052

gettler — ryan inc.
general contractors

February 11, 1988

Regional Water Quality Control Board
San Francisco Bay Region
1111 Jackson Street, Room 6040
Oakland, California 94607

Attention: Mr. Greg Zentner

Reference: ARCO Service Station #4931
731 West MacArthur Boulevard
Oakland, California

Gentlemen:

As authorized by ARCO, we are forwarding a copy of the report issued by Pacific Environmental Group, dated January 20, 1988, documenting the findings of a groundwater investigation conducted at the referenced location.

Please do not hesitate to call should you have any question or comment.

John P. Werfal

JPW/ns

enclosure

cc: Mr. K. Christie, ARCO Petroleum Products Company
Ms. Liz Rose, Alameda County Environmental Health

1992 national avenue • hayward, california 94545 • 783-7500

PACIFIC
ENVIRONMENTAL
GROUP, INC.

January 20, 1988
Project 130-12.03

Gettler-Ryan Inc.
1992 National Avenue
Hayward, CA 94545

Attn: Mr. Jeff Ryan

Re: ARCO Service Station #4931
MacArthur Blvd. (at West Street)
Oakland, California

Gentlemen:

This letter presents the results of a groundwater investigation documented by Pacific Environmental Group, Inc. (PACIFIC) at the ARCO service station located at 731 West MacArthur Boulevard and West Street in Oakland, California (see Figures 1 and 2). The scope of work included; a survey to determine the location of documented water-supply wells within a 1/2-mile radius of the site, installation of four groundwater monitoring wells, and sampling and analysis of groundwater from all site wells.

BACKGROUND

The project site has four gasoline tanks in a common excavation located in the eastern portion of the site. There is currently no waste oil tank at the station.

Eight groundwater monitoring wells (A-1 through A-8) have been previously installed at the site by other consulting firms. Monitoring Wells A-1 through A-4 were installed prior to December, 1982, but no information is available regarding the exact date of installation, or the consulting firm performing the investigation. Wells A-5 through A-8 were installed in March, 1983 by Groundwater Technology, Inc. (GTI). Well A-1 was destroyed in August, 1983, possibly during tank replacement activities.

Gettler-Ryan Inc. has been monitoring all site wells for water level and presence of floating product since late 1982. According to their records, floating product has

been detected intermittently in four site wells since March, 1983. Product has been noted in Wells A-2, A-4 and A-8 at maximum thicknesses of 0.5, 4.0, and 0.3 feet, respectively. Product film was noted in Well A-5 during the first quarter of 1984.

The purpose of PACIFIC's investigation was to define the downgradient extent of hydrocarbons detected in the groundwater during the previous investigations.

PROCEDURES

Four monitoring wells (A-9, A-10, A-11 and A-12) were installed by PACIFIC on December 15 and 16, 1987 at the locations shown on the attached Figure 3. Well A-9 is located in the southwest corner of the station, Well A-10 is located along the southern property line, and Wells A-11 and A-12 were drilled on West Street, west of the site.

The borings for the wells were drilled using either 8-inch (Wells A-10, A-11, and A-12) or 12-inch (Well A-9) diameter hollow-stem auger drilling equipment, and were logged by a PACIFIC geologist using the Unified Soil Classification System. Soil samples for logging were collected at five-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. Boring logs are attached to this report.

Boring A-9 was advanced to a depth of 45 feet, and Borings A-10, A-11 and A-12 were advanced to a depth of 30-1/2 feet each. Borings A-10, A-11, and A-12 were completed as monitoring wells by the installation of 3-inch diameter, Schedule 40 PVC casing and 0.020-inch factory-slotted screen. Well A-9 was constructed with 6-inch diameter casing in the event that aquifer-testing is required in order to determine parameters for remedial action design. In each well the screen was placed through the entire saturated section, extending approximately three to four feet above the static water level. Graded sand pack was placed in the annular space across the screened interval, and extends approximately two feet above the screen. A bentonite and concrete seal extends from the sand pack to the ground surface. A locking cap and protective vault box were installed on the top of each monitoring well. Well construction details are summarized on the attached boring logs.

The surface (box) elevation of each of the newly installed wells was surveyed to the nearest 0.01 foot (relative to a project datum) by Gettler-Ryan Inc.

