JM 310-058.1A

MONITORING
PURGING
DISPOSING
SAMPLING

MPDS SERVICES, INCORPORATED

MPDS-UN5760-05
January 4, 1995

Unocal Corporation
2000 Crow Canyon Place, Suite 400
P.O. Box 5155
San Ramon, California 94583

Attention: Ms. Tina R. Berry

RE: Quarterly Data Report
Unocal Station Service #5760
376 Lewelling Boulevard
San Lorenzo, California

Dear Ms. Berry:

This data report presents the results of the most recent quarter of monitoring and sampling of the monitoring wells at the referenced site by MPDS Services, Inc.

RECENT FIELD ACTIVITIES

The monitoring wells that were monitored and sampled during this quarter are indicated in Table 1. Prior to sampling, the wells were checked for depth to water and the presence of free product or sheen. The monitoring data and the ground water elevations are summarized in Table 1. The ground water flow direction during the most recent quarter is shown on the attached Figure 1.

Ground water samples were collected on December 5, 1994. Prior to sampling, the wells were each purged of between 8 and 20 gallons of water. During purging operations, the field parameters pH, temperature, and electrical conductivity were recorded and are presented in Table 2. Once the field parameters were observed to stabilize, and where possible, a minimum of approximately four casing volumes had been removed from each well, samples were then collected using a clean Teflon bailer. The samples were decanted into clean VOA vials and/or one-liter amber bottles, as appropriate, which were then sealed with Teflon-lined screw caps, labeled, and stored in a cooler, on ice, until delivery to a state-certified laboratory. MPDS Services, Inc. transported the purged ground water to the Unocal Refinery located in Rodeo, California, for treatment and discharge to San Pablo Bay under NPDES permit.

ANALYTICAL RESULTS

The ground water samples were analyzed at Sequoia Analytical Laboratory and were accompanied by properly executed Chain of Custody documentation. The analytical results of the ground water samples collected to date are summarized in Table 3. The concentrations of Total Petroleum

2401 Stanwell Drive, Suite 400, Concord, CA 94520
TEL: (510) 602-5120 FAX: (510) 689-1918

Hydrocarbons (TPH) as gasoline and benzene detected in the ground water samples collected this quarter are shown on the attached Figure 2. Copies of the laboratory analytical results and the Chain of Custody documentation are attached to this report.

LIMITATIONS

Environmental changes, either naturally-occurring or artificially-induced, may cause changes in ground water levels and flow paths, thereby changing the extent and concentration of any contaminants.

DISTRIBUTION

A copy of this report should be sent to Ms. Juliet Shin of the Alameda County Health Care Services Agency.

If you have any questions regarding this report, please do not hesitate to call Mr. Nubar Srabian at (510) 602-5120.

Sincerely,

MPDS Services, Inc.

Sarkis A. Karkarian
Staff Engineer

Joel G. Greger, C.E.G.
Senior Engineering Geologist

License No. EG 1633
Exp. Date 8/31/96

/bp

Attachments: Tables 1, 2 & 3
Location Map
Figures 1 & 2
Laboratory Analyses
Chain of Custody documentation

cc: Mr. Joe Muzzio, Pacific Environmental Group, Inc.

TABLE 1

SUMMARY OF MONITORING DATA

Well #	Ground Water Elevation (feet)	Depth to Water (feet)♦	Total Well Depth (feet)♦	Product Thickness (feet)	Sheen	Water Purged (gallons)
(Monitored and Sampled on December 5, 1994)						
U-1	23.53	16.67	29.90	0	No	20
U-2	22.44	18.82	29.92	0	No	16.5
U-3	22.17	17.08	25.02	0	No	12
U-4	22.20	18.08	27.87	0	No	15
U-5	22.08	17.23	28.40	0	No	8
U-6	22.08	15.60	28.28	0	No	9
U-7	22.01	15.10	34.98	0	No	14
U-8	22.25	16.32	29.83	0	No	9.5
U-9	21.88	15.43	28.20	0	No	9
(Monitored and Sampled on September 7, 1994)						
U-1	22.03	18.17	30.00	0	No	18
U-2	21.98	19.28	29.98	0	No	16
U-3	21.64	17.61	24.72	0	No	11
U-4	21.76	18.52	27.88	0	No	14
U-5	21.58	17.73	28.26	0	No	8
U-6	21.48	16.20	28.32	0	No	8.5
U-7	21.39	15.72	35.00	0	No	14
U-8	21.70	16.87	29.70	0	No	9
U-9	21.25	16.06	28.23	0	No	8.5
(Monitored and Sampled on June 9, 1994)						
U-1	22.78	17.42	30.21	0	No	19
U-2	23.00	18.26	29.98	0	No	17.5
U-3	22.66	16.60	25.04	0	No	13
U-4	22.72	17.53	27.88	0	No	15.5
U-5	22.61	16.70	28.28	0	No	8
U-6	22.50	15.18	28.09	0	No	9
U-7	22.41	14.70	35.02	0	No	14
U-8	22.71	15.86	29.74	0	No	10
U-9	22.26	15.05	28.18	0	No	9

TABLE 1 (Continued)

SUMMARY OF MONITORING DATA

Well #	Ground Water Elevation (feet)	Depth to Water (feet)◆	Total Well Depth (feet)◆	Product Thickness (feet)	Sheen	Water Purged (gallons)
(Monitored and Sampled on March 9, 1994)						
U-1	23.00	17.20	30.10	0	No	20
U-2	23.21	18.05	29.91	0	No	18
U-3	22.91	16.35	24.98	0	No	13
U-4	22.95	17.30	27.80	0	No	16
U-5	22.86	16.45	28.20	0	No	8
U-6	22.78	14.90	28.01	0	No	9
U-7	22.66	14.45	35.00	0	No	14
U-8	22.95	15.62	29.59	0	No	10
U-9	22.57	14.74	28.10	0	No	9.5

Well #	Well Casing Elevation (feet)*
U-1	40.20
U-2	41.26
U-3	39.25▲
U-4	40.28▲
U-5	39.31
U-6	37.68
U-7	37.11
U-8	38.57
U-9	37.31

◆ The depth to water level and total depth measurements were taken from the top of the well casings.

* The elevation of the top of the well casing are relative to Mean Sea Level.

▲ Recently remeasured levels. Prior to September 7, 1994, the respective top of well casing levels were; U-3 = 39.26 ft., U-4 = 40.25 ft.

TABLE 2

RECORD OF THE TEMPERATURE, CONDUCTIVITY, AND pH VALUES
IN THE MONITORING WELLS DURING PURGING AND PRIOR TO SAMPLING

(Measured on December 5, 1994)

Well #	Gallons per Casing Volume	Time	Gallons Purged	Casing Volumes Purged	Temperature (°F)	Conductivity ([μmhos/cm] x1000)	pH
U-1	4.90	13:25	0	0	65.8	1.15	8.15
			5	1.02	66.2	1.14	7.62
			10	2.04	67.9	1.14	7.50
			15	3.06	67.6	1.15	7.40
		13:39	20	4.08	67.8	1.14	7.32
U-2	4.11	8:45	0	0	64.5	0.86	8.11
			4	0.97	66.5	0.89	7.83
			8	1.95	66.4	0.95	7.61
			12	2.92	66.5	1.02	7.55
		9:00	16.5	4.01	66.4	1.02	7.42
U-3	2.94	14:00	0	0	68.1	1.24	7.85
			3	1.02	69.2	1.28	7.63
			6	2.04	69.5	1.21	7.51
			9	3.06	70.4	1.23	7.48
		14:12	12	4.08	70.6	1.23	7.44
U-4	3.62	9:30	0	0	65.8	1.61	7.59
			3.5	0.97	66.7	1.62	7.42
			7	1.93	67.2	1.63	7.30
			11	3.04	67.0	1.63	7.26
		9:42	15	4.14	67.0	1.63	7.22
U-5	1.90	10:20	0	0	67.8	1.66	7.65
			2	1.05	68.9	1.67	7.49
			4	2.11	69.2	1.67	7.40
			6	3.16	69.5	1.67	7.40
		10:30	8	4.21	70.0	1.67	7.33

TABLE 2 (Continued)

RECORD OF THE TEMPERATURE, CONDUCTIVITY, AND pH VALUES
IN THE MONITORING WELLS DURING PURGING AND PRIOR TO SAMPLING

(Measured on December 5, 1994)

Well #	Gallons per Casing Volume	Time	Gallons Purged	Casing Volumes Purged	Temperature (°F)	Conductivity ([μmhos/cm] x1000)	pH
U-6	2.16	12:15	0	0	68.8	1.16	7.58
			2.5	1.16	70.2	1.17	7.51
			5.5	2.55	71.1	1.20	7.43
			7.5	3.47	71.5	1.18	7.35
		12:27	9	4.17	71.9	1.18	7.29
U-7	3.38	11:00	0	0	70.1	1.17	7.38
			3.5	1.04	69.2	1.20	7.42
			7.5	2.22	69.7	1.18	7.51
			10.5	3.11	69.8	1.21	7.46
		11:13	14	4.14	69.9	1.19	7.40
U-8	2.30	11:32	0	0	70.1	1.12	7.85
			2.5	1.09	71.2	1.12	7.39
			5	2.17	71.5	1.13	7.40
			7.5	3.26	71.1	1.12	7.42
		11:42	9.5	4.13	71.4	1.12	7.31
U-9	2.17	12:48	0	0	70.2	1.22	7.98
			2.5	1.15	70.8	1.25	7.56
			5	2.30	71.5	1.26	7.41
			7.5	3.46	71.6	1.27	7.32
		12:59	9	4.15	71.9	1.27	7.43

TABLE 3

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Well #	TPH as Gasoline	Benzene	Toluene	Ethyl-benzene	Xylenes
12/05/94	U-1	1,300	55	20	16	330
	U-2	ND	ND	ND	ND	ND
	U-3	140,000	3,100	5,100	4,900	21,000
	U-4	ND	ND	ND	ND	ND
	U-5	ND	ND	ND	ND	ND
	U-6	450**	ND	ND	ND	ND
	U-7	ND	ND	ND	ND	ND
	U-8	ND	ND	ND	ND	ND
	U-9	3,700**	ND	ND	ND	ND
9/07/94	U-1	41,000	1,600	6,200	3,100	16,000
	U-2	ND	ND	0.63	ND	0.61
	U-3	100,000	2,400	4,900	4,200	21,000
	U-4	ND	ND	1.1	ND	1.0
	U-5	ND	ND	0.73	ND	0.84
	U-6	1,600*	ND	ND	ND	ND
	U-7	ND	ND	ND	ND	ND
	U-8	ND	ND	ND	ND	ND
	U-9	2,700**	ND	ND	ND	ND
6/09/94	U-1	59,000	5,200	1,300	5,200	15,000
	U-2	ND	ND	ND	ND	ND
	U-3	120,000*	3,300	6,100	5,200	26,000
	U-4	ND	ND	ND	ND	ND
	U-5	ND	ND	ND	ND	ND
	U-6	2,600*	16	ND	29	ND
	U-7	ND	ND	ND	ND	ND
	U-8	ND	ND	ND	ND	ND
	U-9	2,900**	ND	ND	ND	ND
4/13/94	U-2	ND	ND	ND	ND	ND
	U-4	ND	ND	ND	ND	ND
	U-5	ND	ND	ND	ND	ND
	U-7	ND	ND	ND	ND	ND
	U-8	ND	ND	0.78	ND	0.98
	U-9	ND	ND	ND	ND	ND

TABLE 3 (Continued)

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Well #	TPH as Gasoline	Benzene	Toluene	Ethyl-benzene	Xylenes
3/09/94	U-1	45,000	930	4,100	2,000	11,000
	U-2	62	1.1	5.4	1.1	9.7
	U-3	120,000	4,500	8,300	5,600	28,000
	U-4	ND	1.4	4.7	1.1	8.1
	U-5	71	1.7	6.3	1.5	10
	U-6	2,200	11	8.2	24	16
	U-7	ND	1.4	4.4	0.96	7.5
	U-8	ND	1.2	3.7	0.79	6.1
	U-9	5,700*	ND	ND	ND	ND
12/02/93	U-1	NOT SAMPLED DUE TO THE PRESENCE OF FREE PRODUCT				
	U-2	ND	ND	ND	ND	ND
	U-3	110,000	3,200	7,700	5,600	26,000
	U-4	ND	ND	ND	ND	2.6
	U-5	ND	ND	ND	ND	ND
	U-6	2,100	12	1.6	21	1.1
	U-7	ND	ND	ND	ND	ND
	U-8	ND	ND	ND	ND	ND
	U-9	ND	ND	ND	ND	ND
9/09/93	U-1	67,000	2,900	18,000	6,200	32,000
	U-2	ND	ND	ND	ND	ND
	U-3	110,000	2,800	10,000	6,500	31,000
	U-4	ND	ND	ND	ND	ND
	U-5	ND	ND	ND	ND	ND
	U-6	6,300♦♦	29	ND	120	34
	U-7	ND	ND	ND	ND	ND
	U-8	ND	ND	ND	ND	ND
	U-9	1,200♦	ND	ND	ND	ND
6/04/93	U-1	35,000	1,300	5,700	900	9,200
	U-2	ND	ND	ND	ND	ND
	U-3	92,000	2,900	8,700	4,300	20,000
	U-4	ND	ND	ND	ND	ND
	U-5	ND	ND	ND	ND	ND
	U-6	13,000	100	38	450	320
	U-7	ND	ND	ND	ND	ND
	U-8	ND	ND	ND	ND	ND
	U-9	2,100♦	ND	ND	ND	ND

TABLE 3 (Continued)

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Well #	TPH as Gasoline	Benzene	Toluene	Ethyl-benzene	Xylenes
2/12/93	U-1	70,000	2,200	8,400	3,100	18,000
	U-2	ND	ND	ND	ND	ND
	U-3	80,000	3,700	9,400	3,700	18,000
	U-4	ND	ND	ND	ND	ND
	U-5	ND	ND	ND	ND	ND
	U-6	2,600	27	ND	120	51
	U-7	ND	ND	ND	ND	ND
	U-8	ND	ND	ND	ND	ND
11/20/92	U-1	NOT SAMPLED DUE TO THE PRESENCE OF FREE PRODUCT				
	U-2	ND	ND	ND	ND	ND
	U-3	50,000	3,200	4,700	1,900	10,000
	U-4	ND	ND	2.5	ND	ND
	U-5	ND	ND	ND	ND	ND
	U-6	WELL WAS INACCESSIBLE				
	U-7	ND	ND	ND	ND	ND
8/06/92	U-1	NOT SAMPLED DUE TO THE PRESENCE OF FREE PRODUCT				
	U-2	ND	ND	ND	ND	ND
	U-3	140,000	5,100	13,000	5,000	23,000
	U-4	ND	ND	ND	ND	ND
	U-5	ND	ND	ND	ND	ND
	U-6	9,200	160	ND	360	150
	U-7	ND	ND	ND	ND	ND
	U-8	ND	ND	ND	ND	ND
4/07/92	U-1	▲	▲	▲	▲	▲
	U-2	ND	ND	ND	ND	ND
	U-3	97,000	6,100	16,000	5,400	28,000
	U-4	ND	ND	ND	ND	ND
	U-5	ND	ND	ND	ND	ND
	U-6	6,600	90	ND	820	1,200
	U-7	ND	ND	ND	ND	ND
	U-8	ND	ND	ND	ND	ND
3/05/92	U-1	NOT SAMPLED DUE TO THE PRESENCE OF FREE PRODUCT				
	U-2	ND	ND	0.36	ND	ND
	U-3	160,000	5,300	15,000	5,400	26,000
	U-4	ND	ND	ND	ND	ND

TABLE 3 (Continued)

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Well #	TPH as Gasoline	Benzene	Toluene	Ethyl-benzene	Xylenes
12/04/91	U-1	NOT SAMPLED DUE TO THE PRESENCE OF FREE PRODUCT				
	U-2	ND	ND	ND	ND	ND
	U-3	75,000	2,500	6,100	1,900	11,000
	U-4	ND	ND	ND	ND	ND
9/19/91	U-1	NOT SAMPLED DUE TO THE PRESENCE OF FREE PRODUCT				
	U-2	ND	ND	ND	ND	ND
	U-3	61,000	3,300	9,700	2,800	15,000
	U-4	ND	ND	ND	ND	ND
6/03/91	U-1	NOT SAMPLED DUE TO THE PRESENCE OF FREE PRODUCT				
	U-2	ND	ND	ND	ND	ND
	U-3	130,000	5,800	19,000	4,600	24,000
	U-4	ND	ND	ND	ND	ND
3/04/91	U-1	NOT SAMPLED DUE TO THE PRESENCE OF FREE PRODUCT				
	U-2	ND	ND	0.9	ND	2.6
	U-3	84,000	1,400	10,000	2,900	17,000
	U-4	ND	ND	ND	ND	ND
1/18/91	U-3	51,000	1,700	3,100	1,500	7,500
	U-4	ND	ND	ND	ND	ND
12/05/90	U-1	NOT SAMPLED DUE TO THE PRESENCE OF FREE PRODUCT				
	U-2	ND	ND	ND	ND	ND
	U-3	69,000	1,900	3,500	1,600	9,800
	U-4	ND	ND	ND	ND	ND
8/24/90	U-1	27,000	1,200	1,800	1,400	5,500
8/23/90	U-2	ND	ND	ND	ND	ND
	U-3	110,000	4,400	13,000	2,800	17,000
	U-4	ND	ND	1.0	ND	1.8
6/05/90	U-1	46,000	2,300	5,500	2,500	11,000
3/20/90	U-1	36,000	2,100	5,500	1,900	9,300
2/09/88	U-1	93,000	3,600	11,000	▲▲	20,000

TABLE 3 (Continued)

SUMMARY OF LABORATORY ANALYSES
WATER

* Sequoia Analytical Laboratory reported that the hydrocarbons detected appeared to be gasoline and non-gasoline mixture.

** Sequoia Analytical Laboratory reported that the hydrocarbon detected did not appear to be gasoline.

▲ Product Skimmer installed in well

▲▲ Ethylbenzene and xylenes were combined prior to March 1990.

♦ The concentration reported as gasoline is primarily due to the presence of a discrete hydrocarbon peak not indicative of standard gasoline.

♦♦ The concentration reported as gasoline is primarily due to the presence of a combination of gasoline and a discrete peak not indicative of gasoline.

ND = Non-detectable.

Results are in micrograms per liter (µg/L), unless otherwise indicated.

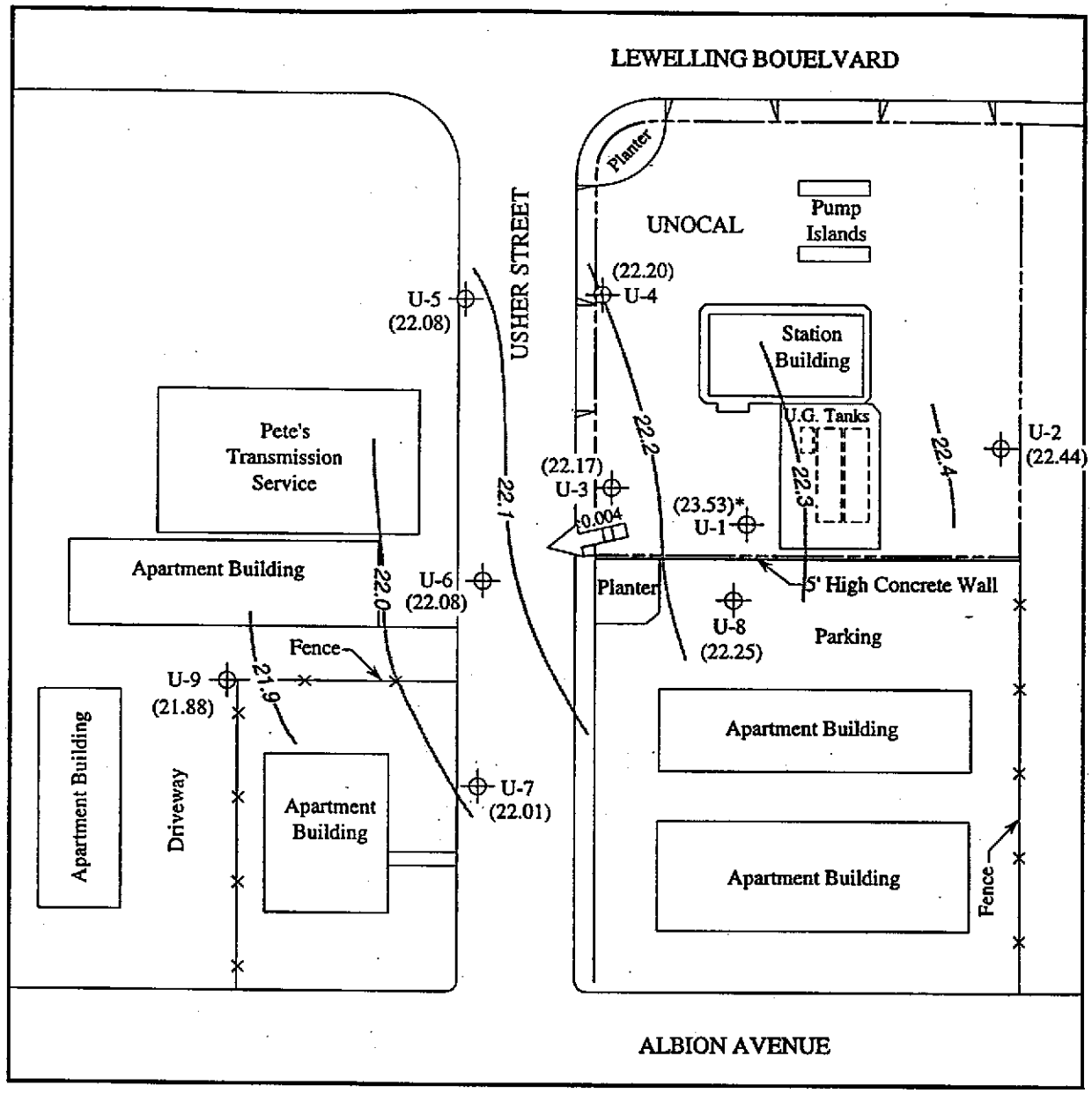
Notes: Laboratory analyses data prior to December 2, 1993, were provided by GeoStrategies, Inc.

