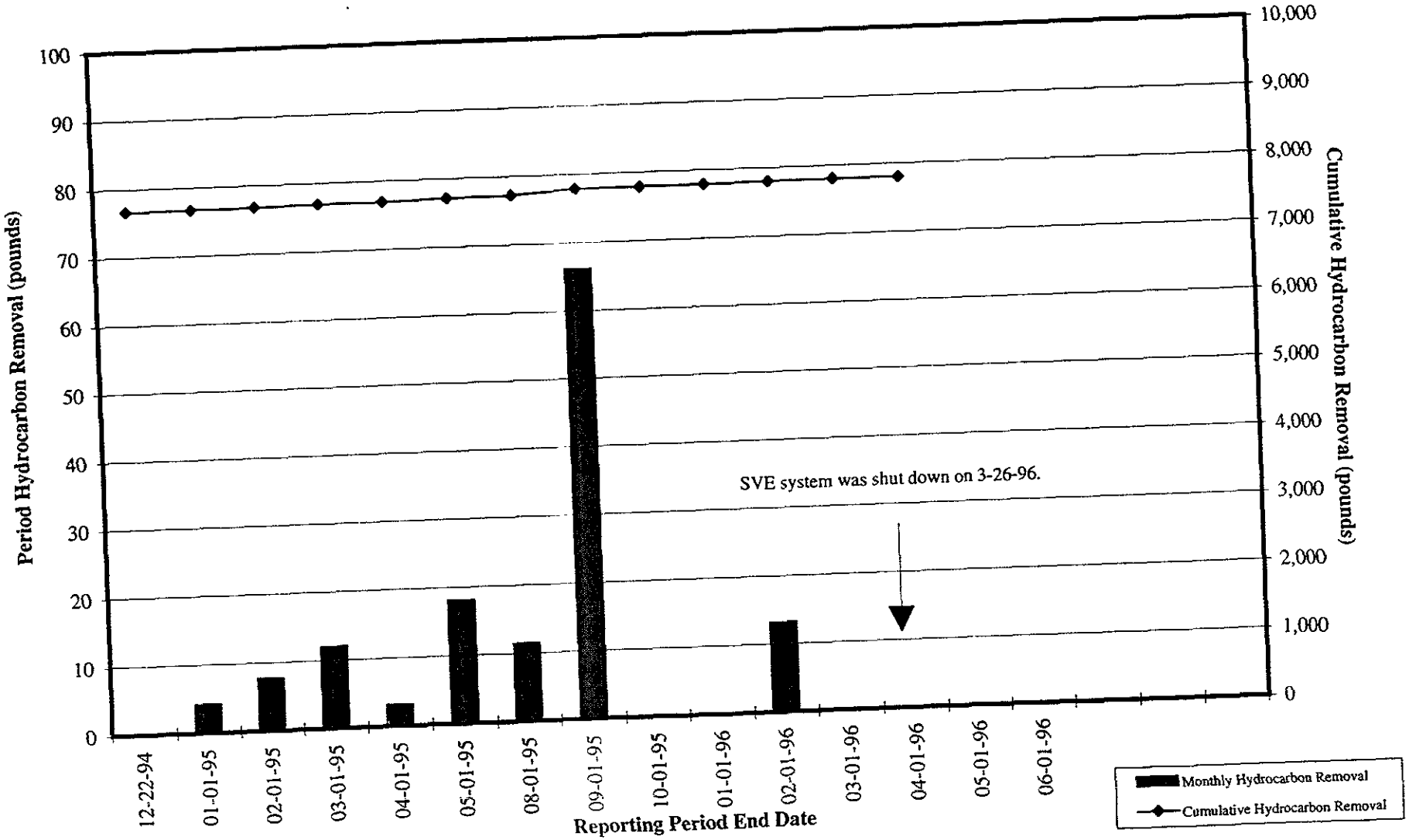
Table 1
ARCO Station 276 - Oakland, California
Summary of Soil Analyses
Hydrocarbon Results
(continued)

Units: mg/kg

Sample ID	Depth (ft)	TPHG	Benzene	Toluene	Ethyl-benzene	Xylenes	TPHD	Oil	Stoddard Solvent	Oil & Grease
Onsite Borings (continued)										
B17 / VW-5	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
B17 / VW-5	10	<1.0	0.0058	<0.0050	<0.0050	0.0090	NA	NA	NA	NA
B17 / VW-5	15	690	2.1	3.1	11	42	NA	NA	NA	NA
B17 / VW-5	18	3700	48	160	94	420	NA	NA	NA	NA
B18 / VW-6	5.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
B18 / VW-6	10.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
B18 / VW-6	15.5	470	0.50	9.6	8.7	81	NA	NA	NA	NA
B18 / VW-6	17.5	690	3.0	15	15	92	NA	NA	NA	NA
B19 / VW-7	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
B19 / VW-7	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
B19 / VW-7	15	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
B19 / VW-7	17.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
Offsite Borings										
B1	16.5	<2.0	<0.050	<0.050	<0.050	<0.050	NA	NA	NA	NA
B1	21.5	<2.0	<0.050	<0.050	<0.050	<0.050	NA	NA	NA	NA
B1	24	<1	<0.005	<0.005	<0.005	<0.005	<10	NA	NA	NA
B1	29	2.3	0.27	0.087	0.054	0.15	NA	NA	NA	NA
B2	6.5	<2.0	<0.050	<0.050	<0.050	<0.050	NA	NA	NA	NA
B2	16.5	<2.0	<0.050	<0.050	<0.050	<0.050	NA	NA	NA	NA
B2	24	<2.0	<0.050	<0.050	<0.050	<0.050	NA	NA	NA	NA
B2	24/26	NA	NA	NA	NA	NA	<10	NA	NA	NA
B2	29	<1	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA
B3	11.5	<2.0	<0.050	<0.050	<0.050	<0.050	NA	NA	NA	NA
B3	16.5	<2.0	<0.050	<0.050	<0.050	<0.050	NA	NA	NA	NA
B3	21.5	<2.0	<0.050	<0.050	<0.050	<0.050	NA	NA	NA	NA
B3	26.5	<2.0	<0.050	<0.050	<0.050	<0.050	NA	NA	NA	NA
B3	29	<1	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA

Figure 7

10600 and 10700 MacArthur Boulevard
On-Site Soil-Vapor Extraction and Treatment System
Historical Hydrocarbon Removal Rates

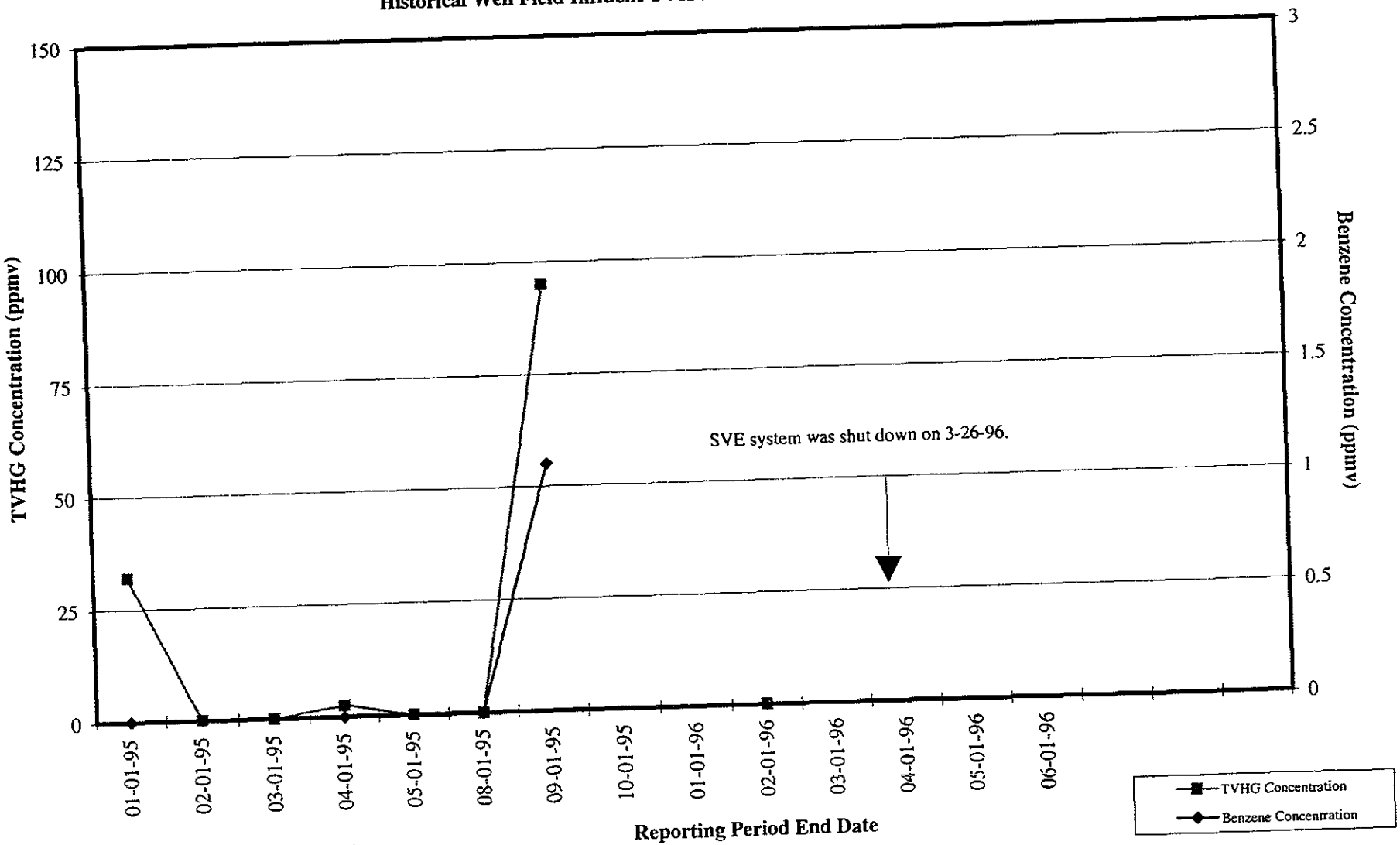


Based on data from EVAX, PEG, and RESNA, approximately 7,666 pounds of hydrocarbon were removed between September 6, 1990 and December 22, 1994.

esj/h:\0276\0276tdb xls\SVE Model:im
20805-120.00

Figure 8

10600 and 10700 MacArthur Boulevard
Soil-Vapor Extraction and Treatment System
Historical Well Field Influent TVHG and Benzene Concentrations



esj/h:\0276\0276tdb.xls\SVE Model:imi
20805-120.006

TVHG: total volatile hydrocarbons as gasoline
ppmv: parts per million by volume

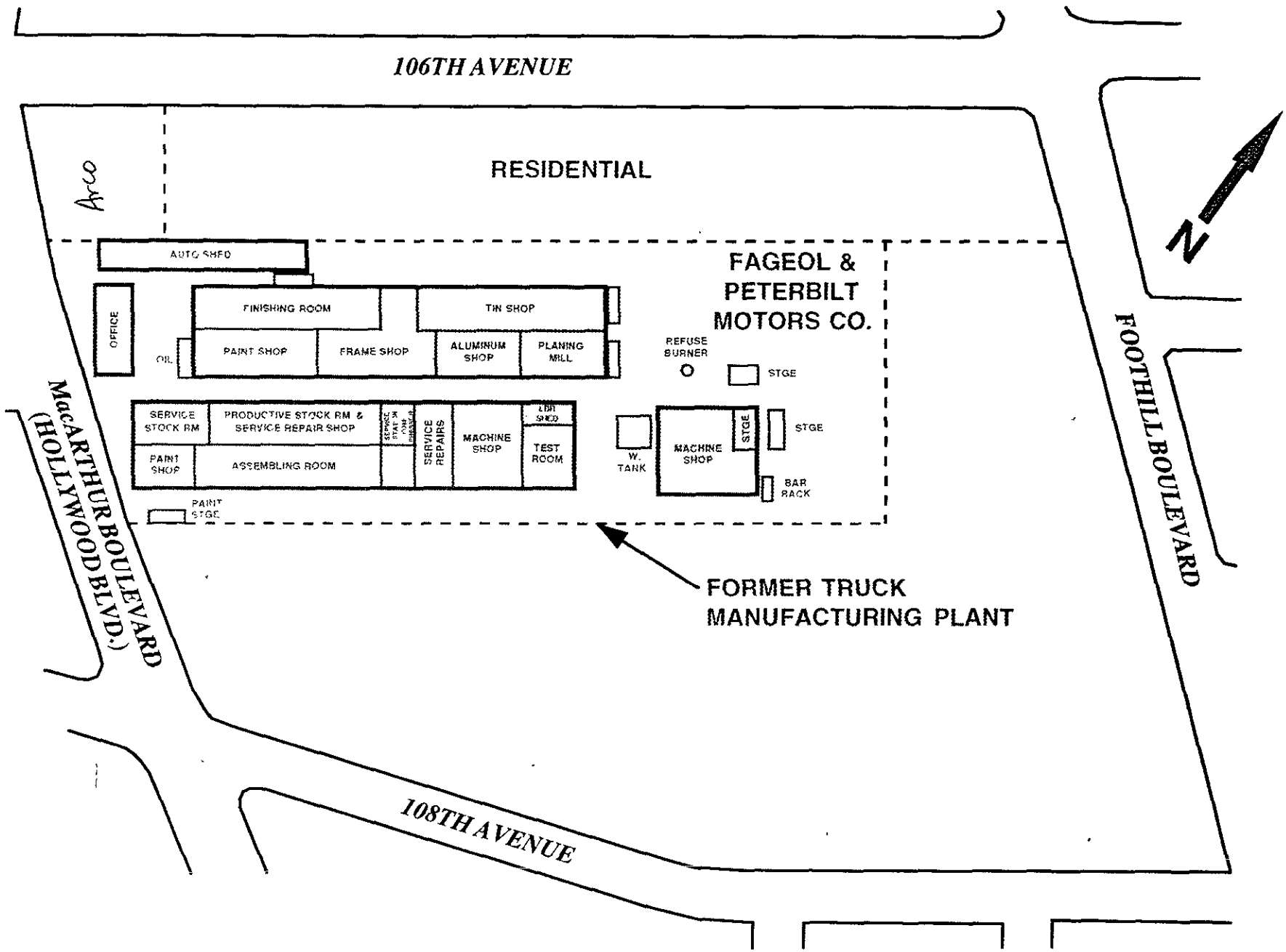
Report 1

SVE QUARTERLY OPERATION AND PERFORMANCE:

