PACIFIC
ENVIRONMENTAL
GROUP, INC.

Date January 2, 1991
Project 330-06.06

To: Mr. Kyle Christie
ARCO Products Company
P. O. Box 5811
San Mateo, CA 94402

We have enclosed:

Copies	Description
1	Assessment Report for the soil and groundwater investigation
	ARCO Service Station 608, 17601 Hesperian Blvd., San Lorenzo, CA.

For your:
x Use
Approval
Review
x Information

Comments: Please call if you have any questions regarding this report.

Tina Berry

cc: Chris Winsor, ARCO
Pamela Evans, Alameda County Environmental Health Department
Steven Ritchie, 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.

January 2, 1991
Project 330-06.06

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

Re: ARCO Service Station 0608
17601 Hesperian Boulevard at Hacienda Avenue
San Lorenzo, California

Dear Mr. Christie:

This letter presents the results of a soil and groundwater investigation performed by Pacific Environmental Group, Inc. (PACIFIC), on behalf of ARCO Petroleum Products Company (ARCO), to further define the extent of gasoline hydrocarbons in groundwater at the ARCO station referenced above. The investigation follows a Work Plan prepared by PACIFIC, dated October 4, 1989. The Work Plan was reviewed and approved by Alameda County, Environmental Health Department in February 1990. This report includes a discussion of the site's background, the scope of work performed including field and laboratory procedures, and investigative findings and conclusions. In addition, this report documents the abandonment of three on-site groundwater monitoring wells and installation of one extraction well, and contains the site groundwater monitoring results for the third quarter 1990.

BACKGROUND

Site Background

ARCO Service Station 0608 is an operating service station located at 17601 Hesperian Boulevard at Hacienda Avenue in San Lorenzo, California (Figures 1 and 2). The service station formerly included three 6,000-gallon tanks (two unleaded gasoline and one regular gasoline) located in a common excavation, and one adjacent 6,000-gallon tank (super unleaded gasoline). A 550-gallon tank

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located southwest of the station building was used to store waste oil. All underground tanks were removed in June 1988 and were replaced with three 12,000-gallon gasoline tanks in the location of the former gasoline tank complex, and one waste oil tank in the same location as the former waste oil tank (Figure 3).

Land use in the vicinity of the site is primarily commercial and residential. The topography in the site area is essentially flat with a very gentle westward slope toward the San Francisco Bay. San Lorenzo Creek trends generally east-west and is located approximately 4,000 feet north of the site. The site is underlain by Quaternary deposits, consisting of alluvial, fluvial, and basin sediments (Helley et al., 1972).

Previous investigations reported that the native soils at the site consist predominantly of clay and silt. Groundwater has historically been encountered at approximately 11 to 12 feet below the ground surface.

Previous Investigations

Investigations of soil and groundwater conditions at the site have been performed by Emcon Associates (1985) and Applied Geosystems (1988). PACIFIC collected soil and groundwater samples during tank replacement activities in 1988, and performed a soil gas survey in 1989. These previous investigations and their results are described in the Work Plan for the present investigation, dated October 4, 1989. Figure 3 shows the locations of wells installed on and near the site. Groundwater monitoring has been performed periodically since 1988. Table 1 summarizes the monitoring results.

PACIFIC performed a step-discharge test in Well MW-6 (E-1) in November 1989 and reported the results in a letter to ARCO dated April 13, 1990. The hydraulic conductivity was estimated to be approximately 8×10^{-3} centimeters per second, and the corresponding transmissivity was estimated to be 200 feet^2 per day. Based on the aquifer test results, groundwater extraction from one or more pumping wells appears to be feasible.

A water-supply well survey was performed for PACIFIC by Alameda County. This survey revealed a total of 18 water-supply wells within a half-mile radius of the site. The approximate locations of the wells are shown on Figure 1. Water use from the wells is primarily for irrigation purposes, although some wells are used for domestic purposes. The wells range in depth between 25 and 202 feet. The closest water-supply well is an irrigation well located about 600 feet southeast of the site. The depth of this well is 25 feet. The closest downgradient well is located

approximately 1,200 feet southwest of the site, and is listed as a 29-foot deep irrigation well.

SCOPE OF WORK

In order to further delineate the extent of hydrocarbons in the groundwater at the site, PACIFIC installed five additional groundwater monitoring wells (MW-7 through MW-11), on March 29 through April 5, 1990. The October 1989 Work Plan proposed a sixth well to be installed during this investigation at a location in Hacienda Avenue between Wells MW-9 and MW-10. This well was not installed because underground and overhead utilities in the immediate area are so numerous that a safe drilling location could not be selected. Selected soil samples were analyzed for low-boiling hydrocarbons (calculated as gasoline) and BTEX compounds. Water samples from all groundwater monitoring wells were collected on either March 29, 1990 or April 13, 1990 and analyzed for gasoline and BTEX compounds. In addition, the three 8-inch diameter on-site wells (MW-3, MW-4, and MW-6) were properly abandoned on July 18, 1990 and replaced with one 6-inch diameter well (E-1A, Figure 3).

Exploratory Drilling and Monitoring Well Installation

The locations for the monitoring wells were selected based on the results of the soil gas investigation discussed above. In order to document the upgradient extent of hydrocarbons in the groundwater, Well MW-7 was installed in the eastern corner of the site. Wells MW-8, MW-10, and MW-11 were installed downgradient (west) of the site (two near the intersection of Hacienda and Via Arriba Avenues, and one in the alley adjacent to the site). The fifth well, MW-9, was installed in Hacienda Avenue, cross-gradient of the site (Figure 3).

The borings for the groundwater monitoring wells were drilled according to Alameda County guidelines using 8-inch diameter, hollow-stem auger drilling equipment. The borings were logged by a PACIFIC geologist using the Unified Soil Classification System and standard geologic techniques. Soil samples for logging and chemical analysis were collected at 5-foot depth intervals by advancing a California-modified split-spoon sampler with brass liners into undisturbed soil beyond the tip of the auger. The sampler was driven a maximum of 18 inches, using a 140-pound hammer with a 30-inch drop. The hollow-stem augers and down-hole sampling equipment were steam cleaned between borings. All soil samples were contained in brass liners, capped with aluminum foil and plastic end caps, sealed in clean glass jars, labeled, and logged onto chain-of-custody docu-

ments. The samples were placed on ice for transport to the laboratory. Chain-of-custody documents are attached to this report.

Soil samples collected at 5-foot intervals during drilling were analyzed in the field for ionizable organic compounds using the HNU Model PI-101 (or equivalent) photo ionization detector (PID) with a 10.2 eV lamp. The test procedure involved measuring approximately 30 grams from an undisturbed soil sample, placing this sub-sample in a clean glass jar, and sealing the jar with aluminum foil secured under a ring-type threaded lid. The jar was warmed for approximately 20 minutes (in the sun), then the foil was pierced and the head-space within the jar was tested for total organic vapor, measured in ppm (volume/volume). The instrument was calibrated prior to drilling using a 100-ppm isobutylene standard (in air) and a sensitivity factor of 0.7 which relates the ionization potential of benzene (10.0 ppm) to the ionization potential of isobutylene (7.0 ppm). The results of these field tests are recorded on the boring logs attached to this report.

All residual soils obtained from drilling operations were stockpiled onsite (on plastic sheeting) until laboratory analyses were completed and the results evaluated. Arrangements were then made for disposal to an appropriate landfill based on the detected gasoline concentrations.

While drilling the borings for the monitoring wells, groundwater was encountered between approximately 11 and 13 feet below grade. The borings were then advanced a maximum of 15 feet into the water-bearing zone. The borings were converted to groundwater monitoring wells with the installation of 2-inch diameter, Schedule 40 PVC casing and 0.020-inch factory-slotted screen. Screen was installed through the entire saturated section, extending a minimum of five feet above the static water level. Graded 12 x 20 Monterey sand pack was placed in the annular space across the screened interval, and extends approximately 1 to 2 feet above the screen. A bentonite and concrete seal was placed from the top of the sand pack to the ground surface. A locking cap and protective vault box was then installed on the top of each well. Well construction details are included on the attached boring logs.

After well installation, all new and existing monitoring well elevations were surveyed to mean sea level datum by a licensed surveyor.

Groundwater Sampling

PACIFIC sampled all site monitoring wells on either March 29, 1990 (MW-3 to MW-6 as part of routine quarterly sampling) or April 13, 1990 (MW-7 to MW-11

subsequent to the well installation program). The next quarterly sampling events were conducted on June 22 and September 19, 1990 and included all existing wells.

Prior to sampling, the depth to static groundwater in each well was measured and recorded. Wells containing separate-phase hydrocarbons are not sampled; however, the thickness of the separate-phase hydrocarbons, if present, is measured and recorded. The sampling procedure involves purging each well of at least four well volumes of water using a centrifugal pump immediately prior to sampling, and allowing the well to recover to approximately 80 percent of the initial water level. During purging, temperature, pH, electrical conductivity, and turbidity were monitored and documented prior to sampling. A Teflon bailer was used to collect the samples. Water samples were placed into clean glass containers, labeled, logged onto chain-of-custody documents and chilled for transport to a State-certified laboratory for analysis.

Water generated during well installation, development, and sampling, was stored on-site in 55-gallon drums until analytical results were evaluated, at which point appropriate disposal activities were implemented, including the removal of purged water by a licensed hauler. The water was delivered to a site permitted to accept such material.

Laboratory Analyses

The soil samples submitted to the laboratory were analyzed for gasoline and BTEX compounds. Groundwater from all sampled wells were analyzed for low-boiling hydrocarbons (calculated as gasoline) and BTEX compounds. The laboratory procedures are taken from EPA Methods 8015, 8020, and 5030, and involve examination of the sample using a purge and trap technique; final detection is by gas chromatography using a flame ionization detector as well as a photo ionization detector. The results of the analyses are discussed below under "Investigative Findings."

Well Abandonment

In addition to the scope of work noted above, **PACIFIC abandoned three existing wells (MW-3, MW-4, and MW-6) on July 18, 1990. These wells were abandoned because their construction details were unknown.** The wells, all located in the western corner of the site, were replaced with one 6-inch diameter well (E-1A) in anticipation of groundwater extraction and remedial activities (Figure 3).

Wells MW-3, MW-4, and MW-6 were abandoned by drilling out the existing vault boxes, casings, seals and sand packs with 12-inch diameter hollow-stem auger

drilling equipment. The remaining borings were then grouted with a bentonite and cement mix from the bottom of the boring to the ground surface.

Well E-1A was installed in a manner similar to that of the monitoring wells installed during this investigation, except a 12-inch diameter auger was used to drill the well boring and 6-inch diameter Schedule 40 PVC was used for the well casing. The boring log for Well E-1A, showing well construction details, is attached to this report.

INVESTIGATIVE FINDINGS

Subsurface Conditions

Soils encountered in Borings MW-7 through MW-11 and E-1A consisted of clay, silt, and silty sand from the surface to the maximum explored depth of 27 feet. Figure 4 presents a cross-section showing generalized subsurface geology between Wells MW-10 and MW-7. Groundwater stabilized between approximately 11 and 13 feet below grade in each well. Water level data collected on April 13, 1990 indicate a groundwater flow direction to the southwest at an approximate gradient of 0.003 (Figure 5). The June 22 and September 19, 1990 sampling events showed similar gradients with westerly groundwater flow directions. Results of the June 22, 1990 sampling event are presented in PACIFIC's quarterly sampling report dated September 25, 1990. Figure 6 presents a groundwater contour map based on the September 19, 1990 sampling event.

Field Analytical Results

The concentrations of organic vapors, measured with the PID during drilling, were found to range from non-detectable levels to 29 ppm in soil samples collected from the wells installed during this investigation (MW-7 to MW-11). A PID measurement of 160 ppm from Well E-1A was noted at a depth of approximately 15 feet. PID measurements are useful only for indicating relative hydrocarbon concentrations and should not be used to evaluate hydrocarbon presence with the confidence of laboratory analysis. The results of the PID field analyses are noted on the attached boring logs.

Soil Analytical Results

Two soil samples were submitted for analysis from Wells MW-8 and MW-9. These samples were collected at the approximate depth of 10 feet, just above the water table. Xylenes were detected in the MW-9 sample at a concentration of

0.006 ppm. The remaining gasoline and BTEX compounds from both samples were at non-detectable levels. Analytical results are noted in Table 2 and on the certified analytical reports attached at the end of this report.