Base modified from 7.5 minute U.S.G.S. Hayward and San Leandro Quadrangles (both photorevised 1980)

0 2000 4000

Approx. scale feet

mpDS SERVICES, INCORPORATED	UNOCAL SERVICE STATION #5760 376 LEWELLING BOULEVARD SAN LORENZO, CALIFORNIA	LOCATION MAP



LEGEND

- Monitoring well
- ( ) Ground water elevation in feet above Mean Sea Level
- #.## Direction of ground water flow with approximate hydraulic gradient
- Contours of ground water elevation
- * Elevation was not used to calculate contours.

0 60 120

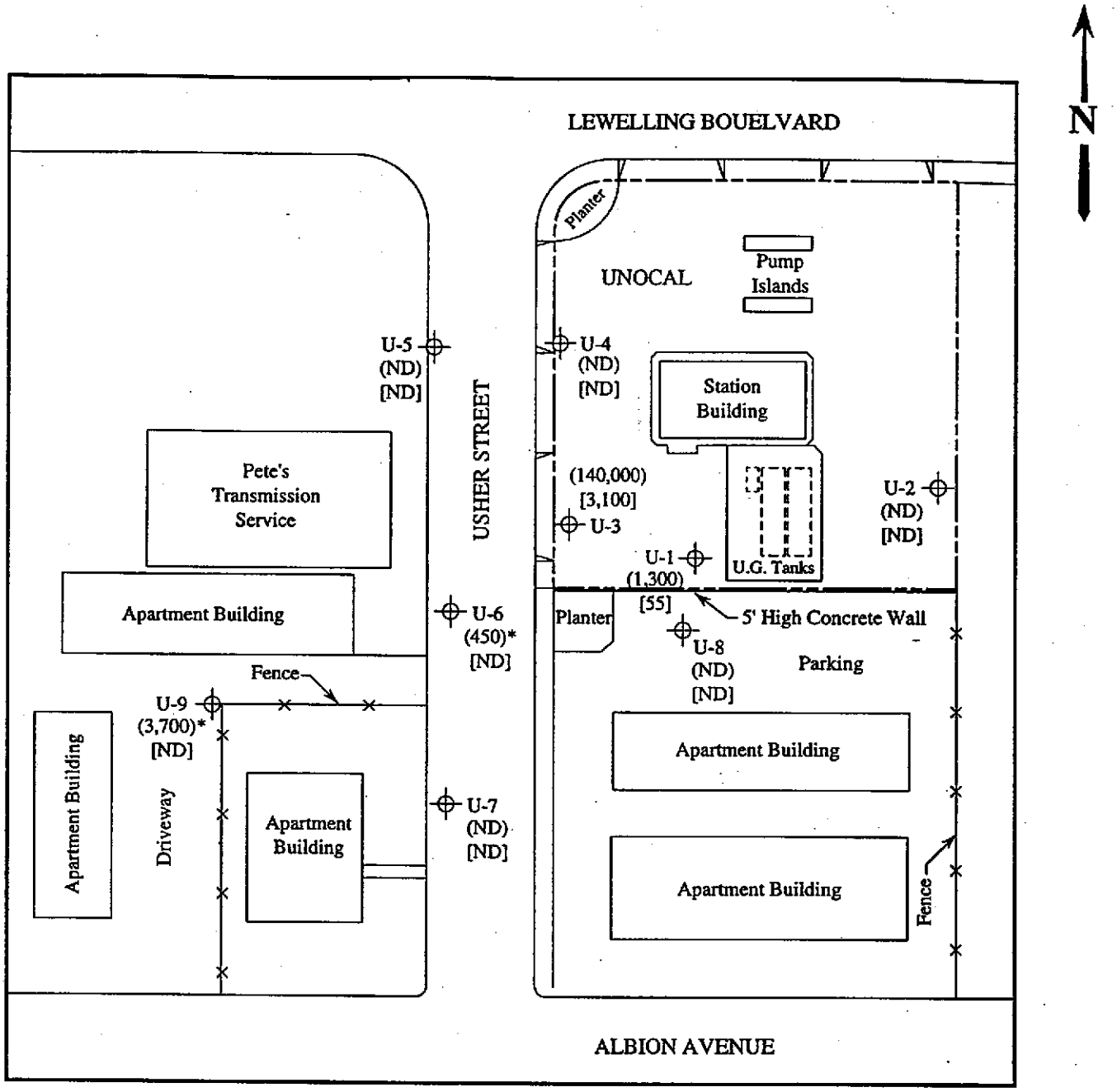
Approx. scale feet

POTENTIOMETRIC SURFACE MAP FOR THE DECEMBER 5, 1994 MONITORING EVENT

MPDS SERVICES, INCORPORATED

UNOCAL SERVICE STATION #5760
376 LEWELLING BOULEVARD
SAN LORENZO, CALIFORNIA

FIGURE
1



LEGEND

- ⊕ Monitoring well
- ( ) Concentration of TPH as gasoline in µg/L
- [ ] Concentration of benzene in µg/L

ND = Non-detectable

* The lab reported that the hydrocarbons detected did not appear to be gasoline.

0 60 120

Approx. scale feet

PETROLEUM HYDROCARBON CONCENTRATIONS IN GROUND WATER ON DECEMBER 5, 1994

MPDS SERVICES, INCORPORATED

UNOCAL SERVICE STATION #5760
376 LEWELLING BOULEVARD
SAN LORENZO, CALIFORNIA

FIGURE 2

ORO LOMA SANITARY DISTRICT
SPECIAL DISCHARGE PERMIT APPLICATION

SECTION I: General Condition

1. Applicant Business Name: Unocal Corporation

2. Applicant Address: 2000 Crow Canyon Place, Suite 400

   City/Sate/Zip: San Ramon, California 94583

3. Name of Environmental/Engineering Firm Representing Applicant

   Pacific Environmental Group, Inc.

4. Environmental/Engineering Firm Address

   Street: 2025 Gateway Place, Suite 440

   City/State/Zip: San Jose, California 95110

5. Person to Contact About this Application

   Name Jason Nutt Title Staff Engineer Date: 4/17/95

6. Person to Contact in case of Emergency

   Name Jason Nutt Title Staff Engineer

   Day Phone (408) 441-7500 Night Phone (408) 554-7590 Code 310

7. *Certification*

   I certify that the information contained in this application is familiar to me and to the best of knowledge, such information is true, complete and accurate.

Tina R. Berry — 4/24/95

Signature — Date

Tina R. Berry

Print Name

ORO LOMA SANITARY DISTRICT
SPECIAL DISCHARGE PERMIT APPLICATION

SECTION 2 SITE INFORMATION

1. Name and Address of Remediation Site

Name Unocal Service Station 5760

Street 376 Lewelling Boulevard

City/State/Zip San Lorenzo, California

2. Discuss the nature of the problem and state the reason(s) why there is no reasonable alternative but to discharge into the wastewater system. (Attach additional pages as necessary).

See cover letter.

3. Site Description

a) Provide a map showing the location of the site.
b) Provide a diagram showing location of all monitoring wells, treatment unit and connection point to the District sewer system.
c) Provide copies of laboratory analysis of pollutant concentration.

4. Wastewater Flow Information

Estimated Discharge Flow Rate 7 (gal/min)
Peak Hourly Flow Rate 10 (gal/min)
Maximum Daily Flow Rate 10 (gal/min)

Estimated Duration of Discharge 6 to 9 months

ORO LOMA SANITARY DISTRICT
SPECIAL DISCHARGE PERMIT APPLICATION

SECTION 3 TREATMENT SYSTEM INFORMATION

1) Provide a narrative description of treatment system. Be sure to include the following information. (Use additional sheets if necessary)

   a) Describe how the groundwater will be treated; (best available technology is required.
   b) Describe the efficiency of the treatment unit.
   c) Describe where and how it will connect to the District's sewer system.
   d) Emergency procedures/security provisions.

See cover letter.

2) Please attached a detailed drawing of the treatment system.

SUSAN/DISCPERM.APP/LR

PACIFIC ENVIRONMENTAL GROUP, INC.
2025 GATEWAY PLACE, SUITE 440
SAN JOSE, CA 95110
(408) 441-7500

BANK OF AMERICA, NT & SA
PALO ALTO COMMERCIAL BANKING
PALO ALTO, CA 94301
11-35-1210

010913

PAY THE SUM OF 420 DOLS 00 CTS

TO THE ORDER OF Oro Loma Sanitary District

DATE	AMOUNT
4-21-95	420.00

⑈010913⑈ ⑆121000358⑆ 14934⑈0367O⑈

PACIFIC ENVIRONMENTAL GROUP, INC.

DETACH AND RETAIN THIS STATEMENT
THE ATTACHED CHECK IS IN PAYMENT OF ITEMS DESCRIBED BELOW.
IF NOT CORRECT PLEASE NOTIFY US PROMPTLY NO RECEIPT DESIRED

SAGEGUARD BUSINESS SYSTEMS - CHECK

PACIFIC ENVIRONMENTAL GROUP, INC. — BANK CODE 103

DESCRIPTION	PROJECT	TASK	ACCOUNT	AMOUNT
Permit Fee	310-058.3B		508	420.00

ATTACHMENT B

RADIUS OF INFLUENCE CALCULATIONS

WELL U-1 EFFECTIVE RADIUS OF INFLUENCE

This program is designed to determine an effective radius of influence of a vapor extraction well. Data from feasibility tests or an operating system may be entered. A best fit curve is generated to fit raw field data.
For more detail on this technic please read:
Timothy E. Buscheck, P.E. and Thomas R. Peargin, R.G., November 1991, Proceedings of the Petroleum Hydrocarbons and Organic Chemicals in Groundwater: Prevention, Detection, and Restoration, Houston, Texas
Summary of a Nation-Wide Vapor Extraction System Performance Study

$n := 4$ Number of monitoring points

$m := 1$ Number of data points per well

$i := 0 \ldots n$ Matrix array size for pressure data

$j := 0 \ldots m - 1$ Matrix array size for number of data points per well

P (i,j) = Well vacuum pressure, inches of H2O

Pn (i,j) = Normalized well vacuum pressure, inches of H2O

R (i) = Radial distance from extraction well to monitoring point, feet

FIELD DATA

Well Pressure (inches of water)

Well U-1 $P_{0,j} := 13.1$

Well U-3 $P_{1,j} := .01$

Well U-4 $P_{2,j} := 0.000001$

Well U-6 $P_{3,j} := .000001$

Radial Distance

$R_i :=$

0.0
48
78
113
46

Well U-8 $P_{4,j} := .000001$

Calculate the normalized vacuum:

$$Pn_{i,j} := \frac{P_{i,j}}{P_{0,j}}$$

first observ
first well
← first well

$$Pn = \begin{bmatrix} 1 \\ 7.634 \cdot 10^{-4} \\ 7.634 \cdot 10^{-8} \\ 7.634 \cdot 10^{-8} \\ 7.634 \cdot 10^{-8} \end{bmatrix}$$

Calculate the average values for normalized data:

$$Pave_i := \sum_j \frac{Pn_{i,j}}{m}$$

$$Pave = \begin{bmatrix} 1 \\ 7.634 \cdot 10^{-4} \\ 7.634 \cdot 10^{-8} \\ 7.634 \cdot 10^{-8} \\ 7.634 \cdot 10^{-8} \end{bmatrix}$$

LINEAR REGRESSION OF VACUUM DATA

Covert an equation of the form $Y = e^{ax} + b$ into linear form:

$Ln(y) = ax + Ln(b)$

$Plog_i := ln[Pave_i]$

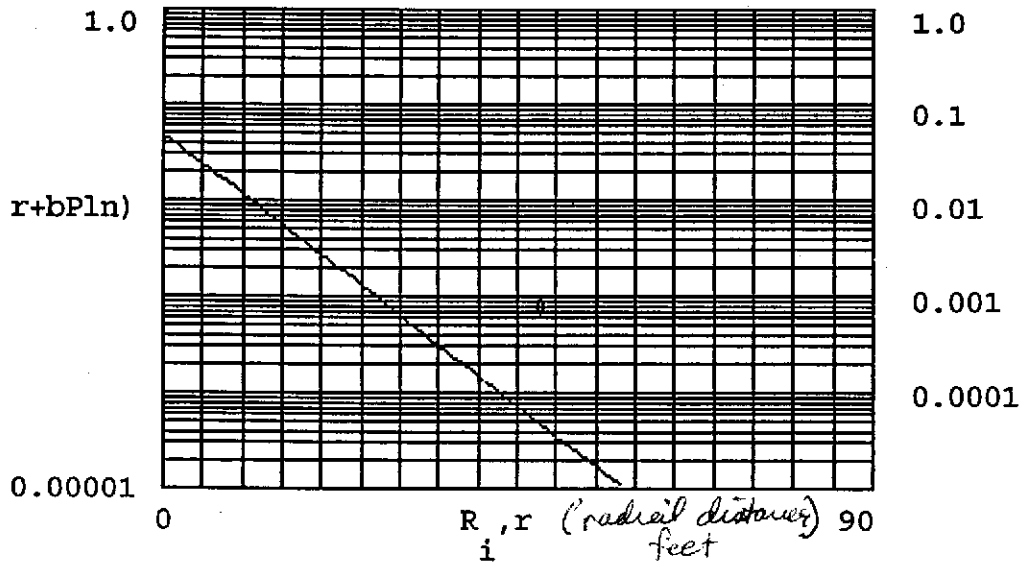
$$Plog = \begin{bmatrix} 0 \\ -7.178 \\ -16.388 \\ -16.388 \\ -16.388 \end{bmatrix}$$

Calculate the slope, y - intercept and the correlation coefficient:

mPln := slope(R,Plog)	mPln = -0.145	linear regression slope
bPln := intercept(R,Plog)	bPln = -3.02	linear regression intercept
rPln := corr(R,Plog)	rPln = -0.814	correlation coefficient

Plot the field data and the regressed curve in semi-log form:

r := 0 ..180



Calculate the effective radius of influence at 1% of total vacuum:

$$Re := \frac{ln(0.01) - bPln}{mPln}$$

Re = 10.954 Feet

Dan would think that if the pressure was greater, the influence (radial) would be greater

WELL U-3 EFFECTIVE RADIUS OF INFLUENCE

This program is designed to determine an effective radius of influence of a vapor extraction well. Data from feasibility tests or an operating system may be entered. A best fit curve is generated to fit raw field data.
For more detail on this technic please read:
Timothy E. Buscheck, P.E. and Thomas R. Peargin, R.G., November 1991, Proceedings of the Petroleum Hydrocarbons and Organic Chemicals in Groundwater: Prevention, Detection, and Restoration, Houston, Texas
Summary of a Nation-Wide Vapor Extraction System Performance Study

$n := 4$ Number of monitoring points

$m := 1$ Number of data points per well

$i := 0 \,..n$ Matrix array size for pressure data

$j := 0 \,..m - 1$ Matrix array size for number of data points per well

P (i,j) = Well vacuum pressure, inches of H2O

Pn (i,j) = Normalized well vacuum pressure, inches of H2O

R (i) = Radial distance from extraction well to monitoring point, feet

FIELD DATA

Well Pressure (inches of water)

Well U-3 $P_{0,j} := 46$

Well U-1 $P_{1,j} := .02$

Well U-4 $P_{2,j} := 0.000001$

Well U-6 $P_{3,j} := .000001$

Radial Distance

$R_i :=$

0.0
48
70
65
60

Well U-8 $P_{4,j} := .000001$

Calculate the normalized vacuum:

$$Pn_{i,j} := \frac{P_{i,j}}{P_{0,j}} \qquad Pn = \begin{bmatrix} 1 \\ 4.348 \cdot 10^{-4} \\ 2.174 \cdot 10^{-8} \\ 2.174 \cdot 10^{-8} \\ 2.174 \cdot 10^{-8} \end{bmatrix}$$

Calculate the average values for normalized data:

$$Pave_i := \sum_j \frac{Pn_{i,j}}{m} \qquad Pave = \begin{bmatrix} 1 \\ 4.348 \cdot 10^{-4} \\ 2.174 \cdot 10^{-8} \\ 2.174 \cdot 10^{-8} \\ 2.174 \cdot 10^{-8} \end{bmatrix}$$

LINEAR REGRESSION OF VACUUM DATA

Covert an equation of the form $Y = e^{ax} + b$ into linear form:

$$Ln(y) = ax + Ln(b)$$

$Plog_i := ln[Pave_i]$

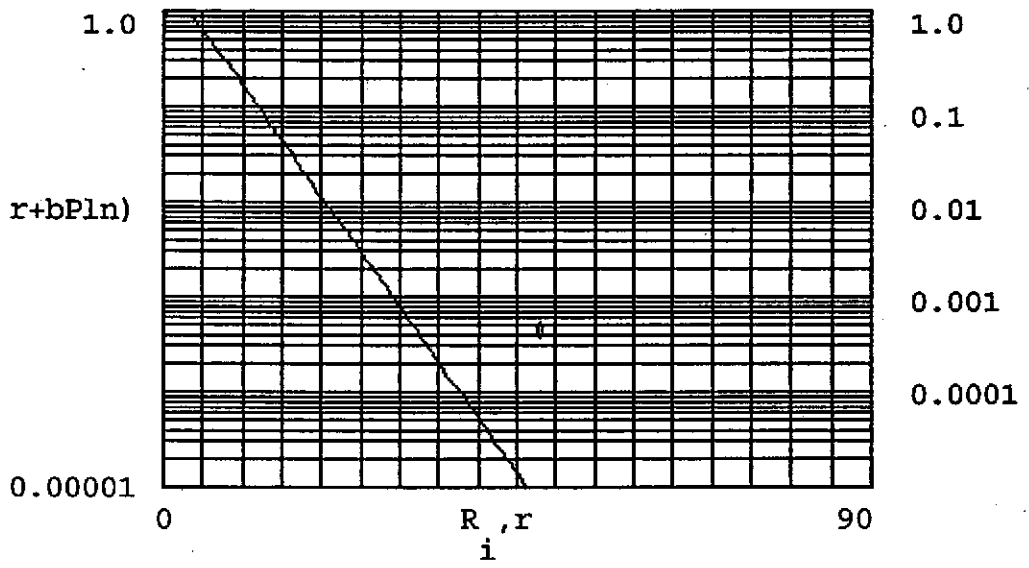
$$Plog = \begin{bmatrix} 0 \\ -7.741 \\ -17.644 \\ -17.644 \\ -17.644 \end{bmatrix}$$

Calculate the slope, y - intercept and the correlation coefficient:

mPln := slope(R,Plog)	mPln = -0.268	linear regression slope
bPln := intercept(R,Plog)	bPln = 0.901	linear regression intercept
rPln := corr(R,Plog)	rPln = -0.948	correlation coefficient

Plot the field data and the regressed curve in semi-log form:

r := 0 ..180



Calculate the effective radius of influence at 1% of total vacuum:

$$Re := \frac{ln(0.01) - bPln}{mPln}$$

Re = 20.528 Feet

ATTACHMENT C

CERTIFIED ANALYTICAL REPORTS

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Pacific Environmental Group
2025 Gateway Place, Suite 440
San Jose, CA 95110

Attention: Maree Doden

Client Proj. ID: 310-058.3A/5760, San Lorenzo
Sample Descript: Infl
Matrix: AIR
Analysis Method: 8015Mod/8020
Lab Number: 9408493-01

Sampled: 08/08/94
Received: 08/09/94

Analyzed: 08/09/94
Reported: 08/10/94

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	100	990
Benzene	1.0	14
Toluene	1.0	29
Ethyl Benzene	1.0	41
Xylenes (Total)	1.0	150
Chromatogram Pattern:		Gas

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	149 Q

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Eileen Manning
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Pacific Environmental Group	Client Proj. ID: 310-058.3A/5760, San Lorenzo	Sampled: 08/08/94
2025 Gateway Place, Suite 440	Sample Descript: Effl	Received: 08/09/94
San Jose, CA 95110	Matrix: AIR	
	Analysis Method: 8015Mod/8020	Analyzed: 08/09/94
Attention: Maree Doden	Lab Number: 9408493-02	Reported: 08/10/94

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	**10**	**81**
Benzene	0.10	N.D.
Toluene	**0.10**	**0.42**
Ethyl Benzene	**0.10**	**0.41**
Xylenes (Total)	**0.10**	**2.6**
Chromatogram Pattern:		**Gas**

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	101

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Eileen Manning
Project Manager

Sequoia Analytical

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Pacific Environmental Group
2025 Gateway Place, Suite 440
San Jose, CA 95110
Attention: Maree Doden

Client Proj. ID: 310-058.3A/5760, San Lorenzo
Lab Proj. ID: 9408493

Received: 08/09/94
Reported: 08/10/94

LABORATORY NARRATIVE

Q - Coelution confirmed.