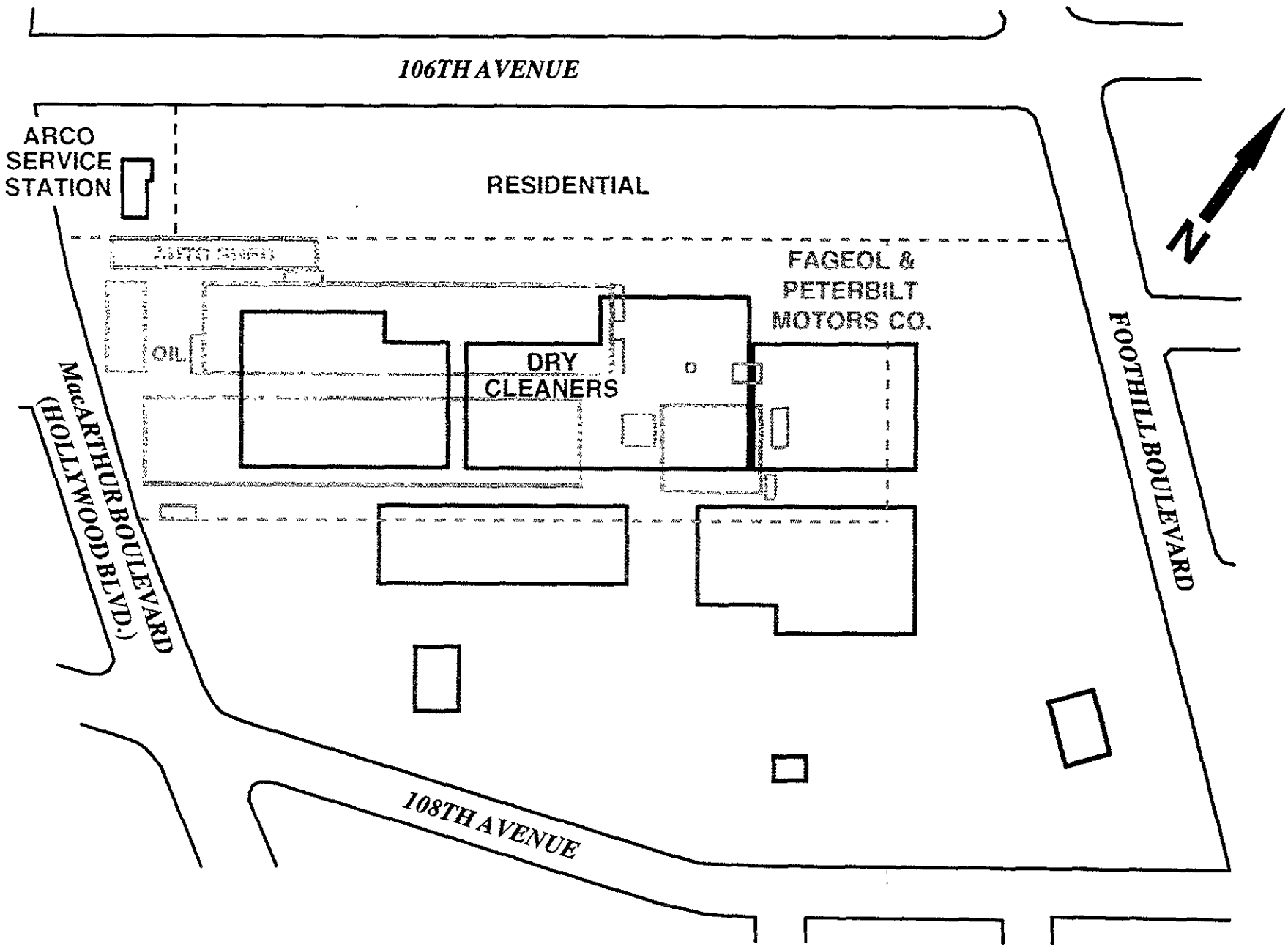
Equipment Inventory:	Anguil Energy Systems Remedi-Cat, 500 cfm, Catalytic Oxidizer For the period from September 6, 1990 through December 22, 1994, please refer to *Fourth Quarter 1994 Groundwater Monitoring Results and Remediation System Performance Evaluation Report,* (EMCON, March 1995), for system operation before December 1994. SVE system was shut down on 3-26-96, due to high groundwater levels and low hydrocarbon concentrations in extracted soil vapors.
Operating Mode:	Catalytic Oxidation
BAAQMD Permit #, A/N:	5998
TPH Conc. End of Period (lab):	NA (Not Available)
Benzene Conc. End of Period (lab):	NA
Flowrate End of Period:	NA
HC Destroyed This Period:	0.0 pounds
HC Destroyed to Date:	7,801.1 pounds
Utility Usage	
Electric (KWH):	0 KWH
Gas (Therms):	24 Therms
Operating Hours This Period:	0.0 hours
Percent Operational:	0.0%
Operating Hours to Date:	4282.8 hours
Unit Maintenance:	Routine monthly maintenance
Number of Auto Shut Downs:	0
Destruction Efficiency Permit Requirement:	90%
Percent TPH Conversion:	NA
Stack Temperature:	NA
Source Flow:	0.0 scfm
Process Flow:	0.0 scfm
Source Vacuum:	0.0 inches of water

ATTACHED:

- Table 1 - Groundwater Monitoring Data, Third Quarter 1997
- Table 2 - Historical Groundwater Elevation and Analytical Data, Petroleum Hydrocarbons and Their Constituents
- Table 3 - Historical Groundwater Analytical Data, Volatile Organic Compounds
- Table 4 - Approximate Cumulative Floating Product Recovered
- Table 5 - Soil-Vapor Extraction System Operation and Performance Data
- Table 6 - Soil-Vapor Extraction Well Data
- Figure 1 - Site Location
- Figure 2 - Groundwater Data Third Quarter 1997
- Figure 3 - Soil-Vapor Extraction and Treatment System, Historical Well Field Influent TVHG and Benzene Concentrations
- Figure 4 - Soil-Vapor Extraction and Treatment System, Historical Hydrocarbon Removal Rates
- Appendix A - Analytical Results and Chain-of-Custody Documentation, Third Quarter 1997 Groundwater Monitoring Event



