PACIFIC
ENVIRONMENTAL
GROUP, INC.

Project # 592328
Fee Paid #500.00
Date 2/15/91

Date February 13, 1991
Project 330-06.10

To: Mr. Charles Carmel
ARCO Products Company
P. O. Box 5811
San Mateo, California 94402

We have enclosed:

Copies	Description
1	Work Plan for ARCO Service Station 608,
	17601 Hesperian Blvd., San Lorenzo, California.

For your:
- X Use
- Approval
- Review
- X Information

Comments: Please call if you have any questions concerning this Work Plan.

Tina Berry TB

cc: Chris Winsor, ARCO Products Company
Pamela Evans, Alameda County - Environmental Health Department
Richard Hiett, RWQCB - S.F. Bay Region

91 FEB 15 AM 10:56

1601 Civic Center Drive, Suite 202, Santa Clara, California 95050, (408) 984-6536
FAX: (408) 243-3911

PACIFIC
ENVIRONMENTAL
GROUP, INC.

February 13, 1991
Project 330-06.10

Mr. Kyle Christie
ARCO Products Company
P. O. Box 5811
San Mateo, California 94402

Re: ARCO Service Station 608
17601 Hesperian Blvd. at Hacienda Ave.
San Lorenzo, California

Dear Mr. Christie:

This letter answers the January 8, 1991 letter from Alameda County's Department of Environmental Health requesting a Work Plan for additional activities for the site referenced above (Figure 1). Additionally, this letter incorporates results of the most recent sampling event conducted in December 1990 by Pacific Environmental Group, Inc. (PACIFIC) on behalf of ARCO Products Company (ARCO).

The site wells were sampled on December 27, 1990 as part of the station's on-going quarterly groundwater monitoring program. Results of that sampling event were not yet available to include in the January 2, 1991 site assessment report. Groundwater sampling and analytical procedures were the same as those discussed in previous monitoring reports. Dissolved gasoline concentrations were detected in Wells MW-7, MW-8 and MW-10 and ranged between 69 parts per billion (ppb) and 5,700 ppb. No dissolved gasoline was detected in Wells MW-9 and MW-11. Well MW-5 continues to be dry. These findings are generally consistent with previous sampling events, however, this is the first time that dissolved gasoline was detected in upgradient Well MW-7.

A groundwater contour map and a gasoline and benzene concentration map for the December 1990 sampling event are shown on Figures 2 and 3, respectively. Copies of the certified analytical report, chain of custody document, and field

sampling sheets are attached to this letter. Historical groundwater analytical results are included on Table 1.

The following addresses specific concerns of Alameda County, as stated in their January 8 letter:

1) Further investigation to define the contaminant plume:
In order to further define the contaminant plume, PACIFIC proposes that five additional groundwater monitoring wells be installed at the locations shown on Figure 4. The procedures for soil and groundwater sampling and well installation will follow those described in PACIFIC's Work Plan dated October 4, 1989 and Site Assessment Report dated January 2, 1991. Groundwater samples obtained from the proposed wells will be analyzed for total petroleum hydrocarbons, calculated as gasoline and benzene, toluene, ethylbenzene and xylenes (BTEX) by EPA Methods 8015, 8020 and 5030.

One well is proposed at the southern corner of the site to document the extent of hydrocarbons in groundwater southeast of Well MW-8 which, in December 1990, contained 1,200 parts per billion (ppb) gasoline. Four wells are proposed northeast, east and southeast of Well MW-10. Well MW-10, the furthest downgradient site well, contained 5,700 ppb gasoline in December 1990. This well has consistently contained the highest gasoline concentrations from all the site wells since its installation in April 1990. Three of the proposed wells are located on county property and one well is located within a school yard. The four wells are proposed to document the downgradient extent of hydrocarbons to non-detectable levels.

Upon approval from Alameda County of this Work Plan, PACIFIC will initiate pursuing encroachment for the off-site field work. It is estimated that encroachment will be obtained by May 15, 1991 which would allow completion of the field work by May 30, 1991.

2) Action to contain plume and mitigate its impact:
ARCO anticipates that groundwater extraction and treatment will be the technology selected to contain and mitigate the hydrocarbon plume. Several tasks preliminary to groundwater remediation have been undertaken already by ARCO. In November 1989, a step-discharge test was performed by PACIFIC and reported in a letter to ARCO dated April 13, 1990. The test was performed to determine aquifer yield and a preliminary estimate of the areal extent of pumping influence. In July 1990, a six-inch diameter extraction well was installed by PACIFIC to prepare for groundwater remediation. Since that time, groundwater samples have been obtained and analyzed for parameters required by regulatory agencies in

order to apply for sanitary sewer and NPDES permits to discharge treated groundwater. A schedule for additional proposed remedial activities is shown on Figure 5.

3) Evaluation of the impact to known wells within 1/2 mile of the site:
Applied Geosystem's (AGS's) report to ARCO dated March 9, 1988 listed 23 wells within one half mile of the site. PACIFIC conducted an additional well survey with Alameda County in July 1989. That survey identified 18 wells within a one half mile radius of the site and was included in the October 4, 1989 Work Plan. It appears that the difference in the number of wells reported from the two surveys may be due to abandonment of wells which were active during the AGS survey.

PACIFIC will more fully evaluate the impact to documented wells as part of this investigation and after the proposed wells are installed. This should allow us to more adequately define the hydrocarbon plume and its distance to the subject wells. Additional options that are being considered to obtain data not covered in the previous well surveys include:

- Examination of borings logs and construction details at the Department of Water Resources (for data not available at Alameda County).
- Canvassing of well owners to obtain well details not available in records at the regulatory agencies.
- Sampling and analysis of selected documented wells to determine groundwater quality. This will be done only if it is determined that the plume may extend close to the wells.

Based upon the schedule of activities discussed in this letter, it is estimated that a technical assessment report discussing the findings of the proposed investigation and remedial activities should be issued on or about July 30, 1991. This schedule is contingent upon obtaining encroachment permits for off-site wells.

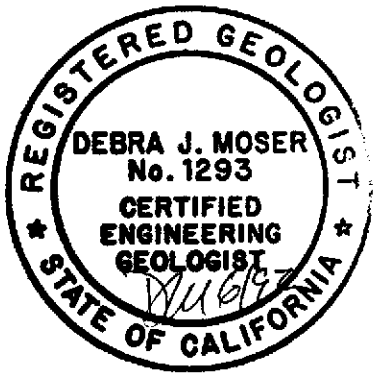
Enclosed please find a check for $500.00, submitted on behalf of ARCO, to cover agency oversight costs. If you have any questions regarding this letter, please call.

Sincerely,

Pacific Environmental Group, Inc.

Tina Berry
Staff Geologist

Debra J. Moser
Senior Geologist
CEG 1293



cc: Chris Winsor, ARCO Products Company
Pamela J. Evans, Alameda County - Environmental Health Department
Richard Hiett, Regional Water Quality Control Board-S.F. Bay Region

Table 1
Summary of Groundwater Analytical Results

ARCO Service Station 0608
Low-Boiling Hydrocarbons

Well Number	Sample Date	Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Xylenes (ppb)
MW-1	01/11/88	300	20	10	50	80
		----------Well Destroyed----------				
MW-2	07/05/85	32,000	1,000	690	NA*	1,500*
	01/11/88	3,300	804	115	168	166
		----------Well Destroyed----------				
MW-3	01/11/88	1,800	20	20	80	60
	03/07/89	150,000	4,600	5,200	5,600	13,000
	06/21/89	63,000	2,700	5,800	3,300	12,000
	12/12/89	----Not Sampled--Insufficient Water Volume-----				
	03/29/90	1,100,000**	13,000	60,000	17,000	91,000
	06/22/90	----Not Sampled--Insufficient Water Volume-----				
	07/18/90	----------Well Destroyed----------				
MW-4	01/11/88	62,000	2,700	7,900	850	5,200
	09/12/88	----Not Sampled--Separate-Phase Hydrocarbon---				
	03/07/89	84,000	2,400	3,400	2,500	7,600
	06/21/89	31,000	400	800	200	1,500
	12/12/89	----------Not Sampled--Well Dry----------				
	03/29/90	--Not Sampled-0.01 foot Separate-Phase Hydrocarbon-				
	06/22/90	----------Not Sampled--Well Dry----------				
	07/18/90	----------Well Destroyed----------				
MW-5	01/11/88	31,000	4,000	2,700	3,800	5,500
	03/07/89	1,300	340	ND	140	50
	06/21/89	1,100	200	ND	130	40
	12/12/89	----------Not Sampled--Well Dry----------				
	03/29/90	-----Not Sampled--Insufficient Water Volume--------				
	06/22/90	-----Not Sampled--Insufficient Water Volume--------				
	09/19/90	----------Not Sampled--Well Dry----------				
	12/27/90	----------Not Sampled--Well Dry----------				
MW-6	06/21/89	1,700	170	170	85	290
(E-1)	12/12/89	500	26	7	8	18
	03/29/90	130	14	9	4	11
	06/22/90	150	15	5	4	13
	07/18/90	----------Well Destroyed----------				
E-1A	09/19/90	<50	7	0.9	1	2
	12/27/90	<50	3	0.5	1	1