SEQUOIA ANALYTICAL

Eileen Manning
Project Manager

Sequoia Analytical

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Pacific Environmental Group
2025 Gateway Place, Suite 440
San Jose, CA 95110
Attention: Maree Doden

Client Project ID: 310-058.3A/5760, San Lorenzo
QC Sample Group: 9408493 01
Reported: Aug 10, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD Batch#:	940829403	940829403	940829403	940829403
Date Prepared:	N.A.	N.A.	N.A.	N.A.
Date Analyzed:	8/9/94	8/9/94	8/9/94	8/9/94
Instrument I.D.#:	GCHP-20	GCHP-20	GCHP-20	GCHP-20
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	120	120	120	117
Matrix Spike Duplicate % Recovery:	110	110	110	110
Relative % Difference:	8.7	8.7	8.7	6.2
LCS Batch#:				
Date Prepared:				
Date Analyzed:				
Instrument I.D.#:				
LCS % Recovery:				
% Recovery Control Limits:	71-133	72-128	72-130	71-120

SEQUOIA ANALYTICAL

Eileen A. Manning
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

Sequoia Analytical

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Pacific Environmental Group
2025 Gateway Place, Suite 440
San Jose, CA 95110
Attention: Maree Doden

Client Project ID: 310-058.3A/5760, San Lorenzo

QC Sample Group: 9408493 02

Reported: Aug 10, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD Batch#:	940829403	940829403	940829403	940829403
Date Prepared:	N.A.	N.A.	N.A.	N.A.
Date Analyzed:	8/9/94	8/9/94	8/9/94	8/9/94
Instrument I.D.#:	GCHP-3	GCHP-3	GCHP-3	GCHP-3
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	100	100	100	100
Matrix Spike Duplicate % Recovery:	100	100	100	100
Relative % Difference:	0.0	0.0	0.0	0.0
LCS Batch#:				
Date Prepared:				
Date Analyzed:				
Instrument I.D.#:				
LCS % Recovery:				
% Recovery Control Limits:	71-133	72-128	72-130	71-120

SEQUOIA ANALYTICAL

Eileen A. Manning
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

UNOCAL 76

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☐ 819 Striker Ave., Suite 8 • Sacramento, CA 95834 • (916) 921-9600
☐ 1900 Bates Ave., Suite LM • Concord, CA 94520 • (510) 686-9600
☐ 18939 120th Ave., N.E., Suite 101 • Bothell, WA 98011 • (206) 481-9200
☐ East 11115 Montgomery, Suite B • Spokane, WA 99206 • (509) 924-9200
☐ 15055 S.W. Sequoia Pkwy, Suite 110 • Portland, OR 97222 • (503) 624-9800

Company Name: Pacific Environmental	Project Name: 3760 LEWELLING BLV. San Lorenzo (Alameda)
Address: 2025 Gateway Suite 440	UNOCAL Project Manager: T. BERRY
City: San Jose State: CA Zip Code: 95110	Release #: 30-058.3A
Telephone: (408) 441-7500 FAX #: (408) 441-9102	Site #: 5760
Report To: Maree Dosen Sampler: Joe Perfumo	QC Data: ☒ Level A (Standard) ☐ Level B ☐ Level C ☐ Level D

Pink - Client

Turnaround Time: ☒ 10 Working Days ☐ 2 Working Days ☐ 5 Working Days ☐ 24 Hours ☐ 3 Working Days ☐ 2 - 8 Hours

9408493

☐ Drinking Water ☐ Waste Water ☒ Other

Analyses Requested

Client Sample I.D.	Date/Time Sampled	Matrix Desc.	# of Cont.	Cont. Type	Laboratory Sample #	GAS / BTEX	Comments
1. INFL.		AIR	1	1L	01 A	X	
2. EFFL		X	X	X	02 A	X	
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							

Yellow - Laboratory

White - Laboratory

Relinquished By:	Date: 8/9/94	Time: 8:15	Received By: M. Dosen 8/9/94 8:15
Relinquished By:	Date: 8/9/94	Time: 1022	Received By:	Date: 8/10/94	Time: 10:22
Relinquished By:	Date: 8/9/94	Time: 1115	Received By Lab:	Date: 8/9/94	Time: 1116

Were Samples Received in Good Condition? ☐ Yes ☐ No Samples on Ice? ☐ Yes ☐ No Method of Shipment _____

Page 1 of 1

To be completed upon receipt of report:

1) Were the analyses requested on the Chain of Custody reported? ☐ Yes ☐ No If no, what analyses are still needed? _____

2) Was the report issued within the requested turnaround time? ☐ Yes ☐ No If no, what was the turnaround time? _____

Approved by: _____ Signature: _____ Company: _____ Date: _____

SEQUOIA ANALYTICAL SAMPLE RECEIPT LOG

CLIENT NAME: PES (310-058.34) MASTER LOG NO. / PAGE: 9408493

REC.. BY (PRINT): DW DATE OF LOG-IN: 8.9.94

CIRCLE THE APPROPRIATE RESPONSE	LAB SAMPLE #	DASH #	CLIENT IDENTIFICATION	CONTAINER DESCRIPTION	SAMPLE MATRIX	DATE SAMP.	REMARKS: CONDITION (ETC)
1. Custody Seal(s): Present / (Absent) Intact / Broken*	1	1	[illegible]	Teflon	A	8.18	
2. Custody Seal Nos.:	2	2	[illegible]	↓	↓	↓	
3. Chain-of-Custody Records: ~~Present~~ / Absent*							
4. Traffic Reports or Packing List: Present / (Absent)							
5. Airbill: Airbill / Sticker Present / (Absent)			DW				
6. Airbill No.:							
7. Sample Tags: ~~Present~~ / Absent* Sample Tag Nos.: (Listed) / Not Listed on Chain-of-Custody							
8. Sample Condition: ~~Intact~~/Broken*/Leaking*							
9. Does information on custody reports, traffic reports and sample tags agree? ~~Yes~~ / No*							
10. Proper Preservatives Used: (Yes) / No*							
11. Date Rec. at Lab: 8/9/94							
12. Time Rec. at Lab: 1116							

* If Circled, contact Project Manager and attach record of resolution

Form SC001

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

310-058.3A

Pacific Environmental Group	Client Proj. ID: 310-050.3A/5760, San Lorenzo	Sampled: 08/09/94
2025 Gateway Place, Suite 440	Sample Descript: Infl	Received: 08/10/94
San Jose, CA 95110	Matrix: AIR	
	Analysis Method: 8015Mod/8020	Analyzed: 08/10/94
Attention: Maree Doden	Lab Number: 9408544-01	Reported: 08/15/94

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	200	560
Benzene	2.0	3.9
Toluene	2.0	4.1
Ethyl Benzene	2.0	15
Xylenes (Total)	2.0	39
Chromatogram Pattern:		Gas

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	116

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Eileen Manning
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Pacific Environmental Group
2025 Gateway Place, Suite 440
San Jose, CA 95110
Attention: Maree Doden

Client Project ID: 310-050.3A/5760, San Lorenzo

QC Sample Group: 9408544 01

Reported: Aug 12, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD Batch#:	G940829408	G940829408	G940829408	G940829408
Date Prepared:	N/A	N/A	N/A	N/A
Date Analyzed:	8/10/94	8/10/94	8/10/94	8/10/94
Instrument I.D.#:	GCHP-17	GCHP-17	GCHP-17	GCHP-17
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	96	96	100	100
Matrix Spike Duplicate % Recovery:	95	96	100	100
Relative % Difference:	1.0	0.0	0.0	0.0

LCS Batch#: NOT APPLICABLE

Date Prepared:
Date Analyzed:
Instrument I.D.#:

LCS % Recovery:

% Recovery Control Limits:	71-133	72-128	72-130	71-120

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

Eileen A. Manning
Project Manager

SEQUOIA ANALYTICAL SAMPLE RECEIPT LOG

CLIENT NAME: PEG Unocal
REC. BY (PRINT): JL

MASTER LOG NO. / PAGE: 9408544
DATE OF LOG-IN: 8.10.94

CIRCLE THE APPROPRIATE RESPONSE	
1. Custody Seal(s):	Present / Absent Intact / Broken*
2. Custody Seal Nos.:	
3. Chain-of-Custody Records:	Present / Absent*
4. Traffic Reports or Packing List:	Present / Absent
5. Airbill:	Airbill / Sticker Present / Absent
6. Airbill No.:	
7. Sample Tags: Sample Tag Nos.:	Present / Absent* Listed / Not Listed on Chain-of-Custody
8. Sample Condition:	Intact/Broken*/Leaking*
9. Does information on custody reports, traffic reports and sample tags agree?	Yes / No*
10. Proper Preservatives Used:	Yes / No*
11. Date Rec. at Lab:	8-9-94
12. Time Rec. at Lab:	1105

LAB SAMPLE #	DASH #	CLIENT IDENTIFICATION	CONTAINER DESCRIPTION	SAMPLE MATRIX	DATE SAMP.	REMARKS: CONDITION (ETC)
		INF	Tedlar	Air	8-9	

* If Circled, contact Project Manager and attach record of resolution

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East 11115 Montgomery, Suite B • Spokane, WA 99206 • (509) 924-9200
15055 S.W. Sequoia Pkwy, Suite 110 • Portland, OR 97222 • (503) 624-9800

Company Name: Pacific Environmental Group	Project Name: 3760 Lewelling Blv. San Lorenzo (Alameda)
Address: 2025 Gateway Pl. Suite 440	UNOCAL Project Manager: T. Berry
City: San Jose State: CA. Zip Code: 95110	Release #: 310-058.3A
Telephone: (408) 441-7500 FAX #: (408) 441 9102	Site #: 5760
Report To: Marcel Dorey Sampler: Joe Perfumo	QC Data: ☒ Level A (Standard) ☐ Level B ☐ Level C ☐ Level D

Pink - Client

Turnaround Time: ☒ 10 Working Days ☐ 5 Working Days ☐ 3 Working Days ☐ 2 Working Days ☐ 24 Hours ☐ 2 - 8 Hours

9408544

☐ Drinking Water ☐ Waste Water ☒ Other AIR

Analyses Requested: GAS/B-TEX, CO2, O2

Client Sample I.D.	Date/Time Sampled	Matrix Desc.	# of Cont.	Cont. Type	Laboratory Sample #	Comments
1. INFL.	8/9 15:00	AIR	1	1L	01 A	
2. ~~INFL.~~	~~8/9 15:00~~	AIR	1	1L		
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

Yellow - Laboratory

Relinquished By:	Date: 8/9	Time: 15:30	Received By:	Date: 8/9 PM	Time: 1530
Relinquished By:	Date: 8/10/94	Time: 0951	Received By:	Date: 8/10/94	Time: 8:51
Relinquished By:	Date: 8/10/94	Time: 1105	Received By Lab:	Date:	Time:

White - Laboratory

Were Samples Received in Good Condition? ☐ Yes ☐ No Samples on Ice? ☐ Yes ☐ No Method of Shipment _____ Page __ of __

To be completed upon receipt of report:
1) Were the analyses requested on the Chain of Custody reported? ☐ Yes ☐ No If no, what analyses are still needed? _____
2) Was the report issued within the requested turnaround time? ☐ Yes ☐ No If no, what was the turnaround time? _____

Approved by: _____ Signature: _____ Company: _____ Date: _____

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600

Pacific Environmental Group
2025 Gateway Place, Suite 440
San Jose, CA 95110

Attention: Maree Doden

Client Proj. ID: 310-058.3A/5760, San Lorenzo
Sample Descript: Infl
Matrix: AIR
Analysis Method: 8015Mod/8020
Lab Number: 9408729-01

Sampled: 08/11/94
Received: 08/12/94

Analyzed: 08/12/94
Reported: 08/16/94

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	50	870
Benzene	0.50	7.2
Toluene	0.50	7.2
Ethyl Benzene	0.50	3.1
Xylenes (Total)	0.50	9.4
Chromatogram Pattern:		
Gas & Non Gas Mix		<C8

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	94

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Eileen Manning
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Pacific Environmental Group	Client Proj. ID: 310-058.3A/5760, San Lorenzo	Sampled: 08/11/94
2025 Gateway Place, Suite 440	Sample Descript: Effl	Received: 08/12/94
San Jose, CA 95110	Matrix: AIR	
	Analysis Method: 8015Mod/8020	Analyzed: 08/12/94
Attention: Maree Doden	Lab Number: 9408729-02	Reported: 08/16/94

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	**10**	**15**
Benzene	0.10	N.D.
Toluene	**0.10**	**0.25**
Ethyl Benzene	**0.10**	**0.24**
Xylenes (Total)	**0.10**	**1.4**
Chromatogram Pattern:		**Gas**

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	101

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Eileen Manning
Project Manager

Sequoia Analytical

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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Pacific Environmental Group
2025 Gateway Place, Suite 440
San Jose, CA 95110
Attention: Maree Doden

Client Project ID: 310-058.3A/5760, San Lorenzo
QC Sample Group: 9408729 01
Reported: Aug 16, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD Batch#:	940864801	940864801	940864801	940864801
Date Prepared:	-	-	-	-
Date Analyzed:	8/12/94	8/12/94	8/12/94	8/12/94
Instrument I.D.#:	GCHP-3	GCHP-3	GCHP-3	GCHP-3
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	110	110	110	110
Matrix Spike Duplicate % Recovery:	100	110	110	107
Relative % Difference:	9.5	0.0	0.0	2.8
LCS Batch#:				
Date Prepared:				
Date Analyzed:				
Instrument I.D.#:				
LCS % Recovery:				
% Recovery Control Limits:	71-133	72-128	72-130	71-120

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

Eileen A. Manning
Project Manager

SEQUOIA ANALYTICAL SAMPLE RECEIPT LOG

CLIENT NAME: PEG
REC.. BY (PRINT): DR

MASTER LOG NO. / PAGE: 9408729
DATE OF LOG-IN: 8-12-94

CIRCLE THE APPROPRIATE RESPONSE	
1. Custody Seal(s):	Present / ~~Absent~~ Intact / Broken*
2. Custody Seal Nos.:	
3. Chain-of-Custody Records:	(Present) / Absent*
4. Traffic Reports or Packing List:	Present / (Absent)
5. Airbill:	Airbill / Sticker Present / (Absent)
6. Airbill No.:	
7. Sample Tags:	(Present) / Absent*
Sample Tag Nos.:	(Listed) / Not Listed on Chain-of-Custody
8. Sample Condition:	(Intact)/Broken*/Leaking*
9. Does information on custody reports, traffic reports and sample tags agree?	(Yes) / No*
10. Proper Preservatives Used:	(Yes) / No*
11. Date Rec. at Lab:	8/12/94
12. Time Rec. at Lab:	1400

LAB SAMPLE #	DASH #	CLIENT IDENTIFICATION	CONTAINER DESCRIPTION	SAMPLE MATRIX	DATE SAMP.	REMARKS: CONDITION (ETC)
01	A	Inlet	Tedlar	A	8/11	
02	b	Effl	b	b	b	

DR

* If Circled, contact Project Manager and attach record of resolution

UNOCAL 76

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- ☐ 819 Striker Ave., Suite 8 • Sacramento, CA 95834 • (916) 921-9600
- ☐ 1900 Bates Ave., Suite LM • Concord, CA 94520 • (510) 686-9600
- ☐ 18939 120th Ave., N.E., Suite 101 • Bothell, WA 98011 • (206) 481-9200
- ☐ East 11115 Montgomery, Suite B • Spokane, WA 99206 • (509) 924-9200
- ☐ 15055 S.W. Sequoia Pkwy, Suite 110 • Portland, OR 97222 • (503) 624-9800

Company Name: Pacific Environ.	Project Name: 376 Lewelling Blv. San Lorenzo (Alameda)
Address: 2025 Gateway Suite 440	UNOCAL Project Manager: T. Berry
City: San Jose State: CA. Zip Code: 95110	Release #: 310-058-3A
Telephone: (408) 441-7500 FAX #: (408) 441-9102	Site #: 5760
Report To: Marc Doden Sampler: Joe Perfumo	QC Data: ☒ Level A (Standard) ☐ Level B ☐ Level C ☐ Level D

Turnaround Time: ☒ 10 Working Days ☐ 5 Working Days ☐ 3 Working Days ☐ 2 Working Days ☐ 24 Hours ☐ 2 - 8 Hours

9408729

☐ Drinking Water ☐ Waste Water ☒ Other A/R

Analyses Requested: GAS/B-TEX 8015/8020

Client Sample I.D.	Date/Time Sampled	Matrix Desc.	# of Cont.	Cont. Type	Laboratory Sample #	GAS/B-TEX 8015/8020								Comments
1. Infl.	8-11-94 2:00 pm	Air	1	1 l	01 A	X								
2. EFFL.	8-11-94	Air	1	1 l	02 A	X								
3.														
4.														
5.														
6.														
7.														
8.														
9.														
10.														

Relinquished By: [signature]	Date: 8-11-94	Time: 2:00 pm	Received By: M. Doden	Date: 8/12/94	Time: 0800
Relinquished By: M. Doden	Date: 8/12/94	Time: 1:25	Received By: [signature]	Date: 8/12/94	Time: 1:25
Relinquished By: [signature]	Date: 8-12-94	Time: 2:00	Received By Lab: [signature]	Date: 8/12/94	Time: 13:25

Were Samples Received in Good Condition? ☒ Yes ☐ No Samples on Ice? ☐ Yes ☒ No Method of Shipment ________ Page 1 of 1

To be completed upon receipt of report:

1) Were the analyses requested on the Chain of Custody reported? ☐ Yes ☐ No If no, what analyses are still needed? ________
2) Was the report issued within the requested turnaround time? ☐ Yes ☐ No If no, what was the turnaround time? ________

Approved by: ________ Signature: ________ Company: ________ Date: ________

Pink - Client
Yellow - Laboratory
White - Laboratory

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Pacific Environmental Group
2025 Gateway Place, Suite 440
San Jose, CA 95110

Attention: Maree Doden

Client Proj. ID: 310-058.3A/5760, San Lorenzo
Sample Descript: Infl
Matrix: AIR
Analysis Method: 8015Mod/8020
Lab Number: 9408777-01

Sampled: 08/13/94
Received: 08/13/94

Analyzed: 08/15/94
Reported: 08/18/94

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	500	1500
Benzene	5.0	21
Toluene	5.0	23
Ethyl Benzene	5.0	28
Xylenes (Total)	5.0	74
Chromatogram Pattern:		
Gas & Non Gas Mix		<C8

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	84

alytes reported as N.D. were not present above the stated limit of detection.

EQUOIA ANALYTICAL - ELAP #1210

leen Manning
oject Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Pacific Environmental Group	Client Proj. ID: 310-058.3A/5760, San Lorenzo	Sampled: 08/13/94
2025 Gateway Place, Suite 440	Sample Descript: Effl	Received: 08/13/94
San Jose, CA 95110	Matrix: AIR	
	Analysis Method: 8015Mod/8020	Analyzed: 08/15/94
Attention: Maree Doden	Lab Number: 9408777-02	Reported: 08/18/94

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	10	N.D.
Benzene	**0.10**	**0.20**
Toluene	0.10	N.D.
Ethyl Benzene	0.10	N.D.
Xylenes (Total)	0.10	N.D.
Chromatogram Pattern:		
Discrete Peak		**C6-C7**

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	101

nalytes reported as N.D. were not present above the stated limit of detection.