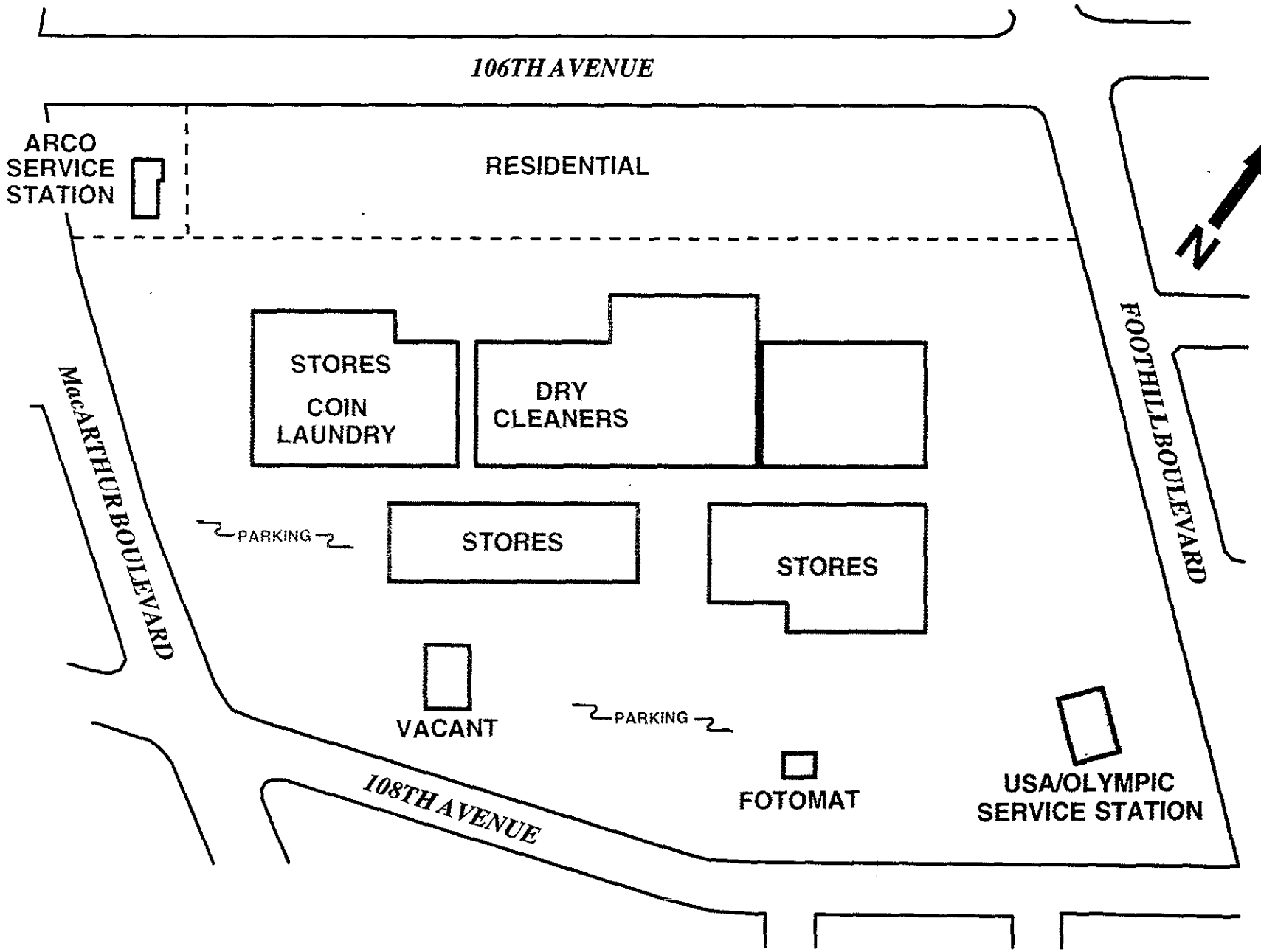
HISTORICAL (1926 & 1951) SITE MAP



1926, 1951, & 1969 COMBINED SITE MAP

SCALE: 0 200 FEET

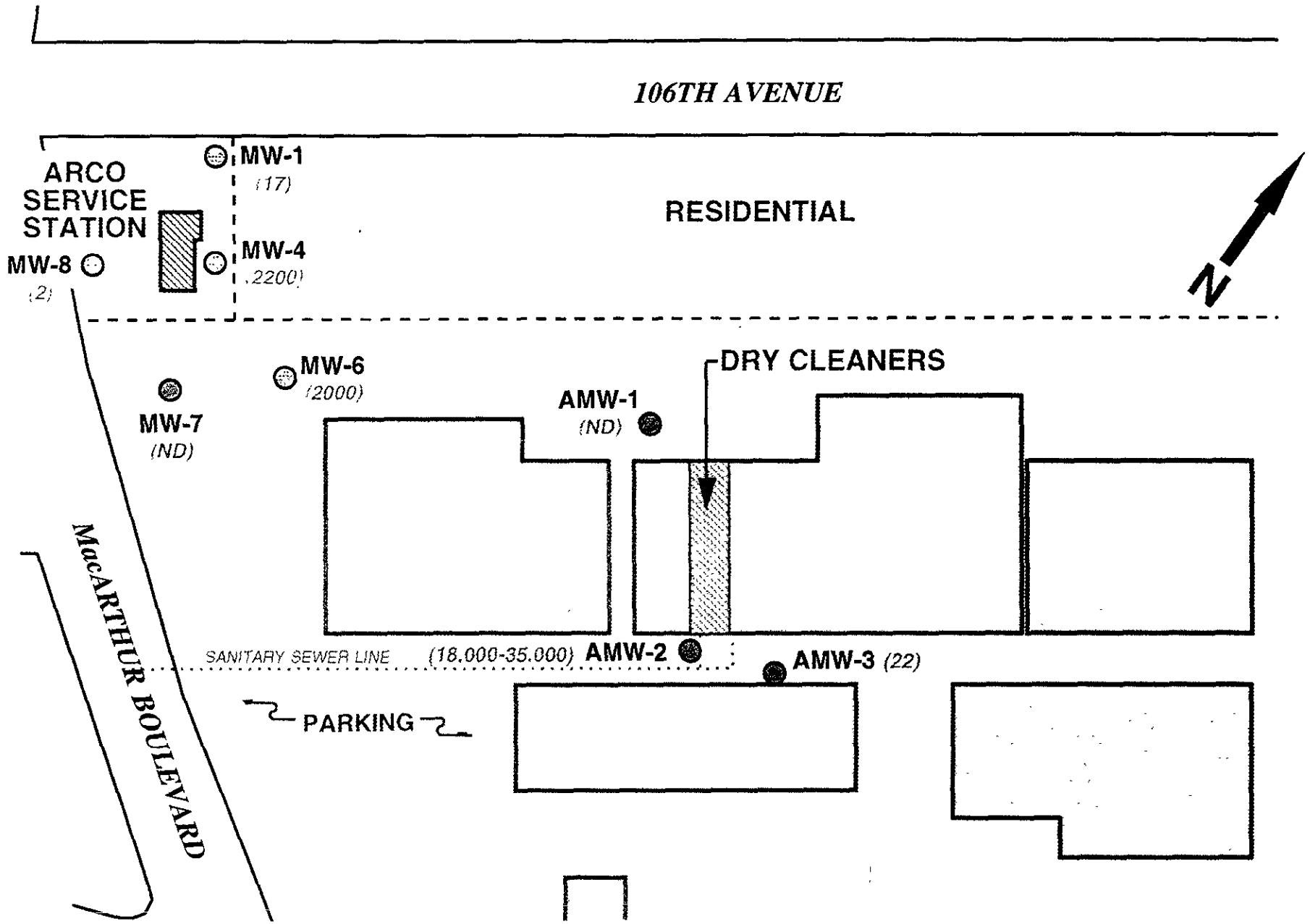
Foothill Square & ARCO



1969 SITE MAP

SCALE: 0 200 FEET

Foothill Square + ARCO



CURRENT SITE MAP AND PCE CONCENTRATIONS
FOURTH QUARTER 1994

SCALE: 0 200 FEET

FOOTHILL SQUARE + ARCO

RISK ASSESSMENT & EVALUATION

Comments on ARCO Service Station 276- 10600 Macarthur, Oakland,CA

Barney,

We received a risk assessment, dated March 12, 1997. I reviewed it and has some questions on the soil concentrations used to come up with an average. So he sent us information on all the soil concentrations used. Again, soil to indoor pathway was not evaluated since the source area does not have any buildings on it based on the current scenario. However, I asked them to evaluate the soil to indoor pathway based on the future scenario and they calculated the risk for this pathway using the average concentration found on site. For every boring, they took the highest concentration (usually was found between 17 to 20 ft depth), and then averaged it for the risk evaluation. This came to be, according to the letter dated May 20, 1997, less than the RBSL's for the soil to indoor pathway.

So, based on the risk assessment, it looks like they have covered everything and it does not look like there should be a problem.

Madhulla L

No impacted soil is believed to be present beneath the service station because petroleum hydrocarbon-impacted soil has been documented to be present only in association with the former USTs which were located outside and downgradient of the footprint of the service station Additionally, the SVE system has successfully removed residual soil petroleum hydrocarbons down to asymptotic levels. Thus, volatilization from subsurface soil to indoor airspace is not considered a significant pathway, and will not be evaluated further.

As summarized in Worksheet 1.4, the only complete potential exposure pathways at this site are:

- Volatilization of chemicals in groundwater through the unsaturated zone to ambient air and indoor air
- Volatilization of chemicals in subsurface soil to ambient air

Representative Groundwater Concentrations

Quarterly groundwater monitoring events have shown a generally decreasing trend in BTEX levels in the groundwater (Appendix A). As a result of this trend, the most recent groundwater concentrations were used to represent the magnitude of the chemical source. BTEX concentrations from the well with the highest concentrations (i.e., off-site monitoring well MW-7) were used to represent the groundwater BTEX concentrations to which hypothetical ambient air and indoor air receptors may be exposed. These representative groundwater concentrations are presented in Table 1. This is a conservative approach because using the highest concentrations (which were measured in an off-site monitoring well) over-estimates the exposure a typical receptor, especially an on-site receptor, is likely to receive.

Ave for past 4 qtrs

The groundwater results from the monitoring well where the highest recent PCE concentrations have been detected (i.e. well MW-4) were used to develop a representative PCE level. The most recent analytical results could not be used because the results from this well have not displayed a clear downward or stable trend. For this reason, the 95 percent upper confidence interval of the mean was used. These representative groundwater concentrations are presented in Table 1. Use of this value is considered conservative because it represents the highest PCE concentration detected at the Site.

past 4 quarters

Representative Soil Concentrations

The analytical results of petroleum-related compounds remaining at the Site following the excavations of the waste oil and fuel tanks, and installation of monitoring and vapor extraction wells (Pacific Environmental Group, February 6, 1989, Applied Geosystems, February 11, 1991, and RESNA January 29, 1993) showed little or no impact until about

20 feet below ground surface (bgs). The majority of gasoline hydrocarbons in the soil on-site are located approximately 15 to 20 feet below ground surface (bgs), directly above first-encountered water within the shallow perched water-bearing zone, in the immediate vicinity of the former USTs at the Site (RESNA, January 29, 1993). Soil was sampled at 18 locations on-site that were not excavated during the removal of the USTs and associated piping. Of these, BTEX was detected at depths above 15 feet in only 3 locations. Data from samples collected at or near this depth were used to evaluate the soil-to-ambient air pathway. The analytical results for the soil samples are summarized in Table 2.

The approach used to evaluate the soil-to-ambient air pathway in the ASTM guidelines assumes a potential receptor can be exposed while standing anywhere on the site. The 95 percent upper confidence interval of the mean BTEX concentrations were used to develop a representative site-wide soil concentration for this potential exposure. These representative soil concentrations are presented in Table 1. It should be noted, that because these data represent the soil conditions prior to the completion of SVE operation, and are thus likely to over-estimate current soil BTEX levels, their use in this evaluation contributes to the conservative nature of this assessment.

The Site is currently operated as a service station, and was assumed to remain a service station for the purpose of this evaluation. Therefore, the commercial/industrial exposure scenario was used to evaluate the potential exposure of receptors to ambient and indoor air at this site. The values for the exposure parameters associated with this scenario are summarized in Worksheet 4.3.

Acceptable risk-based soil and groundwater levels were calculated based on a 1×10^{-5} (i.e., 1 in 100,000) probability of developing cancer from cancer-causing substances, and a hazard quotient of 1 for noncancer-causing substances.

The next step in this Tier 1 evaluation is to review the assumptions used to derive the risk-based screening levels (RBSLs) for contaminated media (i.e., groundwater and soil) and potential exposure routes (i.e., inhalation of indoor and ambient air), and determine whether they are likely to be conservative for this Site.

The emission and air dispersion models, and the default modeling values used in the ASTM guidelines to generate the RBSLs are suitable to generate conservative RBSLs for the following reasons:

- Losses due to biodegradation and adsorption onto soil during volatilization from the unsaturated zone are not accounted for by the models.

Site Name: Retail Service Station
Site Location: 10600 MacArthur Blvd., Oakland, CA
Date Completed: 10-21-96
Completed by: EMCON

BASELINE EXPOSURE FLOWCHART

Instructions: *To characterize baseline exposure conditions, check boxes to identify applicable primary sources, secondary sources (affected media), potential transport mechanisms, and current or potential exposure pathways and receptors (■ = applicable to site). Identify types(s) of both on-site and off-site receptors, if applicable. Provide detailed information on complete pathways, exposure factors, and risk goals on Worksheets 4.3 - 4.5.*

PRIMARY SOURCES	SECONDARY SOURCES	TRANSPORT MECHANISMS	EXPOSURE PATHWAY	POTENTIAL RECEPTORS	COMPLETE PATHWAY?
■ Product Storage ■ Piping / Distribution ☐ Operations ☐ Waste Management Unit ☐ Other:	☐ Affected Surface Soils (≤3 ft depth)	☐ Wind Erosion and Atmospheric Dispersion	☐ Soil Dermal Contact/ Ingestion	**Exposed Receptors** On-Site: ☐ Residential ☐ Non-Resid. ■ N/A ☐ Sensitive Habitat ☐ Recreation Off-Site: ☐ Residential ☐ Non-Resid. ■ N/A ☐ Sensitive Habitat ☐ Recreation	■ No ☐ Yes ○ Current ○ Potential ■ No ☐ Yes ○ Current ○ Potential
	■ Affected Subsurface Soils (> 3 ft depth)	■ Volatilization and Atmospheric Dispersion	■ Air Inhalation of Vapor or Dust	**Exposed Persons** On-Site: ☐ Residential ■ Non-Resid. ☐ N/A Off-Site: ☐ Residential ■ Non-Resid. ☐ N/A	☐ No ■ Yes ● Current ○ Potential ☐ No ■ Yes ● Current ○ Potential
	■ Dissolved Groundwater Plume	■ Volatilization and Enclosed-Space Accumulation			
		■ Leaching and Groundwater Transport	☐ Groundwater Potable Water Use	**Groundwater Users** On-Site: ☐ Residential ☐ Non-Resid. ■ N/A Off-Site: ☐ Residential ☐ Non-Resid. ■ N/A	■ No ☐ Yes ○ Current ○ Potential ■ No ☐ Yes ○ Current ○ Potential
	■ Free-Phase Liquid Plume	☐ Mobile Free-Liquid Migration			
	☐ Affected Surface Soils, Sediments, or Surface Water	☐ Stormwater/ Surface Water Transport	☐ Surface Water Recreational Use / Sensitive Habitat	**Surface Water Users** On-Site: ☐ Residential ☐ Non-Resid. ■ N/A ☐ Sensitive Habitat ☐ Recreation Off-Site: ☐ Residential ☐ Non-Resid. ■ N/A ☐ Sensitive Habitat ☐ Recreation	■ No ☐ Yes ○ Current ○ Potential ■ No ☐ Yes ○ Current ○ Potential

(■ OR ● TO SELECT)

Site Name: Retail Service Station
Site Location: 10600 MacArthur Blvd., Oakland, CA
Date Completed: 10-21-96
Completed By: EMCON

SUBSURFACE SOIL CONCENTRATION DATA SUMMARY (>3 FT BGS)

Instructions: *Indicate type and concentrations of hazardous constituents detected in subsurface soil. Provide statistical data (maximum value, mean value, upper 90% confidence limit on mean) on detectable concentrations only. Do not include non-detects from outside of source zone. Select "representative concentration" value for comparison to cleanup standard (SSTL or RBSL) and calculation of baseline risk. Provide detailed lab data table(s) as Appendix A to this report.*

CONSTITUENTS DETECTED		ANALYTICAL METHOD		SAMPLE POPULATION		DETECTED CONCENTRATIONS			SELECTED REPRESENTATIVE CONC. (mg/kg)
CAS No.	Name	Method No.	Typical Detection Limit (mg/kg	No. of Samples	No. of Detects	Max Conc. (mg/kg)	Mean Conc. (mg/kg)	Upper 90%CL Conc. (mg/kg)	
	Volatilization from Soil to Ambient Air								
	Benzene	5030/8020	0.05	13	9			0.95	0.95
	Toluene	5030/8020	0.05	13	9			0.73	0.73
	Ethylbenzene	5030/8020	0.05	13	10			0.73	0.73
	Xylenes	5030/8020	0.05	13	9			2.7	2.7

Site Name: Retail Service Station

Site Location: 10600 MacArthur Blvd., Oakland, CA

Date Completed: 10-21-96

Completed By: EMCON

GROUNDWATER CONCENTRATION DATA SUMMARY

Instructions: *Indicate type and concentrations of hazardous constituents detected in groundwater. Provide statistical data (maximum value, mean value, upper 90% confidence limit on mean) on detectable concentrations only. Do not include non-detects from outside of source zone. Select "representative concentration" value for comparison to cleanup standard (SSTL or RBSL) and calculation of baseline risk. Provide detailed lab data table(s) as Appendix A to this report.*