Table 1 (Continued)
Summary of Groundwater Analytical Results

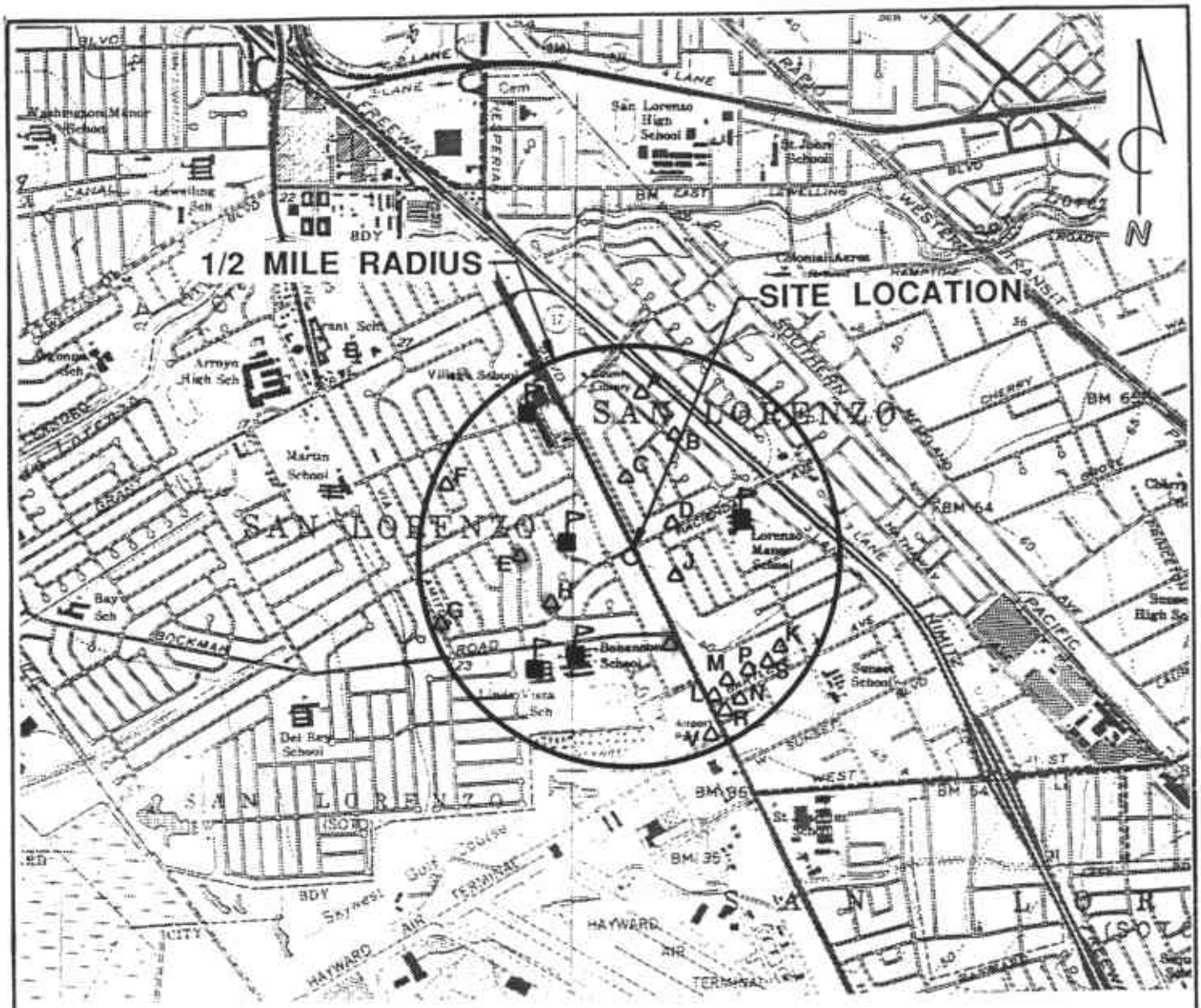
ARCO Service Station 0608
Low-Boiling Hydrocarbons

Well Number	Sample Date	Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Xylenes (ppb)
MW-7	04/13/90	<50	<0.3	<0.3	<0.3	<0.3
	06/22/90	<50	0.5	1	0.6	3
	09/19/90	<50	<0.3	<0.3	<0.3	<0.3
	12/27/90	69	<0.3	0.3	0.4	2
MW-8	04/13/90	4,900	350	16	450	33
	06/22/90	3,700	370	12	330	28
	09/19/90	140	4	3	3	3
	12/27/90	1,200	7	0.3	53	<0.3
MW-9	04/13/90	<50	<0.3	<0.3	<0.3	2
	06/22/90	12,000	200	3	250	180
	09/19/90	<50	<0.3	<0.3	<0.3	0.6
	12/27/90	<50	<0.3	<0.3	<0.3	<0.3
MW-10	04/13/90	10,000	150	4	280	200
	06/22/90	9,700	28	<0.3	131	210
	09/19/90	1,800	<0.3	4	0.8	10
	12/27/90	5,700	7	3	95	61
MW-11	04/13/90	<50	<0.3	<0.3	<0.3	<0.3
	06/22/90	63	0.4	0.9	0.7	3
	09/19/90	<50	<0.3	<0.3	<0.3	<0.3
	12/27/90	<50	<0.3	<0.3	<0.3	<0.3

ppb = parts per billion

* - Ethylbenzene and xylenes given as a combined value.
** - Well contained slight product sheen.

MW-1 and MW-2 destroyed prior to 3/7/89 sampling event.
MW-3, MW-4 and MW-6 (E-1) destroyed 7/18/90.



CALIF

QUADRANGLE LOCATIONS

LEGEND:

SCHOOL

A WATER SUPPLY WELL DESIGNATION AND APPROXIMATE LOCATION

REFERENCE:
USGS 7.5 MIN. TOPOGRAPHIC MAP
TITLED: HAYWARD, CALIFORNIA
DATED: 1959 REVISED: 1980
TITLED: SAN LEANDRO, CALIFORNIA
DATED: 1959 REVISED: 1980

SCALE

2000 0 2000 FEET

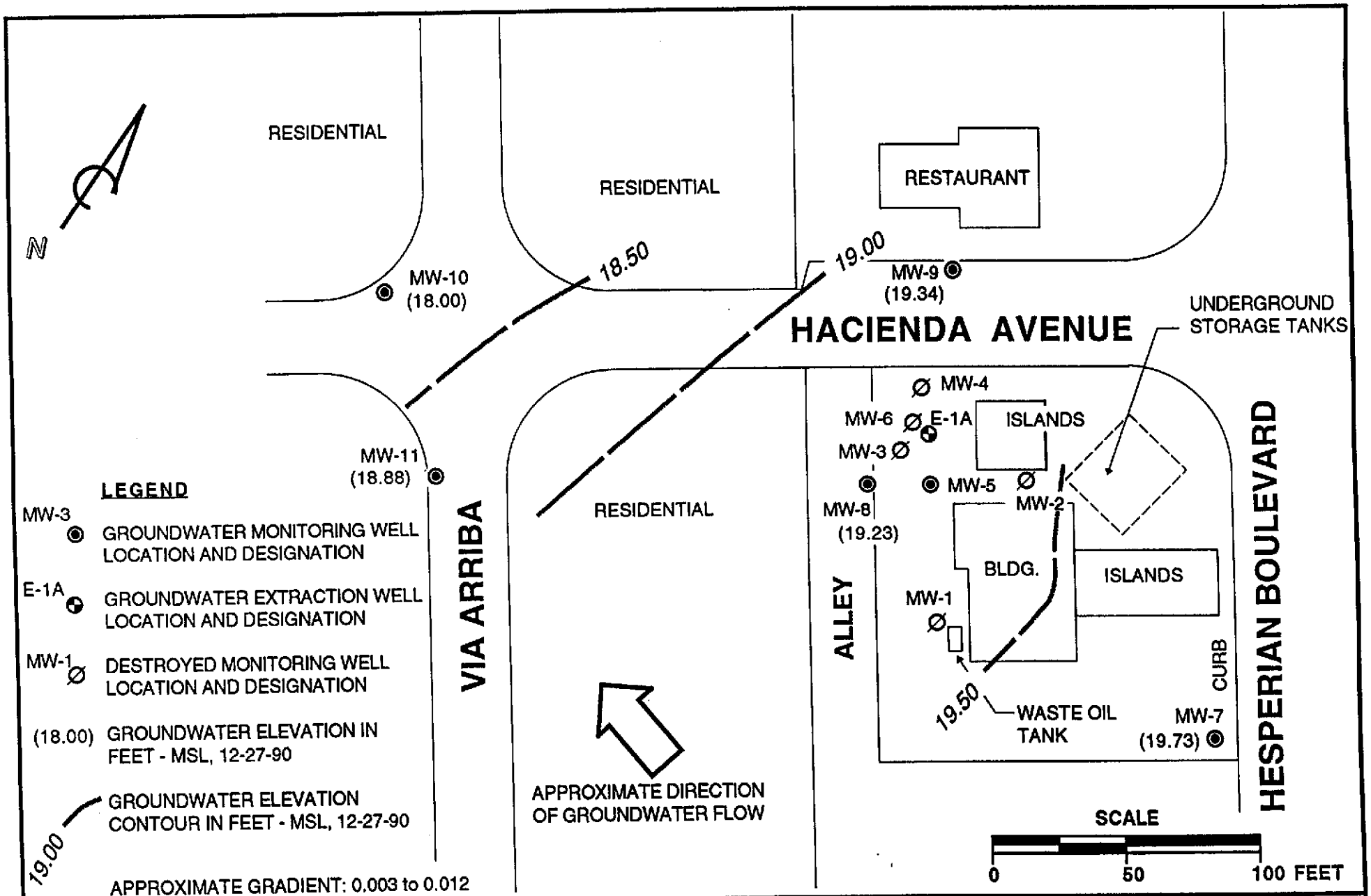
PACIFIC ENVIRONMENTAL GROUP, INC.