EQUOIA ANALYTICAL - ELAP #1210

ileen Manning
roject Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Pacific Environmental Group
2025 Gateway Place, Suite 440
San Jose, CA 95110
Attention: Maree Doden

Client Project ID: 310-058.3A/5760, San Lorenzo

QC Sample Group: 9408777 -01

Reported: Aug 18, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD Batch#:	940829511	940829511	940829511	940829511
Date Prepared:	N.A.	N.A.	N.A.	N.A.
Date Analyzed:	8/15/94	8/15/94	8/15/94	8/15/94
Instrument I.D.#:	GCHP-3	GCHP-3	GCHP-3	GCHP-3
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	100	100	100	103
Matrix Spike Duplicate % Recovery:	100	100	100	100
Relative % Difference:	0.0	0.0	0.0	3.0
LCS Batch#:				
Date Prepared:				
Date Analyzed:				
Instrument I.D.#:				
LCS % Recovery:				
% Recovery Control Limits:	71-133	72-128	72-130	71-120

SEQUOIA ANALYTICAL

Eileen A. Manning
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

Sequoia Analytical

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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Pacific Environmental Group
2025 Gateway Place, Suite 440
San Jose, CA 95110
Attention: Maree Doden

Client Project ID: 310-058.3A/5760, San Lorenzo

QC Sample Group: 9408777 -02

Reported: Aug 18, 1994

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD Batch#:	940829511	940829511	940829511	940829511
Date Prepared:	N.A.	N.A.	N.A.	N.A.
Date Analyzed:	8/15/94	8/15/94	8/15/94	8/15/94
Instrument I.D.#:	GCHP-20	GCHP-20	GCHP-20	GCHP-20
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L
Matrix Spike % Recovery:	96	96	96	97
Matrix Spike Duplicate % Recovery:	100	100	100	103
Relative % Difference:	4.1	4.1	4.1	6.0
LCS Batch#:				
Date Prepared:				
Date Analyzed:				
Instrument I.D.#:				
LCS % Recovery:				
% Recovery Control Limits:	71-133	72-128	72-130	71-120

SEQUOIA ANALYTICAL

Eileen A. Manning
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

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☐ East 11115 Montgomery, Suite B • Spokane, WA 99206 • (509) 924-9200
☐ 15055 S.W. Sequoia Pkwy, Suite 110 • Portland, OR 97222 • (503) 624-9800

Company Name: Pacific Env. Grp.	Project Name: 376 Lewelling Blvd., San Lorenzo
Address: 2025 Gateway Pl. #440	UNOCAL Project Manager: Tina Berry
City: San Jose State: Ca. Zip Code: 95110	Release #: ~~5760~~ 310-0588A
Telephone: (408) 441 7500 FAX #: 441 7539	Site #: ~~5760~~
Report To: Robert Gratton Sampler: Mark Gubrud	QC Data: ☒ Level A (Standard) ☐ Level B ☐ Level C ☐ Level D

Pink - Client

Turnaround Time: ☒ 10 Working Days ☐ 2 Working Days ☐ 5 Working Days ☐ 24 Hours ☐ 3 Working Days ☐ 2 - 8 Hours 9408777

☐ Drinking Water ☐ Waste Water ☒ Other Air

Analyses Requested: TPH/BTEX

	Client Sample I.D.	Date/Time Sampled	Matrix Desc.	# of Cont.	Cont. Type	Laboratory Sample #	Comments
1.	EWE	8/13/94 1000	Air	1	Bag	01A	
2.	EFF2	8/13/94 1000	Air	1	Bag	02	
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							

Yellow - Laboratory

Relinquished By:	Date: 8/13/94	Time: 1207	Received By:
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By Lab: CB

Received By:	Date:	Time:
Received By:	Date:	Time:
Received By Lab: CB	Date: 8/13/94	Time: 1207

White - Laboratory

Were Samples Received in Good Condition? ☒ Yes ☐ No Samples on Ice? ☐ Yes ☒ No N/A Method of Shipment _____ Page 1 of 1

To be completed upon receipt of report:

1) Were the analyses requested on the Chain of Custody reported? ☐ Yes ☐ No If no, what analyses are still needed? _____

2) Was the report issued within the requested turnaround time? ☐ Yes ☐ No If no, what was the turnaround time? _____

Approved by: _____ Signature: _____ Company: _____ Date: _____

SEQUOIA ANALYTICAL SAMPLE RECEIPT LOG

CLIENT NAME: PEG (Unocal 310-058.3A) MASTER LOG NO. / PAGE: 9408777
REC. BY (PRINT): CB DATE OF LOG-IN: 8/13/94

CIRCLE THE APPROPRIATE RESPONSE	LAB SAMPLE #	DASH #	CLIENT IDENTIFICATION	CONTAINER DESCRIPTION	SAMPLE MATRIX	DATE SAMP.	REMARKS: CONDITION (ETC)
1. Custody Seal(s): Present / (Absent) Intact / Broken*	01	A	Infl	tedlar	aq	8/13/94	
2. Custody Seal Nos.:	02	↓	Effl	↓	↓	↓	
3. Chain-of-Custody Records: (Present) / Absent*							
4. Traffic Reports or Packing List: Present / (Absent)							
5. Airbill: Airbill / Sticker (Present) / Absent							
6. Airbill No.:							
7. Sample Tags: (Present) / Absent* Sample Tag Nos.: (Listed) / Not Listed on Chain-of-Custody							
8. Sample Condition: (Intact) / Broken* / Leaking*							
9. Does information on (Yes) / No* custody reports, traffic reports and sample tags agree?							
10. Proper (Yes) / No* Preservatives Used:							
11. Date Rec. at Lab: 8/13/94							
12. Time Rec. at Lab: 1207							

CB 8/13/94

* If Circled, contact Project Manager and attach record of resolution

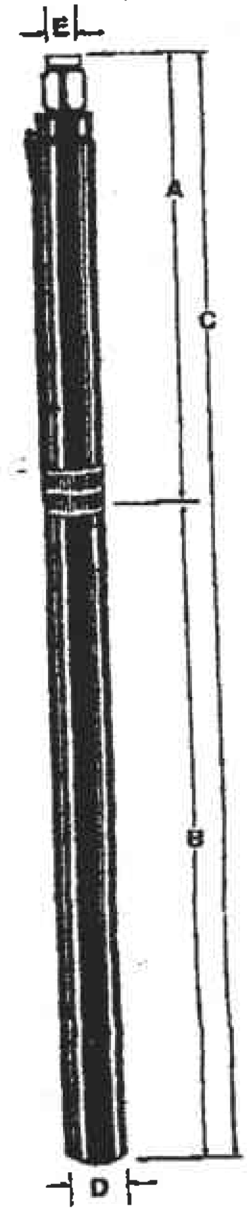
ATTACHMENT C

MANUFACTURER'S EQUIPMENT SPECIFICATIONS

GENERAL PUMP MANUFACTURING, INC

WATER
40-50'
2-WIRE SYSTEM
$991.00 /ea

4 & 7 GPM UNITS FOR 3-" OR LARGER MONITORING WELLS



Construction

Pump & Motor Housings - 300 Series Stainless Steel
Pump Discharge Head - 300 Series Stainless Steel
Motor Bracket - 300 Series Stainless Steel
Motor Head - 300 Series Stainless Steel
Impellers & Diffusers - Ultem thermoplastic
(Excellent for pumping chemicals & Petroleum Products)

Rubber Parts - Viton
Seals - Viton
Motor Lubricant Silicon
Motor Leads - Teflon Insulation
***All Parts in contact with fluid are stainless steel or Ultem Thermoplastic**

Available in 115 or 230 volts 1Ø, 2 or 3 wire
Max O.D. 2.75"
Capacities up to 650 GPH.

3-WIRE (ADD 7" TO B&C FOR 2-WIRE MOTOR)
FOR 3" I.D. WELLS

H.P.	TYPE	A	B	C	D	E
1/2	12M7	15"	23"	38"	2 15/16"	1 1/2"
1/2	14M4	16"	23"	39"	2 15/16"	1 1/2"
1/2	20M4	20"	23"	43"	2 15/16"	1 1/2"

Furnished with 1 1/2" x 1" Check Valve

SELECTION CHART

Disch. Pressure	Model Number Single Phase 115V	Pump Type	H.P.	HEAD IN FEET (PUMPING DEPTH) — GALLONS PER HOUR: 30	40	50	60	70	80	90	100	110	120	130	140	150	175	200	225	250	275	300
0	12M7P050	M-7	1/2					650	630	605	575	550	520	485	445	390	240					
	14M4P050	M-4	1/2							455	425	422	400	375	355	335	270	190				
	20M4P050	M-4	1/2									470	455	445	425	415	390	340	295	250	210	140
20	12M7P050	M-7	1/2	605	580	555	505	530	500	490	415	360	335	240								
	14M4P050	M-4	1/2		480	445	455	410	390	365	340	315	290	255	225	190						
	20M4P050	M-4	1/2						445	435	420	410	395	380	365	350	300	260	210	150		
30	12M7P050	M-7	1/2	565	504	525	490	465	395	345	295	215										
	14M4P050	M-4	1/2	402	420	400	380	360	355	310	285	250	220	180								
	20M4P050	M-4	1/2		470	455	445	430	415	400	390	370	360	340	325	305	260	215	155			
40	12M7P050	M-7	1/2	500	480	425	390	335	270	300												
	14M4P050	M-4	1/2	435	375	350	330	305	275	245	210	185	130									
	20M4P050	M-4	1/2	480	435	415	410	395	385	365	355	335	320	300	285	245	220	160				
60	12M7P050	M-7	1/2	345	215																	
	14M4P050	M-4	1/2	310	250	215	190															
	20M4P050	M-4	1/2	405	370	345	345	330	310	285	275	250	225	215	190	175						

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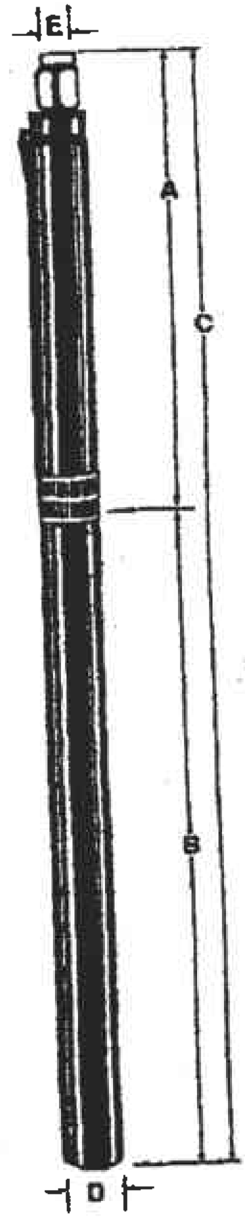
GPM

GENERAL PUMP MANUFACTURING, INC

MODELS "S-4" AND "S-7" FOR 3-INCH AND LARGER WELLS

Construction
Pump & Motor Housings - 300 Series Stainless Steel
Pump Discharge Head - 300 Series Stainless Steel
Motor Bracket - 300 Series Stainless Steel
Motor Head - 300 Series Stainless Steel
Impellers & Diffusers - High strength thermoplastic

Available in 115V or 230V 1Ø, 2 or 3 wire
Max O.D. 2.75"
Capacities up to 650 GPH.
For depth to 300 TDH.



3-WIRE (ADD 7" TO B&C FOR 2-WIRE MOTOR)
FOR 3" I.D. WELLS

H.P.	TYPE	A	B	C	D	E
1/2	12S7	15"	23"	38"	2 15/16"	1 1/2"
1/2	14S4	16"	23"	39"	2 15/16"	1 1/2"
1/2	20S4	20"	23"	43"	2 15/16"	1 1/2"

Furnished with 1 1/4" x 1" Check Valve

SELECTION CHART

Check Pressure	Model Number Single Phase 115V	Pump Type	H.P.	20	40	50	60	70	80	90	100	110	120	130	140	150	175	200	225	250	275	300
				HEAD IN FEET (PUMPING DEPTH) / GALLONS PER HOUR																		
0	12S7P050	S-7	1/2					650	635	610	575	550	520	482	445	399	340					
	14S4P050	S-4	1/2							455	435	420	400	375	355	335	270	180				
	20S4P050	S-4	1/2									470	455	445	425	415	380	340	295	320	210	140
20	12S7P050	S-7	1/2	695	650	595	585	535	500	460	415	380	335	240								
	14S4P050	S-4	1/2		460	445	425	410	380	365	340	315	290	265	222	190						
	20S4P050	S-4	1/2						445	435	420	410	380	360	385	350	300	260	210	150		
30	12S7P050	S-7	1/2	605	550	505	490	445	390	340	280	215										
	14S4P050	S-4	1/2	460	430	400	380	360	335	310	285	255	220	190								
	20S4P050	S-4	1/2		470	455	446	430	412	400	390	370	360	340	325	305	255	215	135			
40	12S7P050	S-7	1/2	560	490	425	390	335	279	200												
	14S4P050	S-4	1/2	405	375	355	330	305	275	245	210	180	120									
	20S4P050	S-4	1/2	480	435	415	410	393	383	365	355	330	390	300	285	265	220	160				
60	12S7P050	S-7	1/2	345	270																	
	14S4P050	S-4	1/2	310	300	215	190															
	20S4P050	S-4	1/2	400	375	360	345	330	310	300	275	260	235	215	195	175						

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ROSEDALE HIGH-CAPACITY BAG FILTERS AND BASKET STRAINERS

For flows from 5 to 220 GPM; pressures to 500 psi

Attention:

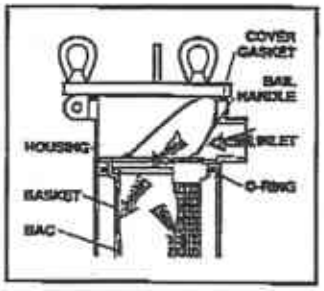
Thank you for requesting information about our bag filters and basket strainers, models 4, 6, & 8, for flows to 220 gpm. We have prepared the following information for immediate response, and are mailing you our complete catalog today.

ROSEDALE
PRODUCTS, INC.
Box 1085
Ann Arbor, MI 48106
Toll-Free 1-800-821-5373
(In Michigan, 313-665-8201)
Fax 313-665-2214

HIGH CAPACITY BASKET STRAINERS & BAG FILTERS FROM ROSEDALE

FEATURES

- Large-area, heavy-duty baskets
- Low pressure drops
- Permanently piped housings
- Covers are O-ring sealed
- Stainless (304 or 316) or carbon steel housings
- Housings are electropolished to resist adhesion of dirt and scale
- Adjustable height legs (optional on Model 4)
- Duplex and Multi-basket units are available



OPERATION

Unfiltered liquid enters the housing above the bag or basket. Solids are filtered out by the bag or basket, containing them inside for ease in servicing and removal.

Model 4 - For flow rates to 50 gpm

- Pipe sizes from 3/4-inch through 2 inches
- Two basket depths: 6 or 12 inches
- Three pressure ratings: 200, 300, or 500 psi
- ASME code stamp available

Model 6 - For flow rates to 100 gpm

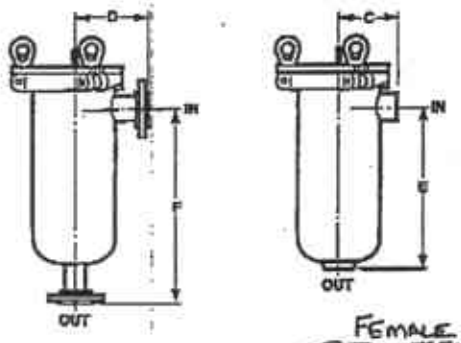
DIMENSIONS (in.)

OUTLET STYLES

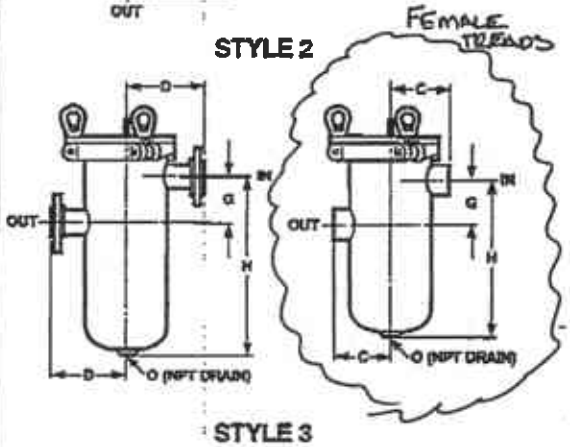
FLANGED (150 lb. ANSI)

THREADED (NPT)

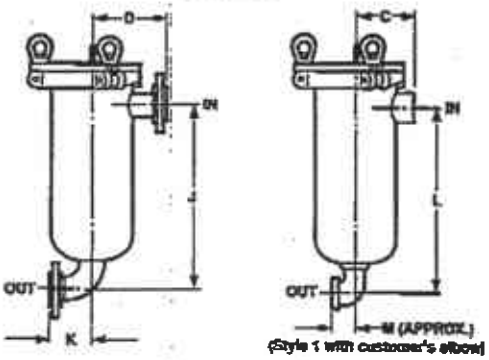
STYLE 1



STYLE 2

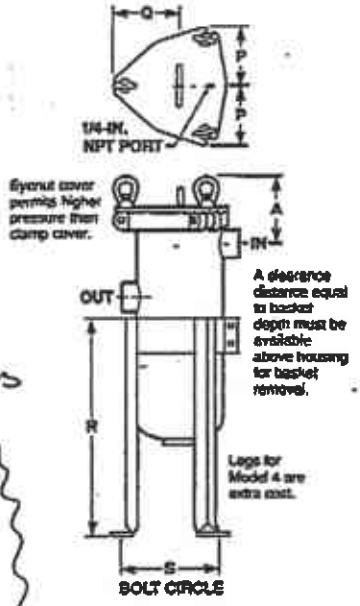


STYLE 3

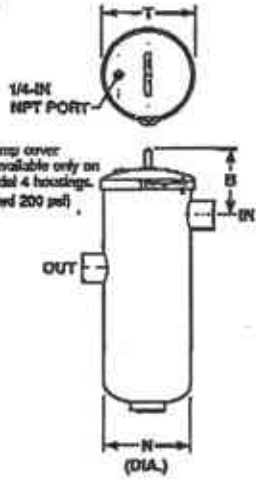


COVER TYPES

EYENUT COVER



CLAMP COVER



Model	Pipe Size	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T
4-6	3/4	5.5	5.2	3.5	5.0	10.1	12.0	3.0	10.1	10.4	4.0	11.2	1.3	4.5	1/2	3.5	3.8	14.0	6.8	5.6
	1	5.5	5.2	3.5	5.0	10.1	12.0	3.0	10.1	10.8	4.0	11.5	1.5							
	1-1/4	6.0	5.8	3.5	5.0	9.4	12.0	4.3	9.5	10.5	4.0	11.1	1.8							
	1-1/2	6.0	5.8	3.5	5.0	9.3	12.0	4.3	9.5	10.8	4.0	11.3	2.0							
	2	6.0	5.8	3.5	5.0	9.3	12.0	4.3	9.5	11.6	4.0	11.8	2.3							
4-12	3/4	5.5	5.2	3.5	5.0	16.1	18.0	3.0	16.1	16.4	4.0	17.2	1.3	4.5	1/2	3.5	3.8	14.0	6.8	5.6
	1	5.5	5.2	3.5	5.0	16.1	18.0	3.0	16.1	16.9	4.0	17.5	1.5							
	1-1/4	6.0	5.8	3.5	5.0	15.4	18.0	4.3	15.5	16.5	4.0	17.1	1.8							
	1-1/2	6.0	5.8	3.5	5.0	15.3	18.0	4.3	15.5	16.8	4.0	17.3	2.0							
	2	6.0	5.8	3.5	5.0	15.3	18.0	4.3	15.5	17.6	4.0	17.8	2.3							

- Two basket depths: 6 or 12 inches
- Three pressure ratings: 200, 300, or 500 psi
- ASME code stamp available

Model 6 - For flow rates to 100 gpm
- Pipe sizes from 3/4-inch through 4 inches
- Three basket depths: 12, 18, or 30 inches
- Four pressure ratings: 150, 210, 300, 500 psi
- ASME code stamp available

Model 8 - For flow rates to 220 gpm
- Pipe sizes from 3/4-inch through 6 inches
- Two basket depths: 15 or 30 inches
- Four pressure ratings: 150, 210, 300, 500 psi
- ASME code stamp available

CONSTRUCTION MATERIALS

All housings and other wetted parts not otherwise specified can be ordered in carbon steel, 304 stainless steel, or 316 stainless steel. Four different materials can be ordered for all seals involved. All basket and mesh linings are made of stainless steel. 304 stainless steel will be supplied with carbon and 304 housings, 316 stainless with 316 housings.

	1-1/4	6.0	5.8	3.5	5.0	15.4	18.0	4.3	15.5	16.5	4.0	17.1	1.8						
	1-1/2	6.0	5.8	3.5	5.0	15.3	18.0	4.3	15.5	16.8	4.0	17.3	2.0						
	2	6.0	5.8	3.5	5.0	15.3	18.0	4.3	15.5	17.6	4.0	17.8	2.3						
6-12	1	6.1		4.3	6.0	17.3	19.8	4.8	17.3	18.1	5.0	18.6	1.5	6.0	3/4	5.0	5.3	18.0	9.5	
	1-1/4	6.1		4.3	6.0	17.3	19.8	4.8	17.3	18.4	5.0	19.0	1.8							
	1-1/2	6.1	N/A	4.3	6.0	17.3	19.8	4.8	17.3	18.8	5.0	19.3	2.0							N/A
	2	6.1		4.3	6.0	17.2	19.7	4.8	17.3	19.6	5.0	19.7	2.3							
	3	7.0		4.3	6.0	18.2	20.7	6.6	18.2	22.0	4.8	21.3	3.1							
6-18	1	6.1		4.3	6.0	23.3	25.8	4.8	23.3	24.1	5.0	24.5	1.5	6.0	3/4	5.0	5.3	18.0	9.5	
	1-1/4	6.1		4.3	6.0	23.3	25.8	4.8	23.3	24.4	5.0	25.0	1.8							
	1-1/2	6.1	N/A	4.3	6.0	23.3	25.8	4.8	23.3	24.8	5.0	25.3	2.0							N/A
	2	6.1		4.3	6.0	23.2	25.7	4.8	23.3	25.6	5.0	25.7	2.3							
	3	7.0		4.3	6.0	24.2	26.7	6.6	24.2	28.0	4.8	27.9	3.1							
6-30	1	5.5		4.3	6.0	35.3	37.8	4.8	35.3	36.1	5.0	36.6	1.5	6.0	3/4	5.0	5.3	18.0	9.5	
	1-1/4	6.0		4.3	6.0	35.3	37.8	4.8	35.3	36.4	5.0	37.0	1.8							
	1-1/2	6.1	N/A	4.3	6.0	35.3	37.8	4.8	35.3	36.8	5.0	37.3	2.0							N/A
	2	6.1		4.3	6.0	35.2	37.7	4.8	35.3	37.6	5.0	37.7	2.3							
	3	7.0		4.3	6.0	36.2	38.7	6.6	36.2	40.0	4.8	39.9	3.1							
8-15	2	6.6		5.9	7.5	20.9	23.5	4.8	21.0	23.2	3.3	23.1	2.3	8.6	1	5.8	6.3	22.0	12.0	
	3	7.4	N/A	6.8	7.5	21.7	24.6	6.6	21.9	25.5	4.8	25.9	3.1							N/A
	4	7.4		6.8	8.6	21.5	25.1	8.4	21.9	26.9	6.3	27.6	3.8							
8-30	2	6.6		5.9	7.5	35.9	38.5	4.8	36.0	39.2	3.3	39.1	2.3	8.6	1	5.8	6.3	22.0	12.0	
	3	7.4	N/A	6.8	7.5	36.7	39.6	6.6	36.9	40.5	4.8	40.9	3.1							N/A
	4	7.4		6.8	8.6	36.5	40.1	8.4	36.9	41.8	6.3	42.6	3.8							

HOW TO ORDER

Build an ordering code as shown in the example. Each option is available only on the model sizes indicated in the colored blocks preceding its description.