Groundwater Analytical Results

During the March and April sampling events, groundwater samples from Wells MW-7, MW-9, and MW-11 were found to contain non-detectable levels of gasoline and BTEX compounds, with the exception of Well MW-9 which contained 2 ppb xylenes. The groundwater samples collected from Wells MW-3, MW-6, MW-8, and MW-10 contained dissolved gasoline concentrations ranging from 130 ppb (MW-6) to 1,100,000 ppb (MW-3). Well MW-4 contained 0.01 foot of separate-phase hydrocarbon on the date sampled. PACIFIC did not sample Well MW-5 due to an insufficient water volume in the well. A dissolved gasoline/benzene concentration map for these sampling events is shown in Figure 7.

During the September sampling event, gasoline was not detected in Wells E-1A, MW-7, MW-9, and MW-11; however, traces of BTEX were noted in Well E-1A and xylenes in Well MW-9. Wells MW-8 and MW-10 contained gasoline concentrations of 140 and 1,800 ppb, respectively. Well MW-5 was dry and therefore not sampled. A dissolved gasoline/benzene concentration map for this event is shown in Figure 8. Historical groundwater analytical results are summarized on Table 1.

SUMMARY OF FINDINGS

A summary of the findings and conclusions of this investigation follows:

- The soils encountered in the borings for Wells MW-7 through MW-11 and E-1A consisted primarily of clay, silt, and silty sand to the maximum explored depth of 27 feet. During drilling, groundwater was encountered, and stabilized, at depths between 11 and 13 feet.
- Water level data collected on April 13, 1990 indicate a southwesterly groundwater flow direction at an approximate gradient of 0.003. Data from the June 22 and September 19, 1990 sampling events showed westerly groundwater flow directions with approximate gradients of 0.003.
- A soil sample collected from the boring for Well MW-9, at a depth of approximately 10 feet, contained 0.006 ppm xylenes. No

dissolved gasoline or additional BTEX compounds were detected in the corresponding soil samples from the borings for Wells MW-8 or MW-9.

- In March and April 1990, gasoline and BTEX concentrations in groundwater samples collected from Wells MW-7, MW-9, and MW-11 were at non-detectable levels, except for 2 ppb xylenes in Well MW-9. Wells MW-3, MW-6, MW-8, and MW-10 contained gasoline concentrations ranging between 130 and 1,100,000 ppb.
- No gasoline concentrations were detected in Wells E-1A, MW-7, MW-9, and MW-11 during the September sampling event. Wells MW-8 and MW-10 contained gasoline concentrations of 140 and 1,800 ppb, respectively.
- Gasoline concentrations in Wells MW-7 to MW-11 declined between the June and September 1990 sampling events.

Conclusions

Based on the results of the recent quarterly monitoring event, the eastern (upgradient) and northern (cross-gradient) extent of hydrocarbons in groundwater is currently defined to non-detectable levels of gasoline in Wells MW-7 and MW-9, respectively. The southern (cross-gradient) and western (downgradient) extent of hydrocarbons in groundwater as gasoline is currently defined to 140 ppb in Well MW-8 and 1,800 ppb in Well MW-10, respectively.

Groundwater discharge options are currently being reviewed and evaluated in anticipation of future remedial activities.

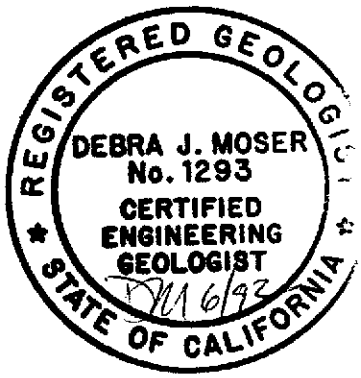
If you have any questions concerning the contents of this report, please call.

Sincerely,

Pacific Environmental Group, Inc.

Tina Berry
Staff Geologist

Debra Moser
Senior Geologist
CEG 1293



Enclosures

cc: Chris Winsor, ARCO
Pamela Evans, Alameda County, Environmental Health Dept.
Steven Ritchie, RWQCB - S.F. Bay Region

REFERENCE

Helley, E.J., Lajoie, K.R., and Burke, D.B., 1972; Geologic Map of Late Cenozoic Deposits, Alameda County, California, U.S.G.S. Miscellaneous Field Studies Map, MF-429.

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----------				
MW-6 (E-1)	06/21/89	1,700	170	170	85	290
	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

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
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
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
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
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

ppb = parts per billion

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

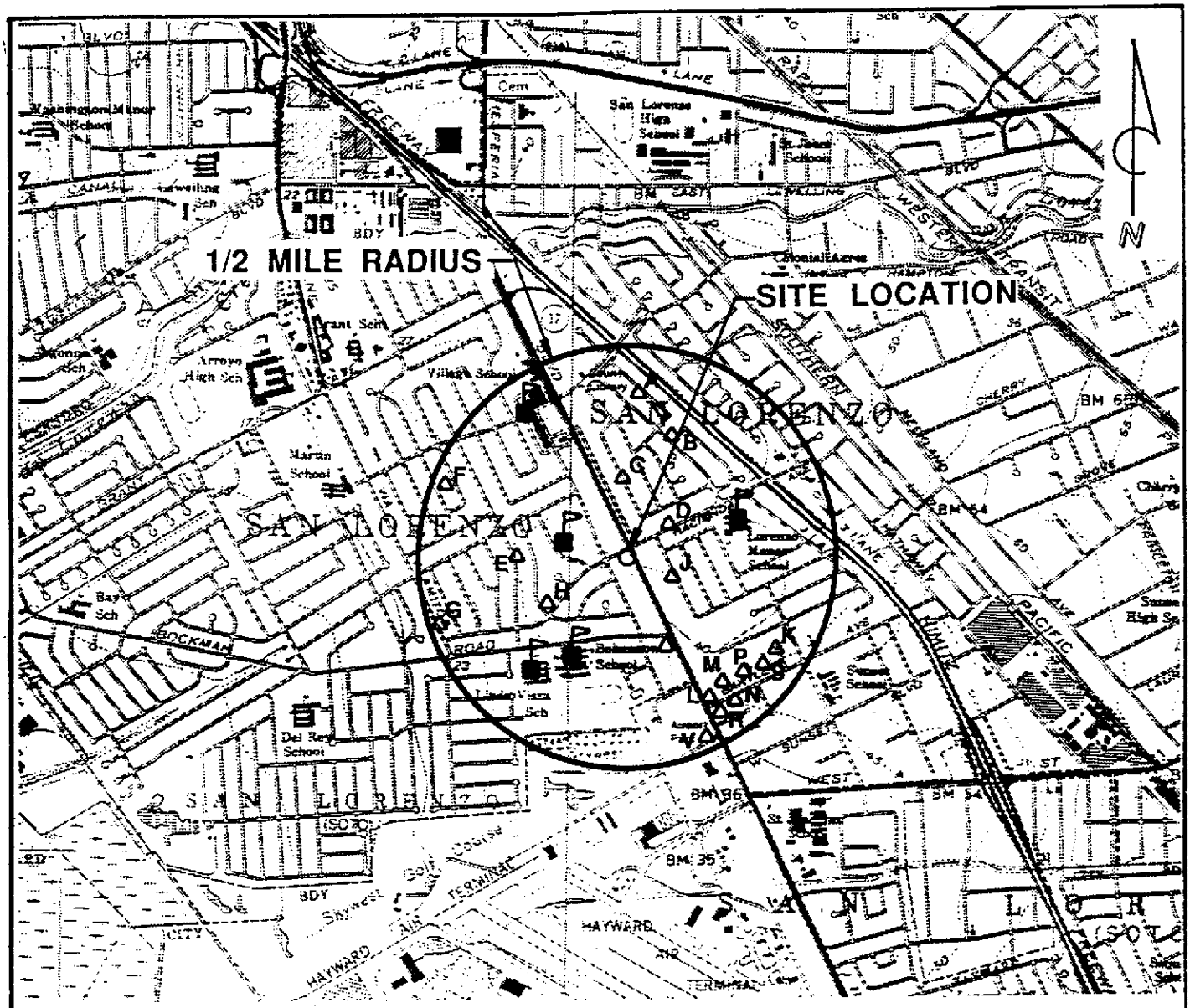
MW-1 and MW-2 destroyed prior to 3/7/89 sampling event.

Table 2
Summary of Soil Analytical Results

ARCO Service Station 0608
Low-Boiling Hydrocarbons

Well Number	Sample Depth	Gasoline (ppm)	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	Xylenes (ppm)
MW-8	10-11.5	<2	<0.003	<0.003	<0.003	<0.003
MW-9	9-10.5	<1	<0.003	<0.003	<0.003	0.006

Soils sampled on 3/29/90 (MW-8) and 4/5/90 (MW-9).
ppm = parts per million



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

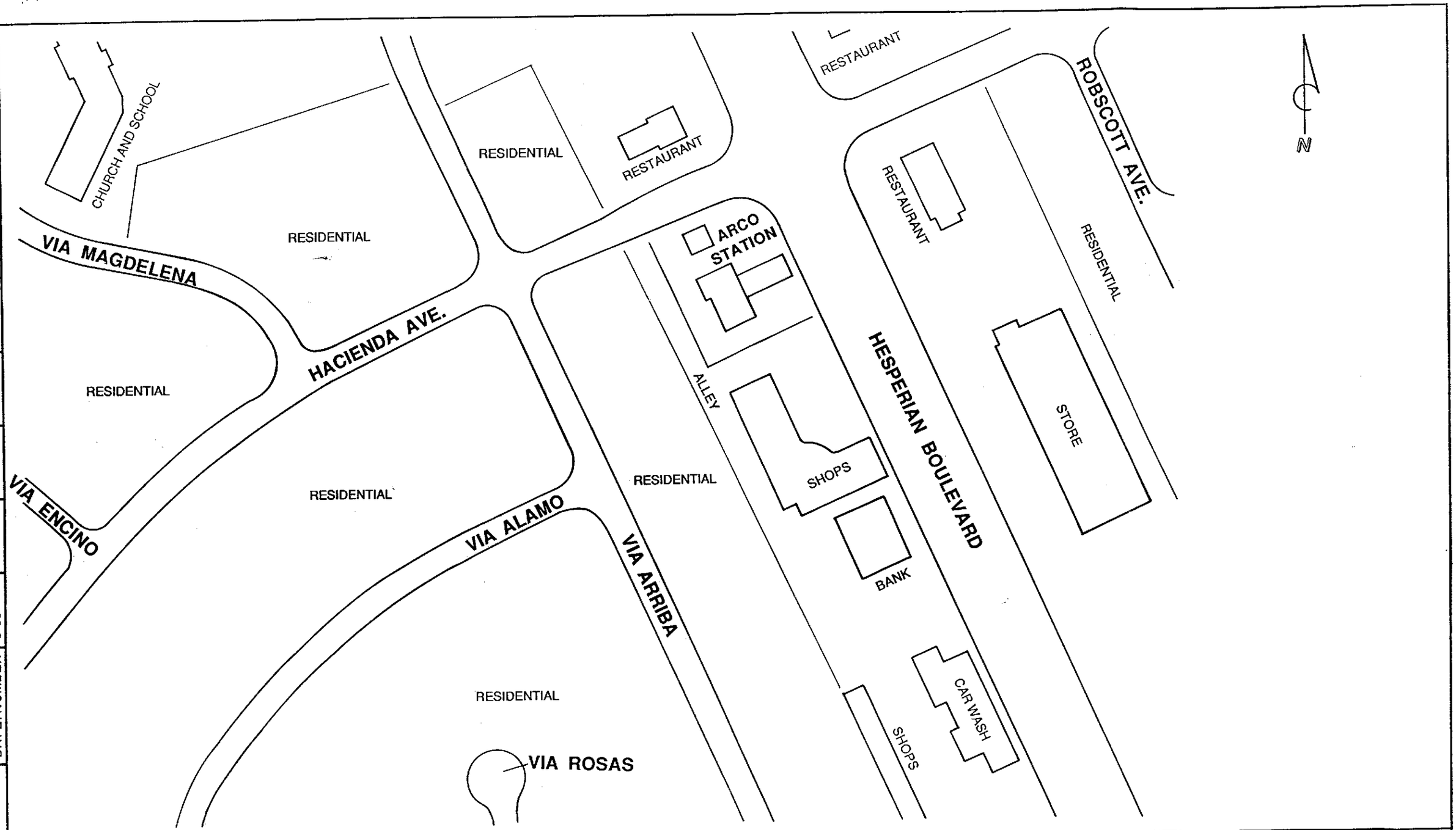
SITE LOCATION MAP

FIGURE: 1

PROJECT: 330-06.06

PROJECT NUMBER 330-06.06

REVISIONS | DRAWN BY ET | DATE/NUMBER 9-88



PACIFIC ENVIRONMENTAL GROUP, INC.