All site wells (A-2 through A-12) were sampled by PACIFIC on January 5, 1988. The sampling procedure consisted of first measuring the water level in each well, then checking each well for the presence of floating petroleum product using a clear teflon bailer. Groundwater samples were collected from all wells which did not contain floating product by first purging a minimum of four casing volumes of water from each well using a centrifugal pump. During purging, temperature, pH, and electrical conductivity were monitored in order to collect a representative sample. Samples were collected using a teflon bailer and were placed into appropriate EPA-approved containers. The samples were labeled, logged onto chain-of-custody documents, and transported on ice to the laboratory.

Groundwater samples were analyzed for the presence of dissolved gasoline and benzene, toluene and xylene (BTX) compounds. Analytical methods are summarized on the attached certified analytical reports.

FINDINGS

Well Survey

The California Department of Water Resources (DWR) was contacted in order to determine the location of possible water-supply wells within a 1/2-mile radius of the site. According to DWR records, there are three documented water-supply wells located within this area (designated A, B and C on Figure 1).

According to DWR records, all three water-supply wells were installed between 1926 and 1928. Wells A and B are located approximately 1300 feet to the northwest of the site. No information was available regarding the current status or usage of Well A. Well B was abandoned in 1958. Well C, located 2,400 feet west (downgradient, as measured in the shallow aquifer) of the site, is a 97-foot deep industrial well.

Subsurface Conditions

Soils encountered during drilling consisted primarily of 12 to 19 feet of clay and silt materials, underlain by sand and clayey sand, with minor clay interbeds to the total depth explored of 45 feet. Faint product odor was noted in soils from Boring A-9 at a depth of nine feet. No odor was observed in soils below 10-1/2 feet in A-9, or during drilling of any of the other wells.

Groundwater was first noted at a depth of approximately 10 feet, and stabilized at depths ranging from approximately 7.5 to 9 feet. Groundwater elevation contours based on liquid levels measured by Gettler-Ryan on January 12, 1988 indicate that groundwater flows westerly at an average gradient of 0.06 (see Figure 3). This groundwater flow direction correlates with the anticipated regional flow direction, which is generally to the west (based on surface topography and drainage patterns) towards San Francisco Bay.

Laboratory Results

On the date sampled, January 5, 1988, floating product was detected in Wells A-4 and A-8 at thicknesses of 0.02 and 0.18 foot, respectively. Samples were collected from the remaining wells and analyzed for the presence of dissolved gasoline and BTX compounds. Dissolved gasoline was detected in Well A-2 at 12,000 parts per billion (ppb) and in Wells A-3, A-6 and A-9 at concentrations ranging from 250 to 390 ppb. No gasoline was detected in groundwater samples collected from the other site wells. Laboratory results are summarized on the attached certified analytical reports.

A 1,000 ppb isoconcentration contour for dissolved gasoline is presented on Figure 3. This contour was plotted based on a logarithmic decrease in concentrations between monitoring wells. Figure 3 shows that the dissolved gasoline plume for gasoline has been defined to levels below 1,000 ppb in both a downgradient and lateral direction.

If you have any questions regarding the contents of this letter, please call.

Very truly yours,

PACIFIC ENVIRONMENTAL GROUP, INC.

Christine Wilson
Project Geologist

Susan Willhite
Senior Geologist
CEG 1272

REGISTERED GEOLOGIST
S. WILLHITE
No. 1272
Certified Engineering
GEOLOGIST
STATE OF CALIFORNIA

TABLE 1

SUMMARY OF WELL SURVEY DATA

Water-Producing Wells
Within 1/2 Mile Radius of the Site

Map Symbol	Well Number	Depth (ft)	Year Drilled	Use
A	1S4W23E	?	1928	?
B	1S4W23E1	575 or 420	1926	Abandoned 1958
C	1S4W23M1	97	1927	Industrial