ARCO SERVICE STATION #0608
17601 Hesperian Boulevard
San Lorenzo, California

SITE LOCATION MAP

FIGURE: 1

PROJECT: 330-06.10

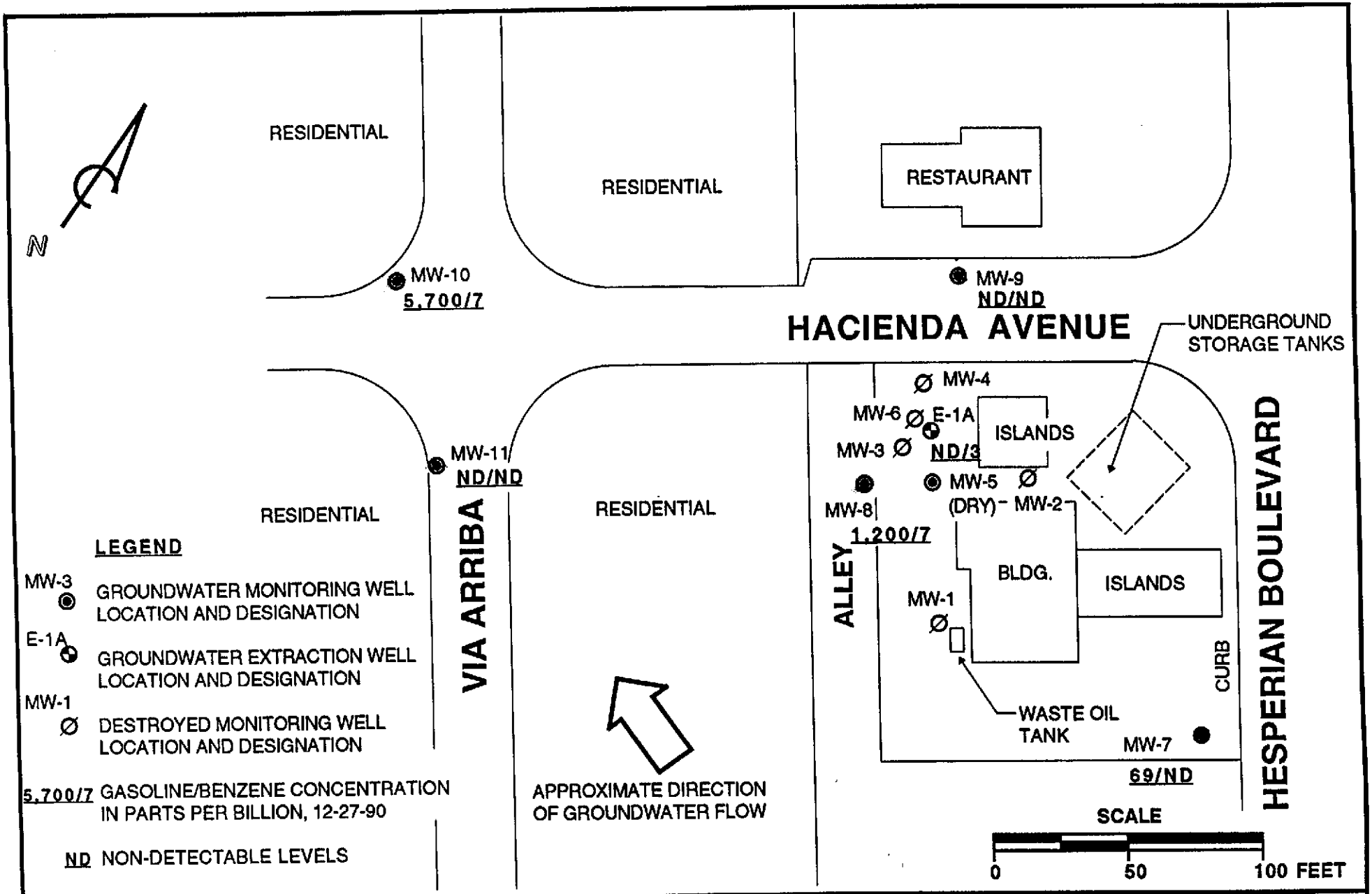


PACIFIC ENVIRONMENTAL GROUP, INC.

ARCO SERVICE STATION #608
17601 Hesperian Boulevard
San Lorenzo, California

GROUNDWATER CONTOUR MAP, DECEMBER 1990

FIGURE: 2
PROJECT: 330-06.10



PACIFIC ENVIRONMENTAL GROUP, INC.

ARCO SERVICE STATION #608
17601 Hesperian Boulevard
San Lorenzo, California

DISSOLVED GASOLINE AND BENZENE CONCENTRATION MAP (DECEMBER 1990)

FIGURE:
3
PROJECT:
330-06.10

PROJECT NUMBER

REVISIONS | DRAWN BY | DATE/NUMBER

CHURCH AND SCHOOL

RESIDENTIAL

RESIDENTIAL

RESTAURANT

MW-9

VIA MAGDELENA

MW-10

HACIENDA AVE.

MW-11

RESIDENTIAL

VIA ENCINO

RESIDENTIAL

VIA ALAMO

VIA ARRIBA

RESIDENTIAL

RESIDENTIAL

VIA ROSAS

E-1A

ARCO STATION

MW-8

MW-5

MW-7

ALLEY

SHOPS

BANK

SHOPS

CAR WASH

RESTAURANT

RESTAURANT

ROBSCOTT AVE.

RESIDENTIAL

STORE

HESPERIAN BOULEVARD

N

LEGEND

MW-7 ◉ GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION

⊕ PROPOSED GROUNDWATER MONITORING WELL LOCATION

E-1A ◉ GROUNDWATER EXTRACTION WELL LOCATION AND DESIGNATION

PACIFIC ENVIRONMENTAL GROUP, INC.