Key to blocks: 4 = Model 4; 6 = Model 6; 8 = Model 8

EXAMPLE: 8 15 3P 1 150 NCD B S – M 200 (HOUSING / BASKET)

MODEL NO.
4 = 4
6 = 6
8 = 8

HOUSING SIZE
4 — 6 in. = 6
4 6 — 12 in. = 12
4 6 8 — 15 in. = 15
6 — 18 in. = 18
6 8 — 30 in. = 30

PIPE SIZE, NPT & FLANGED[1]
4 6 8 — 3/4-in. female NPT = 3/4P
4 6 8 — 1 in. female NPT = 1P
4 6 8 — 1-1/4-in. female NPT = 1-1/4P
4 6 8 — 1-1/2-in. female NPT = 1-1/2P
4 6 8 — 2-in. female NPT = 2P
6 8 — 3-in. female NPT = 3P
4 6 8 — 3/4-in. 150-lb. ANSI flange = 3/4F
4 6 8 — 1-in. 150-lb ANSI flange = 1F
4 6 8 — 1-1/4-in. 150-lb ANSI flange = 1-1/4F
4 6 8 — 1-1/2-in. 150-lb ANSI flange = 1-1/2F
4 6 8 — 2-in. 150-lb ANSI flange = 2F
6 8 — 3-in. 150-lb ANSI flange = 3F
6 8 — 4-in. 150-lb ANSI flange = 4F
8 — 6-in. 150-lb ANSI flange = 6F

OUTLET STYLE
4 6 8 — Bottom = 1
4 6 8 — Side = 2
4 6 8 — Bottom elbow = 3

PRESSURE RATING[2]

BASKET, MEDIA SIZE
No symbol if type B basket was selected
4 6 8 — Perforation diameters (for type P baskets)
1/4, 3/16, 9/64, 3/32, 1/16
4 6 8 — Mesh sizes (for type M and BM baskets)
20, 30, 40, 50, 60, 70, 80, 100, 150, 200

BASKET TYPE
4 6 8 — B = Filter bag basket, 9/64 perforations[3]
4 6 8 — P = Strainer basket, perforated metal
4 6 8 — BM = Filter bag basket, perforated, mesh lined[3]
4 6 8 — M = Strainer basket, perforated, mesh lined
4 6 8 — HWM = Filter bag basket, heavy wire mesh[3]

BASKET SEAL
N = No seal (never on Models 4 & 6 bag-type baskets)
4 6 8 — S = Seal required (always on Model 8 bag-type baskets)

COVER GASKET
4 6 8 — B = Buna N
4 6 8 — E = Ethylene Propylene
4 6 8 — V = Viton Fluoroelastomer
4 6 8 — T = Teflon Fluorocarbon Resin

DISPLACER
N = No displacer
4 6 8 — D = Displacer

AQUA-SCRUB™

Water
Purification
Systems

Our proven low-pressure performers.

The ASC-200, ASC-1200, ASC-2000 & ASC-6000. Practical solutions for activated carbon adsorption.

Designed for fast, easy installation, Westates' economical Aqua-Scrub™ carbon adsorbers are ideal for low-pressure and low-flow water purification applications.

Water flows downward through each unit at a uniform velocity into a distribution system that ensures complete carbon usage.

Aqua-Scrubs are engineered to resist the severe corrosion often found in wastewater applications due to the combination of activated carbon with metal. And with their DOT 57 rating, the ASC-200, ASC-1200, and ASC-2000 are suitable for transporting hazardous waste.

Westates' convenient turnkey service includes on-site carbon changeout plus spent carbon removal and reactivation.

Tips for top performance.

The only installation hardware needed is properly sized pipe or flexible hose for connection to the unit's inlet and outlet ports. However, it is strongly recommended that a particulate filter be installed upstream from your Aqua-Scrub adsorber to prevent particulates from collecting in the adsorber.

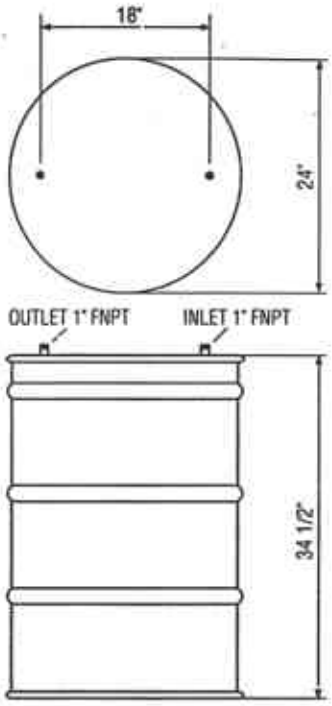
Since entrapped air is the most common cause of channeling, before beginning operation Aqua-Scrub adsorbers must be filled with water, then allowed to stand overnight to wet the carbon and eliminate all air.

As part of our total customer systems and service package, Westates also provides OSHA trained personnel for field service and changeout of spent carbons. For more information, contact your Westates representative or call 213 722-7500.

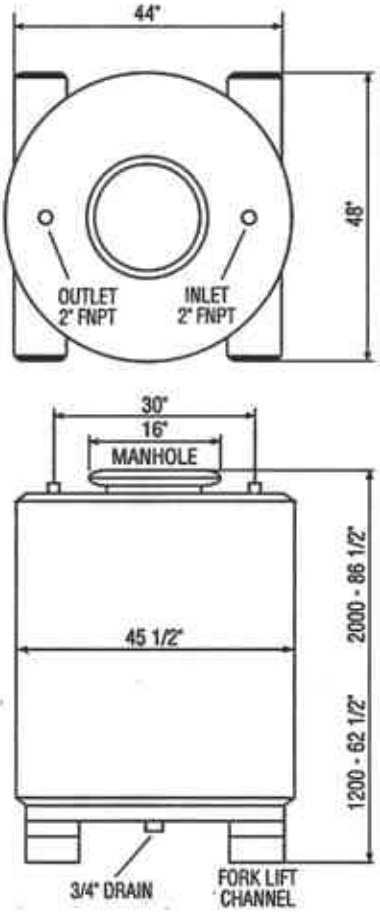
NORTHWEST REGION
510-639-7274

WESTATES CARBON, INC.

ASC-200



ASC-1200, ASC-2000



Vessel Specifications	ASC-200	ASC-1200	ASC-2000	ASC-6000[1]
Overall Height (approx.)	34-1/2"	62-1/2"	86-1/2"	120"
Inlet/Outlet Connection	1"	2"	2"	4"
Manhole	Top	16"	16"	20"
Internal Piping	PVC	PVC	PVC	PVC
Interior Coating	Plastic liner		Fusion-bonded epoxy	
Exterior Coating (all units)			Epoxy urethane finish	
Carbon Fill Volume (cu. ft.)	6.5	33	65	210
Cross Section (sq. ft.)	3.0	11.2	11.2	38.5
Vessel Weight (lbs.):				
Shipping (with KG-401 carbon)	250	1600	2500	3400 Plus Carbon
Operating (approx.)	500	3500	5500	24,000

[1]For ASC-6000 schematic, contact Westates Carbon.

Operating Specifications

Flow, gpm (max.)[2]	10	50	50	200
Pressure, psig (max.)	12	12	12	12
Temperature °F. (max.)	120	120	120	120
Pounds of KG-401				
Activated Carbon	180	1000	1800	6000

[2]Actual equipment selection should be based on required retention time.

Activated Carbon Specifications[3]

General Applications - Bituminous Coal (granular)

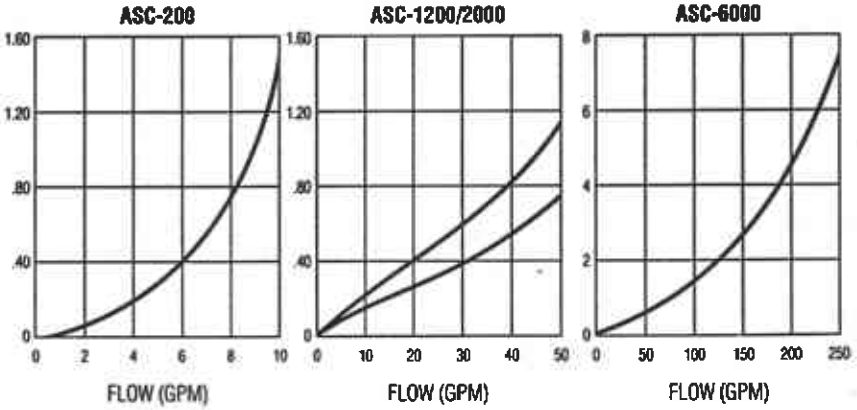
Westates Carbon Model No.	Mesh Size (U.S. Sieve)	Iodine No. (min.)
KG-401	8 x 30	900

Special Applications

Westates Carbon Model Nos.	Mesh Size (U.S. Sieve)	Iodine No. (min)
KG-501 Bituminous Coal (granular)	12 x 40	1000
CC-601 Coconut Shell (granular)	12 x 30	1100

[3]For assistance in selecting the proper carbon for your application, contact Westates Carbon.

Pressure Drop (PSIG)



WESTATES CARBON, INC.

A WHEELABRATOR TECHNOLOGIES COMPANY

2130 Leo Avenue, Los Angeles, California 90040 213 722-7500 Fax 213 722-6207

PN2004 293

FTB6100 and FTB6200 Series

Industrial Positive Displacement Cold Water Meters

OMEGA®

An OMEGA Technologies Company

Operator's Manual
M1096/0992

WARRANTY

OMEGA warrants this unit to be free of defects in materials and workmanship and to give satisfactory service for a period of **13 months** from date of purchase. OMEGA Warranty adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that our customers receive maximum coverage on each product. If the unit should malfunction, it must be returned to the factory for evaluation. Our Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective it will be repaired or replaced at no charge. However, this WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear or which are damaged by misuse are not warranted. These include contact points, fuses, and triacs.

We are glad to offer suggestions on the use of our various products. Nevertheless OMEGA only warrants that the parts manufactured by it will be as specified and free of defects.

OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED.

LIMITATION OF LIABILITY: The remedies of buyer set forth herein are exclusive and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

Every precaution for accuracy has been taken in the preparation of this manual, however, OMEGA ENGINEERING, INC. neither assumes responsibility for any omissions or errors that may appear nor assumes liability for any damages that result from the use of the products in accordance with the information contained in the manual.

RETURN REQUESTS / INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA ENGINEERING Customer Service Department. Call toll free in the USA and Canada: 1-800-622-2378, FAX: 203-359-7811; International: 203-359-1660, FAX: 203-359-7807.

BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, YOU MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OUR CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

FOR WARRANTY RETURNS, please have the following information available BEFORE contacting OMEGA:

1. P.O. number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems you are having with the product.

FOR NON-WARRANTY REPAIRS OR CALIBRATION, consult OMEGA for current repair/calibration charges. Have the following information available BEFORE contacting OMEGA:

1. Your P.O. number to cover the COST of the repair/calibration,
2. Model and serial number of product,
3. Repair instructions and/or specific problems you are having with the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. That way our customers get the latest in technology and engineering.

OMEGA is a registered trademark of OMEGA ENGINEERING, INC.

Printed in U.S.A.

TABLE OF CONTENTS
FTB6100/6200
COLD WATER METER
1/2" THROUGH 2 " POSITIVE DISPLACEMENT

SECTION 1 INTRODUCTION

The OMEGA FTB6100/6200 meter is a volumetric type operating on the oscillating piston principle. This utilizes a piston which the water rotates in a working chamber, with each piston revolution being equivalent to a known volume of water. The highly accurate FTB6100/6200 is specifically designed for cold water applications. It features giant fully rotatable 3", magnetically-driven, permanently hermetically sealed and nitrogen-filled register for extra long life and assured accuracy. Its 1/4" thick glass face is tempered to resist breakage, scratching, and abrasion. A flow detector located on the top of the center spindle, provides visual proof of plumbing leaks.

The FTB6100/6200 has a self-lubricating positive displacement design. The precision-machined internal parts are manufactured from graphite impregnated thermoplastic in combination with a longer life, more trouble-free service. Its internal 40 mesh strainer minimizes stoppages due to foreign matter in the pipe. Because of its unique oscillating piston design and low oscillation rate, wear is reduced to a minimum.

The piston movement is transferred by appropriate reduction gearing and a magnetic drive to a straight reading sealed register calibrated in U.S. Gallons, $ft.^3$ (cubic feet) or m^3 (cubic meters).

WARNING

THESE WATER FLOWMETERS HAVE PLASTIC INTERNAL PARTS THAT ARE RAPIDLY ATTACKED BY HYDROCARBON FLUIDS, SUCH AS GASOLINE, DIESEL FUEL, KEROSENE, AND SIMILAR MATERIALS. EVEN TRACE AMOUNTS OF THESE MATERIALS IN WATER WILL TEND TO ACCUMULATE IN THE PLASTIC PARTS, LEADING TO COMPLETE FAILURE OF THE FLOWMETER.

SECTION 2 AVAILABLE MODELS

DESCRIPTION (BRONZE BODY)	Port Size	Normal Operating Range	Part Number
Water Meter	1/2"	1 to 20 GPM	FTB6105
Water Meter	3/4"	1 to 25 GPM	FTB6107
Water Meter	3/4"	2 to 30 GPM	FTB6107X
Water Meter	1"	3 to 50 GPM	FTB6110
Water Meter	1-1/2"	5 to 100 GPM	FTB6115
Water Meter	2"	8 to 160 GPM	FTB6120

DESCRIPTION (POLYMER BODY)	Port Size	Normal Operating Range	Part Number
Water Meter	1/2"	1 to 25 GPM	FTB6205
Water Meter	3/4"	1 to 25 GPM	FTB6207
Water Meter	3/4"	2 to 30 GPM	FTB6207X

SECTION 3 INSTALLATION

3.1 UNPACKING

Remove the Packing list and verify that all equipment has been received. If there are any questions about the shipment, please call OMEGA Customer Service Department at 1-800-622-2378 or (203) 359-1660.

Upon receipt of shipment, inspect the container and equipment for any signs of damage. Take particular note of any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

NOTE

The carrier will not honor any claims unless all shipping material is saved for their examination. After examining and removing contents, save packing material and carton in the event reshipment is necessary.

3.2 INSTALLATION

The meter must be installed in a clean pipeline, free from any foreign materials. The dial must be mounted face upwards, no more than 45° from the horizontal.

The meter must be inserted with the flow in the direction of the arrow molded, or cast, into the meter body.

Couplings are provided, which allow for connection with NPT threads in sizes 1/2" through 1". The 1-1/2" and 2" meters have NPT screwed ends or oval flanged ends.

SECTION 4 START-UP PROCEDURE

The meter piston can be damaged if the meter is subjected to full flow conditions prior to expelling all the air from the piping. Therefore, turn on the flow gradually.

SECTION 5 SPECIFICATIONS

ACCURACY:	± 1-1/2% of reading at normal operating range
FLUID TEMPERATURE RANGE:	to + 120° F.
WETTED PARTS:	bronze or polyacetal body; graphite-impregnated polystyrene, molybdenum-loaded and glass-filled nylon, barium ferrite magnet and polyacetal internal wetted parts, neoprene gaskets, polymer strainer (stainless steel for 2" unit).
MAXIMUM PRESSURE DROP:	15 PSID at 1 CSTK
MAXIMUM PRESSURE:	150 PSIG
MAXIMUM TOTAL (MILLIONS OF GALLONS)	10 up to 1"; 100 for 1-1/2" and 2"

MODEL	NORMAL OPERATING RANGE	MIN. TEST FLOW (GPM)	LENGTH OVERALL (<----------INCHES----------->)	DIA.	HEIGHT OVERALL	SHIPPING WEIGHT (LBS.)	"-PR" (PULSE/ GAL) STD/OPT
FTB6105	1-20 GPM	0.25	7.5	4.75	5	6	100/200
FTB6107	1-25 GPM	0.25	7.5	4.75	5	6	100/200
FTB6107X	2-30 GPM	0.50	9	4.75	5.5	15	66.6/133.2
FTB6110	3-50 GPM	0.75	10.75	7.06	6.94	24	246/49.2
FTB6115	5-100 GPM	1.5	12.63	7.5	8.5	26	11.3/22.6
FTB6120	8-160 GPM	2	15.25	8.75	10.5	42	5.6/11.1
FTB6205	0.25-25 GPM	0.25	7.5	4.82	5	4	100/200
FTB6207	0.25-25 GPM	0.25	7.5	4.82	5	4	100/200
FTB6207X	0.5-30 GPM	0.50	9	5.03	5.5	5	66.6/133.2

*minimum measurable with ± 5% of reading accuracy

SECTION 6 OPTIONS

Add suffix "-PT" or "-PR" for pulse output. Register is no longer hermetically sealed with pulse output, but is weatherproof. Pulse option adds 0.63 lb. to weight, and 2-1/8" height for PR. Pulse option adds 2 lbs. to weight and 2" height for PT.

Pulse Output Options:

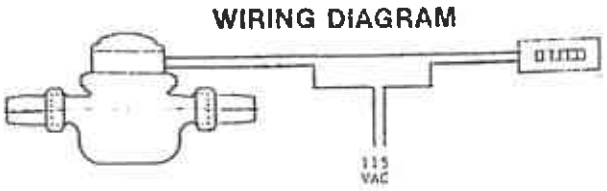
6.1 "-PT": 1 pulse/gallon for 1" or smaller: 1 pulse/10 gallon for 1-1/2" and 2". PT pulser is a limit switch rated at 3A @125 VAC.

6.2 "-PR": 3 watt reed switch rated for minimum 1.5 million pulses. Reed switch is field replaceable. Spare part - part number FTB76-PR. For Pulse Rate see PR (pulse/gallon) Above: Standard or Optional.

SECTION 6 OPTIONS

6.1 -PT OPTION

To be wired in series. Refer to Figure 1. This unit requires power from an external source.



N/O = Normally Open
N/C = Normally Closed

Figure 1. Wiring Diagram for - PT Option

The transmitting element is a 3A limit switch, giving a closure rate as follows:

5/8"	1 Contact Per Gallon
3/4"	1 Contact Per Gallon
1"	1 Contact Per Gallon
1-1/2"	1 Contact Per 10 Gallons
2"	1 Contact Per 10 Gallons

6.2 -PR OPTION

To be wired in series. Refer to Figure 2. The unit requires power from an external source.