CONSTITUENTS DETECTED		ANALYTICAL METHOD		SAMPLE POPULATION		DETECTED CONCENTRATIONS			SELECTED REPRESENTATIVE CONC. (mg/L)
CAS No.	Name	Method No.	Typical Detection Limit (mg/l	No. of Samples	No. of Detects	Max Conc. (mg/L)	Mean Conc. (mg/L)	Upper 90%CL Conc. (mg/L)	
	Volatilization from Groundwater to Ambient Air								
	Tetrachloroethene (PCE)	8240	0.001	165	125			3.1	3.1
	Benzene	8240	0.001	165	19			0.074	0.074
	Toluene	8240	0.001	165	16			0.036	0.036
	Ethylbenzene	8240	0.001	165	19			0.34	0.34
	Xylenes	8240	0.005	165	19			1.6	1.6
	Volatilization from Groundwater to Indoor Air								
	Tetrachloroethene (PCE)	8240	0.001	165	125			3.1	3.1
	Benzene	8240	0.001	165	19			0.074	0.074
	Toluene	8240	0.001	165	16			0.036	0.036
	Ethylbenzene	8240	0.001	165	19			0.34	0.34
	Xylenes	8240	0.005	165	19			1.6	1.6

Table 1

Tier 1 Results
ARCO Service Station 276, 10600 MacArthur Boulevard

Compounds	Groundwater to Ambient Air Pathway			Groundwater to Indoor Air Pathway			Soil to Ambient Air Pathway		
	Representative Concentrations in Groundwater [1] (mg/L)	RBSL (mg/L)	Note	Representative Concentrations in Groundwater [1] (mg/L)	RBSL (mg/L)	Note	Representative Concentrations in Soil [3] (mg/kg)	RBSL (mg/kg)	Note
PCE	2.4 [2]	> S	RBSL Not Exceeded	2.4 [2]	3.2	RBSL Not Exceeded	--	--	
Benzene	0.074	53.4	RBSL Not Exceeded	0.074	0.214	RBSL Not Exceeded	0.95	1.33	RBSL Not Exceeded
Toluene	0.036	> S	RBSL Not Exceeded	0.036	85	RBSL Not Exceeded	0.73	RES	RBSL Not Exceeded
Ethylbenzene	0.34	> S	RBSL Not Exceeded	0.34	> S	RBSL Not Exceeded	0.73	RES	RBSL Not Exceeded
Xylenes	1.6	> S	RBSL Not Exceeded	1.6	> S	RBSL Not Exceeded	2.7	RES	RBSL Not Exceeded

[B] 200 ppb, ∑ for parlyr ≈ 2.5

1. The most recent groundwater monitoring results from well MW-7 were used.
2. The 95 percent upper confidence interval of the mean PCE concentrations were used.
3. The 95 percent upper confidence interval of the mean benzene, toluene, ethylbenzene, and xylene (BTEX) concentrations were used.

RBSL: Risk-Based Screening Level

RBSLs for benzene are for 1×10^{-5} risk level, and have been multiplied by 0.29 to account for California's slope factor for benzene.

PCE: Tetrachloroethene

RES: The RBSL is greater than the holding capacity of the soil, and thus the soil can be saturated and not exceed the RBSL.

>S: The RBSL is greater than the solubility of that compound in water, and thus the water can be saturated and not exceed the RBSL.

EMCON
1921 Ringwood Avenue • San Jose, California 95131-1721 • (408) 453-7300 • Fax (408) 437-9526

May 20, 1997
Project 20805-127.003

97 MAY 22 AM 9:48

Response to questions on Risk Assessment

Ms. Medula Logan
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway
Alameda, California 94502

Re: Response to comments on Tier 1 Risk-Based Corrective Action Evaluation for ARCO Service Station No. 276

Dear Ms. Logan:

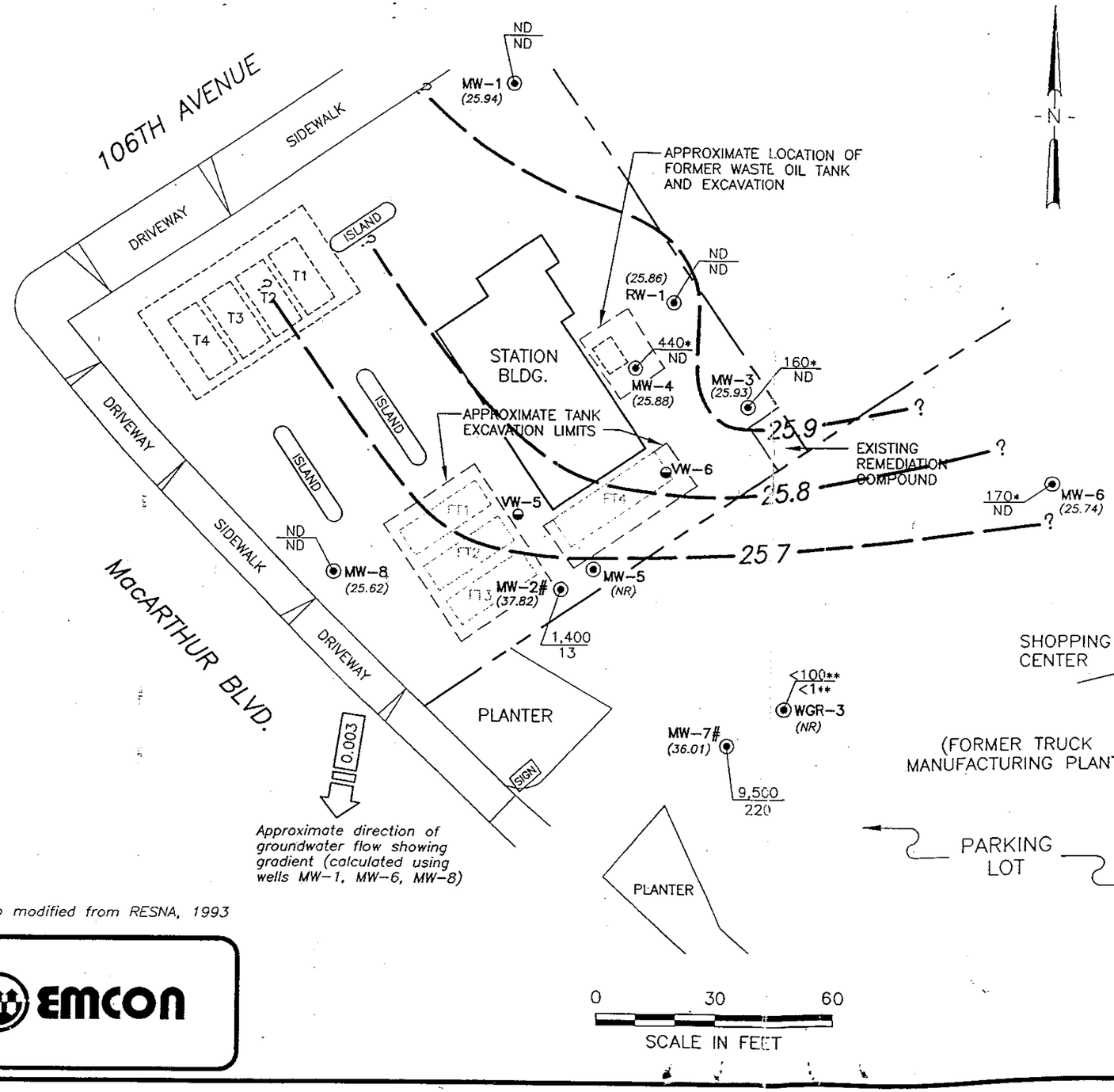
This letter documents EMCON's response to comments you raised during our May 14, phone call regarding the Tier 1 Risk-Based Corrective Action Evaluation for ARCO Service Station No. 276 dated March 12, 1997.

The first comment was whether chlorinated volatile organic compounds (VOCs) were tested in soil from the excavation of the former waste oil tank near the service station building. The details of the excavation of these tanks are presented in a letter from Pacific Environmental Group to ARCO (April 25, 1989). The tanks were removed in September, 1988 and two soil samples (SP-1 and SP-2) were collected from the bottom of the excavation. These samples, and two additional samples (WO-A2 and WO-B2) collected in November after the excavation was deepened to remove visually stained soil, were tested for chlorinated VOCs using EPA Method 8240. The results showed that no chlorinated VOCs were detected in any of the samples.

The second comment deals with evaluating the possibility that a service station building could be relocated elsewhere on the site in the future. The groundwater-to-indoor air pathway is already covered in the Tier 1 report because the highest groundwater concentrations were used in this evaluation. To evaluate the potential soil-to-indoor air pathway, the average soil BTEX concentrations from an approximate depth of 20-feet below the ground surface (the depth at which the maximum petroleum concentrations were detected) were determined across the site. These concentrations are compared to the Tier 1 RBSLs in the accompanying table. The results of this evaluation show that site BTEX levels do not exceed the Tier 1 RBSLs, and thus do not pose a significant risk to the possible future relocation of the service station building.

Compound	Representative Concentration (mg/kg)	RBSL (mg/kg)	Note
Benzene	0.15	0.37	RBSL not exceeded
Toluene	0.11	20.6	RBSL not exceeded
Ethylbenzene	0.13	420	RBSL not exceeded
Xylenes	0.26	RES	RBSL not exceeded

Note : RES indicates that the RBSL is greater than the holding capacity of the soil



Base map modified from RESNA, 1993

EMCON

EXPLANATION

- ⊙ Groundwater monitoring well
- ◒ Vapor extraction well
- [ ] Existing underground storage tank
- [ ] Former underground storage tank
- (25.74) Groundwater elevation (Ft.–MSL); measured 8/18/97
- 1,400 / 13 — TPHG concentration in groundwater (ug/L); sampled 8/18/97 / Benzene concentration in groundwater (ug/L); sampled 8/18/97
- * The sample contains a single non–fuel component eluting in the gasoline range and quantitated as gasoline. The chromatogram does not match the typical gasoline fingerprint.
- ** Raised method reporting limit due to matrix interference or high analyte concentration requiring sample dilution
- ND Not detected at or above the method reporting limit for TPHG (50 ug/L) or benzene (0.5 ug/L)
- NR Not recorded; inaccessible
- // Well screened in shallow water–bearing zone; not used in contouring

DATE AUG. 1997
DWN KAJ
APP
REV
PROJECT NO. 805-120.008

GENERAL SITE MAP

ARCO PRODUCTS COMPANY
SERVICE STATION 276, 10600 MACARTHUR BLVD.
OAKLAND, CALIFORNIA
QUARTERLY GROUNDWATER MONITORING
GROUNDWATER DATA - 3RD QUARTER 1997

EA–SANJOSE–CAD/DRAWINGS: G:\805–120\SJGWELEV.dwg Xrefs: <NONE>
Scale: 1 = 30.00 DimScale: 1 = 30.00 Date: 12/1/97 Time: 4:12 PM Operator: KAJ

Table 3
Historical Groundwater Analytical Data
(TPHG and BTEX)

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 01-17-95
Project Number: 0805-120.02

Well Designation	Water Sample Field Date	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes
		ppb	ppb	ppb	ppb	ppb
MW-1	04-24-89	<50	<0.5	<0.5	<0.5	<0.5
MW-1	10-13-89	<20	<0.5	<0.5	<0.5	<0.5
MW-1	02-01-90	91#	<0.3	<0.3	<0.3	0.36
MW-1	07-31-90	<20	<0.5	<0.5	<0.5	<0.5
MW-1	10-30-90	<50	<0.5	<0.5	<0.5	<0.5
MW-1	01-30-91	<50	<0.5	<0.5	<0.5	<0.5
MW-1	04-30-91	<30	<0.3	<0.3	<0.3	<0.3
MW-1	08-06-91	<30	<0.3	<0.3	<0.3	<0.3
MW-1	11-05-91	<30	<0.3	<0.3	<0.3	<0.3
MW-1	03-10-92	<50	<0.5	<0.5	<0.5	<0.5
MW-1	06-30-92	<50	<0.5	<0.5	<0.5	<0.5
MW-1	09-09-92	<50	<0.5	<0.5	<0.5	<0.5
MW-1	11-20-92	<50	<0.5	<0.5	<0.5	<0.5
MW-1	02-12-93	<50	<0.5	<0.5	<0.5	<0.5
MW-1	05-12-93	<100*	<0.5	<0.5	<0.5	<0.5
MW-1	08-18-93	<51*	<0.5	<0.5	<0.5	<0.5
MW-1	11-10-93	<50	<0.5	<0.5	<0.5	<0.5
MW-1	02-04-94	<50	<0.5	<0.5	<0.5	<0.5
MW-1	05-02-94	<50	<0.5	<0.5	<0.5	<0.5
MW-1	08-03-94	<50	<0.5	<0.5	<0.5	<0.5
MW-2	04-24-89	165000	13000	21000	2100	12700
MW-2	10-13-89	Not sampled: well contained floating product				
MW-2	02-01-90	Not sampled: well contained floating product				
MW-2	07-31-90	240000	14000	24000	3000	17000
MW-2	10-30-90	Not sampled: well contained floating product				
MW-2	01-30-91	Not sampled: well contained floating product				
MW-2	04-30-91	Not sampled: well contained floating product				
MW-2	08-06-91	Not sampled: well contained floating product				
MW-2	11-05-91	Not sampled: well contained floating product				
MW-2	03-10-92	220000	8200	13000	4500	22000
MW-2	06-30-92	130000	10000	16000	4700	24000
MW-2	09-09-92	Not sampled: well contained floating product				
MW-2	11-20-92	Not sampled: well contained floating product				
MW-2	02-12-93	Not sampled: well contained floating product				
MW-2	05-12-93	Not sampled: well contained floating product				
MW-2	08-18-93	Not sampled:				
MW-2	11-10-93	Not sampled: floating product entered well during purging				
MW-2	02-04-94	2100	110	5.6	26	110
MW-2	05-02-94	3400	130	21	73	180
MW-2	08-03-94	Not sampled: well was inaccessible due to a parked car				