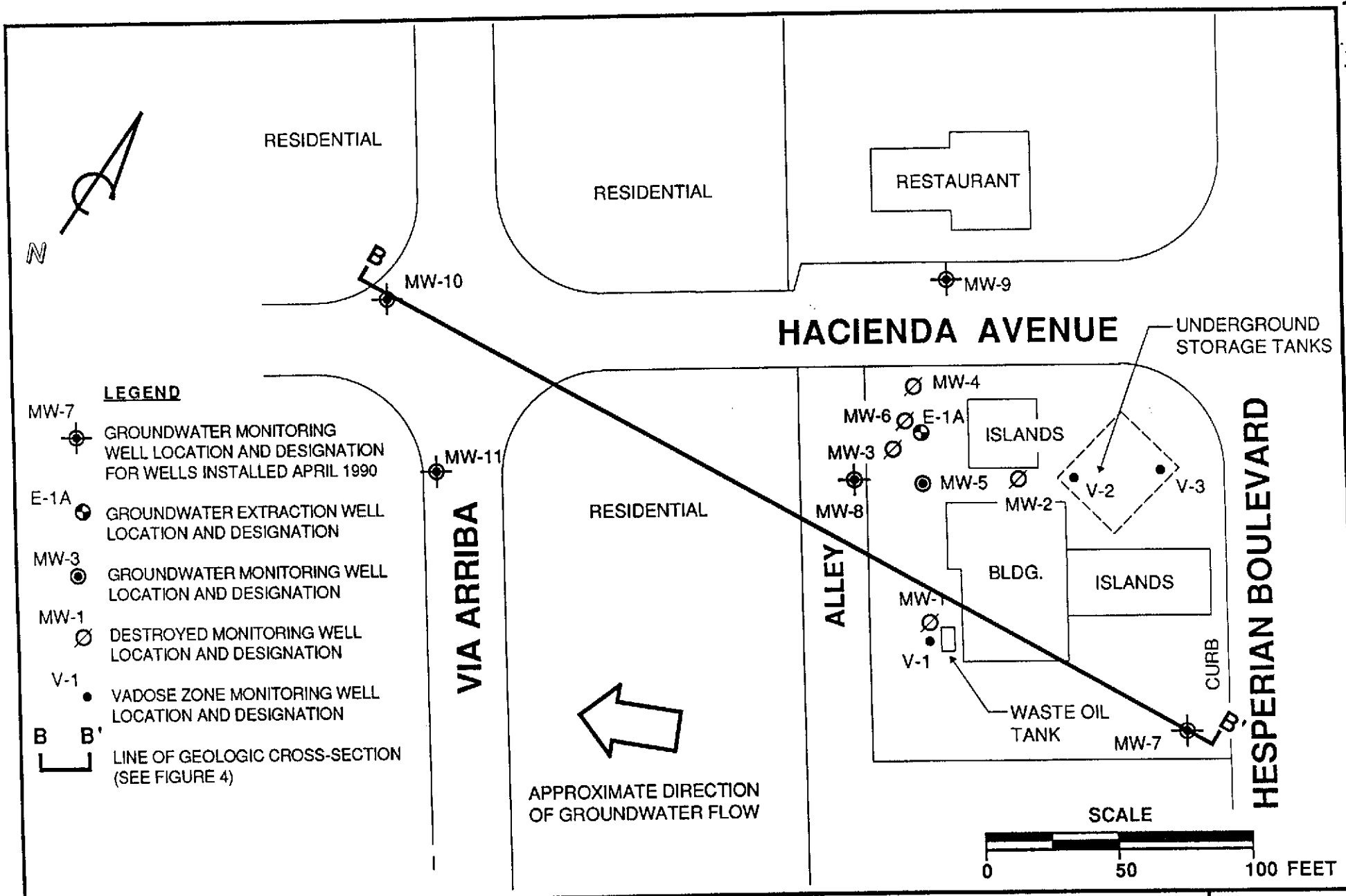
APPROXIMATE SCALE
0 100 200 FEET

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

EXTENDED SITE MAP

FIGURE: 2

PROJECT: 330-06.06



PACIFIC ENVIRONMENTAL GROUP, INC.

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

SITE MAP

FIGURE: 3

PROJECT: 330-06.06

WEST

B

EAST

B'

MW-10 (31.67)

MW-11 (32.54) Proj. 45'N

MW-8 (32.79) Proj. 20'S

MW-1 (Destroyed) Proj. 10'N

MW-7 (34.40)

30

20

10

0

ELEVATION IN FEET - MSL

SCREENED INTERVAL

SAND PACKED INTERVAL

?

LEGEND

MW-7 MONITORING WELL DESIGNATION

(34.40) ELEVATION IN FEET - MSL

STATIC GROUNDWATER LEVEL, (4-13-90)

CLAY AND SILT (CH, CL, ML)

CLAYEY AND SILTY SAND (SC, SM)

PROJECT NUMBER

DRAWN BY

DATE/NUMBER

REVISIONS

PACIFIC ENVIRONMENTAL GROUP, INC.

SCALE

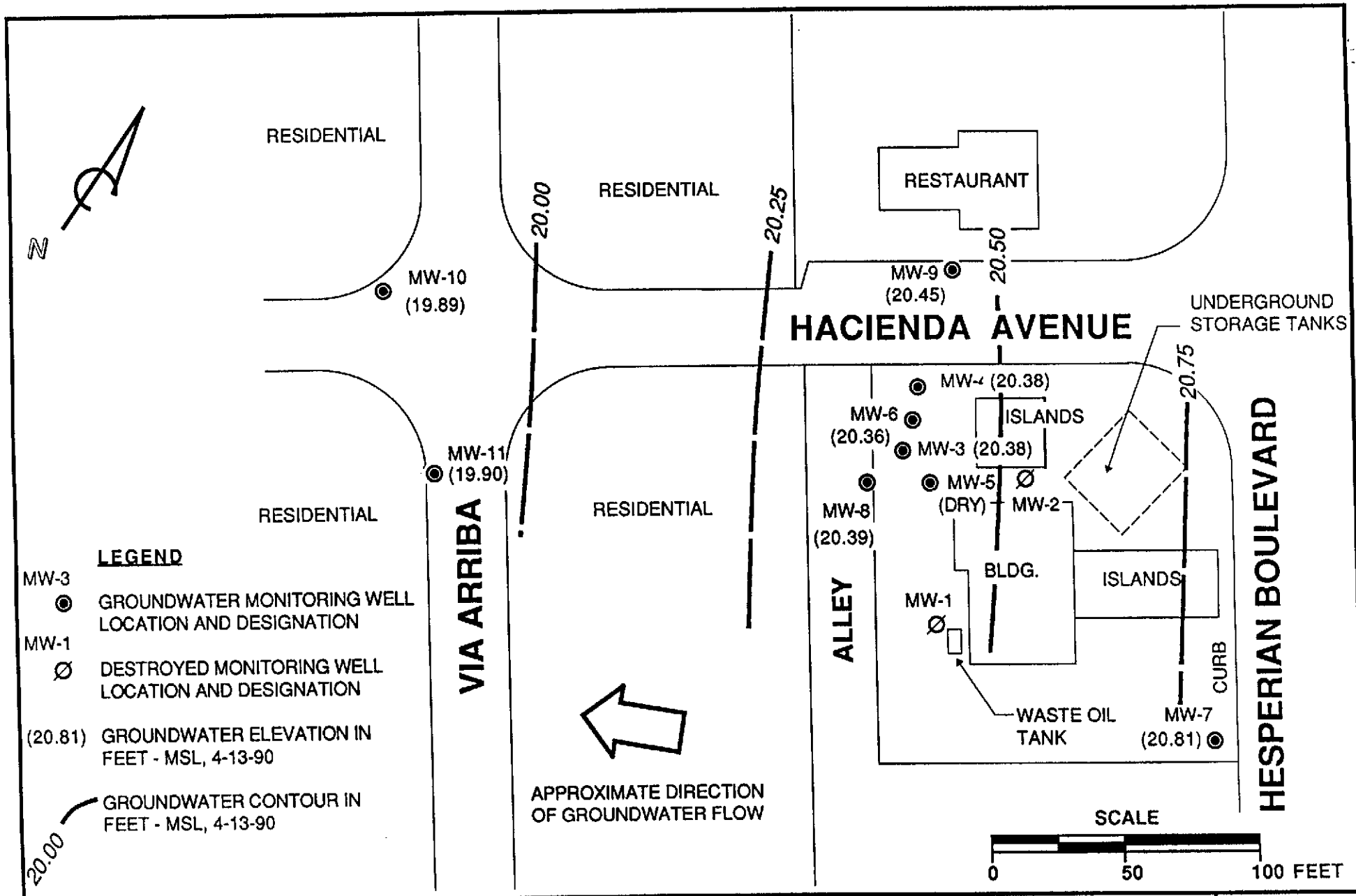
HORIZONTAL 1" = 30'
VERTICAL 1" = 5'

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

CROSS SECTION B-B'

FIGURE: 4

PROJECT: 330-06.06



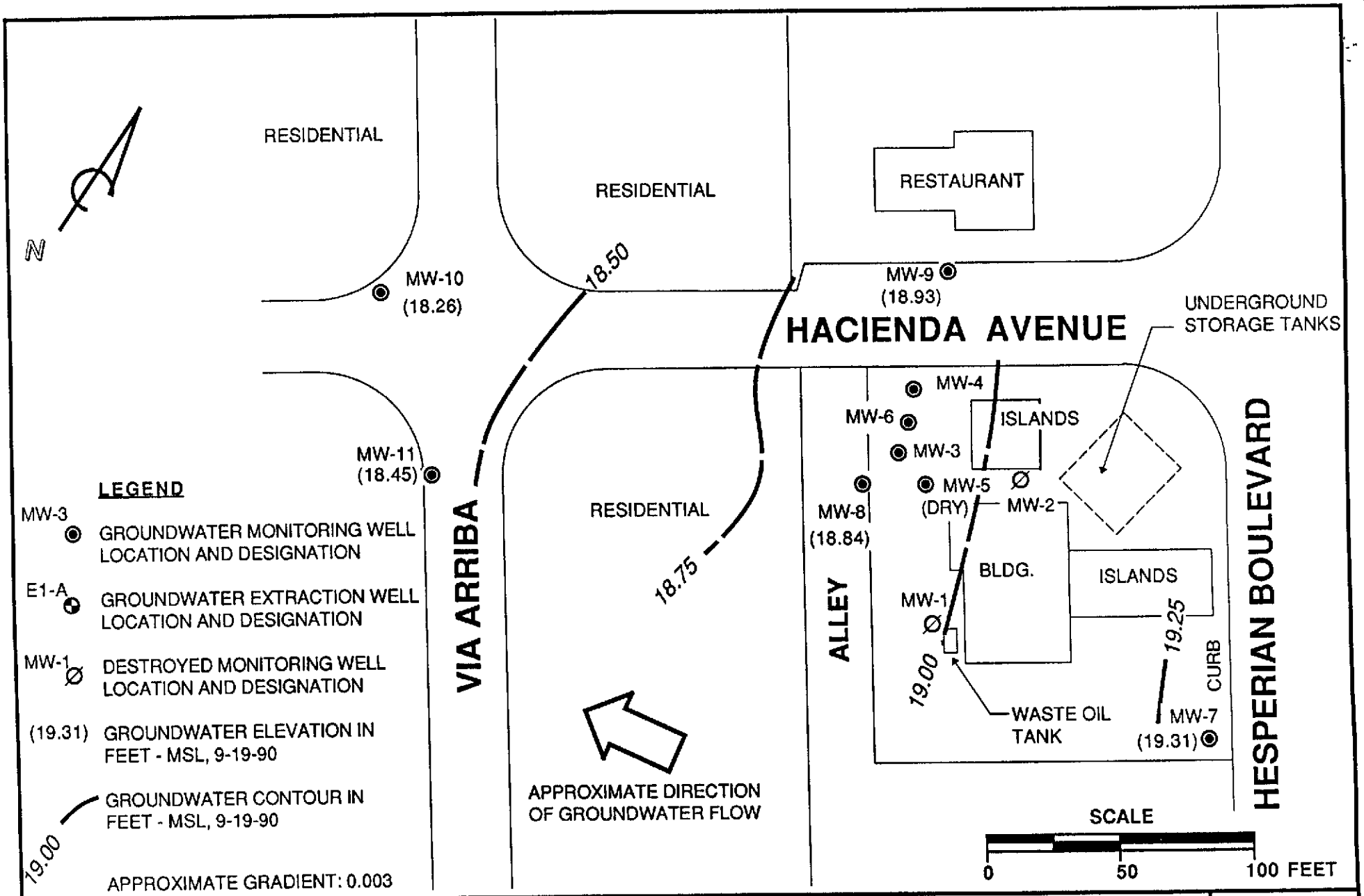
PACIFIC ENVIRONMENTAL GROUP, INC.