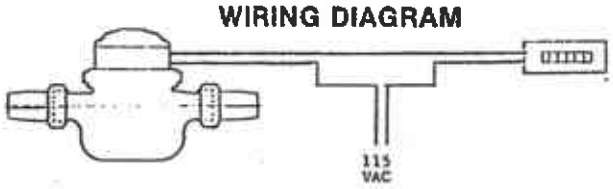
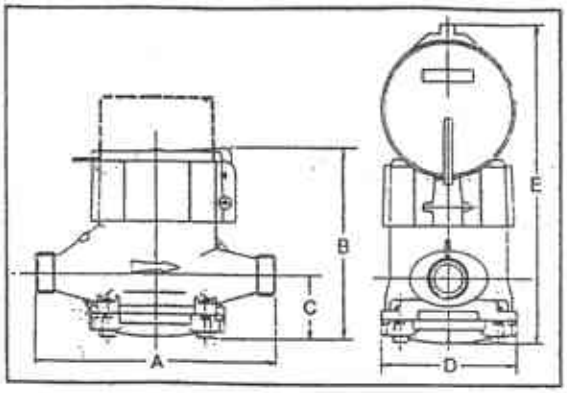
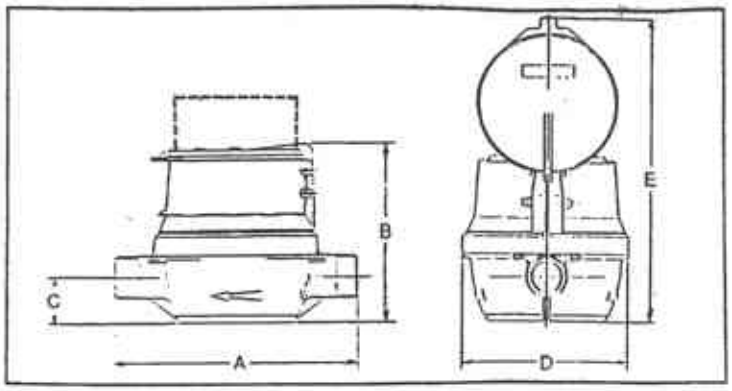


Figure 2. Wiring Diagram for -PR Option

The transmitting element is a dry contact reed switch. SPST, N/O (normally open) with a 3-watt non-inductive rating. Contact Closures are:

SIZE	STANDARD (Contacts/ gallon)	OPTIONAL (Contacts/ gallon)
5/8"	100.0	200.0
3/4"	66.6	133.2
1"	24.6	49.2
1-1/2"	11.3	22.6
2"	-5.6	11.1





BRONZE BODY

Dimensions and Net Weights

Meter Size	Dimensions (inches)					Weight (lbs.)
	A	B	C	D	E	
5/8" x 1/2"	7 1/2	6	2 1/16	4 1/4	10	7 1/16
5/8" x 3/4"	7 1/2	6	2 1/16	4 1/4	10	7 1/16
3/4" x 3/4	9	6 7/16	2 1/2	4 1/2	10 7/16	8 1/2
1"	10 3/4	7 7/16	2 3/16	7 1/4	11 7/16	13

POLYMER BODY

Dimensions and Net Weights

Meter Size	Dimensions (inches)					Weight (lbs.)
	A	B	C	D	E	
5/8" x 1/2"	7 1/2	5 3/8	1 3/8	4 3/4	9 3/8	3 1/4
5/8" x 3/4"	7 1/2	5 3/8	1 3/8	4 3/4	9 3/8	3 1/4
3/4" x 3/4"	9	5 15/16	1 15/16	5	9 15/16	3 5/8

When used with couplings, add to dimentsion (inches) A:

Size	Bronze Body	Polymer Body
5/8 X 1/2	4 7/8	4 3/4
5/8 X 3/4	5 1/8	5
3/4 X 3/4	5 1/8	5
1	5 3/8	

When used with pulser, add to dimension B:

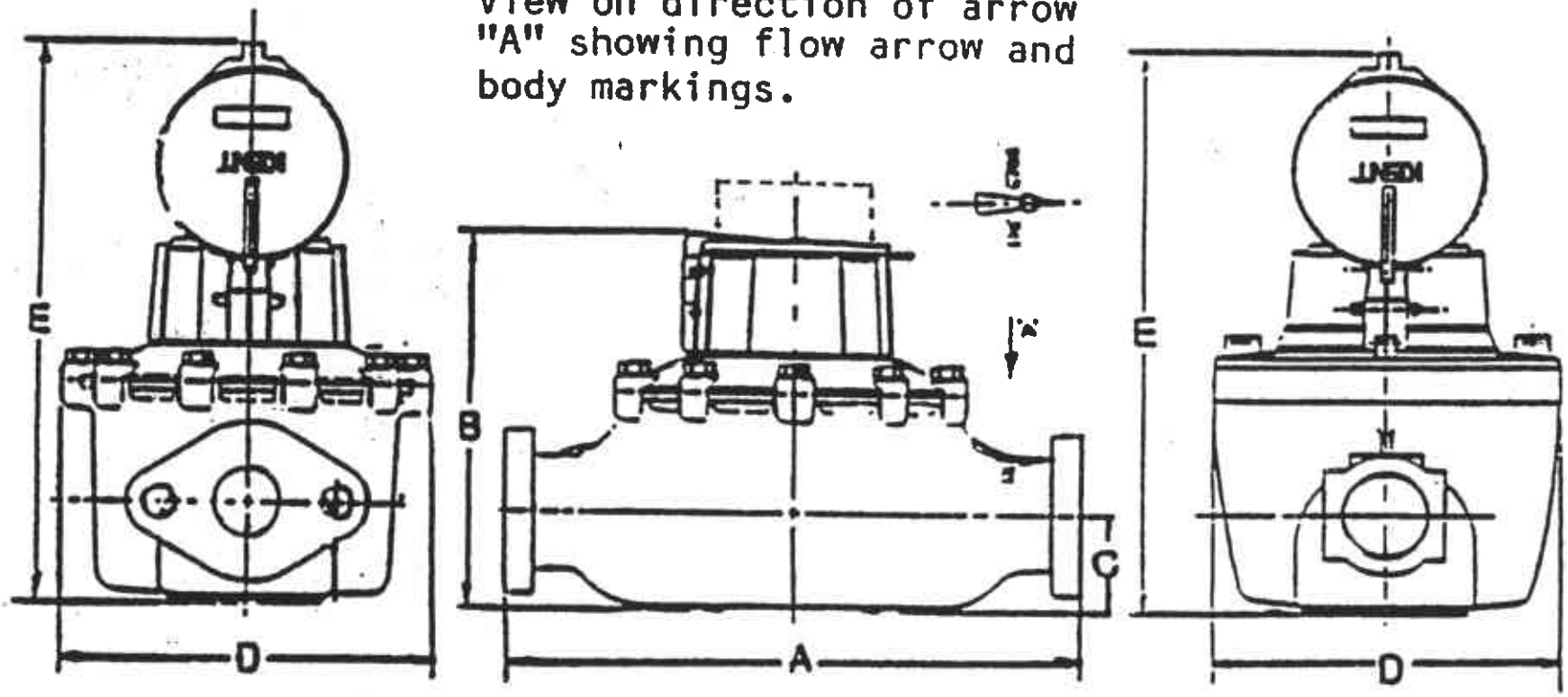
Pulsers model PT★ 2 3/16
Pulsers model PR 2 1/2
*Dotted line shows position of PT pulsers.

Cover is deleted when meter is provided with a pulser.

NOTE: All above dimensions are inch measurements.

OMEGA DIMENSIONS COLD WATER METERS	
FTB 6105	FTB 6205
FTB 6107	FTB 6207
FTB 6107X	FTB 6207X
FTB 6110	

View on direction of arrow "A" showing flow arrow and body markings.



SIZE	LENGTH (A)	HEIGHT (B)	CENTER LINE TO BOTTOM (C)	DIAMETER (D)	HEIGHT W/LID UP (E)	HEIGHT W/PULSER		SHIPPING WEIGHT (LBS)
						PT	PR	
1-1/2"	13"	8-1/2"	2-1/8"	8-1/2"	12-1/4"	10-7/16"	11"	24-6/8
2"	17"	10-1/4"	1-3/4"	8-3/4"	14-1/4"	12-5/16	12-3/4"	42-7/8

Connections are oval flanged or NPT Female.

Meters are designed for Cold Water Service up to 120°F.
At 150 PSIG. Strainers with a 40 Mesh Screen should be used if foreign matter is present.

NOTE: Dotted line shows position of PT or PR Pulser.
Cover is deleted when meter is provided with a pulser.

OMEGA DIMENSIONS

FTB 6115 FTB 6120
COLD WATER METER

H2 Oil Recovery Equipment, Inc.
(503) 382-7070 Fax (503) 382-2242
P.O. Box 9028 Bend, OR 97708

***** Facsimile Transmission *****

****

TO : PACIFIC ENVIRONMENTAL GROUP
ATTN : Jason Nutt
FAX : 408-441-7539 PHONE: 408-441-7500 TIME: 1:50 pm
FROM : Chuck Jarnecke DATE : November 3, 1994 TOTAL # OF PAGES: 4

****

H2 REF#: 940713.CJ

Dear Mr. Nutt;

Pursuant to our telcon earlier this morning, please find pricing, description and spec. sheets on our moisture separators.

The H2 30 gallon moisture separator includes; vacuum gauge, vacuum relief, particulate filter, dilution valve, drain valve, removable lid, hose fitting and 20' of hose.

Your price $ 657.00

The 30 gallon moisture separator comes with either 2" inlet/outlet or 3" inlet/outlet fittings. We can custom design this unit to meet your requirements.

High level shutdown (mechanical) Your price $ 93.00

Pricing is FOB Bend, OR

Other options not discussed per our telcon include; A full line of Rotron Regenerative Blowers to choose from, Electric high level shutdown, NEMA 4 & NEMA 7 motor starters, Combustible Gas Monitors, etc.

I will send you additional information on the full line of remediation equipment we offer. For the time being, I have included our line card to indicate what we offer if something comes up prior to receiving our literature via mail.

If I can assist further or provide further information, please call or fax.

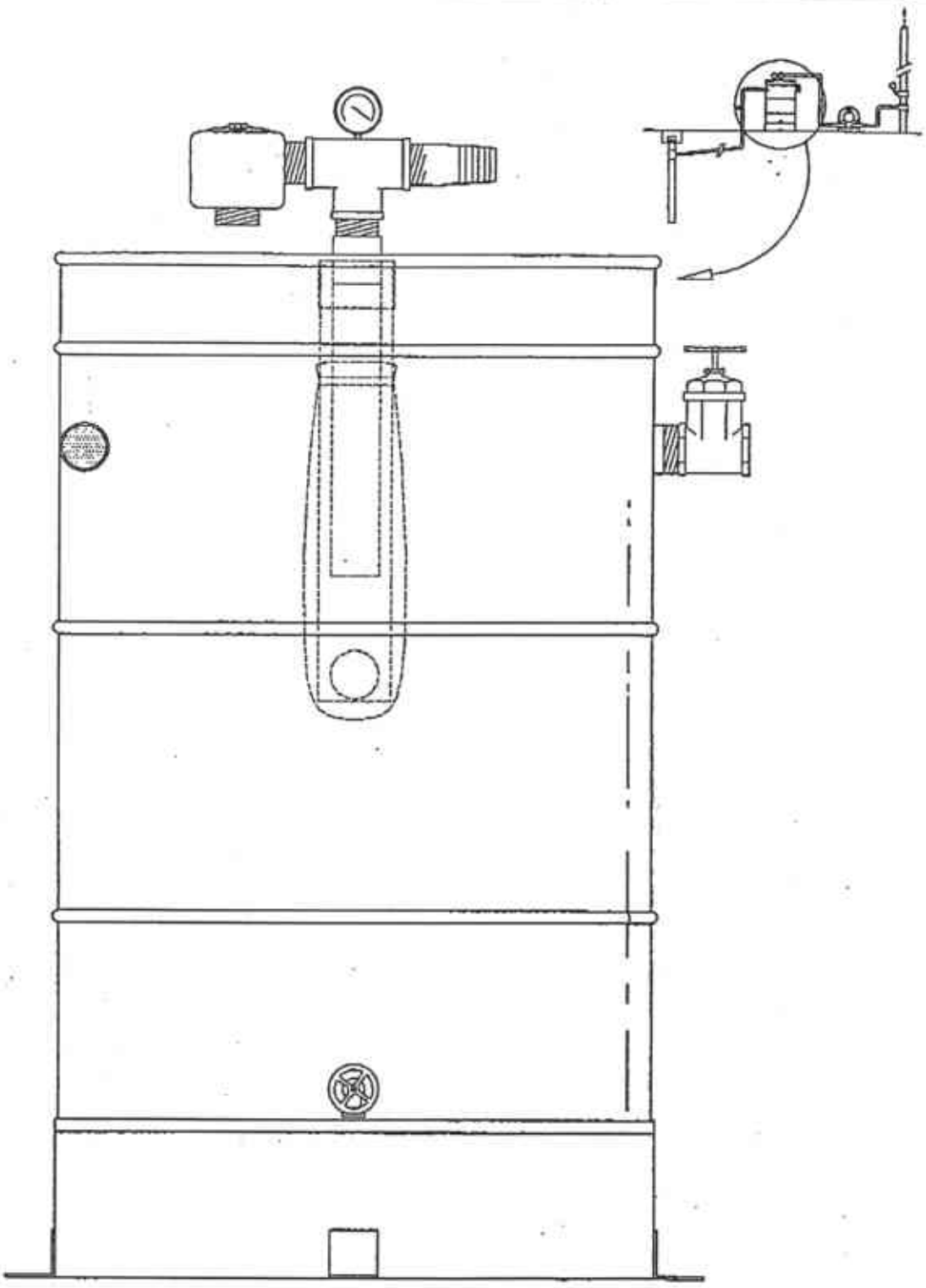
Best regards,

Chuck Jarnecke

Chuck Jarnecke
Sales

FEATURES:

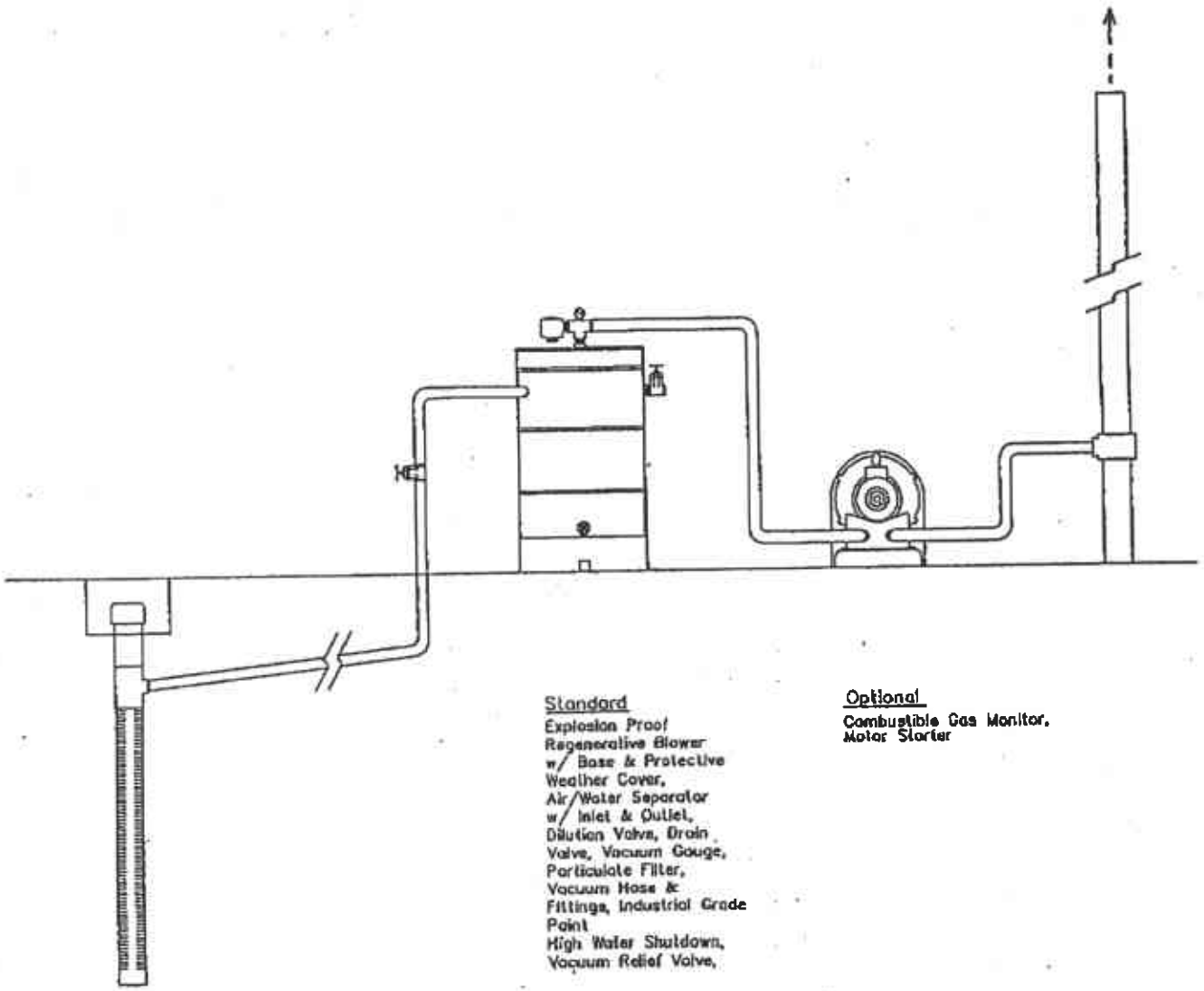
- 30 or 55 gallon
- Epoxy lining
- Cyclonic design
- Vacuum gauge
- Particulate filter
- Dilution valve
- Drain valve
- Removable lid
- 20' Vacuum hose
- Hose fittings
- Mounting tabs
- High water shutdown
- Vacuum relief



H2 Oil Recovery Equipment, Inc.

Moisture Separator w/ High Level Shutdown

P.O. Box 9028
Bend, Oregon 97708
Ph. (503) 382-7070
Fax (503) 382-2242



Standard

Explosion Proof
Regenerative Blower
w/ Base & Protective
Weather Cover,
Air/Water Separator
w/ Inlet & Outlet,
Dilution Valve, Drain
Valve, Vacuum Gauge,
Particulate Filter,
Vacuum Hose &
Fittings, Industrial Grade
Paint
High Water Shutdown,
Vacuum Relief Valve,

Optional

Combustible Gas Monitor,
Motor Starter

H2 Oil Recovery Equipment, Inc.
Soil Vapor Extraction System

P.O. Box 9028
Bend, Oregon 97708
Ph. (503) 382-7070
Fax (503) 382-2242

H2SVES.DWG 3/94

H2 Oil Recovery Equipment, Inc.

P.O. Box 9028, Bend, Oregon 97708 • (503) 382-7070 • Fax (503) 382-2242

Our remediation equipment and supplies include a large selection of:

Vapor treatment

Thermal Oxidizers - Propane or Natural gas fired
Catalytic Oxidizers - Gas or Electric
Activated carbon
Air/Water Separators

Water Treatment

Low Profile Tray Aeration
Packed Tower Air Strippers
Air diffusion systems
Activated carbon

Pump Systems

2" & 4" Water Depression Systems - Electric & Pneumatic
2" & 4" Total Fluids Systems - Electric & Pneumatic
Product Recovery
Floating Skimmer Product Recovery
Product Recovery/Water Depression 2-Pump Systems

Soil Vapor Extraction

Complete Soil Vapor Extraction packages
Air/Water Separators

Oil/Water Separators

350 gallon capacity and larger
Single or double contained
Internal Product Skimmers

System Packages

Trailer mounted units
Custom designed systems
Fully enclosed and insulated systems

Tanks

Poly tanks to 6500 gallons
Steel tanks - Single & double contained tanks
Fire safe UL 142 rated

Batch Pump System

Influent Systems - Pump, tank, and control
Effluent Systems - Pump, tank, and control

Air Compressors and Blowers

Oil lubricated piston
Oil free piston and rotary vane
Regenerative blowers - Pressure and vacuum
Rotary lobe & centrifugal
Sparging Systems

Monitoring Equipment

Combustible gas monitors and sensors
Chart recorders - LEL, temperature, flow
Water Flow Meters
Product Flow Meters
Air Flow Meters
Magnehelic Gauge Sets

Electrical Equipment

UL listed electrical panels
Motor starters
Explosion proof motors
Phase converters - Single - 3 phase
Timer control
Telemonitoring instrumentation

Chain Link Fence Enclosures

Bolt together panels with privacy slats
Portable

Supplies

PVC well screen
Water tight, traffic rated well monuments
Gauges (vacuum, water, product)
Velometers (vacuum, pressure, temperature)
Hose (vacuum, water, product)
Pipe (pvc, steel)
Fittings (pvc, steel, brass)
Switches (float, air, pressure)
Air Stripper packing

Sales • Rentals • Installation

ATTACHMENT D

1993 NPDES ANNUAL REPORT

PACIFIC
ENVIRONMENTAL
GROUP, INC.

January 24, 1994
Project 310-007.07

Mr. Rico Duazo
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94612

Re: Annual Report - 1993
NPDES File No 2189.8286
Unocal Service Station 4425
3499 El Camino Real at Flora Vista Avenue
Santa Clara, California

Dear Mr. Duazo:

This letter has been prepared by Pacific Environmental Group, Inc. (PACIFIC) on behalf of Unocal Corporation (Unocal). The letter presents an annual review of 1993 analytical and operational data and flow rate measurements for the groundwater extraction and treatment system at the site referenced above (Figure 1), as required by National Pollution Discharge Elimination System (NPDES) Permit No. CA0029815. Analytical, field measurement, and flow rate data indicate the system was in compliance with permit conditions during 1993.

SYSTEM DESCRIPTION

The groundwater remedial system consists of the following components: (1) three groundwater extraction wells (Wells MW-1, U-2, and U-4) equipped with pneumatic (MW-1 and U-4) or electric (U-2) submersible pumps, (2) a 550-gallon feed tank, (3) a forwarding pump, (4) a "bag" type prefilter, and (5) two 900-pound aqueous-phase carbon beds arranged in series. Treated effluent is discharged via the storm drain system into Calabazas Creek. A site map is shown on Figure 2 and a process and instrumentation diagram is shown on Figure 3.

2025 Gateway Place, Suite 440, San Jose, California 95110 (408) 441-7500 FAX (408) 441-7539

SAMPLING AND REPORTING REVISIONS

System monitoring throughout most of 1993 was under prior Permit Order No. 88-031. Written notice of recision of individual NPDES permits was received by PACIFIC on August 25, 1993, along with authorization to discharge under general Permit Order No. 91-056 and the accompanying changes in reporting and sampling requirements. PACIFIC sent a letter to the Regional Water Quality Control Board (RWQCB) on November 2, 1993 requesting the following modifications in sampling and reporting requirements: (1) a reduction in reporting frequency from monthly to quarterly, and (2) a reduction in sampling frequency for cyanide and priority pollutant metals from monthly to annually. Both revisions were granted in a letter from the RWQCB dated December 17, 1993. The quarterly reporting period has been initiated and will correspond to the performance review report sent quarterly to the permittee (Unocal); the next report will be issued in February 1994.