Source: California Department of Water Resources, Sacramento Office

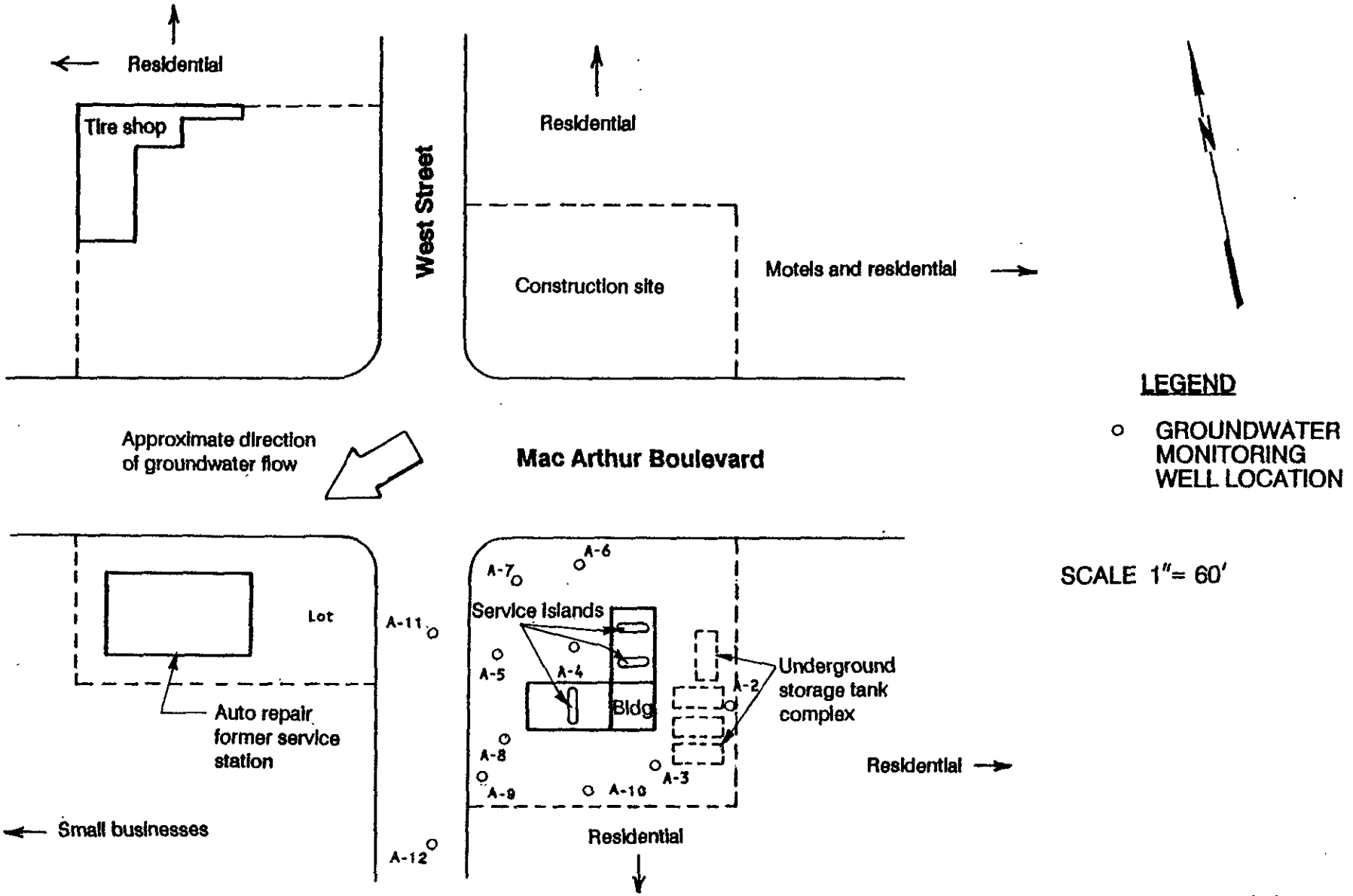
LEGEND

o Well location

SCALE: 1" = 2000'