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995-Present**

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date: 11-25-97

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	TRPH EPA 418.1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-1	03-10-95	55.92	26 26	29.66	ND	NNE	0 003	03-10-95	<57*	<0.5	<0 5	<0.5	<0.5	--	--	--	--
MW-1	06-05-95	55 92	25 71	30 21	ND	FG	FG	06-05-95	<84*	<0.5	<0 5	<0 5	<0.5	--	--	--	--
MW-1	08-29-95	55 92	28 44	27 48	ND	FG	FG	08-29-95	<60*	<0 5	<0 5	<0 5	<0 5	--	<1	--	--
MW-1	11-16-95	55 92	30 85	25 07	ND	SW	0.003	11-16-95	<50	<0.5	<0.5	<0 5	<0 5	<3	--	--	--
MW-1	02-28-96	55 92	24 99	30 93	ND	NNE	0 004	02-28-96	<50	<0 5	<0.5	<0.5	<0 5	--	--	--	--
MW-1	05-28-96	55 92	24 92	31 00	ND	FG	FG	05-28-96	<50	<0.5	<0 5	<0 5	<0.5	<3	--	--	--
MW-1	08-19-96	55 92	28 04	27 88	ND	FG	FG	08-19-96	<50	<0.5	<0.5	<0 5	<0 5	<3	--	--	--
MW-1	11-21-96	55 92	30 19	25 73	ND	FG	FG	11-21-96	<50	<0 5	<0.5	<0 5	<0.5	<3	--	--	--
MW-1	03-26-97	55 92	24 90	31 02	ND	FG	FG	03-26-97	<50	<0 5	<0.5	<0.5	<0.5	<3	--	--	--
MW-1	05-20-97	55 92	26 99	28 93	ND	FG	FG	05-20-97	<50	<0 5	<0.5	<0.5	<0.5	<3	--	--	--
MW-1	08-18-97	55 92	29 98	25 94	ND	SW	0 003	08-18-97	<50	<0.5	<0 5	<0 5	<0.5	<3	--	--	--
MW-2	03-10-95	55.10	13 98	41 12	ND	NNE	0 003	03-11-95	2800	88	12	16	200	--	--	--	--
MW-2	06-05-95	55 10	15 65	39 45	ND	FG	FG	06-05-95	1800	59	10	53	130	--	--	--	--
MW-2	08-29-95	55 10	17 14	37 96	ND	FG	FG	08-29-95	4500	170	20	150	330	--	71	--	--
MW-2	11-16-95	55 10	Not surveyed	well was inaccessible				11-16-95	Not surveyed	well was inaccessible							
MW-2	02-28-96	55 10	12.46	42 64	ND	NNE	0.004	02-28-96	330	18	0.9	13	13	--	--	--	--
MW-2	05-28-96	55 10	15 23	39 87	ND	FG	FG	05-28-96	1200	48	3	28	75	87	--	--	--
MW-2	08-19-96	55.10	16 84	38 26	ND	FG	FG	08-21-96	880	45	1	15	31	80	--	--	--
MW-2	11-21-96	55 10	15.44	39 66	ND	FG	FG	11-21-96	2200	45	3 4	9	140	44	--	--	--
MW-2	03-26-97	55 10	15 73	39.37	ND	FG	FG	03-26-97	<2000^	<20^	<20^	<20^	<20^	1700	--	--	--
MW-2	05-20-97	55 10	16 07	39 03	ND	FG	FG	05-20-97	<1000^	<10^	<10^	<10^	<10^	1400	--	--	--
MW-2	08-18-97	55 10	17.28	37 82	ND	SW	0.003	08-18-97	1400	13	<10^	20	75	1400	--	--	--

Table 3
Historical Groundwater Analytical Data
(TPHG and BTEX)

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 01-17-95
Project Number: 0805-120.02

Well Designation	Water Sample Field Date	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes
		ppb	ppb	ppb	ppb	ppb
MW-3	04-24-89	560#	0.54	0.75	<0.5	<0.5
MW-3	10-12-89	450#	<0.5	<0.5	<0.5	<0.5
MW-3	02-01-90	360#	<0.3	<0.3	<0.3	0.85
MW-3	08-01-90	440#	<0.5	<0.5	<0.5	<0.5
MW-3	10-30-90	340#	<0.5	<0.5	<0.5	<0.5
MW-3	01-30-91	Not sampled: dry well				
MW-3	04-30-91	Not sampled: well was inaccessible due to construction				
MW-3	08-06-91	430#	<0.3	<0.3	<0.3	<0.3
MW-3	11-05-91	290#	<1.5	<1.5	<1.5	<1.5
MW-3	03-10-92	<360*	<0.5	<0.5	<0.5	<0.5
MW-3	06-30-92	<530*	<0.5	<0.5	<0.5	<0.5
MW-3	09-09-92	<290*	<0.5	<0.5	<0.5	<0.5
MW-3	11-20-92	<270*	<0.5	<0.5	<2.4**	<1.8**
MW-3	02-12-93	<500*	<0.5	<0.5	<0.5	<0.5
MW-3	05-12-93	<670*	<0.5	<0.5	<0.5	<0.5
MW-3	08-18-93	<590*	<0.5	<0.5	<0.5	<0.5
MW-3	11-10-93	<400*	<0.5	<0.5	<0.5	<0.9**
MW-3	02-04-94	<190*	<0.5	<0.5	<0.5	<0.5
MW-3	05-02-94	<480*	<0.5	<0.5	<0.5	<0.9**
MW-3	08-03-94	<250*	<0.5	<0.5	<0.5	<0.5
MW-4	04-24-89	2500#	270	1.4	<0.5	85
MW-4	10-13-89	760#	0.86	<0.5	1.2	<0.5
MW-4	02-01-90	680#	<0.3	<0.3	<0.3	1.6
MW-4	07-31-90	470#	<0.5	<0.5	<0.5	<0.5
MW-4	10-30-90	430#	<0.5	<0.5	<0.5	<0.5
MW-4	01-30-91	<50	<0.5	<0.5	1.2	<0.5
MW-4	04-30-91	600#	<0.3	0.3	<0.3	0.43
MW-4	08-06-91	520#	<0.3	<0.3	<0.3	<0.3
MW-4	11-05-91	900#	<3.0***	<3.0***	<3.0***	<3.0***
MW-4	03-10-92	<730*	<0.5	<0.5	<0.5	<0.5
MW-4	06-30-92	<670*	<0.5	<0.5	<2.3**	500
MW-4	09-09-92	<470*	<0.5	<0.5	<0.5	<0.5
MW-4	11-20-92	<680*	<0.5	<0.5	<6.3**	<3.2**
MW-4	02-12-93	<860*	<0.5	<0.5	<0.5	<0.5
MW-4	05-12-93	<670*	<0.5	<0.5	<1.4**	<1.3**
MW-4	08-18-93	<700*	<0.5	<0.5	<0.5	<0.5
MW-4	11-10-93	<460*	<0.5	<0.5	<0.5	<1.3**
MW-4	02-04-94	<480*	<0.5	<0.5	<0.5	1.4
MW-4	05-02-94	<490*	<0.5	<0.5	<0.5	<0.9**
MW-4	08-03-94	<400*	<0.5	<0.5	<0.5	<0.5

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995-Present**

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date: 11-25-97

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	TRPH EPA 418.1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-3	03-10-95	56 55	26.74	29.81	ND	NNE	0.003	03-11-95	<440*	<0 5	<0.5	<0 5	0.7	--	--	--	--
MW-3	06-05-95	56.55	26 34	30 21	ND	FG	FG	06-05-95	<970*	<1^	<1^	1.1	1.8	--	--	--	--
MW-3	08-29-95	56.55	29 15	27.40	ND	FG	FG	08-29-95	<700*	<0 5	<0.5	<0 5	<0.5	--	<20	--	--
MW-3	11-16-95	56.55	31 50	25 05	ND	SW	0.003	11-16-95	<500*	<0 5	<0.5	<0 5	<0.5	<3	--	--	--
MW-3	02-28-96	56 55	25 32	31.23	ND	NNE	0 004	02-28-96	<500*	<0 5	<0.5	<0 5	<0.5	--	--	--	--
MW-3	05-28-96	56 55	25 46	31 09	ND	FG	FG	05-28-96	<600*	<0.5	<0 5	<0 5	<0.5	<3	--	--	--
MW-3	08-19-96	56.55	28 71	27 84	ND	FG	FG	08-19-96	<400*	<0.5	<0.5	<0.5	<0 5	<3	--	--	--
MW-3	11-21-96	56 55	30.85	25 70	ND	FG	FG	11-21-96	<300*	<0.5	<0 5	<0.5	<0 5	<3	--	--	--
MW-3	03-26-97	56 55	25 36	31 19	ND	FG	FG	03-26-97	<500*	<0 5	<0.5	<0.5	<0.5	<3	--	--	--
MW-3	05-20-97	56 55	27.61	28 94	ND	FG	FG	05-20-97	<300*	<0 5	<0 5	<0.5	<0.5	<3	--	--	--
MW-3	08-18-97	56 55	30.62	25 93	ND	SW	0 003	08-18-97	160"	<0 5	<0 5	<0 5	<0 5	<3	--	--	--
MW-4	03-10-95	55 98	26 22	29 76	ND	NNE	0.003	03-11-95	<780*	<1^	<1^	<1^	1	--	--	<500	--
MW-4	06-05-95	55 98	25.79	30 19	ND	FG	FG	06-05-95	<1200*	<1^	<1^	<1^	<1^	--	--	600	--
MW-4	08-29-95	55 98	28.56	27 42	ND	FG	FG	08-29-95	<1100*	<1^	<1^	<1^	<1^	--	<20	--	--
MW-4	11-16-95	55.98	31 00	24 98	ND	SW	0 003	11-16-95	<900*	<0 5	<0 5	<0 5	<0 5	<6^	--	<0 5	--
MW-4	02-28-96	55 98	24 77	31.21	ND	NNE	0 004	02-28-96	<1000*	<1^	<1^	<1^	<1^	--	--	0 7	--
MW-4	05-28-96	55 98	24.91	31.07	ND	FG	FG	05-28-96	<900*	<0 5	<0.5	<0 5	<0 5	<6^	--	<0 5	--
MW-4	08-19-96	55 98	28.17	27 81	ND	FG	FG	08-19-96	<800*	<0 5	<0.5	<0.5	<0.5	<7^	--	0.8	--
MW-4	11-21-96	55 98	30 30	25 68	ND	FG	FG	11-21-96	<400*	<1^	<1^	<1^	<1^	<5^	--	<0.5	--
MW-4	03-26-97	55 98	24 80	31.18	ND	FG	FG	03-26-97	<800*	<1^	<1^	<1^	<1^	<10^	--	<0.5	--
MW-4	05-20-97	55 98	27 03	28 95	ND	FG	FG	05-20-97	<500*	<1^	<1^	<1^	<1^	<6^	--	0 6	--
MW-4	08-18-97	55 98	30.10	25 88	ND	SW	0.003	08-18-97	440"	<0 5	<0.5	<0 5	<0 5	<3	--	--	--

Table 3
Historical Groundwater Analytical Data
(TPHG and BTEX)

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 01-17-95
Project Number: 0805-120.02

Well Designation	Water Sample Field Date	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes
		ppb	ppb	ppb	ppb	ppb
MW-5	04-24-89	130#	0.67	<0.5	<0.5	<0.5
MW-5	10-13-89	75#	<0.5	<0.5	<0.5	<0.5
MW-5	02-01-90	81#	0.94	0.88	<0.3	1.8
MW-5	07-31-90	110#	<0.5	<0.5	<0.5	<0.5
MW-5	10-30-90	<50	<0.5	<0.5	<0.5	<0.5
MW-5	01-30-91	<50	<0.5	<0.5	<0.5	<0.5
MW-5	04-30-91	120#	<0.3	<0.3	<0.3	<0.3
MW-5	08-06-91	<30	<0.3	<0.3	<0.3	<0.3
MW-5	11-05-91	77#	1	3.6	0.6	2.6
MW-5	03-10-92	<110*	<0.5	<0.5	<0.5	<0.6**
MW-5	06-30-92	<50	<0.5	<0.5	<0.5	<0.5
MW-5	09-09-92	<50	<0.5	<0.5	<0.5	<0.5
MW-5	11-24-92	<50	<0.5	<0.5	<0.5	<0.5
MW-5	02-12-93	<150*	<0.5	<0.5	<0.5	<0.5
MW-5	05-12-93	<50	<0.5	<0.5	<0.5	<0.5
MW-5	08-18-93	<50	<0.5	<0.5	<0.5	<0.5
MW-5	11-10-93	<50	<0.5	<0.5	<0.5	<1.4**
MW-5	02-04-94	<50	<0.5	<0.5	<0.5	<0.5
MW-5	05-02-94	<50	<0.5	<0.5	<0.5	<0.5
MW-5	08-03-94	<50	<0.5	<0.5	<0.5	<0.5
MW-6	06-30-92	<850*	<0.5	<0.5	<0.5	<0.5
MW-6	09-09-92	Not sampled: well was paved over				
MW-6	11-20-92	Not sampled: well was paved over				
MW-6	02-12-93	<1900*	<2.5***	<2.5***	<2.5***	<2.5***
MW-6	05-12-93	<1600*	<2.5***	<2.5***	<2.5***	<2.5***
MW-6	08-18-93	<1500*	<2.5***	<2.5***	<2.5***	<2.5***
MW-6	11-10-93	<1000*	<2.5***	<2.5***	<2.5***	<2.5***
MW-6	02-04-94	<830*	<2.5***	<2.5***	<2.5***	3.1
MW-6	05-02-94	<860*	<1***	<1***	<1***	1.3
MW-6	08-03-94	<660*	<1***	<1***	<1***	<1***