A single-page report format was developed by PACIFIC in September 1993 and approved for use by the RWQCB; the new form is currently in use.

PARAMETERS OF CONCERN

Sample Analyses Performed

Influent and effluent samples were analyzed monthly for total petroleum hydrocarbons calculated as gasoline (TPH-g), benzene, toluene, ethylbenzene, and xylenes (BTEX compounds), and TPH calculated as diesel (TPH-d). Priority pollutant metals and cyanide, which were analyzed annually under Order 88-031, will continue to be sampled on an annual schedule (October). Order 88-031 also required semiannual analysis for volatile organic compounds (EPA Method 624); this has been superseded by Order 91-056, which requires semiannual analyses for halogenated volatile organics (EPA Method 601/8010) and semivolatile organics (EPA Method 625/8270). In addition, a 96-hour static renewal bioassay test, performed annually under Order 88-031, is currently performed on a semiannual schedule (April and October) under Order 91-056. Analytical data are presented in Tables 1 through 4. Table 5 documents monthly field measurements for temperature, pH, electrical conductivity, and dissolved oxygen.

Annual Flow Summary

A flow meter attached to the treatment system records the amount of treated groundwater discharged to Calabazas Creek. On December 1, 1993, the flow meter showed that a total of approximately 29,895 gallons were discharged during 1993. The average flow rate throughout 1993 was 0.05 gallon per minute (gpm), (76 gallons per day [gpd]),

and was consistently below the permit maximum limit of 4.17 gpm (6,000 gpd). Flow meter readings are summarized in Table 6.

If you have any questions or require additional information, please do not hesitate to call.

Sincerely,

Pacific Environmental Group, Inc.

Suzanne McClurkin-Nelson
Engineering Technician

Brian Frus
Senior Staff Engineer

Attachments: Table 1 - Groundwater Analytical Data - Total Petroleum Hydrocarbons (TPH as Gasoline, BTEX Compounds, and TPH as Diesel)
Table 2 - Groundwater Analytical Data - Cyanide and Priority Pollutant Metals
Table 3 - Groundwater Analytical Data - Volatile Organic Compounds (EPA Method 624/8240)
Table 4 - Groundwater Analytical Data - Effluent Toxicity Analyses
Table 5 - Groundwater System Field Measurement Data
Table 6 - Treatment System Metered Volume
Figure 1 - Site Location Map
Figure 2 - Site Map
Figure 3 - Process and Instrumentation Diagram

cc: Ms. Penny Silzer, Unocal Corporation
Mr. Mohammad Khan, Santa Clara Valley Water District
Mr. John West, Regional Water Quality Control Board - S.F. Bay Region
Mr. Larry Monette, Ph.D., Santa Clara Fire Department

Table 1
Groundwater Analytical Data
Total Petroleum Hydrocarbons
(TPH as Gasoline, BTEX Compounds, and TPH as Diesel)

Unocal Service Station 4425
3499 El Camino Real at Flora Vista Avenue
Santa Clara, California

Designation and Date	TPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-Benzene (ppb)	Xylenes (ppb)	TPH as Diesel (ppb)
Station I-1 - Influent Sample						
06/18/90[a]	NS	730	4,800	2,600	15,000	56,000
06/26/90	NS	740	4,300	2,400	13,000	34,000
07/23/90	NS	670	3,550	2,300	13,800	6,000
08/29/90	NS	1,100	2,700	2,100	12,000	1,400
10/17/91	5,500	22	ND	18	270	770
10/23/91	1,100	ND	ND	ND	7.9	2,000
04/06/92	4,600	13	ND	8.6	150	6,500
04/20/92	2,600	3.3	ND	7.6	78	1,300
05/20/92	10,000	ND	ND	ND	ND	25,000
06/23/92	NS	NS	NS	NS	NS	NS
07/20/92	300	19	0.46	4.8	7.6	240
08/19/92	2,100	4.6	4.4	2.6	200	1,800
09/22/92	4,000	16	11	24	360	1,400
10/19/92	1,700	ND	ND	ND	28	1,100
11/18/92	1,500	4.3	2.1	10	49	5,700
12/17/92	750	14	1.4	3.8	18	350
01/26/93	150	ND	ND	ND	ND	630
03/03/93	390	1.2	3.5	1.5	17	6,500
03/16/93	61	ND	ND	ND	ND	130
04/06/93	ND	ND	ND	ND	ND	110
05/04/93	ND	ND	ND	ND	ND	120
06/05/93	ND	1.0	1.8	ND	1.0	240
07/12/93	ND	ND	ND	ND	ND	60
08/11/93	ND	ND	ND	ND	ND	84
09/08/93	ND	ND	ND	ND	ND	51
10/07/93	ND	ND	ND	ND	ND	69
11/03/93	ND	ND	ND	ND	ND	69
12/01/93	ND	ND	ND	ND	ND	67
Station P-1 - Mid Sample (Between Carbon Units)						
06/18/90[b]	NS	ND	ND	ND	ND	ND
06/26/90	NS	ND	ND	ND	ND	ND
07/23/90	NS	ND	ND	ND	ND	ND

Table 1 (continued)
Groundwater Analytical Data
Total Petroleum Hydrocarbons
(TPH as Gasoline, BTEX Compounds, and TPH as Diesel)

Unocal Service Station 4425
3499 El Camino Real at Flora Vista Avenue
Santa Clara, California

Designation and Date	TPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-Benzene (ppb)	Xylenes (ppb)	TPH as Diesel (ppb)
Station P-1 (continued)						
08/29/90	NS	ND	ND	ND	ND	ND
04/06/92	ND	ND	ND	ND	ND	ND
04/20/92	ND	ND	ND	ND	ND	ND
05/20/92	ND	ND	ND	ND	ND	ND
06/23/92	NS	NS	NS	NS	NS	NS
07/20/92	ND	ND	ND	ND	ND	ND
08/20/92	ND	ND	ND	ND	ND	ND
09/22/92	ND	ND	ND	ND	ND	ND
10/19/92	ND	ND	ND	ND	ND	ND
11/18/92	ND	ND	ND	ND	ND	ND
12/17/92	NS	NS	NS	NS	NS	NS
01/26/93	NS	NS	NS	NS	NS	NS
03/03/93	NS	NS	NS	NS	NS	NS
03/16/93	NS	NS	NS	NS	NS	NS
04/06/93	ND	ND	ND	ND	ND	ND
05/04/93	ND	ND	ND	ND	ND	ND
06/05/93	NS	NS	NS	NS	NS	NS
07/12/93	ND	ND	ND	ND	ND	ND
08/11/93	ND	ND	ND	ND	ND	ND
09/08/93	ND	ND	ND	ND	ND	ND
10/07/93	ND	ND	ND	ND	ND	ND
11/03/93	ND	ND	ND	ND	ND	ND
12/01/93	ND	ND	ND	ND	ND	ND
Station E-1 - Effluent Sample						
06/18/90[c]	NS	ND	ND	ND	ND	ND
06/26/90	NS	ND	ND	ND	ND	ND
07/23/90	NS	ND	ND	ND	ND	ND
08/29/90	NS	ND	ND	ND	ND	ND
10/17/91	ND	ND	ND	ND	ND	ND
10/23/91	ND	ND	ND	ND	ND	ND
04/06/92	ND	ND	ND	ND	0.52	ND
04/20/92	ND	ND	ND	ND	ND	ND

Table 1 (continued)
Groundwater Analytical Data
Total Petroleum Hydrocarbons
(TPH as Gasoline, BTEX Compounds, and TPH as Diesel)

Unocal Service Station 4425
3499 El Camino Real at Flora Vista Avenue
Santa Clara, California

Designation and Date	TPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-Benzene (ppb)	Xylenes (ppb)	TPH as Diesel (ppb)
Station E-1 (continued)						
05/20/92	ND	ND	ND	ND	ND	ND
06/23/92	NS	NS	NS	NS	NS	NS
07/20/92	ND	ND	ND	ND	ND	ND
08/20/92	ND	ND	ND	ND	ND	ND
09/22/92	ND	ND	1.2	ND	ND	ND
10/19/92	ND	ND	ND	ND	ND	ND
11/18/92	ND	ND	ND	ND	ND	ND
12/17/92	ND	ND	ND	ND	ND	ND
01/26/93	ND	ND	ND	ND	ND	ND
03/03/93	ND	ND	ND	ND	ND	350
03/16/93	ND	ND	ND	ND	ND	ND
04/06/93	ND	ND	ND	ND	ND	ND
05/04/93	ND	ND	ND	ND	ND	ND
06/05/93	ND	ND	0.8	ND	ND	ND
07/13/93	ND	ND	ND	ND	ND	ND
08/11/93	ND	ND	ND	ND	ND	ND
09/08/93	ND	ND	ND	ND	ND	ND
10/07/93	ND	ND	ND	ND	ND	ND
11/03/93	ND	ND	ND	ND	ND	ND
12/01/93	ND	ND	ND	ND	ND	ND
Station C-1 - 50 Feet Downstream From Effluent Discharge						
06/26/90	NS	ND	ND	ND	ND	ND
07/23/90	NS	ND	ND	ND	ND	ND
08/29/90	NS	NS	NS	NS	NS	NS
04/06/92	NS	NS	NS	NS	NS	NS
04/20/92	NS	NS	NS	NS	NS	NS
05/20/92	NS	NS	NS	NS	NS	NS
06/23/92	NS	NS	NS	NS	NS	NS
07/20/92	NS	NS	NS	NS	NS	NS
08/20/92	NS	NS	NS	NS	NS	NS
09/22/92	NS	NS	NS	NS	NS	NS
10/19/92	NS	NS	NS	NS	NS	NS

Table 1 (continued)
Groundwater Analytical Data
Total Petroleum Hydrocarbons
(TPH as Gasoline, BTEX Compounds, and TPH as Diesel)

Unocal Service Station 4425
3499 El Camino Real at Flora Vista Avenue
Santa Clara, California

Designation and Date	TPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-Benzene (ppb)	Xylenes (ppb)	TPH as Diesel (ppb)
Station C-1 (continued)						
11/18/92	NS	NS	NS	NS	NS	NS
12/17/92	ND	ND	0.50	1.3	0.50	1,300
01/26/93	NS	NS	NS	NS	NS	NS
03/03/93	NS	NS	NS	NS	NS	NS
03/16/93	NS	NS	NS	NS	NS	NS
04/06/93	NS	NS	NS	NS	NS	NS
05/04/93	NS	NS	NS	NS	NS	NS
06/05/93	ND	ND	0.8	ND	0.6	280
07/12/93	NS	NS	NS	NS	NS	NS
08/11/93	NS	NS	NS	NS	NS	NS
09/08/93	NS	NS	NS	NS	NS	NS
10/07/93	NS	NS	NS	NS	NS	NS
11/03/93	NS	NS	NS	NS	NS	NS
12/01/93	NS	NS	NS	NS	NS	NS

ppb = Parts per billion
NS = Not sampled
ND = Not detected
a. Sample labeled as INFL (influent to carbon).
b. Sample labeled as MID or MIDDLE (between carbon).
c. Sample labeled as EFFL (effluent to storm).

Table 2
Groundwater Analytical Data
Cyanide and Priority Pollutant Metals

Unocal Service Station 9425
3499 El Camino Real at Flora Vista Avenue
Santa Clara, California

Date Sampled	Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc	Cyanide
Influent Stream (mg/L)														
10/17/91	ND	ND	ND	ND	ND	ND	ND	ND	0.083	ND	ND	ND	0.439	ND
10/23/92	ND	ND	ND	ND	ND	ND	ND	ND	0.007	ND	ND	ND	0.117	ND
10/07/93	ND	ND	ND	ND	ND	ND	ND	ND	0.015	ND	ND	ND	0.023	ND
Effluent Stream (mg/L)														
10/17/91	ND	0.013	ND	ND	ND	ND	ND	ND	0.029	ND	ND	ND	0.160	ND
10/23/92	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.736	ND
10/07/93	ND	ND	ND	ND	ND	ND	ND	ND	0.0089	ND	ND	ND	0.250	ND
Effluent Stream (grams per day)														
10/17/91	NA	0.007	NA	NA	NA	NA	NA	NA	0.016	NA	NA	NA	0.091	NA
10/23/92	NA	NA	NA	NA	NA	NA	NA	NA	0.000	NA	NA	NA	0.418	NA
10/07/93	NA	NA	NA	NA	NA	NA	NA	NA	0.005	NA	NA	NA	0.139	NA

mg/L = Milligrams per liter
ND = Not detected
NA = Not applicable

Table 3
Groundwater Analytical Data
Volatile Organic Compounds
(EPA Method 624/8240)

Unocal Service Station 4425
3499 El Camino Real at Flora Vista Avenue
Santa Clara, California

Date Sampled	Sample Location	Acetone (µg/L)	2–Butanone (µg/L)	1,1,1–Trichloroethane (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	Xylenes (Total) (µg/L)
10/23/92	I–1	21	36	ND	5	ND	8
	E–1	ND	ND	5	ND	ND	ND
	C–1	NS	NS	NS	NS	NS	NS
01/10/93	I–1	ND	ND	ND	ND	ND	ND
	E–1	ND	ND	ND	ND	ND	ND
	C–1	NS	NS	NS	NS	NS	NS
10/07/93	I–1	36	ND	ND	ND	ND	ND
	E–1	23	ND	ND	ND	ND	ND
	C–1	NS	NS	NS	NS	NS	NS
11/01/93*	I–1	ND	ND	ND	ND	ND	ND
	E–1	ND	ND	ND	ND	ND	ND
	C–1	NS	NS	NS	NS	NS	NS

µg/L = Micrograms per liter
I–1 = Influent sample
E–1 = Effluent sample
C–1 = Sample taken 50 feet downstream from the point of discharge
ND = Not detected above detection limits
NS = Not sampled
* = Resampled following 10/07/93 event, due to permit violation.
Only compounds detected above detection limits are shown; all other compounds were reported as not detected.

Table 4
Groundwater Analytical Data
Effluent Toxicity Analyses

Unocal Service Station 4425
3499 El Camino Real at Flora Vista Avenue
Santa Clara, California

Date Sampled	Species Sampled	Control Sample (Percent Survival)	Effluent Sample (Percent Survival)
10/19/92 – 10/22/92	Fat-head Minnows	100	100
10/11/93	Rainbow Trout	95	90

Treatment system effluent sampled annually.

Table 5
Groundwater System Field Measurement Data

Unocal Service Station 4425
3499 El Camino Real at Flora Vista Avenue
Santa Clara, California

Sample Designation and Date	pH	Temperature (°F)	Dissolved Oxygen (mg/L)	Specific Conductance (umhos/cm)
Station I-1				
06/18/90	7.55	75.6	0.3	783
06/26/90	6.69	71.1	0.6	682
07/23/90	6.79	77.9	<1	768
08/29/90	6.90	75.1	0.15	1,067
10/17/91	NA	NA	NA	NA
10/23/91	9.37	86.6	NA	NA
04/06/92	7.98	77.5	3	930
04/20/92	7.53	77.5	4	940
05/20/92	7.22	76.8	2	881
06/23/92	NA	NA	NA	NA
07/20/92	7.89	76.1	5	706
08/19/92	7.47	70.1	2	1,142
09/22/92	7.62	81.8	2	930
10/19/92	7.70	72.6	2	596
11/18/92	7.37	68.4	2	983
12/17/92	7.50	50.1	3	654
01/26/93	7.76	50.9	2	798
03/03/93	7.48	61.4	4	761
03/16/93	7.32	64.6	4	974
04/06/93	7.33	58.7	1	666
05/04/93	7.78	74.5	2	904
06/05/93	7.83	68.4	2	848
07/12/93	6.76	77.1	3	849
08/11/93	6.82	72.1	2	792
09/08/93	6.90	73.2	2	804
10/07/93	8.62	64.7	2	884
11/03/93	8.13	61.4	2	796
12/01/93	7.98	63.4	2	820
Station P-1				
06/18/90	7.41	75.4	0.2	814
06/26/90	6.73	72.2	0.2	727
07/23/90	6.78	81.8	<1	767
08/29/90	7.25	74.8	0.25	1,103
04/06/92	7.37	72.3	0.6	707
04/20/92	7.49	75.2	4	913
05/20/92	8.09	78.3	3	753
06/23/92	NA	NA	NA	NA
07/20/92	6.50	76.0	2	684
08/19/92	7.62	71.2	1	1,148
09/22/92	7.52	76.4	0.2	847
10/19/92	7.67	70.7	1	595

Table 5 (continued)
Groundwater System Field Measurement Data

Unocal Service Station 4425
3499 El Camino Real at Flora Vista Avenue
Santa Clara, California

Sample Designation and Date	pH	Temperature (°F)	Dissolved Oxygen (mg/L)	Specific Conductance (umhos/cm)
Station P-1 (continued)				
11/18/92	7.81	64.4	1	918
12/17/92	NA	NA	NA	NA
01/26/93	NA	NA	NA	NA
03/03/93	NA	NA	NA	NA
03/16/93	NA	NA	NA	NA
04/06/93	7.52	61.6	1	704
05/04/93	7.50	71.8	2	801
06/05/93	7.74	67.3	1	822
07/12/93	7.41	79.1	2	841
08/11/93	7.24	69.8	1	758
09/08/93	7.16	71.4	1	792
10/07/93	8.24	65.9	<1	835
11/03/93	8.24	65.7	<1	852
12/01/93	8.13	66.7	<1	873
Station E-1				
06/18/90	7.27	74.1	0.6	848
06/26/90	6.80	72.3	0.3	762
07/23/90	6.68	77.5	<1	744
08/29/90	7.43	75.0	0.15	1,127
10/17/91	NA	NA	NA	NA
10/23/91	9.37	71.0	NA	NA
04/06/92	7.11	70.6	0.2	776
04/20/92	7.14	76.1	4	933
05/20/92	7.24	75.6	1	886
06/23/92	NA	NA	NA	NA
07/20/92	6.30	77.0	2	678
08/19/92	7.71	71.4	1	1,145
09/22/92	7.83	79.1	0.2	885
10/19/92	7.57	69.4	1	629
11/18/92	7.92	64.5	1	839
12/17/92	7.34	54.0	2	743
01/26/93	7.39	51.8	1	1,771
03/03/93	7.32	59.8	2	737
03/16/93	7.54	65.9	4	1,042
04/06/93	7.13	59.5	1	1,062
05/04/93	7.40	70.8	2	784
06/05/93	7.74	67.2	1	826
07/12/93	7.28	79.9	1	877

Table 5 (continued)
Groundwater System Field Measurement Data

Unocal Service Station 4425
3499 El Camino Real at Flora Vista Avenue
Santa Clara, California

Sample Designation and Date	pH	Temperature (°F)	Dissolved Oxygen (mg/L)	Specific Conductance (umhos/cm)
Station E-1 (continued)				
08/11/93	7.21	72.6	<1	793
09/08/93	7.18	71.6	<1	796
10/07/93	8.04	68.0	<1	831
11/03/93	8.65	66.1	<1	1,021
12/01/93	8.24	67.1	<1	982
Station C-1				
06/18/90	NA	NA	NA	NA
06/26/90	8.51	75.2	1.0	747
07/23/90	7.70	78.3	5.5	1,203
08/29/90	NA	NA	NA	NA
04/20/92	NA	NA	NA	NA
05/20/92	NA	NA	NA	NA
06/23/92	NA	NA	NA	NA
07/20/92	NA	NA	NA	NA
08/19/92	NA	NA	NA	NA
09/22/92	NA	NA	NA	NA
10/19/92	NA	NA	NA	NA
11/18/92	NA	NA	NA	NA
12/17/92	7.39	58.2	4	138
01/26/93	NA	NA	NA	NA
03/03/93	NA	NA	NA	NA
03/16/93	NA	NA	NA	NA
04/06/93	NM	NM	NM	NM
05/04/93	NM	NM	NM	NM
06/05/93	8.13	67.4	.3	137
07/12/93	NM	NM	NM	NM
08/11/93	Dry	Dry	Dry	Dry
09/08/93	Dry	Dry	Dry	Dry
10/07/93	Dry	Dry	Dry	Dry
11/03/93	Dry	Dry	Dry	Dry
12/01/93	Dry	Dry	Dry	Dry