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

GROUNDWATER CONTOUR MAP (APRIL 1990)

FIGURE: 5

PROJECT: 330-06.06

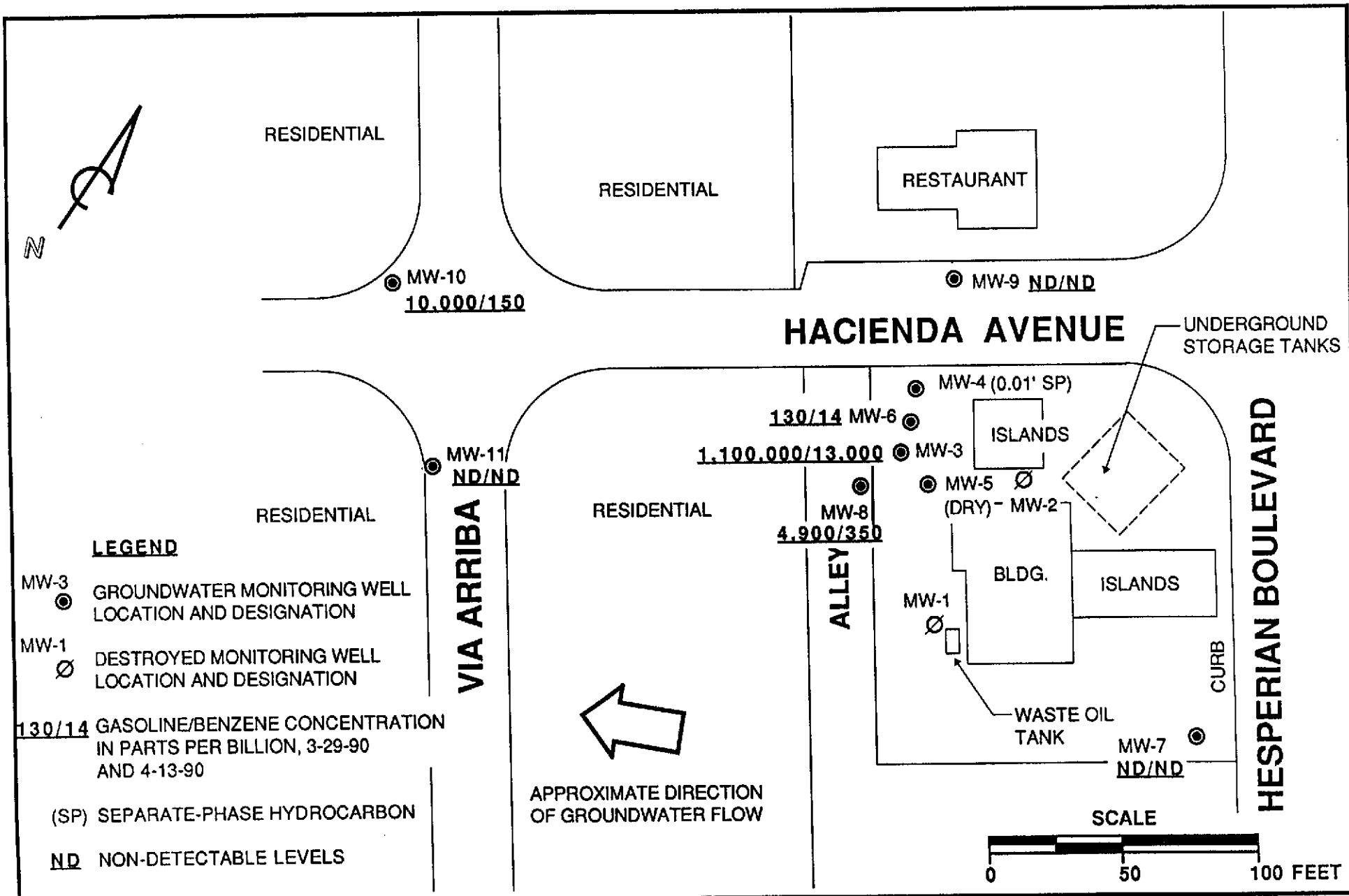


PACIFIC ENVIRONMENTAL GROUP, INC.

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

GROUNDWATER CONTOUR MAP (SEPTEMBER 1990)

FIGURE: 6
PROJECT: 330-06.06



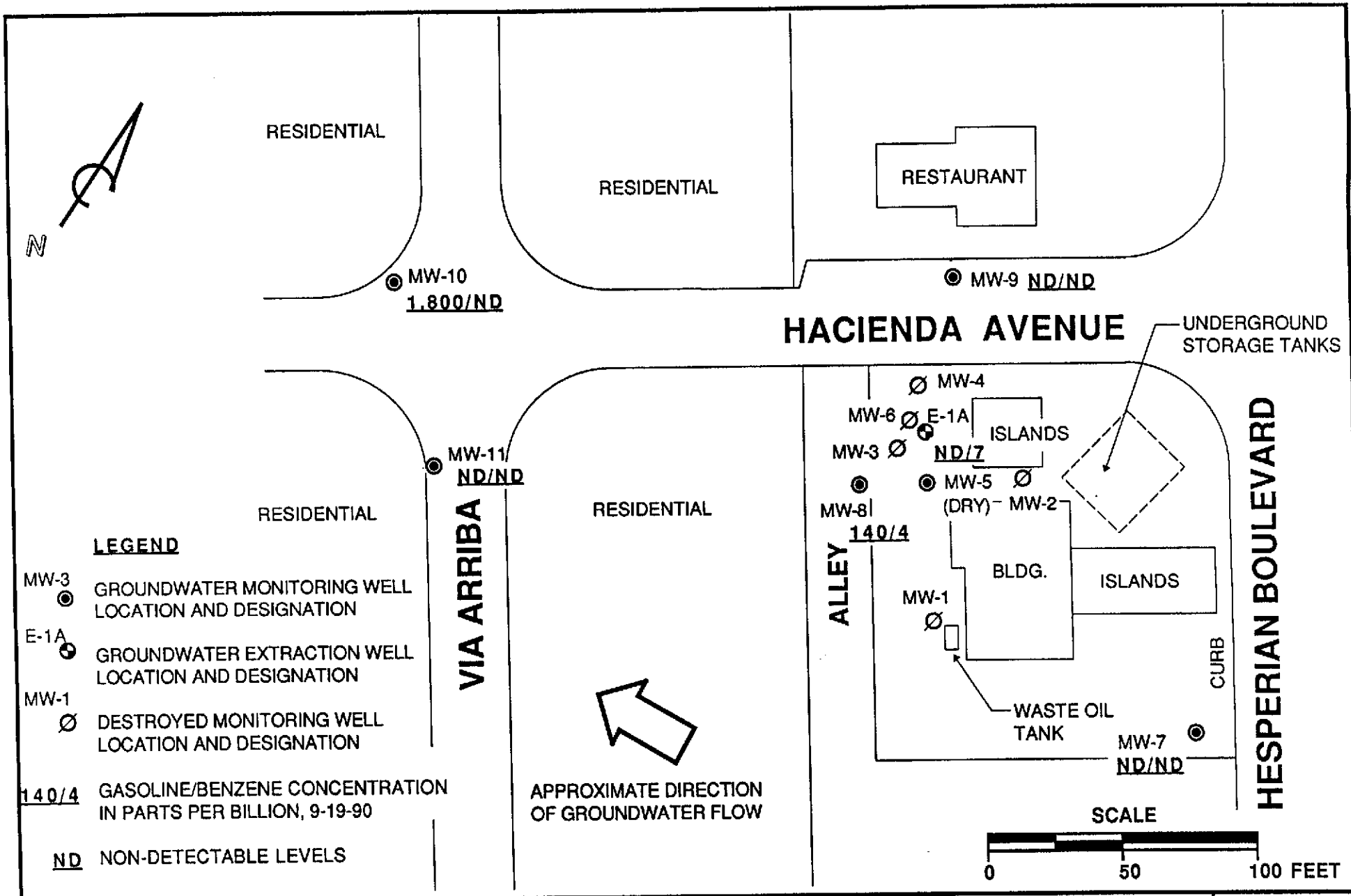
PACIFIC ENVIRONMENTAL GROUP, INC.

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

DISSOLVED GASOLINE/BENZENE CONCENTRATION MAP (APRIL 1990)

FIGURE: 7

PROJECT: 330-06.06



PACIFIC ENVIRONMENTAL GROUP, INC.

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

DISSOLVED GASOLINE/BENZENE CONCENTRATION MAP (SEPTEMBER 1990)

FIGURE:
8

PROJECT:
330-06.06

Unified Soil Classification System

Primary Divisions			Group Symbol/Graphic	Typical Names
COARSE GRAINED SOILS more than half is larger than #200 sieve	GRAVELS half of coarse fraction larger than #4 sieve	CLEAN GRAVELS (less than 5% fines)	G W	Well graded gravels, gravel-sand mixtures; little or no fines
			G P	Poorly graded gravels or gravel-sand mixtures; little or no fines
		GRAVEL WITH FINES	G M	Silty gravels, gravel-sand-silt mixtures
			G C	Clayey gravels, gravel-sand-clay mixtures
	SANDS half of coarse fraction smaller than #4 sieve	CLEAN SANDS (less than 5% fines)	S W	Well graded sands, gravelly sands, little or no fines
			S P	Poorly graded sands or gravelly sands, little or no fines
		SANDS WITH FINES	S M	Silty sands, sand-silt mixtures
			S C	Clayey sands, sand-clay mixtures, plastic fines
FINE GRAINED SOILS more than half is smaller than #200 sieve	SILTS AND CLAYS liquid limit less than 50%		M L	Inorganic silts and very fine sand, rock flour, silty or clayey fine sands or clayey silts, with slight plasticity
			C L	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			O L	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS liquid limit more than 50%		M H	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			C H	Inorganic clays of high plasticity, fat clays
			O H	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			P t	Peat and other highly organic soils

Pacific Environmental Group, Inc.

WELL LOG
KEY TO ABBREVIATIONS

Drilling Method
- HSA - Hollow stem auger
- CFA - Continuous flight auger
- Air - Reverse air circulation

Gravel Pack
- CA - Coarse aquarium sand

Sampling Method
- Cal. Mod. - California modified split-spoon sampler (2" inner diameter) driven 18" by a 140-pound hammer having a 30" drop. Where penetration resistance is designated "P," sampler was instead pushed by drill rig.
- Disturbed - Sample taken from drill-return materials as they surfaced.
- n/a - Not applicable.

Moisture Content
- Dr - Dry
- Dp - Damp
- Mst - Moist
- Wt - Wet
- Sat - Saturated

Sorting
- PS - Poorly sorted
- MS - Moderately sorted
- WS - Well sorted

Plasticity
- L - Low
- M - Moderate
- H - High

H-NU (ppm)
- ND - No detection

Symbols
- ▽ - First encountered ground water
- ▼ - Static ground water level

Density

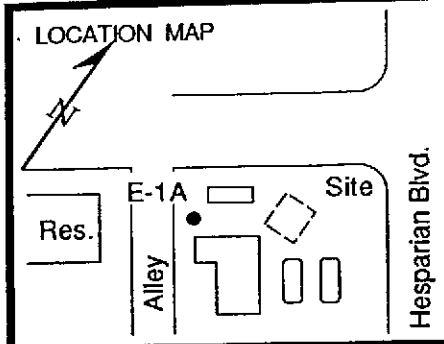
Sands and gravels		Silts and clays	
0 - 4	- Very Loose	0 - 2	- Very Soft
5 - 10	- Loose	3 - 4	- Soft
11 - 30	- Medium dense	5 - 8	- Firm
31 - 50	- Dense	9 - 16	- Stiff
over 50	- Very dense	17 - 32	- Very stiff
		over 32	- Hard

GRAIN-SIZE SCALE

GRADE LIMITS inches	GRADE LIMITS U.S. Standard sieve size	GRADE NAME
		Boulders
12.0		
		Cobbles
3.0	3.0 in.	
		Gravel
0.19	No. 4	
	coarse	
0.08	No. 10	
	medium	Sand
	No. 40	
	fine	
	No. 200	
		Silt
		Clay Size

PACIFIC ENVIRONMENTAL GROUP, INC.

LOCATION MAP



PACIFIC ENVIRONMENTAL GROUP, INC.