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995-Present**

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date: 11-25-97

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	TRPH EPA 418.1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-5	03-10-95	55 43	25 62	29.81	ND	NNE	0 003	03-10-95	<110*	<0.5	<0.5	<0 5	<0.5	--	--	--	--
MW-5	06-05-95	55.43	25 30	30.13	ND	FG	FG	06-05-95	<130*	<0 5	<0.5	<0 5	<0.5	--	--	--	--
MW-5	08-29-95	55.43	28 21	27 22	ND	FG	FG	08-29-95	<120*	<0.5	<0.5	<0 5	<0 5	--	<5	--	--
MW-5	11-16-95	55 43	30 63	24.80	ND	SW	0 003	11-16-95	<500*	<0.5	<0 5	<0 5	0.7	<20^	--	--	--
MW-5	02-28-96	55 43	24.07	31.36	ND	NNE	0 004	02-28-96	<400*	<0.5	<0.5	<0 5	<0.5	--	--	--	--
MW-5	05-28-96	55 43	24 42	31.01	ND	FG	FG	05-28-96	<100*	<0.5	<0 5	<0 5	<0.5	11	--	--	--
MW-5	08-19-96	55 43	27 82	27 61	ND	FG	FG	08-21-96	<50	<0 5	<0 5	<0.5	<0 5	29	--	--	--
MW-5	11-21-96	55 43	29 92	25.51	ND	FG	FG	11-21-96	<600*	<1^	<1^	<1^	<1^	<20^	--	--	--
MW-5	03-26-97	55 43	24 22	31 21	ND	FG	FG	03-26-97	<200*	<0.5	<0 5	<0.5	<0.5	20	--	--	--
MW-5	05-20-97	55 43	26 60	28 83	ND	FG	FG	05-20-97	<200*	<0 5	<0.5	<0.5	<0.5	26	--	--	--
MW-5	08-18-97	55 43	NR	NR	ND	SW	0 003	08-18-97	--	--	--	--	--	--	--	--	--
MW-6	03-10-95	61 21	31 54	29 67	ND	NNE	0 003	03-11-95	<390*	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-6	06-05-95	61 21	31 15	30 06	ND	FG	FG	06-05-95	<750*	<0.5	<0.5	<0 5	<0.5	--	--	--	--
MW-6	08-29-95	61 21	34 03	27 18	ND	FG	FG	08-29-95	<600*	<0.5	<0 5	<0.5	<0.5	--	<20	--	--
MW-6	11-16-95	61 21	36 40	24 81	ND	SW	0 003	11-16-95	<500*	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-6	02-28-96	61 21	30 18	31.03	ND	NNE	0 004	02-28-96	<500*	<0 5	<0.5	<0.5	<0.5	--	--	--	--
MW-6	05-28-96	61 21	30 29	30 92	ND	FG	FG	05-28-96	<400*	<0 5	<0 5	<0.5	<0.5	<3	--	--	--
MW-6	08-19-96	61 21	33 54	27 67	ND	FG	FG	08-19-96	<300*	<0 5	<0.5	<0.5	<0.5	<3	--	--	--
MW-6	11-21-96	61 21	35.70	25.51	ND	FG	FG	11-21-96	<300*	<0.5	<0 5	<0.5	<0 5	<3	--	--	--
MW-6	03-26-97	61.21	30.15	31 06	ND	FG	FG	03-26-97	<400*	<0 5	<0 5	<0.5	<0.5	<5^	--	--	--
MW-6	05-20-97	61 21	32.40	28.81	ND	FG	FG	05-20-97	<200*	<0.5	<0 5	<0.5	<0 5	<3	--	--	--
MW-6	08-18-97	61.21	35.47	25.74	ND	SW	0 003	08-18-97	170"	<0.5	<0 5	<0 5	<0 5	4	--	--	--

Table 3
Historical Groundwater Analytical Data
(TPHG and BTEX)

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 01-17-95
Project Number: 0805-120.02

Well Designation	Water Sample Field Date	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes
		ppb	ppb	ppb	ppb	ppb
MW-7	06-30-92	71000	5100	6600	2300	14000
MW-7	09-09-92	Not sampled: well contained floating product				
MW-7	11-20-92	Not sampled: well contained floating product				
MW-7	02-12-93	Not sampled: well contained floating product				
MW-7	05-12-93	Not sampled: well contained floating product				
MW-7	08-18-93	Not sampled: well contained floating product				
MW-7	11-10-93	Not sampled: floating product entered the well during purging				
MW-7	02-04-94	40000	900	980	1100	9700
MW-7	05-02-94	38000	640	600	930	7200
MW-7	08-03-94	47000	1000	1200	1500	10000
MW-8	09-09-92	<50	3.4	<0.5	<0.5	0.7
MW-8	11-24-92	<50	<0.5	<0.5	<0.5	<0.5
MW-8	02-12-93	<50	<0.5	<0.5	<0.5	<0.5
MW-8	05-12-93	<50	<0.5	<0.5	<0.5	<0.5
MW-8	08-18-93	<50	<0.5	<0.5	<0.5	<0.5
MW-8	11-10-93	<50	<0.5	<0.5	<0.5	1.1
MW-8	02-04-94	<50	<0.5	<0.5	<0.5	<0.5
MW-8	05-02-94	<50	<0.5	<0.5	<0.5	<0.5
MW-8	08-03-94	<50	<0.5	<0.5	<0.5	<0.5
RW-1	11-05-91	750#	4.8	3.7	<3.0	<3.0
RW-1	03-10-92	<140*	<0.5	<0.5	<0.5	<0.6**
RW-1	06-30-92	<400*	<0.5	<0.5	<0.5	<0.5
RW-1	09-09-92	<520*	<0.5	<0.5	<0.5	<0.5
RW-1	11-24-92	<650*	<0.5	<0.5	<8.6**	<7.2**
RW-1	02-12-93	<260*	<0.5	<0.5	<0.5	<0.5
RW-1	05-12-93	<240*	<0.5	<0.5	<0.5	<0.5
RW-1	08-18-93	<230*	<0.5	<0.5	<0.5	<0.5
RW-1	11-10-93	<380*	<0.5	<0.5	<0.5	<0.8**
RW-1	02-04-94	<540*	<0.5	<0.5	<0.5	<1.5**
RW-1	05-02-94	<50	<0.5	<0.5	<0.5	<0.5
RW-1	08-03-94	<140*	<0.5	<0.5	<0.5	<0.5

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995-Present**

Date: 11-25-97

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	TRPH EPA 418.1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-7	03-10-95	58.22	17 69	40.53	ND^^	NNE	0.003	03-11-95	Not sampled, floating product entered the well during purging								
MW-7	06-05-95	58 22	19 68	38.54	ND	FG	FG	06-05-95	36000	90	51	450	2000	--	--	--	--
MW-7	08-29-95	58 22	21 70	36.52	ND	FG	FG	08-29-95	86000	380	260	1100	5000	--	<10	--	--
MW-7	11-16-95	58 22	23 02	35.20	ND	SW	0 003	11-16-95	1400000	610	590	7800	3300	<4000^	--	--	--
MW-7	02-28-96	58 22	16.54	41.68	ND	NNE	0 004	02-28-96	29000	<20^	<20^	180	1000	--	--	--	--
MW-7	05-28-96	58 22	19 29	38 93	ND	FG	FG	05-28-96	50000	<100^	100	510	2300	<500^	--	--	--
MW-7	08-19-96	58.22	21 84	36.38	ND	FG	FG	08-21-96	45000	340	200	820	3400	<300^	--	--	--
MW-7	11-21-96	58 22	19 58	38.64	ND	FG	FG	11-21-96	41000	190	150	730	2900	<300^	--	--	--
MW-7	03-26-97	58 22	19.67	38 55	ND	FG	FG	03-26-97	6400	60	25	160	300	190	--	--	--
MW-7	05-20-97	58.22	20 18	38.04	ND	FG	FG	05-20-97	13000	110	56	590	1800	720	--	--	--
MW-7	08-18-97	58 22	22 21	36.01	ND	SW	0 003	08-18-97	9500	220	25	610	690	310	--	--	--
MW-8	03-10-95	53.65	23.60	30 05	ND	NNE	0.003	03-10-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-8	06-05-95	53.65	23 48	30.17	ND	FG	FG	06-05-95	<50	<0 5	<0.5	<0.5	<0.5	--	--	--	--
MW-8	08-29-95	53 65	26.44	27.21	ND	FG	FG	08-29-95	<50	<0.5	<0.5	<0.5	<0 5	--	3	--	--
MW-8	11-16-95	53.65	28 90	24 75	ND	SW	0.003	11-16-95	<50	<0.5	<0.5	<0 5	<0.5	6	9	--	--
MW-8	02-28-96	53 65	22.16	31.49	ND	NNE	0.004	02-28-96	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-8	05-28-96	53 65	22.62	31 03	ND	FG	FG	05-28-96	<50	<0.5	<0 5	<0.5	<0.5	5	--	--	--
MW-8	08-19-96	53.65	26 70	26 95	ND	FG	FG	08-21-96	<50	<0.5	<0.5	<0.5	<0.5	18	--	--	--
MW-8	11-21-96	53 65	28 16	25 49	ND	FG	FG	11-21-96	<50	<0 5	<0.5	<0.5	<0 5	19	--	--	--
MW-8	03-26-97	53 65	22 42	31 23	ND	FG	FG	03-26-97	<50	<0.5	<0 5	<0 5	<0 5	44	--	--	--
MW-8	05-20-97	53 65	24 84	28.81	ND	FG	FG	05-20-97	<50	<0 5	<0.5	<0.5	<0 5	21	--	--	--
MW-8	08-18-97	53 65	28 03	25 62	ND	SW	0 003	08-18-97	<50	<0.5	<0 5	<0.5	<0 5	41	--	--	--

Table 3
Historical Groundwater Analytical Data
(TPHG and BTEX)

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 01-17-95
Project Number: 0805-120.02

Well Designation	Water Sample Field Date	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes
		ppb	ppb	ppb	ppb	ppb
WGR-3	05-02-94	<50	<0.5	<0.5	<0.5	<0.5
WGR-3	08-03-94	<50	<0.5	<0.5	<0.5	<0.5

TPHG = Total petroleum hydrocarbons as gasoline
ppb = Parts per billion or micrograms per liter (µg/l)
# = Based on new results, the chromatogram peaks previously interpreted to be TPHG and BTEX have been reinterpreted to be a single peak hydrocarbon *(possibly PCE)*
* = Raised method reporting limit due to matrix interference. The sample contains a single non-fuel component eluting in the gasoline range and quantitated as gasoline (possibly PCE). The chromatogram does not match the typical gasoline fingerprint.
** = Raised method reporting limit due to matrix interference.
*** = Raised method reporting limit due to high analyte concentration requiring sample dilution

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Table 5
Historical Groundwater Analytical Data
(Volatile Organic Compounds)

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 01-17-95
Project Number: 0805-120.02

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		PCE	TCE	1,2-DCE	cis-1,2-DCE	Freon 12	Benzene	Toluene	Ethyl-benzene	Total Xylenes
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
MW-1	09-03-91	4.5	ND	ND	ND		ND	ND	ND	ND
MW-1	11-06-91	<2.0	<2.0	<2.0	<2.0		ND	ND	ND	ND
MW-1	03-10-92	8.2	ND	ND	ND		ND	ND	ND	ND
MW-1	06-30-92	15	ND	ND	ND		ND	ND	ND	ND
MW-1	09-09-92	6	ND	ND	ND		ND	ND	ND	ND
MW-1	11-20-92	2	ND	ND	ND		ND	ND	ND	ND
MW-1	02-12-93	92	ND	ND	ND		ND	ND	ND	ND
MW-1	05-12-93	280	ND	ND	ND		ND	ND	ND	ND
MW-1	08-18-93	120	ND	ND	ND		ND	ND	ND	ND
MW-1	11-10-93	46	ND	ND	ND		ND	ND	ND	ND
MW-1	02-04-94	22	<1	<1	<1		<1	<1	<1	<5
MW-1	05-02-94	35	<1	<1	<1		<1	<1	<1	<5
MW-1	08-03-94	14	<1	<1	<1		<1	<1	<1	<5