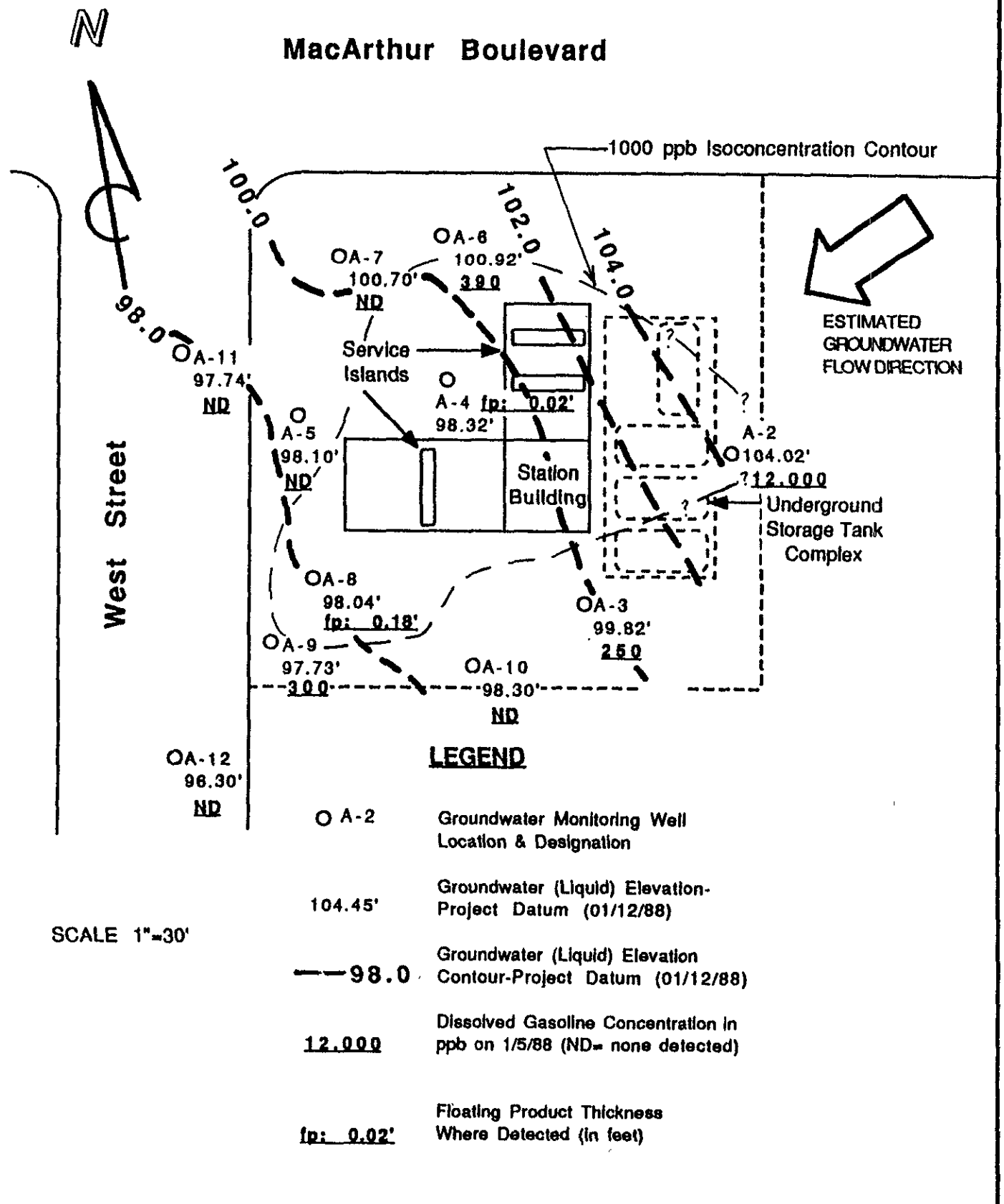
Source: U.S. Geological Survey topographic map

PACIFIC ENVIRONMENTAL GROUP INC.	ARCO SERVICE STATION #4931 MacArthur Boulevard & West Street Oakland, California	FIGURE: 1
	WELL LOCATION MAP	PROJECT: 130-12.03



PACIFIC ENVIRONMENTAL GROUP, INC.	ARCO SERVICE STATION #4931 MacArthur Boulevard & West Street Oakland, California	FIGURE: 2
	EXTENDED SITE MAP	PROJECT: 130-12.03

SAN JOSE BLUEPRINT CO.
PRINTED ON 1000H



PACIFIC ENVIRONMENTAL GROUP, INC.	ARCO SERVICE STATION #4931 MacArthur Boulevard & West Street Oakland, California	FIGURE: 3
	GROUNDWATER CONTOUR MAP	PROJECT: 130-12.03

UNIFIED SOIL CLASSIFICATION SYSTEM

PRIMARY DIVISIONS			GROUP SYMBOL	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)	GW	Well graded gravels, gravel-sand mixtures; little or no fines
			GP	Poorly graded gravels or gravel-sand mixtures; little or no fines
		GRAVEL WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS half of coarse fraction smaller than # 4 sieve	CLEAN SANDS (less than 5% fines)	SW	Well graded sands, gravelly sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures
			SC	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%		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts, with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS liquid limit less than 50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils

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

Density

Sands and gravels	Silts and clays
VL - Very loose	VS - Very soft
L - Loose	Sft - Soft
MD - Medium dense	MSt - Medium Stiff
D - Dense	Stf - Stiff
VD - Very dense	VSt - Very stiff
	Hd - Hard

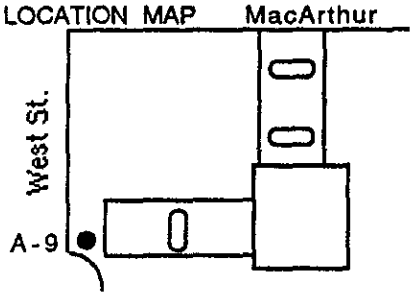
Symbols
- ▽ - First encountered ground water
- ▼ - Static ground water level

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 MacArthur



PACIFIC ENVIRONMENTAL GROUP, INC.

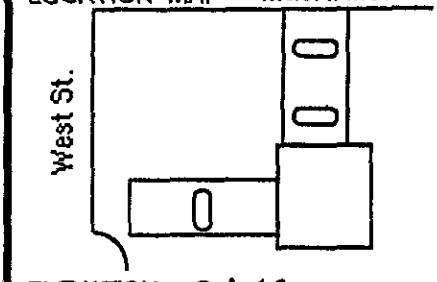
WELL / A-9
BORING NO.
PAGE 1 OF 1

PROJECT NO. 130-12.03
LOGGED BY: MD
DRILLING METHOD: HSA
SAMPLING METHOD: CAL MOD
CASING TYPE: Sch 40 PVC
SLOT SIZE: 0.020
GRAVEL PACK: 12 X 20 SAND

CLIENT: G.R. ARCO
DATE DRILLED: 12-15-87
LOCATION: MacArthur & West
HOLE DIAMETER: 12"
HOLE DEPTH: 45'
WELL DEPTH: 40'
WELL DIAMETER: 6"

WELL COMPLETION	MOISTURE CONTENT	TIP	PENETRATION RESISTANCE (BLOWS/FT)	DEPTH (FEET)	SAMPLE	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS
				2			CL	ASPHALT & GRAVEL _ FILL. CLAY; tan; silty; 10-15% fine to coarse sand; trace fine gravel; iron oxide stains; trace organics.
CONCRETE	Dp		P	4				@3 1/2'; no product odor.
BENTONITE				6				
	Mst		8	8				@9'; as above; no sand or gravel; gray mottle around rootholes; rootholes moist; stiff; faint product odor.
				10				
				12				
	Wt		25	14			SW	SAND; dark brown-gray; trace to 10% fines; fine to coarse grained; mostly coarse sand; trace fine gravel; angular to sub rounded; medium dense.
				16				@14'; no product odor.
				18				@19'; as above; medium dense; no product odor.
	Wt		24	20				
12 X 20 SAND				22				
				24				@24'; as above; dense; no product odor.
	Wt		35	26				
				28			SP/ CL	INTERBEDDED SAND & CLAY; SAND: tan; 10-15% low plasticity fines; very fine grained; iron oxide stains; CLAY: tan; iron oxide stains; silty; trace fine to coarse sand; bedds up to 8" thick.
	Wt		14	30				@30'; no product odor.
				32				
	Wt		23	34			SC-CL	CLAY to CLAYEY SAND; brick red; 50% fine to coarse sand; trace fine gravel; sand and gravel rounded.
				36				
				38				
	Wt		25	40			SC	CLAYEY SAND; medium brown; iron oxide stains; 25-35% low plasticity fines; fine to medium grained; medium dense.
				42				@39'; no product odor.
				44				BOTTOM OF BORING AT ~45'

LOCATION MAP MacArthur



PACIFIC ENVIRONMENTAL GROUP, INC.