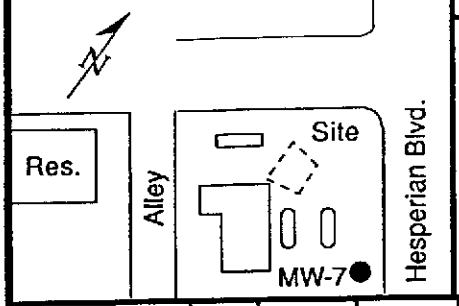
WELL / E-1A
BORING NO.
PAGE 1 OF 1

PROJECT NO. 330-06.08
LOGGED BY: JC
DRILLING METHOD: HSA
SAMPLING METHOD: CAL MOD
CASING TYPE: Sch 40 PVC
SLOT SIZE: 0.020"
GRAVEL PACK: 12 X 2 SAND

CLIENT: ARCO
DATE DRILLED: 7-18-90
LOCATION: San Lorenzo
HOLE DIAMETER: 12"
HOLE DEPTH: 27'
WELL DEPTH: 26'
WELL DIAMETER: 6"

WELL COMPLETION	MOISTURE CONTENT	H-NU READING (PPM)	PENETRATION RESISTANCE (BLOWS/FT)	DEPTH (FEET)	SAMPLE	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS
CEMENT				2			CL	CLAY; black; moderate plasticity; 10-15% silt and fine sand; trace coarse sand; very stiff; no product odor. @3': brown. @5': medium brown; 10-20% silt and fine sand; light gray
	Mst	1	37	6				
				8				
BENTONITE	Mst	18	28	10			SM	SILTY SAND; light bluish gray; 15-20% silt; fine sand; trace coarse sand; 5-10% gravel; medium dense; no product odor.
				12				
SAND				14				
	V Mst	160	18	16			CL-CH	CLAY; bluish gray; moderate to high plasticity; 10-15% silt and fine sand; gray mottling; very stiff; faint product odor.
	Wt	0	15	18			SM-ML	SILTY SAND; medium brown; some clay; 30-40% silt; very fine sands; medium dense; no product odor.
	Mst	0	24	20			CL	CLAY; grayish brown; moderate plasticity; 10-20% silt and fine sand; iron oxide mottling; manganese oxide; stiff; no product odor.
	V Mst	0	PUSH	22				
				24				
	V Mst	0	17	26				@25.5': light grayish brown; moderate plasticity; 20-25% silt and fine sand.
				28				BOTTOM OF BORING AT 27'
				30				
				32				
				34				
				36				
				38				
				40				
				42				
				44				

LOCATION MAP



PACIFIC ENVIRONMENTAL GROUP, INC.

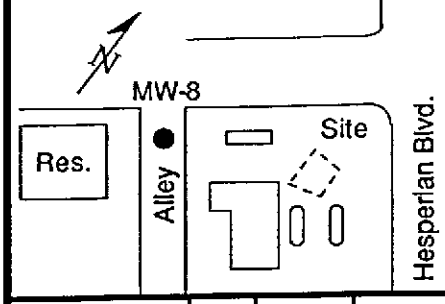
WELL / MW-7
BORING NO.
PAGE 1 OF 1

PROJECT NO. 330-06.06
LOGGED BY: DKU/JC
DRILLING METHOD: HSA
SAMPLING METHOD: CAL MOD
CASING TYPE: Sch 40 PVC
SLOT SIZE: 0.020"
GRAVEL PACK: 12 X 20 SAND

CLIENT: ARCO
DATE DRILLED: 3-29-90
LOCATION: San Lorenzo
HOLE DIAMETER: 8"
HOLE DEPTH: 22'
WELL DEPTH: 19'
WELL DIAMETER: 3"

WELL COMPLETION	MOISTURE CONTENT	H-NU READING (PPM)	PENETRATION RESISTANCE (BLOWS/FT)	DEPTH (FEET)	SAMPLE	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS
CEMENT				2			SC	FILL; asphalt. CLAYEY SAND - FILL; medium to light brown; 20-30% fines; 20-40% sub-angular gravel; iron oxide staining; dense; no product odor.
	Dp	29.0	21	4			CH	CLAY; dark brown; 5-10% fine sand altered; very stiff; no product odor.
				6				@5.5': light yellowish brown; 10-20% fine sand; platy; shell fragments; very stiff; no product odor.
BENTONITE				8			ML	SILT; dark greenish gray; firm; no product odor.
	Mst	15.0	7	10				
SAND				12				
	Mst	13.0	12	14			CL	CLAY; yellowish brown; 20-40% fines sand; iron oxide black specks; mottled; rootholes; stiff; no product odor.
				16				
				18				
NATURAL CLAY	Dp	12.0	20	20			ML	SILT; as above.
	Wt	–	9	22			SM	SILTY SAND; medium brownish yellow; poorly graded; low to moderate plasticity; loose; no product odor.
				24				
				26				BOTTOM OF BORING AT 22'
				28				WELL ELEVATION 34.40' - MSL
				30				
				32				
				34				
				36				
				38				
				40				
				42				
				44				

LOCATION MAP



PACIFIC ENVIRONMENTAL GROUP, INC.

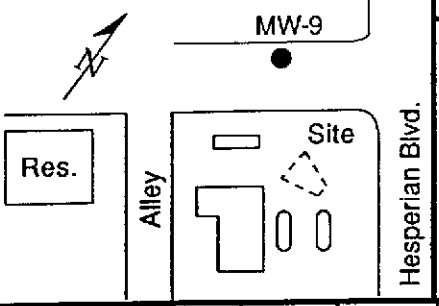
WELL / MW-8
BORING NO.
PAGE 1 OF 1

PROJECT NO. 330-06.06
LOGGED BY: DKU/JC
DRILLING METHOD: HSA
SAMPLING METHOD: CAL MOD
CASING TYPE: Sch 40 PVC
SLOT SIZE: 0.020"
GRAVEL PACK: 12 X 20 SAND

CLIENT: ARCO
DATE DRILLED: 3-29-90
LOCATION: San Lorenzo
HOLE DIAMETER: 8"
HOLE DEPTH: 21.5'
WELL DEPTH: 21.5'
WELL DIAMETER: 3"

WELL COMPLETION	MOISTURE CONTENT	H-NU READING (PPM)	PENETRATION RESISTANCE (BLOWS/FT)	DEPTH (FEET)	SAMPLE	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS
CEMENT				2			SC	FILL; asphalt.
							CL	CLAYEY SAND - FILL; light brown; 30-45% gravel.
							CH	CLAY; dark brown.
				4				CLAY; yellowish brown to very dark brown; concretions; roots; .25" bed clayey sand;
	Dp	16.0	14	6				@4.5': shell fragments; light gray patches (3-5 mm); stiff; no product odor.
				8				
BENTONITE	Mst	21.0	10	10				@10': 1/2" to 1" organic layers.
				12			SM	SILTY SAND; medium greenish gray; 40% silt and clay; 50% fine sand; 10% medium sand; loose; no product odor.
SAND	V. Mst	2.0	12	14				
				16			CL	CLAY; greenish gray with brown clay; moderate plasticity; 30-40% fine sand; black specks; iron oxide stains; stiff; no product odor.
	V. Mst	12.0	17	18				
				20				@20': yellowish brown; moderate to high plasticity; 10-15% fine sand; black 3-5 mm specks; shell fragments; very stiff; no product odor.
				22				
				24				
				26				BOTTOM OF BORING AT 21.5'
				28				WELL ELEVATION 32.79' - MSL
				30				
				32				
				34				
				36				
				38				
				40				
				42				
				44				

LOCATION MAP



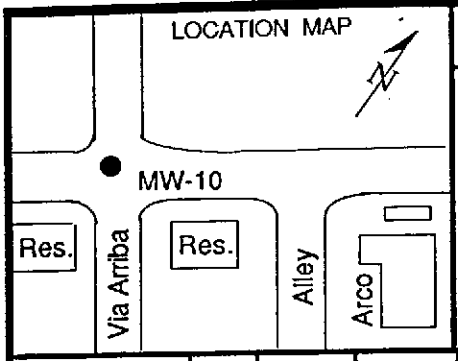
PACIFIC ENVIRONMENTAL GROUP, INC.

WELL / MW-9
BORING NO.
PAGE 1 OF 1

PROJECT NO. 330-06.06
LOGGED BY: JC/DKU
DRILLING METHOD: HSA
SAMPLING METHOD: CAL MOD
CASING TYPE: Sch 40 PVC
SLOT SIZE: 0.020"
GRAVEL PACK: 12 X 20 SAND

CLIENT: ARCO
DATE DRILLED: 4-5-90
LOCATION: San Lorenzo
HOLE DIAMETER: 8"
HOLE DEPTH: 22.0'
WELL DEPTH: 19.5'
WELL DIAMETER: 3"

WELL COMPLETION	MOISTURE CONTENT	H-NU READING (PPM)	PENETRATION RESISTANCE (BLOWS/FT)	DEPTH (FEET)	SAMPLE	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS
CEMENT				2			CL	FILL; asphalt; very compacted gravel at 6". CLAY; very dark gray to black; moderate plasticity; 10-15% gravel; 15-30% fine to medium sand; stiff; no product odor.
	Mst	4.0	PUSH	4				
BENTONITE				6			CH	CLAY; dark yellowish brown; moderate to high plasticity; 20% fine sand; weak platy structure; vertical gray alteration; interbedded with black clay.
				8			SM	SILTY SAND; dark greenish gray; 10-20% silt and clay; loose; faint product odor.
SAND	Mst	3.0	6	10				
				12			CL	CLAY; yellowish brown; low to moderate plasticity; 20-40% fine sand and silt; 0.5-1.5 cm rootholes; wet with gray coating; black specks; firm; no product odor.
	Wt	0.0	8	14				
				16				
				18				@19': rootholes smaller; iron and mangenese oxide; trace of coarse sand; stiff; no product odor.
NATURAL CLAY	Wt	0.0	20	20				
				22			SM	SILTY SAND; yellowish brown.
				24				BOTTOM OF BORING AT 22'
				26				WELL ELEVATION 32.11' - MSL
				28				
				30				
				32				
				34				
				36				
				38				
				40				
				42				
				44				



PACIFIC ENVIRONMENTAL GROUP, INC.

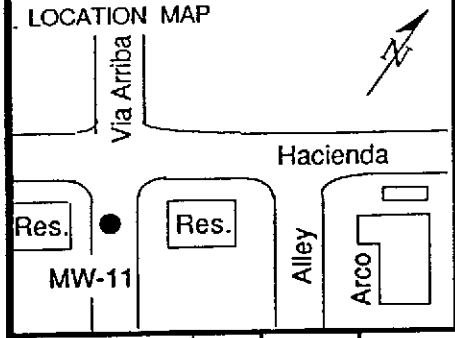
WELL / MW-10
BORING NO.
PAGE 1 OF 1

PROJECT NO. 330-06.06
LOGGED BY: JC
DRILLING METHOD: HSA
SAMPLING METHOD: CAL MOD
CASING TYPE: Sch 40 PVC
SLOT SIZE: 0.020"
GRAVEL PACK: 12 X 20 SAND

CLIENT: ARCO
DATE DRILLED: 4-5-90
LOCATION: San Lorenzo
HOLE DIAMETER: 8"
HOLE DEPTH: 25.5'
WELL DEPTH: 23.0'
WELL DIAMETER: 3"

WELL COMPLETION	MOISTURE CONTENT	H-NU READING (PPM)	PENETRATION RESISTANCE (BLOWS/FT)	DEPTH (FEET)	SAMPLE	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS
CEMENT	Mst	0.0	PUSH	2			CL	FILL; asphalt.
				4				CLAY; dark brown to brown; moderate plasticity; 10-20% fine sand; trace of coarse sand; weak platy structure; rootholes; firm; no product odor.
				6				
				8				
	Mst	0.0	10	10				@9': fine to medium grained poorly graded sand; 6" sand layer; 10-20% silt; clay in sand layer.
				12			SM-ML	SILTY SAND to SILT; dark greenish gray; extensive iron oxide stain; rootholes.
SAND / BENTONITE	Wt	8.0	12	14			ML	SILT; dark greenish gray; some clay; 30-40% fine sand; stiff; no product odor.
				16				
				18				
	Wt	1.0	6	20			CH	CLAY; medium brown to gray; high plasticity; 30-40% fine sand; vertical veins of gray silt - clay; firm; no product odor.
				22				
	Wt	0.0	12	24			SM	@24': firm; black oxidation on sand grains; light brown colored zones.
				26				SILTY SAND; brown; interbedded with clay; 10-20% silt and clay; iron oxide; medium dense; no product odor.
				28				
				30				BOTTOM OF BORING AT 25.5'
				32				WELL ELEVATION 31.67' - MSL
				34				
				36				
				38				
				40				
				42				
				44				

LOCATION MAP



PACIFIC ENVIRONMENTAL GROUP, INC.