APPROXIMATE SCALE

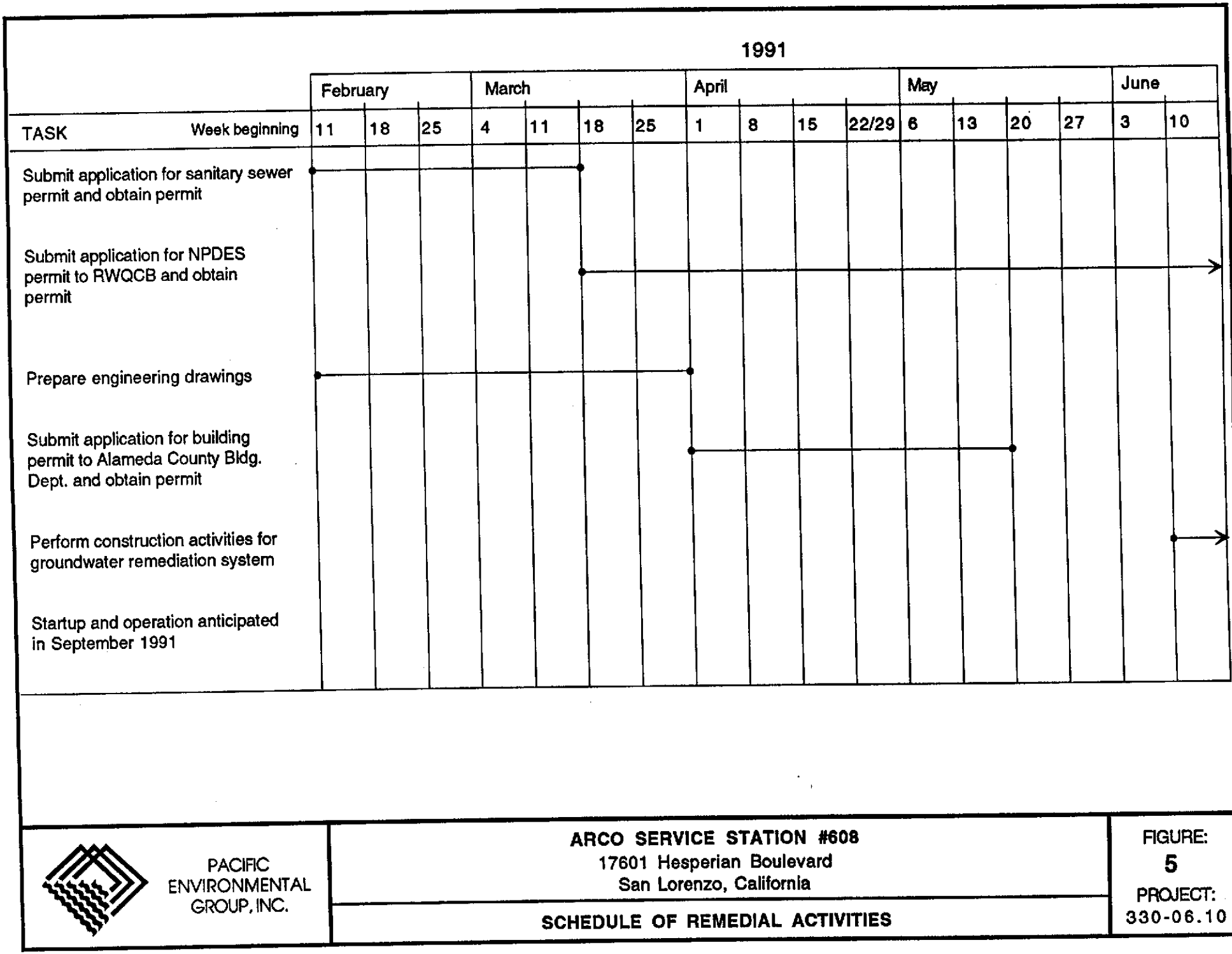
0 100 200 FEET

ARCO SERVICE STATION #0608
17601 Hesperian Boulevard
San Lorenzo, California

PROPOSED WELL LOCATION

FIGURE: 4

PROJECT: 330-06.10



PACIFIC ENVIRONMENTAL GROUP, INC.

ARCO SERVICE STATION #608
17601 Hesperian Boulevard
San Lorenzo, California

SCHEDULE OF REMEDIAL ACTIVITIES

FIGURE:
5
PROJECT:
330-06.10

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I • SAN FRANCISCO, CA 94124 • PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 52960
CLIENT: Pacific Environmental Group
CLIENT JOB NO.: 330-06.05

DATE RECEIVED: 12/28/90
DATE REPORTED: 01/08/91

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
by Modified EPA SW-846 Method 5030 and 8015

LAB #	Sample Identification	Concentration (ug/L) Gasoline Range
1	MW-7	69
2	MW-8	1200
3	MW-11	ND<50
4	MW-10	5700
5	MW-9	ND<50
6	MW-12 (E-1A)	ND<50
7	RINSATE	ND<50
8	TRIP BLANK	ND<50

ug/L - parts per billion (ppb)
Minimum Detection Limit for Gasoline in Water: 50ug/L

QAQC Summary:
Daily Standard run at 2mg/L: %Diff Gasoline =<15
MS/MSD Average Recovery = 87%: Duplicate RPD = 7%

Richard Srna, Ph.D.
Laboratory Director

TB

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I • SAN FRANCISCO, CA 94124 • PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 52960
CLIENT: Pacific Environmental Group
CLIENT JOB NO.: 330-06.05

DATE RECEIVED: 12/28/90
DATE REPORTED: 01/08/91

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES
by EPA SW-846 Methods 5030 and 8020

LAB #	Sample Identification	Concentration(ug/L) Benzene	Toluene	Ethyl Benzene	Xylenes
1	MW-7	ND<0.3	0.3	0.4	2
2	MW-8	7	0.3	53	ND<0.3
3	MW-11	ND<0.3	ND<0.3	ND<0.3	ND<0.3
4	MW-10	7	3	95	61
5	MW-9	ND<0.3	ND<0.3	ND<0.3	ND<0.3
6	MW-12 (E-1A)	3	0.5	1	1
7	RINSATE	0.5	2	ND<0.3	2
8	TRIP BLANK	ND<0.3	ND<0.3	ND<0.3	ND<0.3

ug/L - parts per billion (ppb)

Minimum Detection Limit in Water:0.3ug/L

QAQC Summary:
Daily Standard run at 20ug/L: %Diff 8020 = <15
MS/MSD Average Recovery = 96% : Duplicate RPD = 6%

Richard Srna, Ph.D.
Laboratory Director

S## 52460

SAMPLING/ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Project No.: 330-06.05 Requested By: Lainie Damian P.O. No.: 14457

REQUEST		LABORATORY REQUIREMENTS					CHAIN OF CUSTODY				
SAMPLE TYPE:		CONTAINERS					SAMPLER'S SIGNATURE		CONTRACT LABORATORY		
SAMPLE I.D.	PARAMETERS	SIZE/TYPE	QUANTITY	PRES.	LAB	DUE DATE	SAMPLER	SAMPLE DATE	REC'D BY	COMMENTS	DATE REC'D
MW-7	Gas BTEX	40ml/VOA	3	HCL	Superior	1/1/91	R. Sampson	12-27-90		12/28/90 COC Corrected	
MW-8										For Sample ID -	
MW-11										Copy FAXd to Lab	
MW-10										L.D	
MW-9											
MW-12 (E-1A)	X										
Rinsate	X		X								
Trip Blnk	X		1	X							
[redacted]	[redacted]		[redacted]	[redacted]							
[redacted]	[redacted]	X	[redacted]	[redacted]		X	X	X			

SIGNATURES:

Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time	Turn Around Time (Circle Choice)
[redacted]	REG.	12-27-90 0905	Brian Quinlan	COURIER EXPRESS IT	12-28-90 805	24 Hrs
Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time	48 Hrs
						5 Days
Relinquished By (Signature)	Organization	Date/Time	Received For Laboratory By (Signature)		Date/Time	10 Days

SAMPLING/ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Project No.: 330-06.05 Requested By: [illegible signature] P.O. No.: 14457

REQUEST		LABORATORY REQUIREMENTS					CHAIN OF CUSTODY				
SAMPLE TYPE:		CONTAINERS					SAMPLER'S SIGNATURE		CONTRACT LABORATORY		
SAMPLE I.D.	PARAMETERS	SIZE/TYPE	QUANTITY	PRES.	LAB	DUE DATE	SAMPLER	SAMPLE DATE	REC'D BY	COMMENTS	DATE REC'D
mw-7	Gas BTEX	40ml/VOA	3	HCL	Superior	1/11/91	R. Sampson	12-27-90			
mw-8											
MW-11											
mw-10											
mw-9											
mw-12	X										
Rinsate	X		X								
Trip Blank	X		1	X							
MW-12Ph (E-1A)	P.h.		2	None							
mw-12 8240	8240	X	2	HCL		X	X	X			

SIGNATURES:

Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time	Turn Around Time (Circle Choice)
[signature]	REG.	12-27-90 0505	[signature]	Courier Express It	12-28-90 805	24 Hrs
[signature]	Express It	12 28 90 835	X			48 Hrs
[signature]	Express it.	12/28/90 930	Received For Laboratory By (Signature): [signature]		12/28/90	5 Days 10 Days (circled)

Water/Product Depth Field Sheet

Client: ARCO

Project No.: 330-06.05

Location: Hesperian
San Lorenzo

Field Dates: 12-27-90

Sampler: R Sampson

Probe Type:
- [x] Oil/Water Interface
- [ ] Electronic Indicator
- [ ] Bell Sounder
- [ ] Other _____

Well ID	Date	Time	TD	TOB DTL	TOB DTW	TOC DTL	TOC DTW	Comments
MW-7	12-27-90	11:34	18.99		14.67		14.17	
MW-5		11:40	14.05		14.00		13.59	Dry
MW-8		11:48	21.70		13.56		12.83	.73
MW-11		11:52	19.26		13.66		13.26	
MW-10		11:57	23.09		13.67		13.04	
MW-9		12:02	18.78		12.77		12.25	
MW-12	↓	12:17	26.04		13.86		13.36	

Pacific Environmental Group, Inc.