Table 5
Historical Groundwater Analytical Data
(Volatile Organic Compounds)

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 01-17-95
Project Number: 0805-120.02

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		PCE	TCE	1,2-DCE	cis-1,2-DCE	Freon 12	Benzene	Toluene	Ethyl-benzene	Total Xylenes
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
MW-2	09-03-91	Not sampled: well contained floating product								
MW-2	11-06-91	Not sampled: well contained floating product								
MW-2	03-10-92	0.9	ND	5.4	ND		ND	ND	ND	ND
MW-2	06-30-92	<2000	<2000	<2000	<2000		9300	18000	4200	27000
MW-2	09-09-92	Not sampled: well contained floating product								
MW-2	11-20-92	Not sampled: well contained floating product								
MW-2	02-12-93	Not sampled: well contained floating product								
MW-2	05-12-93	Not sampled: well contained floating product								
MW-2	08-18-93	Not sampled:								
MW-2	11-10-93	Not sampled: floating product entered the well during purging								
MW-2	02-04-94	<1	<1	<1	<1		170	9	36	160
MW-2	05-02-94	<1	<1	<1	<1		140	21	79	190
MW-2	08-03-94	Not sampled: well was inaccessible due to a parked car								

Table 3
Historical Groundwater Analytical Data
Volatile Organic Compounds
1995-Present*

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date: 11-25-97

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		Tetrachloro-ethene µg/L	Trichloro-ethene µg/L	trans-1,2-Dichloro-ethene µg/L	cis-1,2-Dichloro-ethene µg/L	Freon 12 µg/L	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Total Xylenes µg/L
MW-1	03-10-95	170	<1	--	<1	--	<1	<1	<1	<5
MW-1	06-05-95	210	<5	--	<5	--	<5	<5	<5	<25
MW-1	08-29-95	130	<1	--	<1	--	<1	<1	<1	<5
MW-1	11-16-95	45	<1	--	<1	<1	<1	<1	<1	<5
MW-1	02-28-96	97	<1	<1	<1	--	<1	<1	<1	<5
MW-1	05-28-96	160	<5	<5	<5	--	<5	<5	<5	<25
MW-1	08-19-96	77	<1	<1	<1	--	<1	<1	<1	<5
MW-1	11-21-96	30	<1	<1	<1	--	<1	<1	<1	<5
MW-1	03-26-97	66	<1	<1	<1	--	<1	<1	<1	<5
MW-1	05-20-97	36	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5
MW-1	08-18-97	11	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5
MW-2	03-11-95	<1	<1	--	<1	--	110	12	15	240
MW-2	06-05-95	<1	<1	--	<1	--	83	14	72	190
MW-2	08-29-95	<5	<5	--	<5	--	220	26	210	450
MW-2	11-16-95	Not surveyed: well was inaccessible								
MW-2	02-28-96	<1	<1	<1	<1	--	18	<1	13	14
MW-2	05-28-96	<1	<1	<1	<1	--	44	<1	22	62
MW-2	08-21-96	<1	<1	<1	<1	--	49	<1	17	40
MW-2	11-21-96	<1	<1	<1	<1	--	49	3	7	180
MW-2	03-26-97	<10^	<10^	<10^	<10^	--	10	<10^	<10^	<50^
MW-2	05-20-97	<1^	<1^	<1^	<1^	--	<1^	<1^	<1^	<1^
MW-2	08-18-97	<5^	<5^	<5^	<5^	--	<5^	<5^	<5^	<5^

Table 5
Historical Groundwater Analytical Data
(Volatile Organic Compounds)

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 01-17-95
Project Number: 0805-120.02

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		PCE	TCE	1,2-DCE	cis-1,2-DCE	Freon 12	Benzene	Toluene	Ethyl-benzene	Total Xylenes
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
MW-3	09-03-91	1600	ND	ND	ND		ND	ND	ND	ND
MW-3	11-06-91	400	ND	ND	ND		ND	ND	ND	ND
MW-3	03-10-92	980	5.6	ND	1	3.4	ND	ND	ND	ND
MW-3	06-30-92	1500	ND	ND	ND		ND	ND	ND	ND
MW-3	09-09-92	800	ND	ND	ND		ND	ND	ND	ND
MW-3	11-20-92	690	ND	ND	ND		ND	ND	ND	ND
MW-3	02-12-93	1200	ND	ND	ND		ND	ND	ND	ND
MW-3	05-12-93	1600	ND	ND	ND		ND	ND	ND	ND
MW-3	08-18-93	1300	ND	ND	ND		ND	ND	ND	ND
MW-3	11-10-93	1300	ND	ND	ND		ND	ND	ND	ND
MW-3	02-04-94	91	<5	<5	<5		<5	<5	<5	<25
MW-3	05-02-94	1600	<20	<20	<20		<20	<20	<20	<100
MW-3	08-03-94	680	<20	<20	<20		<20	<20	<20	<100

Table 5
Historical Groundwater Analytical Data
(Volatile Organic Compounds)

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 01-17-95
Project Number: 0805-120.02

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		PCE	TCE	1,2-DCE	cis-1,2-DCE	Freon 12	Benzene	Toluene	Ethyl-benzene	Total Xylenes
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
MW-4	07-31-90	1600	7.5	0.7	ND		ND	ND	ND	ND
MW-4	10-30-90	3600	8.1	0.7	ND		ND	ND	ND	ND
MW-4	01-30-91	4900	12	ND	ND		ND	ND	ND	ND
MW-4	04-30-91	2200	ND	ND	ND		ND	ND	ND	ND
MW-4	08-06-91	1700	ND	ND	ND		ND	ND	ND	ND
MW-4	09-03-91	2000	ND	ND	ND		ND	ND	ND	ND
MW-4	11-06-91	1000	6.3	ND	ND		ND	ND	ND	ND
MW-4	03-10-92	2300	13	ND	4		ND	ND	ND	ND
MW-4	06-30-92	1800	ND	ND	ND		ND	ND	ND	ND
MW-4	09-09-92	1300	ND	ND	ND		ND	ND	ND	ND
MW-4	11-20-92	1700	ND	ND	ND		ND	ND	ND	ND
MW-4	02-12-93	1800	ND	ND	ND		ND	ND	ND	ND
MW-4	05-12-93	1500	ND	ND	ND		ND	ND	ND	ND
MW-4	08-18-93	1800	ND	ND	ND		ND	ND	ND	ND
MW-4	11-10-93	1800	ND	ND	ND		ND	ND	ND	ND
MW-4	02-04-94	1900	<20	<20	<20		<20	<20	<20	<100
MW-4	05-02-94	1700	<20	<20	<20		<20	<20	<20	<100
MW-4	08-03-94	1200	<20	<20	<20		<20	<20	<20	<100

Table 3
Historical Groundwater Analytical Data
Volatile Organic Compounds
1995-Present*

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date: 11-25-97

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		Tetrachloro-ethene µg/L	Trichloro-ethene µg/L	trans-1,2-Dichloro-ethene µg/L	cis-1,2-Dichloro-ethene µg/L	Freon 12 µg/L	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Total Xylenes µg/L
MW-3	03-11-95	1700	<10	--	<10	--	<10	<10	<10	<50
MW-3	06-05-95	2500	<20	--	<20	--	<20	<20	<20	<100
MW-3	08-29-95	1600	<20	--	<20	--	<20	<20	<20	<100
MW-3	11-16-95	1100	<20	--	<20	<20	<20	<20	<20	<100
MW-3	02-28-96	1100	<10	<10	<10	--	<10	<10	<10	<50
MW-3	05-28-96	1700	<20	<20	<20	--	<20	<20	<20	<100
MW-3	08-19-96	1200	<20	<20	<20	--	<20	<20	<20	<100
MW-3	11-21-96	710	<20^	<20^	<20^	--	<20^	<20^	<20^	<100^
MW-3	03-26-97	710	<40^	<40^	<40^	--	<40^	<40^	<40^	<200^
MW-3	05-20-97	800	<25^	<25^	<25^	--	<25^	<25^	<25^	<25^
MW-3	08-18-97	420	<5^	<5^	<5^	--	<5^	<5^	<5^	<5^
MW-4	03-11-95	2600	<20	--	<20	--	<20	<20	<20	<100
MW-4	06-05-95	3100	<20	--	<20	--	<20	<20	<20	<100
MW-4	08-29-95	2900	<20	--	<20	--	<20	<20	<20	<100
MW-4	11-16-95	2100	<20	--	<20	<20	<20	<20	<20	<100
MW-4	02-28-96	2400	<20	<20	<20	--	<20	<20	<20	<100
MW-4	05-28-96	2700	<20	<20	<20	--	<20	<20	<20	<100
MW-4	08-19-96	2600	<20	<20	<20	--	<20	<20	<20	<100
MW-4	11-21-96	1100	<20^	<20^	<20^	--	<20^	<20^	<20^	<100^
MW-4	03-26-97	1900	<40^	<40^	<40^	--	<40^	<40^	<40^	<200^
MW-4	05-20-97	1600	<50^	<50^	<50^	--	<50^	<50^	<50^	<50^
MW-4	08-18-97	600	<125^	<125^	--	--	<125^	<125^	<125^	<125^

Table 5
Historical Groundwater Analytical Data
(Volatile Organic Compounds)

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 01-17-95
Project Number: 0805-120.02

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		PCE ppb	TCE ppb	1,2-DCE ppb	cis-1,2-DCE ppb	Freon 12 ppb	Benzene ppb	Toluene ppb	Ethyl-benzene ppb	Total Xylenes ppb
MW-5	08-06-91	7.3	ND	ND	ND		ND	ND	ND	ND
MW-5	09-03-91	25	ND	ND	ND		ND	ND	ND	ND
MW-5	11-06-91	12	ND	ND	ND		ND	ND	ND	ND
MW-5	03-10-92	300	1.3	ND	ND		ND	ND	ND	ND
MW-5	06-30-92	30	ND	ND	ND		ND	ND	ND	ND
MW-5	09-09-92	120	ND	ND	ND		ND	ND	ND	ND
MW-5	11-24-92	93	ND	ND	ND		ND	ND	ND	ND
MW-5	02-12-93	210	ND	ND	ND		ND	ND	ND	ND
MW-5	05-12-93	50	ND	ND	ND		ND	ND	ND	ND
MW-5	08-18-93	80	ND	ND	ND		ND	ND	ND	ND
MW-5	11-10-93	42	ND	ND	ND		ND	ND	ND	ND
MW-5	02-04-94	39	<1	<1	<1		<1	<1	<1	<5
MW-5	05-02-94	35	<1	<1	<1		<1	<1	<1	<5
MW-5	08-03-94	25	<1	<1	<1		<1	<1	<1	<5

Table 5
Historical Groundwater Analytical Data
(Volatile Organic Compounds)

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 01-17-95
Project Number: 0805-120.02

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		PCE	TCE	1,2-DCE	cis-1,2-DCE	Freon 12	Benzene	Toluene	Ethyl-benzene	Total Xylenes
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
MW-6	06-30-92	2400	ND	ND	ND		ND	ND	ND	ND
MW-6	09-09-92	Not sampled: well was paved over								
MW-6	11-20-92	Not sampled: well was paved over								
MW-6	02-12-93	4200	ND	ND	ND		ND	ND	ND	ND
MW-6	05-12-93	3500	ND	ND	ND		ND	ND	ND	ND
MW-6	08-18-93	3000	ND	ND	ND		ND	ND	ND	ND
MW-6	11-10-93	3900	ND	ND	ND		ND	ND	ND	ND
MW-6	02-04-94	2900	<50	<50	<50		<50	<50	<50	<250
MW-6	05-02-94	2000	<50	<50	<50		<50	<50	<50	<250
MW-6	08-03-94	1400	<50	<50	<50		<50	<50	<50	<250
MW-7	06-30-92	<1000	<1000	<1000	<1000		5100	6800	2300	16000
MW-7	09-09-92	Not sampled: well contained floating product								
MW-7	11-20-92	Not sampled: well contained floating product								
MW-7	02-12-93	Not sampled: well contained floating product								
MW-7	05-12-93	Not sampled: well contained floating product								
MW-7	08-18-93	Not sampled: well contained floating product								
MW-7	11-10-93	Not sampled: floating product entered the well during purging								
MW-7	02-04-94	<50	<50	<50	<50		940	950	1100	9100
MW-7	05-02-94	<50	<50	<50	<50		440	400	660	5200
MW-7	08-03-94	<50	<50	<50	<50		640	770	960	6200

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0805-120.02

Table 3
Historical Groundwater Analytical Data
Volatile Organic Compounds
1995-Present*