WELL / MW-11
BORING NO.
PAGE 1 OF 1

PROJECT NO. 330-06.06
LOGGED BY: JC
DRILLING METHOD: HSA
SAMPLING METHOD: CAL MOD
CASING TYPE: Sch 40 PVC
SLOT SIZE: 0.020"
GRAVEL PACK: 12 X 20 SAND

CLIENT: ARCO
DATE DRILLED: 4-5-90
LOCATION: San Lorenzo
HOLE DIAMETER: 8"
HOLE DEPTH: 20.5'
WELL DEPTH: 19.5'
WELL DIAMETER: 3"

WELL COMPLETION	MOISTURE CONTENT	H-NU READING (PPM)	PENETRATION RESISTANCE (BLOWS/FT)	DEPTH (FEET)	SAMPLE	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS
CEMENT				2			CL	FILL; asphalt. CLAY; yellowish brown; moderate plasticity; 10-25% fine sand; roots present; platy structure; trace coarse sand and gravel; scarce iron oxide alteration; firm; no product odor.
BENTONITE	Mst	0.0	PUSH	4				
				6				
				8				
	Mst	0.0	7	10			SM	SILTY SAND; yellowish brown; 15-25% clay, silt and fine sand; trace oxidized black coarse sand; loose; no product odor.
SAND				12				
	Wt	1.0	3	14			CL	CLAY; very dark grayish brown; 30-40% silt and fine sand; moderate plasticity; very soft; no product odor.
				16			ML	SILT; light brown; 10-25% clay; 20-30% fine sand; very stiff; no product odor.
				18				
NATURAL CLAY	Mst	0.0	19	20			CL	CLAY; brown; moderate plasticity; 10-15% silt and fine sand; 1-3 millimeter black specks; very stiff; no product odor.
				22				
				24				
				26				
				28				
				30				
				32				
				34				
				36				
				38				
				40				
				42				
				44				

BOTTOM OF BORING AT 20.5'
WELL ELEVATION 32.54' - MSL

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

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 10619
CLIENT: Pacific Environmental Group
CLIENT JOB NO.: 330-06.06

DATE RECEIVED: 04/03/90
DATE REPORTED: 04/17/90

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

LAB #	Sample Identification	Concentration (mg/kg) Gasoline Range
1	MW-08 10'-11.5'	ND<2

mg/kg - parts per million (ppm)

Minimum Detection Limit for Gasoline in Soil: 2mg/kg

QAQC Summary:

Daily Standard run at 2mg/L: RPD Gasoline = <15%
MS/MSD Average Recovery =118%: Duplicate RPD = <10%

Comments: Late eluting hydrocarbons. Possibly low level diesel fuel.

Richard Srna, Ph.D.
Laboratory Director

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

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 10619
CLIENT: Pacific Environmental Group
CLIENT JOB NO.: 330-06.06

DATE RECEIVED: 04/03/90
DATE REPORTED: 04/17/90

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

LAB #	Sample Identification	Concentration(ug/kg) Benzene	Toluene	Ethyl Benzene	Xylenes
1	MW-08 10'-11.5'	ND<3	ND<3	ND<3	ND<3

ug/kg - parts per billion (ppb)

Minimum Detection Limit in Soil: 3.0ug/kg

QAQC Summary:

Daily Standard run at 20ug/L: RPD = <15%
MS/MSD Average Recovery = 100% : Duplicate RPD = <4%

Richard Srna, Ph.D.
Laboratory Director

SAMPLING/ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Project No.: 330-06.06 Requested By: DEB MOSER P.O. No.: 12698

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-8 9.10	GAS/BTEX	2x4" BRASS RING	1	ICE	SUP	4-12	JOHNC	3-29-90			

SIGNATURES:

Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time	Turn Around Time (Circle Choice)
[signature]	P.E.G		[signature] 4-3-90 1635 0921			24 Hrs
Relinquished By (Signature)	Organization	Date/Time	Received By (Signature) [signature] 1635 0921	Organization	Date/Time	48 Hrs
Relinquished By (Signature)	Organization	Date/Time	Received For Laboratory By (Signature)		Date/Time	5 Days 10 Days Standard

PACIFIC ENVIRONMENTAL GROUP, INC.

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

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 51917
CLIENT: Pacific Environmental Group
CLIENT JOB NO.: 330-06.06

DATE RECEIVED: 04/09/90
DATE REPORTED: 04/18/90

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

LAB #	Sample Identification	Concentration (mg/kg) Gasoline Range
1	MW-9 9-10.5'	ND<1
2	SPOILS	ND<1

mg/kg - parts per million (ppm)

Minimum Detection Limit for Gasoline in Soil: 1mg/kg

QAQC Summary:

Daily Standard run at 2mg/L: RPD Gasoline = <15%
MS/MSD Average Recovery = 118%: Duplicate RPD = 10%

Richard Srna, Ph.D.
Laboratory Director

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

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 51917
CLIENT: Pacific Environmental Group
CLIENT JOB NO.: 330-06.06

DATE RECEIVED: 04/09/90
DATE REPORTED: 04/18/90

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

LAB #	Sample Identification	Concentration(ug/kg) Benzene	Toluene	Ethyl Benzene	Xylenes
1	MW-9 9-10.5'	ND<3	ND<3	ND<3	6
2	SPOILS	ND<3	ND<3	ND<3	4

ug/kg - parts per billion (ppb)

Minimum Detection Limit in Soil: 3.0ug/kg

QAQC Summary:

Daily Standard run at 20ug/L: RPD = <15%
MS/MSD Average Recovery = 100% : Duplicate RPD = <4%

Richard Orma, Ph.D.
Laboratory Director

SA # 51917

SAMPLING/ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Project No.: 330 06.06 Requested By: DEB MOSER P.O. No.: 12739

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
9-10.5' MW-9	GAS/BTEX	2" x 4" BRASS	1	ICE	SUP		JC	4-5-90			
SPOILS	GAS/BTEX	↓	3	ICE	SUP		JC	4-5-90			
		MAKE	COMPOSITE	OF	SPOILS						
			3 INTO	1							

SIGNATURES:

Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time	Turn Around Time (Circle Choice)
John Conaway	PEG	4-9-90 2PM	[signature]	Express 1+	1/10/710	24 Hrs
Relinquished By (Signature): [signature]	Organization: EXP. 1+	Date/Time: 4-9-	Received By (Signature)	Organization	Date/Time	48 Hrs
Relinquished By (Signature)	Organization	Date/Time	Received For Laboratory By (Signature): W.D. Hollenberg		Date/Time: 4/9/90 5:30	(5 Days)
						10 Days

PACIFIC ENVIRONMENTAL GROUP INC

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

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 51865
CLIENT: Pacific Environmental Group
CLIENT JOB NO.: 330-06.05

DATE RECEIVED: 03/29/90
DATE REPORTED: 04/08/90

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

LAB #	Sample Identification	Concentration (mg/l) Gasoline Range
1	E-1	0.13
2	MW-3	1100

mg/L - parts per million (ppm)

Minimum Detection Limit for Gasoline in Water: 0.05mg/L

QAQC Summary:

Daily Standard run at 2mg/L: RPD Gasoline = <15 %
MS/MSD Average Recovery = 80%: Duplicate RPD = 3 %

Richard Srna, Ph.D.
Laboratory Director

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

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 51865
CLIENT: Pacific Environmental Group
CLIENT JOB NO.: 330-06.05

DATE RECEIVED: 03/29/90
DATE REPORTED: 04/08/90

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	E-1	14	9	4	11
2	MW-3	13000	60000	17000	91000

ug/L - parts per billion (ppb)

Minimum Detection Limit in Water:0.3ug/L

QAQC Summary:

Daily Standard run at 20ug/L: RPD = <15%
MS/MSD Average Recovery = 92% : Duplicate RPD = <2%

Richard Srna, Ph.D.
Laboratory Director

SAMPLING/ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Project No.: 330-06.05 Requested By: Lainie Demian P.O. No.: 12683

REQUEST		LABORATORY REQUIREMENTS					CHAIN OF CUSTODY		CONTRACT LABORATORY		
SAMPLE TYPE: water		CONTAINERS					SAMPLER'S SIGNATURE: [signature]				
SAMPLE I.D.	PARAMETERS	SIZE/TYPE	QUANTITY	PRES.	LAB	DUE DATE	SAMPLER	SAMPLE DATE	REC'D BY	COMMENTS	DATE REC'D
E-1	Gas/BTEX	40ml VOA	3	HCl	Superior	4/12/90	Scott Pisle	3-29-90			
MW-3	↓	↓	↓								

SIGNATURES:

RELEASED BY: [signature] 3-29-90 1:30 RELEASED BY: ______ RELEASED BY: ______

RECEIVED BY: [signature] RECEIVED BY: ______ RECEIVED BY: ______

RELEASED BY: ______ RELEASED BY: ______ RELEASED BY: ______

RECEIVED BY: ______ RECEIVED BY: ______ RECEIVED BY LAB: [signature] 3/29/90

PACIFIC ENVIRONMENTAL GROUP, INC.

SUPERIOR ANALYTICAL LABORATORY, INC.

1555 BURKE, UNIT I · SAN FRANCISCO, CA 94124 · PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 51944
CLIENT: Pacific Environmental Group
CLIENT JOB NO.: 330-06.06

DATE RECEIVED: 04/16/90
DATE REPORTED: 04/30/90

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	ND<50
2	MW-8	4900
3	MW-9	ND<50
4	MW-10	10000
5	MW-11	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: RPD Gasoline = <15%
MS/MSD Average Recovery = 75%: Duplicate RPD = 6%

Richard Srna, Ph.D.

Laboratory Director

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

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 51944
CLIENT: Pacific Environmental Group
CLIENT JOB NO.: 330-06.06

DATE RECEIVED: 04/16/90
DATE REPORTED: 04/30/90

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	ND<0.3	ND<0.3	ND<0.3
2	MW-8	350	16	450	33
3	MW-9	ND<0.3	ND<0.3	ND<0.3	2
4	MW-10	150	4	280	200
5	MW-11	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: RPD = <15%
MS/MSD Average Recovery = 100% : Duplicate RPD = 5%

Richard Srna, Ph.D.
Laboratory Director

SAMPLING/ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Project No.: 330-06.06 Requested By: Lanie Denton P.O. No.: 12800

REQUEST		LABORATORY REQUIREMENTS					CHAIN OF CUSTODY				
SAMPLE TYPE: Water		CONTAINERS					SAMPLER'S SIGNATURE Scott Risley		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	40 ml VOA	3	HCl	Sequoia	4-30-90	Scott Risley	4-13-90			
MW-8	↓	↓	↓	↓	↓	↓	↓	↓			
MW-9											
MW-10											
MW-11											

SIGNATURES:

RELEASED BY: Scott Risley 4-16-90 13:56 RELEASED BY: _____ RELEASED BY: _____

RECEIVED BY: Bill Mourning RECEIVED BY: _____ RECEIVED BY: _____

RELEASED BY: E Liddle 4-16-90 1540 RELEASED BY: _____ RELEASED BY: _____

RECEIVED BY: _____ RECEIVED BY: _____ RECEIVED BY LAB: Eileen [illegible] 4/16/90 2345

PACIFIC ENVIRONMENTAL GROUP, INC.

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

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 52522
CLIENT: Pacific Environmental Group
CLIENT JOB NO.: 330-06.05

DATE RECEIVED: 09/21/90
DATE REPORTED: 09/27/90

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	ND<50
2	Mw-8	140
3	Mw-9	ND<50
4	Mw-10	1800
5	Mw-11	ND<50
6	Mw-12	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: RPD Gasoline = <15%
MS/MSD Average Recovery = 88%: Duplicate RPD = <1%

Richard Srna, Ph.D.
Laboratory Director

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

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 52522
CLIENT: Pacific Environmental Group
CLIENT JOB NO.: 330-06.05

DATE RECEIVED: 09/21/90
DATE REPORTED: 09/27/90

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	ND<0.3	ND<0.3	0.3
2	Mw-8	4	3	3	3
3	Mw-9	ND<0.3	ND<0.3	ND<0.3	0.6
4	Mw-10	ND<0.3	4	0.8	10
5	Mw-11	ND<0.3	ND<0.3	ND<0.3	ND<0.3
6	Mw-12	7	0.9	1	2

ug/L - parts per billion (ppb)

Minimum Detection Limit in Water:0.3ug/L

QAQC Summary:
Daily Standard run at 20ug/L: RPD = <15%
MS/MSD Average Recovery = 96% : Duplicate RPD = <4%

Richard Srna, Ph.D.
Laboratory Director

SAMPLING/ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Project No.: 330-06.05 Requested By: Lainie Demian P.O. No.: 13786

REQUEST		LABORATORY REQUIREMENTS					CHAIN OF CUSTODY				
SAMPLE TYPE: Water		CONTAINERS					SAMPLER'S SIGNATURE [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	40 ml VOA	3	HCl	Spectrum	10-5-90	Scott Fiske	9-19-90			
MW-8	↓	↓	↓	↓	↓	↓	↓	↓			
MW-9											
MW-10											
MW-11											
MW-12											
Trip Blank			1							10/25/90 Please reissue report #52522 with MW-12 identified as EI-A - Thanks. Lainie	

SIGNATURES:

Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time	Turn Around Time (Circle Choice)
[signature]	PEG	9-21-90 1102	[signature] KENNEDY KMS	EXPRESS IT	9-21-90 1102	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 Standard

PACIFIC ENVIRONMENTAL GROUP, INC.