Monitoring Well Field Sheet

Client: Arco
Sampler: RSampson
Project No.: 330-06.05
Field Dates: 12-27-90
Location: Hesperian San Lorenzo
Well I.D.: MW-7

Well Information

Total Depth: 18.99
Diameter: 2" (3") 4" 5" 6" ___
Depth to Water: 14.17 TOC 14.67 TOB
Product: ☐ Yes ☑ No
Depth to Liquid: ___ TOC ___ TOB
Thickness (feet): ___
Date: 12-27-90
Color: ___
Time: 11:34
Comments:

Probe Type: ☑ Oil/Water Interface ☐ Other ☐ Electronic Indicator ☐ Bell Sounder

Purge Information

Date Purged: 12-27-90
Purge Method: ☐ Bailer ☐ Positive Displacement
Calculated Purge: 8 (gal)
☑ Centrifugal ☐ Dedicated ☐ Gas Displacement
Actual Purge: 8 (gal)
☐ Other ___

Vol (gal)	Time	pH (std. units)	EC (µmhos)	Temp (°F)	Color	Odor
2.5	12.45	7.58	804	65.5	Slightly cloudy	None
5	12.46	7.49	803	66.3	Clear	—
8	12.48	7.36	833	69.4	—	—

Comments:

Sample Information

Sampler: RSampson
Sample I.D.: MW-7
Date Sampled: 12-27-90
Time Sampled: 15:15

No. Containers	Size/Type	Pres.	Analysis
3	40 mL/Vom	HCL	6.3 BTEX

Sample Method:
☑ Bailer ☐ Positive Displacement
☐ Dedicated ☐ Other ___
Comments:

Monitoring Well Field Sheet

Client: Aico
Sampler: R Sampson
Project No.: 330-06.05
Field Dates: 12-27-90
Location: Hesperia San Lorenzo
Well I.D.: MW-8

Well Information

Total Depth: 21.70
Diameter: 2" (3") 4" 5" 6" ___
Depth to Water: 12.83 TOC 13.54 TOB
Product: ☐ Yes ☐ No
Depth to Liquid: ___ TOC ___ TOB
Thickness (feet): ___
Date: ~~11:48~~ 12-27-90
Color: ___
Time: 11:48
Comments:

Probe Type: ☑ Oil/Water Interface ☐ Other ☐ Electronic Indicator ☐ Bell Sounder

Purge Information

Date Purged: 12-27-90
Purge Method: ☐ Bailer ☐ Positive Displacement
Calculated Purge: 12. (gal)
☑ Centrifugal ☐ Dedicated ☐ Gas Displacement
Actual Purge: 7 (gal)
☐ Other ___

Vol (gal)	Time	pH (std. units)	EC (µmhos)	Temp (°F)	Color	Odor
~~4~~	13:10	7.24	773	66.3	Cloudy Brown	None
~~5~~ 7	13:11	7.11	782	67.0	" "	" "
~~12~~						

Comments:
Dry @ 7 gallons

Sample Information

Sampler: R. Sampson
Sample I.D.: MW-8
Date Sampled: 12-27-90
Time Sampled: 15:40

No. Containers	Size/Type	Pres.	Analysis
3	40 ml/VOA	HCL	Gas BTEX

Sample Method:
☑ Bailer ☐ Positive Displacement
☐ Dedicated ☐ Other ___
Comments:

Monitoring Well Field Sheet

Client: Arco
Sampler: R. Sampson
Project No.: 330-06.05
Field Dates: 12-27-90
Location: Hesperian San Lorenzo
Well I.D.: MW-9

Well Information

Total Depth: 18.78
Diameter: 2" (3") 4" 5" 6" ___
Depth to Water: 12.25 TOC 12.77 TOB
Product: ☐ Yes ☑ No
Depth to Liquid: ___ TOC ___ TOB
Thickness (feet): ___
Date: 12-27-90
Color: ___
Time: 12:02
Comments:

Probe Type: ☑ Oil/Water Interface ☐ Other ☐ Electronic Indicator ☐ Bell Sounder

Purge Information

Date Purged: 12-27-90
Purge Method: ☐ Bailer ☐ Positive Displacement ☑ Centrifugal ☐ Dedicated ☐ Gas Displacement ☐ Other ___
Calculated Purge: 9 (gal)
Actual Purge: 9 (gal)

Vol (gal)	Time	pH (std. units)	EC (µmhos)	Temp (°F)	Color	Odor
3	1355	6.76	811	62.6	Cloudy Green	—
6	13:56	6.79	831	65.1	Cloudy	—
9	13:58	6.79	835	64.9	Clear Tan	—

Comments:

Sample Information

Sampler: R. Sampson
Sample I.D: MW-9
Date Sampled: 12-27-90
Time Sampled: 14:00

No. Containers	Size/Type	Pres.	Analysis
3	40ml / Voa	HCL	Gas BTEX
~~2~~	~~40ml / [illegible]~~	~~None~~	~~Ph~~

Sample Method:
☑ Bailer ☐ Positive Displacement
☐ Dedicated ☐ Other ___
Comments:

Pacific Environmental Group, Inc.

Monitoring Well Field Sheet

Client: Arco
Sampler: R. Sampson
Project No.: 330-06-05
Field Dates: 12-27-90
Location: Hesperian San Lorenzo
Well I.D.: MW-10

Well Information

Total Depth: 23.08
Diameter: 2" (3") 4" 5" 6" ___
Depth to Water: 13.04 TOC 13.67 TOB
Product: ☐ Yes ☒ No
Depth to Liquid: ___ TOC ___ TOB
Thickness (feet): ___
Date: 12-27-90
Color: ___
Time: 11:57
Comments:

Probe Type: ☒ Oil/Water Interface ☐ Other ☐ Electronic Indicator ☐ Bell Sounder

Purge Information

Date Purged: 12-27-90
Purge Method: ☐ Bailer ☐ Positive Displacement
Calculated Purge: 10 (gal)
☒ Centrifugal ☐ Dedicated ☐ Gas Displacement
Actual Purge: 10 (gal)
☐ Other ___

Vol (gal)	Time	pH (std. units)	EC (µmhos)	Temp (°F)	Color	Odor
3.5	1338	6.79	799	60.5	Cloudy Gray	None
7	1340	6.77	806	62.9	Clear	—
10	13:42	6.72	822	65.0	—	—

Comments:

Sample Information

Sampler: R. Sampson
Sample I.D: MW-10
Date Sampled: 12-27-90
Time Sampled: 15:45

Sample Method:
☒ Bailer ☐ Positive Displacement
☐ Dedicated ☐ Other ___
Comments:

No. Containers	Size/Type	Pres.	Analysis
3	40 ml/vial	HCL	Gas BTEX

Monitoring Well Field Sheet

Client: Arco
Sampler: R. Sampson
Project No.: 320-06.05
Field Dates: 12-27-90
Location: Hesperian San Lorenzo
Well I.D.: MW-11

Well Information

Total Depth: 19.26
Diameter: 2" (3") 4" 5" 6" ___
Depth to Water: 13.26 TOC 13.66 TOB
Product: ☐ Yes ☒ No
Depth to Liquid: ___ TOC ___ TOB
Thickness (feet): ___
Date: 12-27-90
Color: ___
Time: 11:52
Comments:

Probe Type: ☑ Oil/Water Interface ☐ Other ☐ Electronic Indicator ☐ Bell Sounder

Purge Information

Date Purged: 12-27-90
Purge Method: ☑ Bailer ☐ Positive Displacement
Calculated Purge: 9 (gal) ☐ Centrifugal ☐ Dedicated ☐ Gas Displacement
Actual Purge: 9 (gal) ☐ Other ___

Vol (gal)	Time	pH (std. units)	EC (µmhos)	Temp (°F)	Color	Odor
3	13:23	6.85	783	63.2	Cloudy Brown/Red	—
6	13:24	6.89	797	63.9	—	—
9	13:26	6.87	804	64.5	—	—

Comments:

Sample Information

Sampler: R Sampson
Sample I.D.: MW-11
Date Sampled: 12-27-90
Time Sampled: 15:25

Sample Method:
☑ Bailer ☐ Positive Displacement
☐ Dedicated ☐ Other ___
Comments:

No. Containers	Size/Type	Pres.	Analysis
3	40 ml / VOA	HCl	Gas BTEX

Monitoring Well Field Sheet

Client: Arco
Sampler: R. Sampson
Project No.: 330-06.09
Field Dates: 12-27-90
Location: Hesperian San Lorenzo
Well I.D.: MW-12 (E-1A)

Well Information

Total Depth: 26.04
Diameter: 2" 3" 4" 5" (6")
Depth to Water: 13.36 TOC 13.86 TOB
Product: ☐ Yes ☑ No
Depth to Liquid: TOC TOB
Thickness (feet):
Date: 12-27-90
Color:
Time: 12:12
Comments:

Probe Type: ☑ Oil/Water Interface ☐ Other ☐ Electronic Indicator ☐ Bell Sounder

Purge Information

Date Purged: 12-27-90
Purge Method: ☐ Bailer ☐ Positive Displacement
Calculated Purge: ~~70~~ 71 (gal)
☑ Centrifugal ☐ Dedicated ☐ Gas Displacement
Actual Purge: 71 (gal)
☐ Other

Vol (gal)	Time	pH (std. units)	EC (µmhos)	Temp (°F)	Color	Odor
23	14:44	7.03	785	64.8	Clear	None
46	14:49	6.95	805	67.6	—	—
70	14:57	7.33	790	66.4	—	—

Comments:

Sample Information

Sampler: R. Sampson
Sample I.D.: MW-12
Date Sampled: 12-26-90
Time Sampled: 10:10

Sample Method:
☑ Bailer ☐ Positive Displacement
☐ Dedicated ☐ Other
Comments:

No. Containers	Size/Type	Pres.	Analysis
3	40mL/Vial	HCL	Gas BTEX
2	40ml/Vial	None	pH
2	250ml Plastic	None	Chrome VI
1	" "	NaOH	Cyanide
1	" "	HNO3	Cam 17
2	500mL/Amb.	None	COD
1	1 l/amber	None	Cyanide
1	" "	" "	T.S.S.
1	" "	" "	8270
2	40ml/Vial	HCL	8240

PACIFIC
ENVIRONMENTAL
GROUP INC.

Date February 13, 1991
Project 330-06.10

To: Mr. Charles Carmel
ARCO Products Company
P. O. Box 5811
San Mateo, California 94402

We have enclosed:

Copies	Description
1	Work Plan for ARCO Service Station 608,
	17601 Hesperian Blvd., San Lorenzo, California.

For your:
- X Use
- Approval
- Review
- X Information

Comments: Please call if you have any questions concerning this Work Plan.

Tina Berry TB

cc: Chris Winsor, ARCO Products Company
Pamela Evans, Alameda County - Environmental Health Department
Richard Hiett, RWQCB - S.F. Bay Region

1601 Civic Center Drive, Suite 202, Santa Clara, California 95050, (408) 984-6536
FAX: (408) 243-3911

PACIFIC
ENVIRONMENTAL
GROUP, INC.

February 13, 1991
Project 330-06.10

Mr. Kyle Christie
ARCO Products Company
P. O. Box 5811
San Mateo, California 94402

Re: ARCO Service Station 608
17601 Hesperian Blvd. at Hacienda Ave.
San Lorenzo, California

Dear Mr. Christie:

This letter answers the January 8, 1991 letter from Alameda County's Department of Environmental Health requesting a Work Plan for additional activities for the site referenced above (Figure 1). Additionally, this letter incorporates results of the most recent sampling event conducted in December 1990 by Pacific Environmental Group, Inc. (PACIFIC) on behalf of ARCO Products Company (ARCO).

The site wells were sampled on December 27, 1990 as part of the station's on-going quarterly groundwater monitoring program. Results of that sampling event were not yet available to include in the January 2, 1991 site assessment report. Groundwater sampling and analytical procedures were the same as those discussed in previous monitoring reports. Dissolved gasoline concentrations were detected in Wells MW-7, MW-8 and MW-10 and ranged between 69 parts per billion (ppb) and 5,700 ppb. No dissolved gasoline was detected in Wells MW-9 and MW-11. Well MW-5 continues to be dry. These findings are generally consistent with previous sampling events, however, this is the first time that dissolved gasoline was detected in upgradient Well MW-7.

A groundwater contour map and a gasoline and benzene concentration map for the December 1990 sampling event are shown on Figures 2 and 3, respectively. Copies of the certified analytical report, chain of custody document, and field

1601 Civic Center Drive, Suite 202, Santa Clara, California 95050, (408) 984-6536
FAX: (408) 243-3911

sampling sheets are attached to this letter. Historical groundwater analytical results are included on Table 1.

The following addresses specific concerns of Alameda County, as stated in their January 8 letter:

1) Further investigation to define the contaminant plume:
In order to further define the contaminant plume, PACIFIC proposes that five additional groundwater monitoring wells be installed at the locations shown on Figure 4. The procedures for soil and groundwater sampling and well installation will follow those described in PACIFIC's Work Plan dated October 4, 1989 and Site Assessment Report dated January 2, 1991. Groundwater samples obtained from the proposed wells will be analyzed for total petroleum hydrocarbons, calculated as gasoline and benzene, toluene, ethylbenzene and xylenes (BTEX) by EPA Methods 8015, 8020 and 5030.

One well is proposed at the southern corner of the site to document the extent of hydrocarbons in groundwater southeast of Well MW-8 which, in December 1990, contained 1,200 parts per billion (ppb) gasoline. Four wells are proposed northeast, east and southeast of Well MW-10. Well MW-10, the furthest downgradient site well, contained 5,700 ppb gasoline in December 1990. This well has consistently contained the highest gasoline concentrations from all the site wells since its installation in April 1990. Three of the proposed wells are located on county property and one well is located within a school yard. The four wells are proposed to document the downgradient extent of hydrocarbons to non-detectable levels.

Upon approval from Alameda County of this Work Plan, PACIFIC will initiate pursuing encroachment for the off-site field work. It is estimated that encroachment will be obtained by May 15, 1991 which would allow completion of the field work by May 30, 1991.

2) Action to contain plume and mitigate its impact:
ARCO anticipates that groundwater extraction and treatment will be the technology selected to contain and mitigate the hydrocarbon plume. Several tasks preliminary to groundwater remediation have been undertaken already by ARCO. In November 1989, a step-discharge test was performed by PACIFIC and reported in a letter to ARCO dated April 13, 1990. The test was performed to determine aquifer yield and a preliminary estimate of the areal extent of pumping influence. In July 1990, a six-inch diameter extraction well was installed by PACIFIC to prepare for groundwater remediation. Since that time, groundwater samples have been obtained and analyzed for parameters required by regulatory agencies in

order to apply for sanitary sewer and NPDES permits to discharge treated groundwater. A schedule for additional proposed remedial activities is shown on Figure 5.

3) Evaluation of the impact to known wells within 1/2 mile of the site:
Applied Geosystem's (AGS's) report to ARCO dated March 9, 1988 listed 23 wells within one half mile of the site. PACIFIC conducted an additional well survey with Alameda County in July 1989. That survey identified 18 wells within a one half mile radius of the site and was included in the October 4, 1989 Work Plan. It appears that the difference in the number of wells reported from the two surveys may be due to abandonment of wells which were active during the AGS survey.

PACIFIC will more fully evaluate the impact to documented wells as part of this investigation and after the proposed wells are installed. This should allow us to more adequately define the hydrocarbon plume and its distance to the subject wells. Additional options that are being considered to obtain data not covered in the previous well surveys include:

- Examination of borings logs and construction details at the Department of Water Resources (for data not available at Alameda County).
- Canvassing of well owners to obtain well details not available in records at the regulatory agencies.
- Sampling and analysis of selected documented wells to determine groundwater quality. This will be done only if it is determined that the plume may extend close to the wells.

Based upon the schedule of activities discussed in this letter, it is estimated that a technical assessment report discussing the findings of the proposed investigation and remedial activities should be issued on or about July 30, 1991. This schedule is contingent upon obtaining encroachment permits for off-site wells.

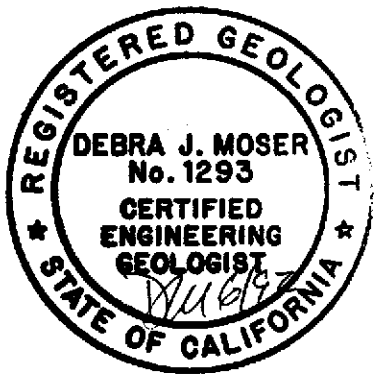
Enclosed please find a check for $500.00, submitted on behalf of ARCO, to cover agency oversight costs. If you have any questions regarding this letter, please call.