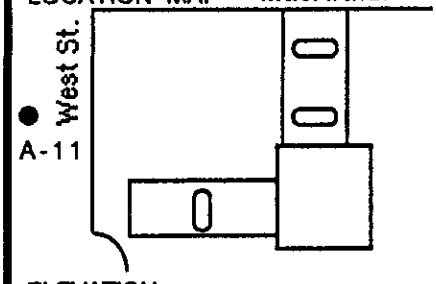
WELL / A-10
BORING NO.
PAGE 1 OF 1

PROJECT NO. 130-12.03
LOGGED BY: MD
DRILLING METHOD: HSA
SAMPLING METHOD: CAL MOD
CASING TYPE: Sch 40 PVC
SLOT SIZE: 0.020
GRAVEL PACK: 12 X 20 SAND

CLIENT: G.R. ARCO
DATE DRILLED: 12-15-87
LOCATION: MacArthur & West
HOLE DIAMETER: 8"
HOLE DEPTH: 30 1/2'
WELL DEPTH: 30'
WELL DIAMETER: 3"

WELL COMPLETION	MOISTURE CONTENT	TIP	PENETRATION RESISTANCE (BLOWS/FT)	DEPTH (FEET)	SAMPLE	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS
BENTONITE, CONCRETE, 12 X 20 SAND				2				ASPHALT & GRAVEL - FILL.
	Dp		P	4			ML	SILT; tan; iron oxide stains; trace clay; 5-15% fine to coarse gravel; trace organics. @3 1/2'; no product odor.
				6				
				8				
	Dp		7	10			CL	CLAY; tan; iron oxide stains; silty; trace fine sand; rootholes. @9'; no product odor.
				12				
	Mst		21	14				@14'; as above; 20-30% sand; 5-10% fine to coarse gravel; very stiff; no product odor.
				16				
				18				
	Wt		26	20			SW	SAND; medium brown; 10-15% low plasticity fines; fine to coarse grained; well graded; 5-10% fine to medium gravel; angular; medium dense. @19'; no product odor.
				22				
	Wt		26	24				@24'; as above; predominantely coarse sand; medium dense; no product odor.
				26				
				28				
	Wt		14	30				@29'; as above; no product odor.
				32			CL	CLAY; tan; iron oxide stains; 5-15% fine to medium sand; trace coarse sand; trace organics; silty.
				34				
				36				BOTTOM OF BORING AT 30 1/2'
				38				
				40				
				42				
				44				

LOCATION MAP MacArthur



PACIFIC ENVIRONMENTAL GROUP, INC.

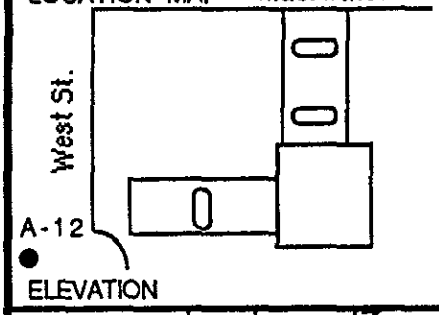
WELL / A-11
BORING NO.
PAGE 1 OF 1

PROJECT NO. 130-12.03
LOGGED BY: MD
DRILLING METHOD: HSA
SAMPLING METHOD: CAL MOD
CASING TYPE: Sch 40 PVC
SLOT SIZE: 0.020
GRAVEL PACK: 12 X 20 SAND

CLIENT: G.R. ARCO
DATE DRILLED: 12-16-87
LOCATION: MacArthur & West
HOLE DIAMETER: 8"
HOLE DEPTH: 30 1/2'
WELL DEPTH: 30'
WELL DIAMETER: 3"

WELL COMPLETION	MOISTURE CONTENT	TIP	PENETRATION RESISTANCE (BLOWS/FT)	DEPTH (FEET)	SAMPLE	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS
BENTONITE, CONCRETE, 12 X 20 SAND	Dp		P	2, 4, 6	■		CL	ASPHALT & GRAVEL - FILL. CLAY; tan-orange; iron oxide stains; silty; trace fine sand; rootholes; gray mottle at rootholes; trace organics. @3 1/2'; no product odor.
	Mst		10	8, 10, 12	■			@9'; as above; water in rootholes; stiff; no product odor.
	Wt		28	14, 16	■			@14'; as above; medium brown; 5-10% fine to coarse sand; trace fine gravel; water in rootholes; very stiff; no product odor.
	Wt		41	18, 20, 22	■		SW	SAND; dark reddish brown; 5% low plasticity fines; fine to coarse grined; 5% fine to medium gravel; angular to sub rounded; dense. @19'; no product odor. @24'; as above; very dense; no product odor.
	Wt		51	24, 26	■			
	Wt		15	28, 30	■		SP/ CL	INTERBEDDED CLAY & SAND; CLAY: tan; iron oxide stains; silty; trace fine sand; low plasticity; SAND: tan; iron oxide stains; 10-15% low plasticity fines; very fine grained; bedds ~ 4-6" thick in sample tube. @29'; no product odor.
				32, 34, 36, 38, 40, 42, 44				BOTTOM OF BORING AT 30 1/2'

LOCATION MAP MacArthur



PACIFIC ENVIRONMENTAL GROUP, INC.