Well Sampling Field Sheet

Client: ARCO
Project No.: 330.06.05
Location: SanLorenzo

Sampler: SP/AK
Date: 3/29/90
Sample I.D.: MW-3

Well Information

Well I.D.: MW-3

TD 14'
DTL
DTW 12.67' TOB 9:15
Calc. Purge 13.5

Diameter: 2" 3" 4" 4.5" 6" (8")
Product: Y / N / NA
Thickness:
Actual Purge: 4

Readings:

VOL (gal.)	TIME	pH (std units)	EC(µmhos)	TEMP (°F)	COLOR	ODOR
4	10:45	6.96	646	63.6	Grey	Strong

Comments: Well dry at 4 gallons. Well has a definate scum on surface of water.

Purge Method:

- [ ] Bailer
- [ ] N.A.
- [ ] Positive Displacement
- [ ] Gas Displacement
- [x] Centrifugal
- [ ] Electric Submersible
- [ ] Well Wizard
- [ ] Dedicated

Sample Method:

- [x] Bailer
- [ ] N.A.
- [ ] Positive Displacement
- [ ] Peristaltic
- [ ] Dipper
- [x] Electronic Probe
- [ ] Electric Submersible
- [ ] Well Wizard
- [ ] Dedicated
- [ ] Bell Sounder

Probe Type:

- [ ] Interface Probe

Well Sampling Field Sheet 59

Client: ARCO
Project No.: 330-06.05
Location: San Lorenzo

Sampler: SP/AK
Date: 3/29/90
Sample I.D.: MW-4

Well Information

Well I.D.: MW-4

TD 12.5'
DTL
DTW 11.72' TOB 9:10
Calc. Purge 8

Diameter: 2" 3" 4" 4.5" 6" (8")
Product: (Y) N / NA
Thickness: 0.01
Actual Purge:

Readings:

VOL (gal.)	TIME	pH (std units)	EC(µmhos)	TEMP (°F)	COLOR	ODOR

Comments: Not sampled well
Definate scum on top of water would not go away

Purge Method:
- ☐ Bailer
- ☐ N.A.

Sample Method:
- ☒ Bailer
- ☐ N.A.

Probe Type:
- ☐ Interface Probe

- ☐ Positive Displacement
- ☐ Gas Displacement
- ☒ Centrifugal
- ☐ Positive Displacement
- ☐ Peristaltic
- ☐ Dipper
- ☒ Electronic Probe

- ☐ Electric Submersible
- ☐ Well Wizard
- ☐ Dedicated
- ☐ Electric Submersible
- ☐ Well Wizard
- ☐ Dedicated
- ☐ Bell Sounder

Well Sampling Field Sheet

Client: ARCO
Sampler: SPIAK
Project No.: 330-06.5
Date: 3/29/90
Location: San Lorenzo
Sample I.D.: MW-5

Well Information

Well I.D.: MW-5
TD 13.5'
Diameter: 2" 3" (4") 4.5" 6"
DTL
Product: Y / N / NA
DTW 12.30' TOB 9:05
Thickness:
Calc. Purge
Actual Purge:

Readings:

VOL (gal.)	TIME	pH (std units)	EC(µmhos)	TEMP (°F)	COLOR	ODOR

Comments: NO Sample.

Purge Method:
- ☐ Bailer
- ☐ N.A.

Sample Method:
- ☐ Bailer
- ☐ N.A.

Probe Type:
- ☐ Interface Probe

- ☐ Positive Displacement
- ☐ Gas Displacement
- ☒ Centrifugal
- ☐ Positive Displacement
- ☐ Peristaltic
- ☐ Dipper
- ☒ Electronic Probe

- ☐ Electric Submersible
- ☐ Well Wizard
- ☐ Dedicated
- ☐ Electric Submersible
- ☐ Well Wizard
- ☐ Dedicated
- ☐ Bell Sounder

Well Sampling Field Sheet

Client: ARCO
Project No.: 330-06.05
Location: San Lorenzo

Sampler: SP/AK
Date: 3/29/90
Sample I.D.: E-1 (MW-6)

Well Information

TD 21.5'
DTL
DTW 12.39 TOB 9/12
Calc. Purge .93

Well I.D.: E-1
Diameter: 2" 3" 4" 4.5" 6" (8")
Product: Y (N) NA
Thickness:
Actual Purge: 92

Readings:

VOL (gal.)	TIME	pH (std units)	EC(µmhos)	TEMP (°F)	COLOR	ODOR
~~20 gal~~	~~1000~~	~~8.11~~		~~62.4~~	~~light brown~~	~~NO~~
30 gal	1005	~~NA~~	764	63.4	light brown	NO
60 gal	1009	7.08	756	62.9	light brown	NO
92 gal	10:16	7.00	736	62.2	clear	NO

Comments:

Purge Method:
- [ ] Bailer
- [ ] N.A.
- [ ] Positive Displacement
- [ ] Gas Displacement
- [x] Centrifugal
- [ ] Electric Submersible
- [ ] Well Wizard
- [ ] Dedicated

Sample Method:
- [x] Bailer
- [ ] N.A.
- [ ] Positive Displacement
- [ ] Peristaltic
- [ ] Dipper
- [ ] Electric Submersible
- [ ] Well Wizard
- [ ] Dedicated

Probe Type:
- [ ] Interface Probe
- [x] Electronic Probe
- [ ] Bail Sounder

Well Sampling Field Sheet

Client: Arco
Sampler: SP
Project No.: 330-06.06
Date: 4-13-90
Location: San Lorenzo
Sample I.D.:

Well Information

Well I.D.: M-3

TD
Diameter: 2" 3" 4" 4.5" 6"
DTL
Product: Y / N / NA
DTW 12.89
Thickness:
Calc. Purge
Actual Purge:

Readings:

VOL (gal.)	TIME	pH (std units)	EC(µmhos)	TEMP (°F)	COLOR	ODOR

Comments:

Purge Method:

- ☐ Bailer
- ☐ N.A.

Sample Method:

- ☐ Bailer
- ☐ N.A.

Probe Type:

- ☐ Interface Probe

- ☐ Positive Displacement
- ☐ Gas Displacement
- ☐ Centrifugal
- ☐ Positive Displacement
- ☐ Peristaltic
- ☐ Dipper
- ☐ Electronic Probe

- ☐ Electric Submersible
- ☐ Well Wizard
- ☐ Dedicated
- ☐ Electric Submersible
- ☐ Well Wizard
- ☐ Dedicated
- ☐ Bell Sounder

Well Sampling Field Sheet

Client: ARCO
Sampler: SP
Project No.: 330-06.06
Date: 4-13-90
Location: San Lorenzo
Sample I.D.:

Well Information

Well I.D.: MW-4

TD _____
Diameter: 2" 3" 4" 4.5" 6"
DTL _____
Product: Y / N / NA
DTW 12.05 TOB
Thickness: _____
Calc. Purge _____
Actual Purge: _____

Readings:

VOL (gal.)	TIME	pH (std units)	EC(µmhos)	TEMP (°F)	COLOR	ODOR

Comments:

Purge Method:
- ☐ Bailer
- ☐ N.A.
- ☐ Positive Displacement
- ☐ Gas Displacement
- ☐ Centrifugal
- ☐ Electric Submersible
- ☐ Well Wizard
- ☐ Dedicated

Sample Method:
- ☐ Bailer
- ☐ N.A.
- ☐ Positive Displacement
- ☐ Peristaltic
- ☐ Dipper
- ☐ Electric Submersible
- ☐ Well Wizard
- ☐ Dedicated

Probe Type:
- ☐ Interface Probe
- ☐ Electronic Probe
- ☐ Bell Sounder

Well Sampling Field Sheet

Client: Arco
Sampler: SD
Project No.: 330-06-06
Date: 4-13-88
Location: San Lorenzo
Sample I.D.:

Well Information

Well I.D.: MW-5

TD
DTL
DTW Dry
Calc. Purge

Diameter: 2" 3" 4" 4.5" 6"
Product: Y / N / NA
Thickness:
Actual Purge:

Readings:

VOL (gal.)	TIME	pH (std units)	EC(µmhos)	TEMP (°F)	COLOR	ODOR

Comments:

Purge Method:

- ☐ Bailer
- ☐ N.A.

Sample Method:

- ☐ Bailer
- ☐ N.A.

Probe Type:

- ☐ Interface Probe

- ☐ Positive Displacement
- ☐ Gas Displacement
- ☐ Centrifugal
- ☐ Positive Displacement
- ☐ Peristaltic
- ☐ Dipper
- ☐ Electronic Probe

- ☐ Electric Submersible
- ☐ Well Wizard
- ☐ Dedicated
- ☐ Electric Submersible
- ☐ Well Wizard
- ☐ Dedicated
- ☐ Bell Sounder

Well Sampling Field Sheet

Client: ARCO
Sampler: SP
Project No.: 330-06.06
Date: 4-13-90
Location: San Lorenzo
Sample I.D.:

Well Information

Well I.D.: MW-6
TD
Diameter: 2" 3" 4" 4.5" 6"
DTL
Product: Y / N / NA
DTW 12.59 TOR
Thickness:
Calc. Purge
Actual Purge:

Readings:

VOL (gal.)	TIME	pH (std units)	EC(µmhos)	TEMP (°F)	COLOR	ODOR

Comments:

Purge Method:
- ☐ Bailer
- ☐ N.A.
- ☐ Positive Displacement
- ☐ Gas Displacement
- ☐ Centrifugal
- ☐ Electric Submersible
- ☐ Well Wizard
- ☐ Dedicated

Sample Method:
- ☐ Bailer
- ☐ N.A.
- ☐ Positive Displacement
- ☐ Peristaltic
- ☐ Dipper
- ☐ Electric Submersible
- ☐ Well Wizard
- ☐ Dedicated

Probe Type:
- ☐ Interface Probe
- ☑ Electronic Probe
- ☐ Bell Sounder

Pacific Environmental Group, Inc.

Well Sampling Field Sheet

Client: ARCO
Project No.: 330-06.06
Location: San Lorenzo

Sampler: SP
Date: 4-13-90
Sample I.D.: MW-7

Well Information

TD 19'
DTL
DTW 13.59 TOB
Calc. Purge 8.5 gallons

Well I.D.: MW-7
Diameter: 2" (3") 4" 4.5" 6"
Product: Y / N / NA
Thickness:
Actual Purge: 50

Readings:

VOL (gal.)	TIME	pH (std units)	EC(µmhos)	TEMP (°F)	COLOR	ODOR
10	11:08	6.96	811	69.6	Tan Cloudy	NO
20	11:16	6.87	824	73.6	"	"
30	11:21	6.86	821	73.2	"	"

Comments: well developed 50 gallons prior to sampling

Purge Method:

- [ ] Bailer
- [ ] N.A.
- [ ] Positive Displacement
- [ ] Gas Displacement
- [x] Centrifugal
- [ ] Electric Submersible
- [ ] Well Wizard
- [ ] Dedicated

Sample Method:

- [x] Bailer
- [ ] N.A.
- [ ] Positive Displacement
- [ ] Peristaltic
- [ ] Dipper
- [ ] Electric Submersible
- [ ] Well Wizard
- [ ] Dedicated

Probe Type:

- [ ] Interface Probe
- [x] Electronic Probe
- [ ] Bell Sounder

Well Sampling Field Sheet

Client: ARCO
Project No.: 330-0606
Location: San Lorenzo

Sampler: SP
Date: 4-13-50
Sample I.D.: MW-8

Well Information

TD 21.5
DTL
DTW 12.40
Calc. Purge 13.5

Well I.D.: MW-8
Diameter: 2" (3") 4" 4.5" 6"
Product: Y / N / NA
Thickness:
Actual Purge: 40

Readings:

VOL (gal.)	TIME	pH (std units)	EC(µmhos)	TEMP (°F)	COLOR	ODOR
20	10:30	6.80	838	73.6	cloudy	NO
40	10:40	6.79	826	73.1	cloudy	slight

Comments: well developed prior to sampling.