Sincerely,

Pacific Environmental Group, Inc.

Tina Berry
Staff Geologist

Debra J. Moser
Senior Geologist
CEG 1293



cc: Chris Winsor, ARCO Products Company
Pamela J. Evans, Alameda County - Environmental Health Department
Richard Hiett, Regional Water Quality Control Board-S.F. Bay Region

Table 1
Summary of Groundwater Analytical Results

ARCO Service Station 0608
Low-Boiling Hydrocarbons

Well Number	Sample Date	Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Xylenes (ppb)
MW-1	01/11/88	300	20	10	50	80
		----------Well Destroyed----------				
MW-2	07/05/85	32,000	1,000	690	NA*	1,500*
	01/11/88	3,300	804	115	168	166
		----------Well Destroyed----------				
MW-3	01/11/88	1,800	20	20	80	60
	03/07/89	150,000	4,600	5,200	5,600	13,000
	06/21/89	63,000	2,700	5,800	3,300	12,000
	12/12/89	----Not Sampled--Insufficient Water Volume----				
	03/29/90	1,100,000**	13,000	60,000	17,000	91,000
	06/22/90	----Not Sampled--Insufficient Water Volume----				
	07/18/90	----------Well Destroyed----------				
MW-4	01/11/88	62,000	2,700	7,900	850	5,200
	09/12/88	----Not Sampled--Separate-Phase Hydrocarbon---				
	03/07/89	84,000	2,400	3,400	2,500	7,600
	06/21/89	31,000	400	800	200	1,500
	12/12/89	----------Not Sampled--Well Dry----------				
	03/29/90	--Not Sampled-0.01 foot Separate-Phase Hydrocarbon-				
	06/22/90	----------Not Sampled--Well Dry----------				
	07/18/90	----------Well Destroyed----------				
MW-5	01/11/88	31,000	4,000	2,700	3,800	5,500
	03/07/89	1,300	340	ND	140	50
	06/21/89	1,100	200	ND	130	40
	12/12/89	----------Not Sampled--Well Dry----------				
	03/29/90	-----Not Sampled--Insufficient Water Volume--------				
	06/22/90	-----Not Sampled--Insufficient Water Volume--------				
	09/19/90	----------Not Sampled--Well Dry----------				
	12/27/90	----------Not Sampled--Well Dry----------				
MW-6	06/21/89	1,700	170	170	85	290
(E-1)	12/12/89	500	26	7	8	18
	03/29/90	130	14	9	4	11
	06/22/90	150	15	5	4	13
	07/18/90	----------Well Destroyed----------				
E-1A	09/19/90	<50	7	0.9	1	2
	12/27/90	<50	3	0.5	1	1

Table 1 (Continued)
Summary of Groundwater Analytical Results

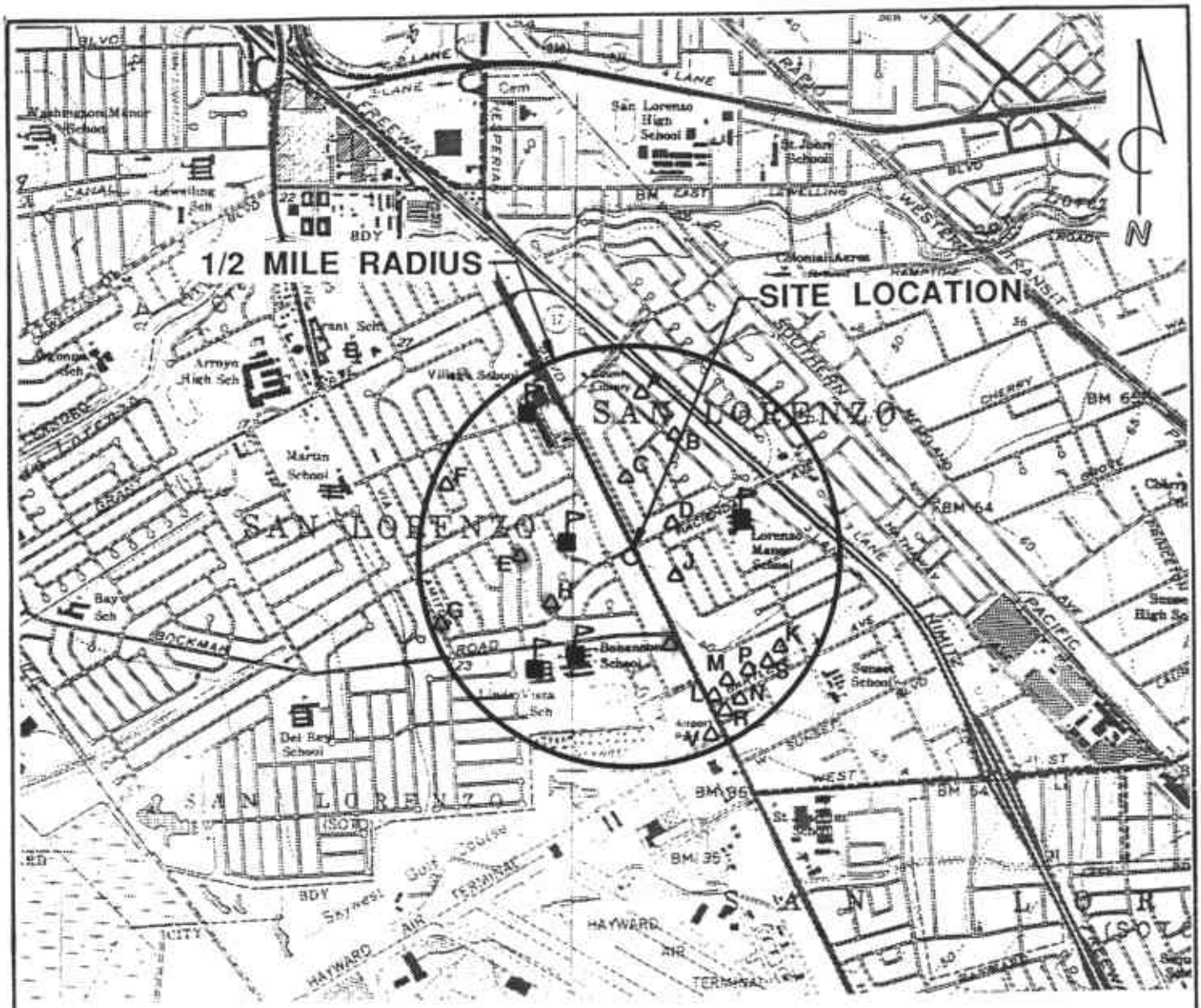
ARCO Service Station 0608
Low-Boiling Hydrocarbons

Well Number	Sample Date	Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Xylenes (ppb)
MW-7	04/13/90	<50	<0.3	<0.3	<0.3	<0.3
	06/22/90	<50	0.5	1	0.6	3
	09/19/90	<50	<0.3	<0.3	<0.3	<0.3
	12/27/90	69	<0.3	0.3	0.4	2
MW-8	04/13/90	4,900	350	16	450	33
	06/22/90	3,700	370	12	330	28
	09/19/90	140	4	3	3	3
	12/27/90	1,200	7	0.3	53	<0.3
MW-9	04/13/90	<50	<0.3	<0.3	<0.3	2
	06/22/90	12,000	200	3	250	180
	09/19/90	<50	<0.3	<0.3	<0.3	0.6
	12/27/90	<50	<0.3	<0.3	<0.3	<0.3
MW-10	04/13/90	10,000	150	4	280	200
	06/22/90	9,700	28	<0.3	131	210
	09/19/90	1,800	<0.3	4	0.8	10
	12/27/90	5,700	7	3	95	61
MW-11	04/13/90	<50	<0.3	<0.3	<0.3	<0.3
	06/22/90	63	0.4	0.9	0.7	3
	09/19/90	<50	<0.3	<0.3	<0.3	<0.3
	12/27/90	<50	<0.3	<0.3	<0.3	<0.3

ppb = parts per billion

* - Ethylbenzene and xylenes given as a combined value.
** - Well contained slight product sheen.

MW-1 and MW-2 destroyed prior to 3/7/89 sampling event.
MW-3, MW-4 and MW-6 (E-1) destroyed 7/18/90.