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date. 11-25-97

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		Tetrachloro-ethene	Trichloro-ethene	trans-1,2-Dichloro-ethene	cis-1,2-Dichloro-ethene	Freon 12	Benzene	Toluene	Ethylbenzene	Total Xylenes
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-5	03-10-95	270	<5	--	<5	--	<5	<5	<5	<25
MW-5	06-05-95	310	<5	--	<5	--	<5	<5	<5	<25
MW-5	08-29-95	240	<5	--	<5	--	<5	<5	<5	<25
MW-5	11-16-95	940	<5	--	<5	<5	<5	<5	<5	<25
MW-5	02-28-96	1100	<10	<10	<10	--	<10	<10	<10	<50
MW-5	05-28-96	360	<5	<5	<5	--	<5	<5	<5	<25
MW-5	08-21-96	150	<1	<1	2	--	<1	<1	<1	<5
MW-5	11-21-96	1900	<20^	<20^	<20^	--	<20^	<20^	<20^	<100^
MW-5	03-26-97	270	<10^	<10^	<10^	--	<10^	<10^	<10^	<50^
MW-5	05-20-97	290	<5^	<5^	<5^	--	<5^	<5^	<5^	<5^
MW-5	08-18-97	--	--	--	--	--	--	--	--	--
MW-6	03-11-95	1300	<20	--	<20	--	<20	<20	<20	<100
MW-6	06-05-95	2000	<20	--	<20	--	<20	<20	<20	<100
MW-6	08-29-95	1300	<20	--	<20	--	<20	<20	<20	<100
MW-6	11-16-95	1300	<20	--	<20	<20	<20	<20	<20	<100
MW-6	02-28-96	960	<20	<20	<20	--	<20	<20	<20	<100
MW-6	05-28-96	970	<20	<20	<20	--	<20	<20	<20	<100
MW-6	08-19-96	820	<20	<20	<20	--	<20	<20	<20	<100
MW-6	11-21-96	680	<20^	<20^	<20^	--	<20^	<20^	<20^	<100^
MW-6	03-26-97	830	<40^	<40^	<40^	--	<40^	<40^	<40^	<200^
MW-6	05-20-97	270	<5^	<5^	<5^	--	<5^	<5^	<5^	<5^
MW-6	08-18-97	420	<62.5^	<62.5^	--	--	<62.5^	<62.5^	<62 5^	<62.5^

Table 3
Historical Groundwater Analytical Data
Volatile Organic Compounds
1995-Present*

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date: 11-25-97

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		Tetrachloro-ethene µg/L	Trichloro-ethene µg/L	trans-1,2-Dichloro-ethene µg/L	cis-1,2-Dichloro-ethene µg/L	Freon 12 µg/L	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Total Xylenes µg/L
MW-7	03-11-95	Not sampled: floating product entered the well during purging								
MW-7	06-05-95	<10	<10	--	<10	--	86	27	420	1400
MW-7	08-29-95	<10	<10	--	<10	--	410	230	1100	5000
MW-7	11-16-95	<20	<20	--	<20	<20	360	220	1700	10000
MW-7	02-28-96	<10	<10	<10	<10	--	<10	<10	87	760
MW-7	05-28-96	<10	<10	<10	<10	--	74	36	340	1600
MW-7	08-21-96	<1	<1	<1	<1	--	260	200	800	3200
MW-7	11-21-96	<10^	<10^	<10^	<10^	--	180	120	640	2900
MW-7	03-26-97	<20^	<20^	<20^	<20^	--	37	<20^	210	410
MW-7	05-20-97	<10^	<10^	<10^	<10^	--	140	77	700	2200
MW-7	08-18-97	<10^	<10^	<10^	<10^	--	150	13	500	540
MW-8	03-10-95	<1	<1	--	<1	--	<1	<1	<1	<5
MW-8	06-05-95	<1	<1	--	<1	--	<1	<1	<1	<5
MW-8	08-29-95	<1	<1	--	<1	<1	<1	<1	<1	<5
MW-8	11-16-95	<1	<1	--	<1	--	<1	<1	<1	<5
MW-8	02-28-96	3	<1	<1	<1	--	<1	<1	<1	<5
MW-8	05-28-96	<1	<1	<1	<1	--	<1	<1	<1	<5
MW-8	08-21-96	<1	<1	<1	<1	--	<1	<1	<1	<5
MW-8	11-21-96	7	<1	<1	<1	--	<1	<1	<1	<5
MW-8	03-26-97	<1	<1	<1	<0.5	--	<0.5	<0.5	<0.5	<0.5
MW-8	05-20-97	<0.5	<0.5	<0.5	--	--	<5	<5	<5	<5
MW-8	08-18-97	<5	<5	<5						

Table 5
Historical Groundwater Analytical Data
(Volatile Organic Compounds)

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 01-17-95
Project Number: 0805-120.02

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		PCE	TCE	1,2-DCE	cis-1,2-DCE	Freon 12	Benzene	Toluene	Ethyl-benzene	Total Xylenes
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
MW-8	09-09-92	37	ND	ND	ND		4	ND	ND	ND
MW-8	11-24-92	2	ND	ND	ND		ND	ND	ND	ND
MW-8	02-12-93	<1	<1	<1	<1		ND	ND	ND	ND
MW-8	05-12-93	<1	<1	<1	<1		ND	ND	ND	ND
MW-8	08-18-93	<1	<1	<1	<1		ND	ND	ND	ND
MW-8	11-10-93	<1	<1	<1	<1		ND	ND	ND	ND
MW-8	02-04-94	<1	<1	<1	<1		<1	<1	<1	<5
MW-8	05-02-94	<1	<1	<1	<1		<1	<1	<1	<5
MW-8	08-03-94	<1	<1	<1	<1		<1	<1	<1	<5
RW-1	11-06-91	980	ND	ND	ND		ND	ND	ND	ND
RW-1	03-10-92	400	1.7	ND	ND		ND	ND	ND	ND
RW-1	06-30-92	1100	ND	ND	ND		ND	ND	ND	ND
RW-1	09-09-92	1500	ND	ND	ND		ND	ND	ND	ND
RW-1	11-24-92	1500	ND	ND	ND		ND	ND	ND	ND
RW-1	02-12-93	620	ND	ND	ND		ND	ND	ND	ND
RW-1	05-12-93	500	ND	ND	ND		ND	ND	ND	ND
RW-1	08-18-93	470	ND	ND	ND		ND	ND	ND	ND
RW-1	11-10-93	1500	ND	ND	ND		ND	ND	ND	ND
RW-1	02-04-94	2200	<20	<20	<20		<20	<20	<20	<100
RW-1	05-02-94	45	<1	<1	<1		<1	<1	<1	<5
RW-1	08-03-94	350	4	<1	<1		<1	<1	<1	<5

Table 3
Historical Groundwater Analytical Data
Volatile Organic Compounds
1995-Present*

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date: 11-25-97

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		Tetrachloro-ethene	Trichloro-ethene	trans-1,2-Dichloro-ethene	cis-1,2-Dichloro-ethene	Freon 12	Benzene	Toluene	Ethylbenzene	Total Xylenes
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
RW-1	03-10-95	260	<5	--	<5	--	<5	<5	<5	<25
RW-1	06-05-95	59	<1	--	<1	--	<1	<1	<1	<5
RW-1	08-29-95	570	<5	--	<5	--	<5	<5	<5	<25
RW-1	11-16-95	140	<1	--	<1	<1	<1	<1	<1	<5
RW-1	02-28-96	6	<1	<1	<1	--	<1	<1	<1	<5
RW-1	05-28-96	12	<1	<1	<1	--	<1	<1	<1	<5
RW-1	08-21-96	100	<1	<1	<1	--	<1	<1	<1	<5
RW-1	11-21-96	190	1	<1	<1	--	<1	<1	<1	<5
RW-1	03-26-97	6	<1	<1	<1	--	<1	<1	<1	<5
RW-1	05-20-97	5.3	<0.5	<0 5	<0 5	--	<0 5	<0 5	<0 5	<0 5
RW-1	08-18-97	46	<5	<5	--	--	<5	<5	<5	<5

Table 5
Historical Groundwater Analytical Data
(Volatile Organic Compounds)

10600 and 10700 MacArthur Boulevard
Oakland, California

Date: 01-17-95
Project Number: 0805-120.02

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		PCE	TCE	1,2-DCE	cis-1,2-DCE	Freon 12	Benzene	Toluene	Ethyl-benzene	Total Xylenes
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
WGR-3	05-02-94	<1	<1	<1	<1		<1	<1	<1	<5
WGR-3	08-03-94	<1	<1	<1	<1		<1	<1	<1	<5

PCE = Tetrachloroethene
TCE = Trichloroethene
1,2-DCE = 1,2-Dichloroethene
cis-1,2-DCE = cis-1,2-Dichloroethene
ppb = Parts per billion or micrograms per liter (µg/l)
ND = Not detected at or above the method detection limit

Table 3
Historical Groundwater Analytical Data
Volatile Organic Compounds
1995-Present*

Arco Service Station 276
10600 MacArthur Boulevard, Oakland, California

Date: 11-25-97

Well Designation	Water Sample Field Date	Halogenated Volatile Organic Compounds by EPA Method 601/8010 or 624/8240					BTEX by EPA Method 624/8240			
		Tetrachloro-ethene	Trichloro-ethene	trans-1,2-Dichloro-ethene	cis-1,2-Dichloro-ethene	Freon 12	Benzene	Toluene	Ethylbenzene	Total Xylenes
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
WGR-3	03-11-95	<1	<1	--	<1	--	<1	<1	<1	<5
WGR-3	06-05-95	<1	<1	--	<1	--	<1	<1	<1	<5
WGR-3	08-29-95	<1	<1	--	<1	--	<1	<1	<1	<5
WGR-3	11-16-95	<1	<1	--	<1	<1	<1	<1	<1	<5
WGR-3	02-28-96	<1	<1	<1	<1	--	<1	<1	<1	<5
WGR-3	05-28-96	<1	<1	<1	<1	--	<1	<1	<1	<5
WGR-3	08-19-96	<1	<1	<1	<1	--	<1	<1	<1	<5
WGR-3	11-21-96	<1	<1	<1	<1	--	<1	<1	<1	<5
WGR-3	03-26-97	<1	<1	<1	<1	--	<1	<1	<1	<5
WGR-3	05-20-97	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5
WGR-3	08-18-97	<5	<5	<5	--	--	<5	<5	<5	<5

µg/L: micrograms per liter
- - : not analyzed or not reported
^: method reporting limit was raised due to (1) high analyte concentration requiring sample dilution, or (2) matrix interference
* For previous historical analytical data please refer to *Fourth Quarter 1995 Groundwater Monitoring Results and Remediation System Performance Evaluation Report, Retail Service Station 10600 and 10700 MacArthur Boulevard, Oakland, California, (EMCON, March 22, 1996)*

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-120.008/TO#22312.00/RAT8/276 OAKLAND
Sample Matrix: Water

Service Request: S9801748
Date Collected: 6/30/98
Date Received: 6/30/98

BTEX and TPH as Gasoline

Sample Name: MW-7(20')
Lab Code: S9801748-002
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	20	NA	7/4/98	8200	
Benzene	EPA 5030	8020	0.5	20	NA	7/4/98	<10	C1
Toluene	EPA 5030	8020	0.5	20	NA	7/4/98	<10	C1
[illegible]	EPA 5030	8020	0.5	20	NA	7/4/98	110	
Xylenes, Total	EPA 5030	8020	0.5	20	NA	7/4/98	260	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-120.008/TO#22312.00/RAT8/276 OAKLAND
Sample Matrix: Water

Service Request: S9801748
Date Collected: 6/30/98
Date Received: 6/30/98

EPA Method 8260
Volatile Organic Compounds

Units: ug/L (ppb)
Basis: NA

Sample Name: MW-7(20')
Lab Code: S9801748-002
Test Notes: M1

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Methyl tert-Butyl Ether	NONE	8260	0.5	10	NA	7/14/98	<5	C1

The MRL was elevated due to high analyte concentration requiring sample dilution.

1522/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9801748
Project:	20805-120.008/TO#22312.00/RAT8/276 OAKLAND	**Date Collected:**	6/30/98
Sample Matrix:	Water	**Date Received:**	6/30/98

BTEX and TPH as Gasoline

Sample Name:	MW-2(16')	Units:	ug/L (ppb)
Lab Code:	S9801748-001	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	10	NA	7/7/98	<500	M1
[redacted]	EPA 5030	8020	0.5	10	NA	7/7/98	<5	M1
Benzene	EPA 5030	8020	0.5	10	NA	7/7/98	<5	M1
Toluene	EPA 5030	8020	0.5	10	NA	7/7/98	<5	M1
Ethylbenzene	EPA 5030	8020	0.5	10	NA	7/7/98	<5	M1
Xylenes, Total	EPA 5030	8020	0.5	10	NA	7/7/98	<5	M1

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9801748
Project:	20805-120.008/TO#22312.00/RAT8/276 OAKLAND	**Date Collected:**	6/30/98
Sample Matrix:	Water	**Date Received:**	6/30/98

EPA Method 8260
Volatile Organic Compounds

Sample Name:	MW-2(16')	Units:	ug/L (ppb)
Lab Code:	S9801748-001	Basis:	NA
Test Notes:	C1		

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Methyl tert-Butyl Ether	NONE	8260	0.5	5	NA	7/14/98	410	

M1 The MRL was elevated because of matrix interferences.

1S22/020597p