Purge Method:
- ☐ Bailer
- ☐ N.A.

Sample Method:
- ☒ Bailer
- ☐ N.A.

Probe Type:
- ☐ Interface Probe

- ☐ Positive Displacement
- ☐ Gas Displacement
- ☒ Centrifugal
- ☐ Positive Displacement
- ☐ Peristaltic
- ☐ Dipper
- ☒ Electronic Probe

- ☐ Electric Submersible
- ☐ Well Wizard
- ☐ Dedicated
- ☐ Electric Submersible
- ☐ Well Wizard
- ☐ Dedicated
- ☐ Bell Sounder

Well Sampling Field Sheet

Client: Arco
Project No.: 330-06.06
Location: San Lorenzo

Sampler: SP
Date: 4-13-90
Sample I.D.: MW-9

Well Information

TD 19
DTL
DTW 11.66 TOR
Calc. Purge 12

Well I.D.: MW-9
Diameter: 2" (3") 4" 4.5" 6"
Product: Y / N / NA
Thickness:
Actual Purge: 50

Readings:

VOL (gal.)	TIME	pH (std units)	EC(µmhos)	TEMP (°F)	COLOR	ODOR
30	12:01	6.73	803	6.77	Tan cloudy	none
40	12:09	6.79	821	72.1	cloudy	no
50	12:18	6.84	829	71.6		

Comments: well developed 50 gallons prior to sampling

Purge Method:

- [ ] Bailer
- [ ] N.A.
- [ ] Positive Displacement
- [ ] Gas Displacement
- [x] Centrifugal
- [ ] Electric Submersible
- [ ] Well Wizard
- [ ] Dedicated

Sample Method:

- [x] Bailer
- [ ] N.A.
- [ ] Positive Displacement
- [ ] Peristaltic
- [ ] Dipper
- [x] Electronic Probe
- [ ] Electric Submersible
- [ ] Well Wizard
- [ ] Dedicated
- [ ] Bell Sounder

Probe Type:

- [ ] Interface Probe

Well Sampling Field Sheet

Client: ARCO
Project No.: 330-0606
Location: San Lorenzo

Sampler: SP
Date: 4-13-50
Sample I.D.: MW-10

Well Information

TD 23'
DTL
DTW 11.78
Calc. Purge 17

Well I.D.: MW-10
Diameter: 2" (3") 4" 4.5" 6"
Product: Y / N / NA
Thickness:
Actual Purge: 50

Readings:

VOL (gal.)	TIME	pH (std units)	EC(µmhos)	TEMP (°F)	COLOR	ODOR
25	12:38	6.65	823	70.1	cloudy	moderate
40	12:52	6.64	799	67.0	"	"
50	12:54	656	799	66.7	"	"

Comments: well developed for 50 gallons prior to sampling

Purge Method:
- ☐ Bailer
- ☐ N.A.

Sample Method:
- ☒ Bailer
- ☐ N.A.

Probe Type:
- ☐ Interface Probe

- ☐ Positive Displacement
- ☐ Gas Displacement
- ☒ Centrifugal
- ☐ Positive Displacement
- ☐ Peristaltic
- ☐ Dipper
- ☒ Electronic Probe

- ☐ Electric Submersible
- ☐ Well Wizard
- ☐ Dedicated
- ☐ Electric Submersible
- ☐ Well Wizard
- ☐ Dedicated
- ☐ Bell Sounder

Well Sampling Field Sheet

Client: ARCO
Project No.: 330-06.06
Location: San Lorenzo

Sampler: SP
Date: 4-13-50
Sample I.D.: MW-11

Well Information

Well I.D.: MW-11

TD 19.5'
DTL
DTW 12.46
Calc. Purge 10.5

Diameter: 2" 3" 4" 4.5" 6"
Product: Y / N / NA
Thickness:
Actual Purge:

Readings:

VOL (gal.)	TIME	pH (std units)	EC(µmhos)	TEMP (°F)	COLOR	ODOR
20	13:20	6.74	818	68.6	Brown	NO
40	13:25	6.65	800	69.0	"	"
50	13:36	6.65	780	66.6	"	"
		"				

Comments: Well developed 50 gallons prior to sampling

Purge Method:

- ☐ Bailer
- ☐ N.A.
- ☐ Positive Displacement
- ☐ Gas Displacement
- ☒ Centrifugal
- ☐ Electric Submersible
- ☐ Well Wizard
- ☐ Dedicated

Sample Method:

- ☒ Bailer
- ☐ N.A.
- ☐ Positive Displacement
- ☐ Peristaltic
- ☐ Dipper
- ☒ Electronic Probe
- ☐ Electric Submersible
- ☐ Well Wizard
- ☐ Dedicated
- ☐ Bell Sounder

Probe Type:

- ☐ Interface Probe

Monitoring Well Field Sheet

Client: ARCO Sampler: SP
Project No.: 330-06.05 Field Dates: 9-18/19-19-90
Location: San Lorenzo Well I.D.: MW-5

Well Information

Total Depth: 14 Diameter: 2" 3" (4") 5" 6" ___
Depth to Water: TOC 13.99 TOB Product: ☐ Yes ☐ No
Depth to Liquid: TOC TOB Thickness (feet): ___
Date: 9-18-90 Color: ___
Time: 11:13 Comments:

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

Purge Information

Date Purged: ~~9-18-90~~ Purge Method: ■ Bailer ☐ Positive Displacement
Calculated Purge: ___ (gal) ☐ Centrifugal ☐ Dedicated ☐ Gas Displacement
Actual Purge: ___ (gal) ☐ Other ___

Vol (gal)	Time	pH (std. units)	EC (µmhos)	Temp (°F)	Color	Odor

Comments: Well dry Not Sampled.

Sample Information

Sampler: SP
Sample I.D.: MW-5
Date Sampled: ~~9-19-90~~
Time Sampled: ___

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

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

Monitoring Well Field Sheet

Client: Arco
Sampler: SP
Project No.: 330-06-05
Field Dates: 9-18/9-19-90
Location: San Lorenzo
Well I.D.: MW-7

Well Information

Total Depth: 19
Diameter: 2" (3") 4" 5" 6" ___
Depth to Water: TOC 15.09 TOB
Product: ☐ Yes ☐ No
Depth to Liquid: TOC TOB
Thickness (feet): ___
Date: 9-18-90
Color: ___
Time: 11:17
Comments:

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

Purge Information

Date Purged: 9-18-90
Purge Method: ☒ Bailer ☐ Positive Displacement
Calculated Purge: 6 (gal) ☐ Centrifugal ☐ Dedicated ☐ Gas Displacement
Actual Purge: 6 (gal) ☐ Other ___

Vol (gal)	Time	pH (std. units)	EC (µmhos)	Temp (°F)	Color	Odor
2	14:30	6.83	1113	81.0	cloudy	NO
4	14:35	6.81	1100	78.8	↓	↓
6	14:40	6.81	1129	78.5	↓	↓

Comments:

Sample Information

Sampler: SP
Sample I.D: MW-7
Date Sampled: 9-19-90
Time Sampled: 13:00

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: SP
Project No.: 330-0605 | Field Dates: 9-18/9-19-90
Location: San Lorenzo | Well I.D.: MW-8

Well Information

Total Depth: 22 | Diameter: 2" (3") 4" 5" 6" ___
Depth to Water: TOC 13.95 TOB | Product: ☐ Yes ☐ No
Depth to Liquid: TOC TOB | Thickness (feet): ___
Date: 9-18-90 | Color: ___
Time: 11:25 | Comments:

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

Purge Information

Date Purged: 9-18-90 | Purge Method: ● Bailer ☐ Positive Displacement
Calculated Purge: 12 (gal) | ~~● Centrifugal~~ ☐ Dedicated ☐ Gas Displacement
Actual Purge: 12 (gal) | ☐ Other ___

Vol (gal)	Time	pH (std. units)	EC (µmhos)	Temp (°F)	Color	Odor
4	14:00	6.91	1045	77.5	cloudy	NO
8	14:10	6.92	1050	77.1	"	"
12	14:18	6.92	1038	77.0	"	"

Comments:

Sample Information

Sampler: SP
Sample I.D: MW-8
Date Sampled: 9-19-90
Time Sampled: 12:45

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

No. Containers	Size/Type	Pres.	Analysis
5	40 ml VOA	HCl	Gas/BTEX

Monitoring Well Field Sheet

Client: Arco
Sampler: SP
Project No.: 330-06-05
Field Dates: 9-18-90 9-19-90
Location: San Lorenzo
Well I.D.: MW-9

Well Information

Total Depth: 19
Diameter: 2" (3") 4" 5" 6" ___
Depth to Water: TOC 13.18 TOB
Product: ☐ Yes ☐ No
Depth to Liquid: TOC TOB
Thickness (feet): ___
Date: 9-18-90
Color: ___
Time: 11:30
Comments:

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

Purge Information

Date Purged: 9-19-90
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	13:20	6.85	1112	79	cloudy	NO
6	13:24	6.85	1111	78.8	"	"
9	13:28	6.85	1123	78.6	"	"

Comments:

Sample Information

Sampler: SP
Sample I.D.: MW-9
Date Sampled: 9-19-90
Time Sampled: 13:35

No. Containers	Size/Type	Pres.	Analysis
3	40 ml VOA	HCl	G+S/BTEX

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

Monitoring Well Field Sheet

Client: ARCO
Sampler: SP
Project No.: 330-06.05
Field Dates: 9-18/9-19-90
Location: San Lorenzo
Well I.D.: MW-10

Well Information

Total Depth: 23
Diameter: 2" (3") 4" 5" 6" ___
Depth to Water: TOC 13.41 TOB
Product: ☐ Yes ☐ No
Depth to Liquid: TOC TOB
Thickness (feet): ___
Date: 9-18-90
Color: ___
Time: 11:40
Comments:

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

Purge Information

Date Purged: 9-19-90
Purge Method: ☑ Bailer ☐ Positive Displacement
Calculated Purge: 15 (gal) ☐ Centrifugal ☐ Dedicated ☐ Gas Displacement
Actual Purge: 15 (gal) ☐ Other ___

Vol (gal)	Time	pH (std. units)	EC (µmhos)	Temp (°F)	Color	Odor
5	13:55	6.78	1108	76.8	Cloudy	Strong
10	14:01	6.81	1101	76.5	"	"
15	14:10	6.81	1125	76.1	"	"

Comments:

Sample Information

Sampler: SP
Sample I.D: MW-10
Date Sampled: 9-19-90
Time Sampled: 14:15

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: SP
Project No.: 330-06.05 Field Dates: 9-18-90/9-19-90
Location: San Lorenzo Well I.D.: MW-11

Well Information

Total Depth: 20 Diameter: 2" (3") 4" 5" 6" ___
Depth to Water: TOC/4.09 TOB Product: ☐ Yes ☐ No
Depth to Liquid: TOC TOB Thickness (feet): ___
Date: 9-18-90 Color: ___
Time: 11:44 Comments:

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

Purge Information

Date Purged: 9-19-90 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	14:30	6.72	1050	70.3	cloudy	NO
6	14:38	6.72	1051	69.9	"	"
9	14:43	6.78	1047	70.8	"	"

Comments:

Sample Information

Sampler: SP
Sample I.D.: MW-11
Date Sampled: 9-19-90
Time Sampled: 15:00

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: SP
Project No.: 330-06-05 Field Dates: 9-18-90/9-19-90
Location: San Lorenzo Well I.D.: MW-12 (E-1A)

Well Information

Total Depth: 25 Diameter: 2" 3" 4" 5" (6") ___
Depth to Water: TOC 14.20 TOB Product: ☐ Yes ☐ No
Depth to Liquid: TOC TOB Thickness (feet): ___
Date: 9-18-90 Color: ___
Time: 11:10 **Comments:**

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

Purge Information

Date Purged: 9-19-90 Purge Method: ☐ Bailer ☐ Positive Displacement
Calculated Purge: 156 (gal) ☒ Centrifugal ☐ Dedicated ☐ Gas Displacement
Actual Purge: 160 (gal) ☐ Other ___

Vol (gal)	Time	pH (std. units)	EC (µmhos)	Temp (°F)	Color	Odor
55	12:30	6.95	1080	78.8	Sandy Brown	NO
100	13:00	6.89	1064	78.6	cloudy	"
160	13:20	6.91	1055	78.8	cloudy	"

Comments: well developed. 9-19-90 a full 10 casings

Sample Information

Sampler: SP
Sample I.D: MW-12
Date Sampled: 9-19-90
Time Sampled: 12:30

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

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