CALIF

QUADRANGLE LOCATIONS

LEGEND:

SCHOOL

A WATER SUPPLY WELL DESIGNATION AND APPROXIMATE LOCATION

REFERENCE:
USGS 7.5 MIN. TOPOGRAPHIC MAP
TITLED: HAYWARD, CALIFORNIA
DATED: 1959 REVISED: 1980
TITLED: SAN LEANDRO, CALIFORNIA
DATED: 1959 REVISED: 1980

SCALE

2000 0 2000 FEET

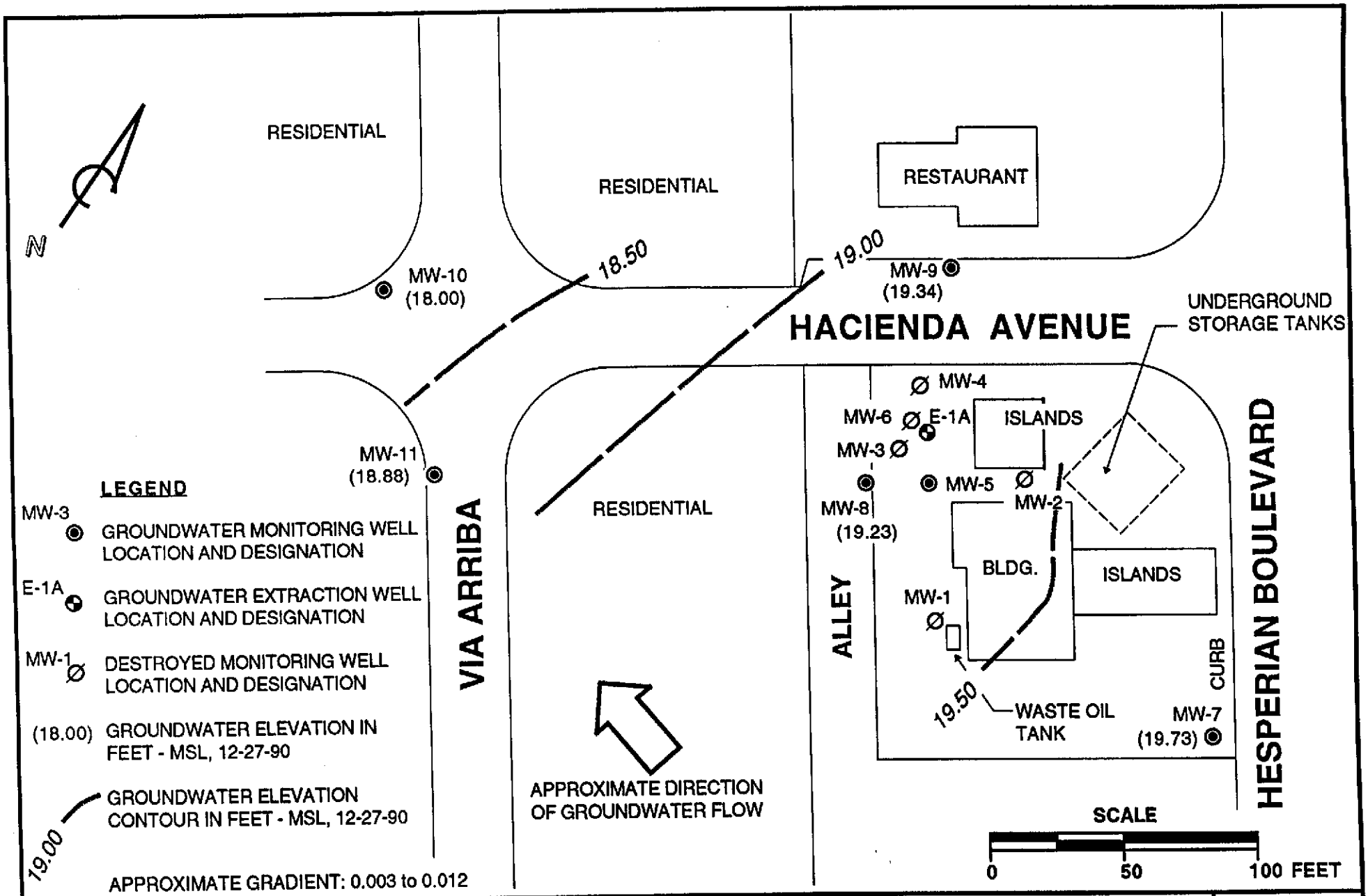
PACIFIC ENVIRONMENTAL GROUP, INC.

ARCO SERVICE STATION #0608
17601 Hesperian Boulevard
San Lorenzo, California

SITE LOCATION MAP

FIGURE: 1

PROJECT: 330-06.10



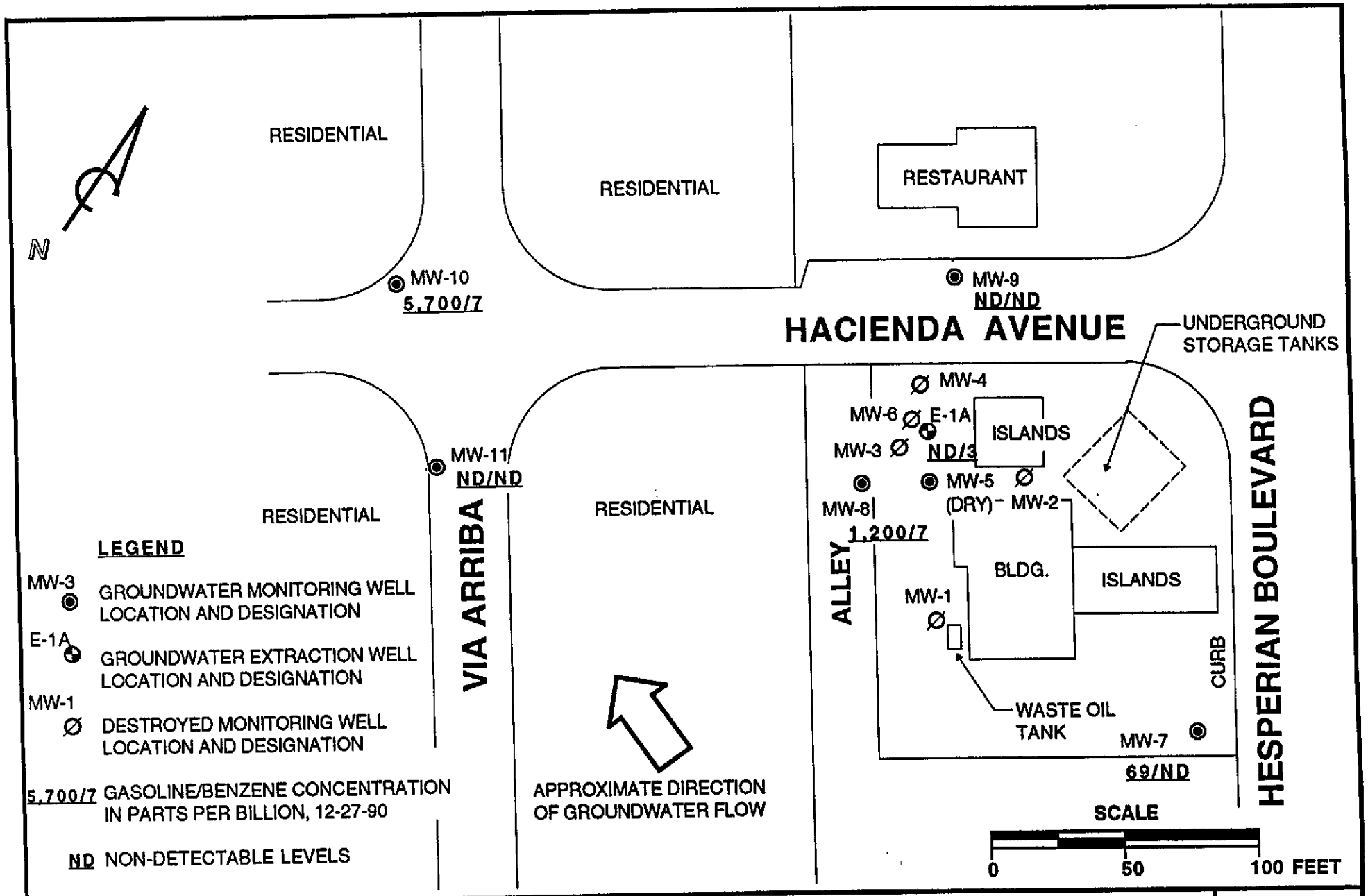
PACIFIC ENVIRONMENTAL GROUP, INC.

ARCO SERVICE STATION #608
17601 Hesperian Boulevard
San Lorenzo, California

GROUNDWATER CONTOUR MAP, DECEMBER 1990

FIGURE: 2

PROJECT: 330-06.10



PACIFIC ENVIRONMENTAL GROUP, INC.

ARCO SERVICE STATION #608
17601 Hesperian Boulevard
San Lorenzo, California

DISSOLVED GASOLINE AND BENZENE CONCENTRATION MAP (DECEMBER 1990)

FIGURE: 3
PROJECT: 330-06.10