WELL / A-12
BORING NO.
PAGE 1 OF 1

PROJECT NO. 130-12.03
LOGGED BY: MD
DRILLING METHOD: HSA
SAMPLING METHOD: CAL MOD
CASING TYPE: Sch 40 PVC
SLOT SIZE: 0.020
GRAVEL PACK: 12 X 20 SAND

CLIENT: G.R. ARCO
DATE DRILLED: 12-16-87
LOCATION: MacArthur & West
HOLE DIAMETER: 8"
HOLE DEPTH: 30 1/2'
WELL DEPTH: 30'
WELL DIAMETER: 3"

WELL COMPLETION	MOISTURE CONTENT	TIP	PENETRATION RESISTANCE (BLOWS/FT)	DEPTH (FEET)	SAMPLE	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS
BENTONITE, CONCRETE, 12 X 20 SAND				2				ASPHALT.
	Dp		P	4			CL	CLAY; tan; silty; 10-15% fine sand; trace organics; roots; rootholes; rootholes dry. @3 1/2'; no product odor.
				6				
				8				
	Mst		14	10				@9'; as above; trace sand; no organics; rootholes mottled gray; rootholes wet; stiff; no product odor.
				12				
	Wt		15	14			SW	SAND; medium brown; 10-15% low plasticity fines; fine to coarse grained; trace fine gravel; angular to sub rounded; well graded; medium dense. @14'; no product odor.
				16				
				18				
	Wt		28	20				@19'; as above; thin interbedds of medium grained sand; medium dense; no product odor.
				22				
	Wt		16	24				
				26			CL	CLAY; tan; iron oxide stains; trace fine sand; silty; very stiff; no product odor.
				28				
	Wt		24	30			SW	SAND; as above; some 2" clay interbedds; medium dense. @29'; no product odor.
				32				
				34				BOTTOM OF BORING AT 30 1/2'
				36				
				38				
				40				
				42				
				44				

INTERNATIONAL TECHNOLOGY CORPORATION

Pacific Environmental Group, Inc.
1601 Civic Center Drive
Suite 202
Santa Clara, CA 95050

January 19, 1988

ATTN: John Adams

Following are the results of analyses on the samples described below.

Project Number:	130-12.03
Lab Numbers:	S8-01-044-01 thru S8-01-044-10
Number of Samples:	10
Sample Type:	Water
Date Received:	1/7/88
Analyses Requested:	Low Boiling Hydrocarbons

The method of analysis for low boiling hydrocarbons is taken from EPA Methods 8015, 8020 and 5030. The sample is examined using the purge and trap technique. Final detection is by gas chromatography using a flame ionization detector as well as a photoionization detector.

The result for total low boiling hydrocarbons is calculated as gasoline and includes benzene, toluene, ethyl benzene and xylenes.

Fred Rouse

FR/gg

1 Page Following - Table of Results

IT/Santa Clara to
Pacific Environmental Group, Inc.
ATTN: John Adams

January 19, 1988
Page 1 of 1

Summary of Results

Project Number: 130-12.03

ND = None Detected

Lab Number	Sample Identification	Micrograms per Liter: Low Boiling Hydrocarbons (Gasoline)	Benzene	Toluene	Ethyl benzene and xylenes
S8-01-044-01	A-2	12,000.	920.	1,500.	4,000.
S8-01-044-02	A-3	250.	2.3	8.	21.
S8-01-044-03	A-5	ND	0.5	1.	4.
S8-01-044-04	A-6	390.	54.	89.	110.
S8-01-044-05	A-7	ND	ND	1.	4.
S8-01-044-06	A-9	300.	45.	14.	43.
S8-01-044-07	A-10	ND	0.6	11.	4.
S8-01-044-08	A-11	ND	1.1	2.	5.
S8-01-044-09	A-12	ND	ND	2.	ND
S8-01-044-10	Trip Blank	ND	ND	ND	ND
Detection Limit		50.	0.5	1.	4.