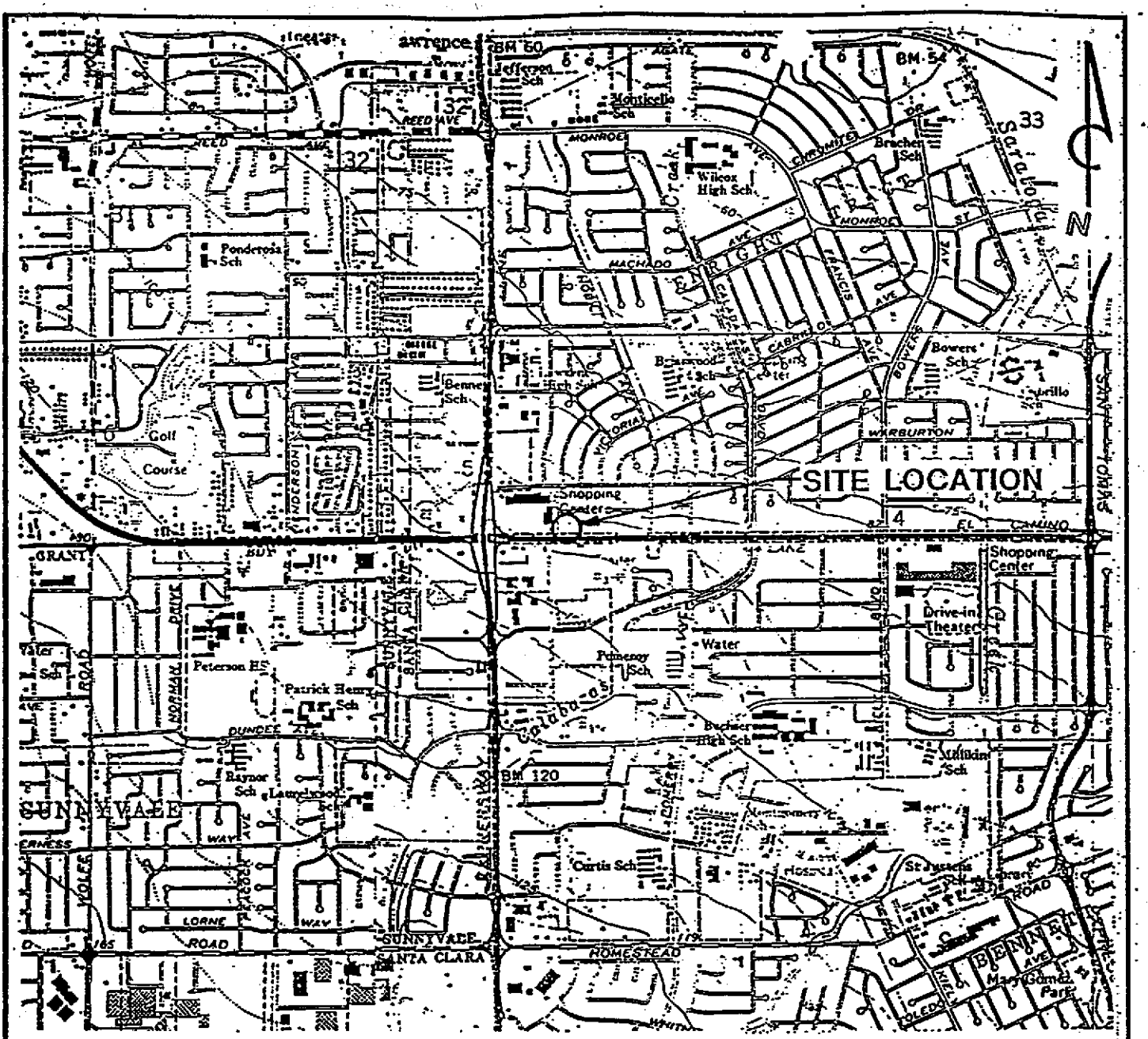
mg/L = Milligrams per liter
umhos/cm = Micromhos per centimeter
NA = Not available
NM = Not measured

Table 6
Treatment System Metered Volume

Unocal Service Station 4425
3499 El Camino Real at Flora Vista Avenue
Santa Clara, California

Sample ID	Flow Meter Reading Date	Flow Meter Reading (gallons)	Flow Meter Net Volume (gallons)	Cumulative System Discharge To Date (gallons)	Average Total System Discharge (gpm)	Average Total System Discharge (gpd)
INFL	01/01/92	NA	NA	150	NA	NA
INFL	02/24/92	324	174	324	0.002	3.22
INFL	03/16/92	NA	NA	324	NA	NA
INFL	04/06/92	752	428	752	0.014	20.38
INFL	04/20/92	1,538	786	1,538	0.039	56.14
INFL	05/20/92	1,795	257	1,795	0.006	8.57
INFL	06/15/92	1,838	43	1,838	0.001	1.65
INFL	06/23/92	1,838	0	1,838	NA	0.00
INFL	07/20/92	2,239	401	2,239	0.010	14.85
INFL	08/19/92	4,648	2,409	4,648	0.056	80.30
INFL	09/22/92	5,814	1,166	5,814	0.024	34.29
INFL	10/19/92	7,101	1,287	7,101	0.033	47.67
INFL	11/18/92	11,983	4,882	11,983	0.113	162.73
INFL	12/17/92	13,557	1,574	13,557	0.036	54.26
INFL	01/26/93	17,412	3,855	17,412	0.067	96.38
INFL	03/03/93	19,611	2,199	19,611	0.042	61.08
INFL	03/16/93	19,930	319	19,930	0.017	24.54
INFL	04/06/93	20,020	90	20,020	0.003	4.29
INFL	05/03/93	20,794	774	20,794	0.020	28.67
INFL	06/05/93	23,043	2,249	23,043	0.047	68.15
INFL	07/12/93	24,265	1,222	24,265	0.023	33.03
INFL	08/11/93	28,143	3,878	28,143	0.090	129.27
INFL	09/08/93	33,331	5,188	33,331	0.129	185.29
INFL	10/07/93	37,581	4,250	37,581	0.102	146.55
INFL	11/03/93	39,856	2,275	39,856	0.059	84.26
INFL	12/01/93	41,878	2,022	41,878	0.050	72.21
Total Approximate Discharge (gallons) 1993:				29,895		
Average Flow Rate 1993:					0.05	76.00

gpm = Gallons per minute
gpd = Gallons per day
NA = Not available or not applicable



QUADRANGLE LOCATION

REFERENCE:
USGS 7.5 MIN. TOPOGRAPHIC MAP
TITLED: SAN JOSE WEST, CALIFORNIA
DATED: 1961 REVISED: 1980
TITLED: CUPERTINO, CALIFORNIA
DATED: 1961 REVISED: 1980

SCALE
2000 0 2000 FEET

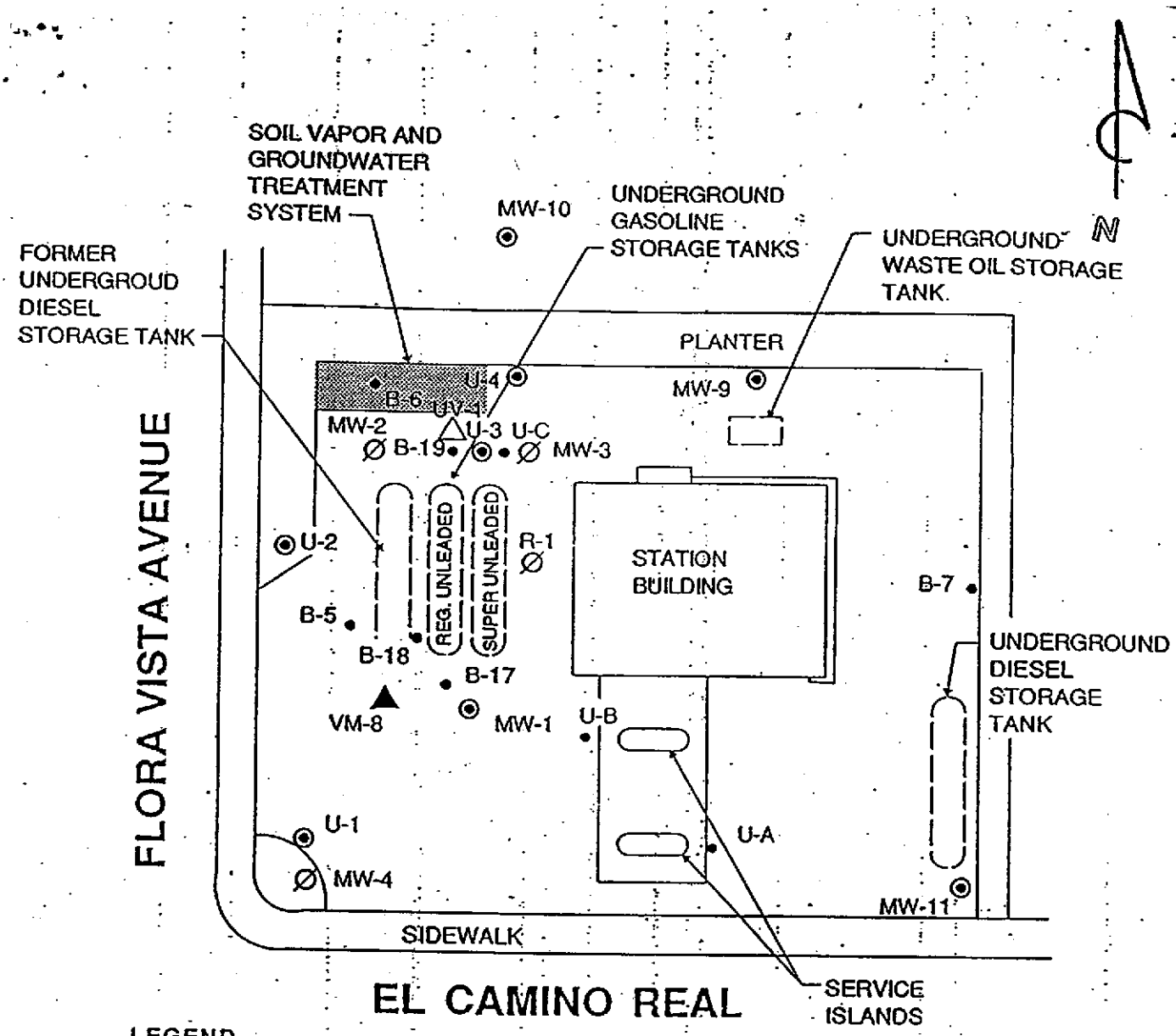
PACIFIC ENVIRONMENTAL GROUP INC.

UNOCAL SERVICE STATION 4425
3499 El Camino Real at Flora Vista Avenue
Santa Clara, California

SITE LOCATION MAP

FIGURE: 1
PROJECT: 310-07.07

SAN JOSE BLUEPRINT CO.
PRINTED ON 1000H-10



LEGEND

U-1 ◉ GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION

R-1, MW-2 Ø DESTROYED WELL LOCATION AND DESIGNATION

U-A • EXPLORATORY SOIL BORING LOCATION AND DESIGNATION

VM-8 ▲ SOIL VAPOR MONITORING WELL LOCATION AND DESIGNATION

UV-1 △ SOIL VAPOR EXTRACTION WELL LOCATION AND DESIGNATION

SCALE

0 30 60 FEET

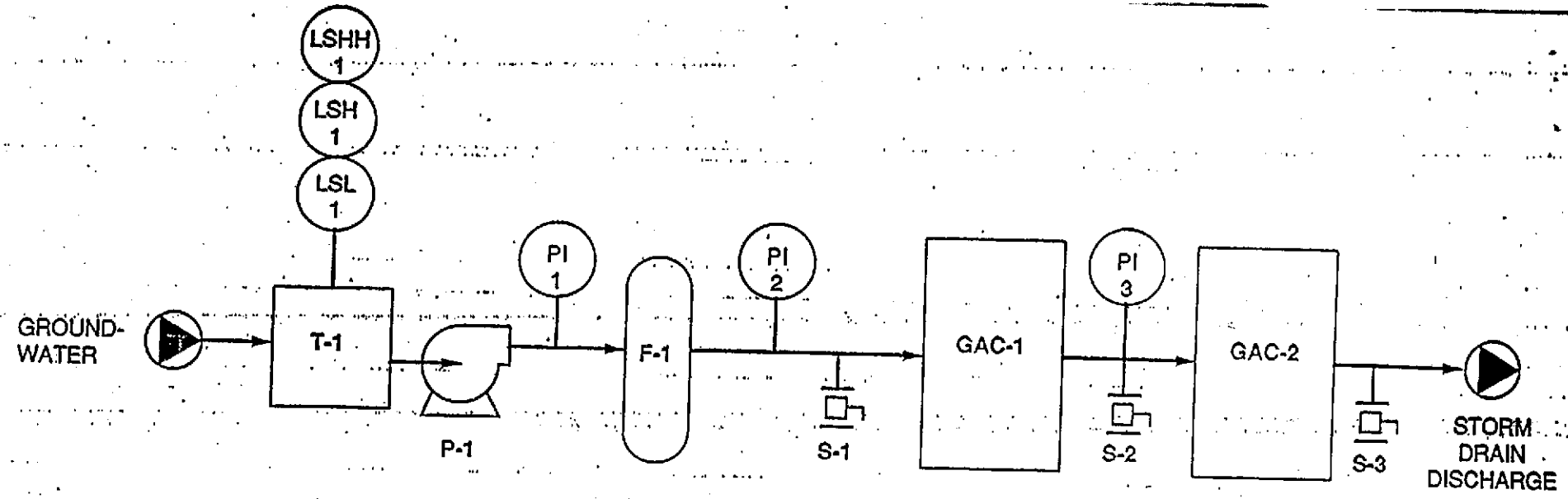
PACIFIC ENVIRONMENTAL GROUP, INC.

UNOCAL SERVICE STATION 4425
3499 El Camino Real at Flora Vista Avenue
Santa Clara, California

SITE MAP

FIGURE: 2

PROJECT: 310-07.07



LEGEND

LSH-1	LEVEL SWITCH, HIGH
LSL-1	LEVEL SWITCH, LOW
LSHH-1	LEVEL SWITCH, HIGH HIGH
T-1	FEED TANK
F-1	BAG FILTER
P-1	FORWARDING PUMP
PI-1	PRESSURE INDICATOR
S-1	SAMPLE LOCATION
GAC-1	LIQUID PHASE CARBON ADSORPTION UNIT

PACIFIC ENVIRONMENTAL GROUP, INC.

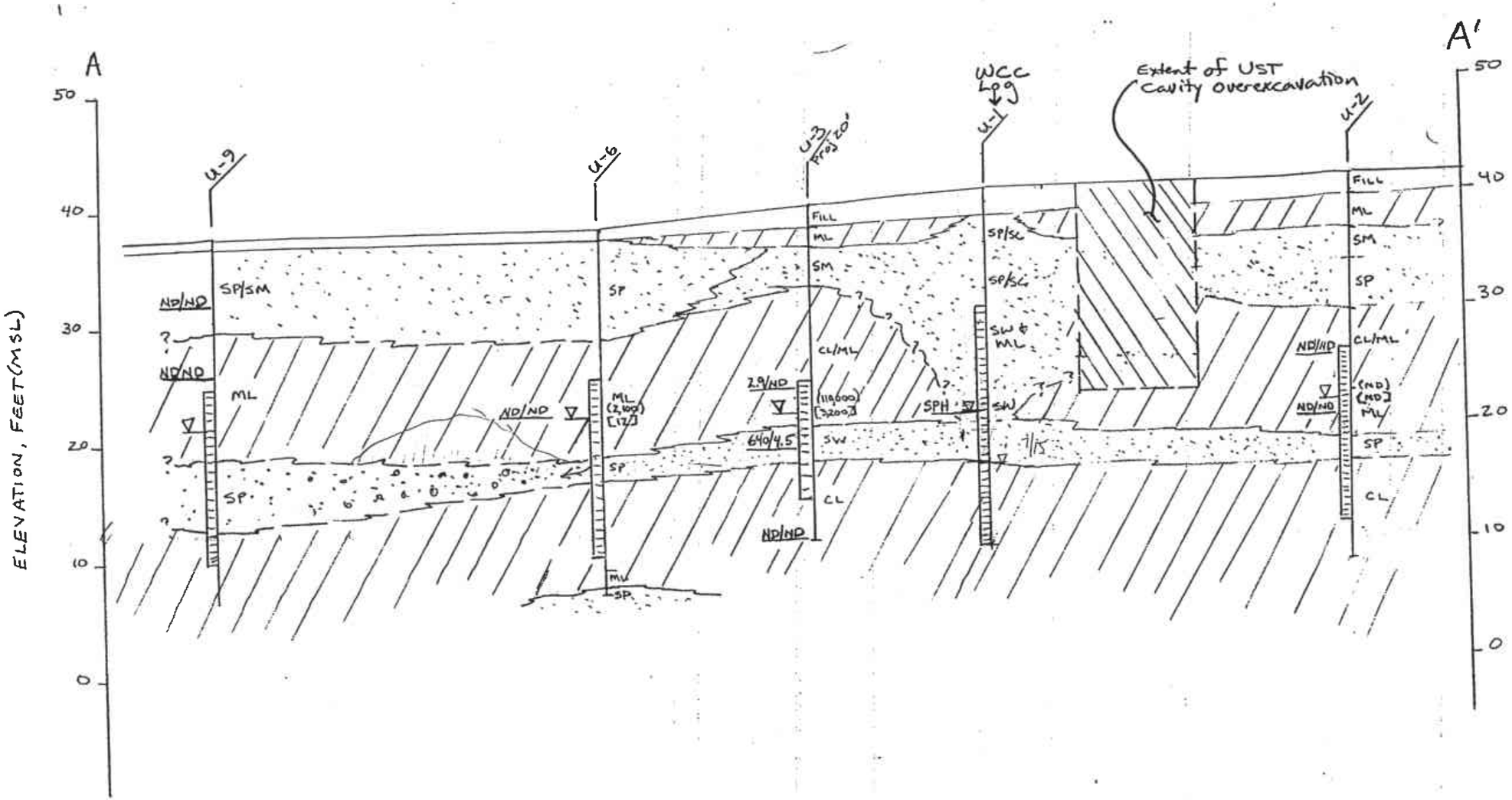
UNOCAL SERVICE STATION 4425
3499 El Camino Real at Flora Vista Avenue
Santa Clara, California

PROCESS AND INSTRUMENTATION DIAGRAM

FIGURE: 3
PROJECT: 310-07.07

05/15/92

GEOLOGIC CROSS-SECTION A - A'



▽ - Groundwater Elevation 12/2/93

640/4.5 - TPH-g/Benzene Concentrations (ppm) in soil.

(110,000) - Concentration of TPH-g (ppb) 12/2/93

[3,100] - Concentration of Benzene (ppb) 12/2/93

- Primarily coarse-grained deposits; sand and silty sand.

- Primarily fine-grained deposits; silts, sandy silts and clays.

SCALE
1"=30' Horizontal
1"=10' Vertical

FIGURE 2.

S0310413

odward-Clyde Consu..ants

PROJECT NAME Gettler-Ryan NO. 8820011A

MONITORING WELL LOCATION	376 Lewelling Blvd., San Lorenzo, CA			ELEVATION AND DATUM	
DRILLING AGENCY	Bay Land Drilling	DRILLER	Kurt	DATE STARTED / DATE FINISHED	2/1/88 / 2/1/88
DRILLING EQUIPMENT	CME - 55			COMPLETION DEPTH 30.5'	SAMPLER California Modified Sampler
DRILLING METHOD	8-inch Hollowstem Augers	DRILL BIT		NO. OF SAMPLES DIST. 6	UNDIST. none
SIZE AND TYPE OF CASING	3-inch PVC			WATER LEVEL FIRST 17.9'	COMPL. 24 HRS.
TYPE OF PERFORATION	0.020-inch slotted screen	FROM 30.5 TO 10.5 FT.		LOGGED BY: G. Heyman	CHECKED BY: M. Bonkowski
SIZE AND TYPE OF PACK	12/20 Monterey sand	FROM 30.5 TO 7 FT.			
TYPE OF SEAL	NO. 1 Bentonite	FROM 7 TO 5.5 FT.			
	NO. 2 Cement	FROM 5.5 TO 0.7 FT.			

Depth (feet)	Samples	Blows	MATERIAL DESCRIPTION		USCS	Well Construction
			ASPHALTIC PAVEMENT			
5	1	Sampler Pushed @ 450 psi	SAND with CLAYEY SAND yellow-brown with dark gray brown clayey pockets, fine to medium grained, loose, moist, subrounded, moderately to poorly sorted, clayey sand is more common in samples C and D, contains organic fragments	No odor	SP-SC	
10	2	1 2 1	medium brown, fine to medium grained with little to some clay, very loose to loose, wet, subrounded, well to moderately sorted, fine organic fragments throughout	No odor	SP-SC	
15	3	3 5 3	SAND with interlayered CLAYEY SILT brown to dark brown, silt is dark gray, fine to very coarse grained sand, little gravel to 2x2x2.5 cm., little to some clay, medium dense, stiff, silt has low plasticity, wet, subrounded to subangular, silt layers are up to 3-inches thick in the B sample	Organic odor	SW & ML	
20	4	2 4 5	SAND dark gray, fine to medium grained, little to some clay, little gravel to 0.5x0.5x1cm., loose, saturated, subrounded to subangular, poorly sorted, homogeneous	Strong hydrocarbon odor Free product on sampler	SW	
			CLAY at 23.5 feet in cuttings			
25	5	3 5 7	SILTY CLAY and CLAY dark to medium gray brown, trace very fine to medium sand, one 2-inch layer of clayey sand, medium to high plasticity, stiff, saturated, homogeneous	Weak hydrocarbon odor	CH	
30	6	9 15 23	CLAY dark gray brown, little to some silt, occasionally little very fine to medium sand, very plastic, very stiff to hard, wet, homogeneous	Weak hydrocarbon odor	CH	
			BOTTOM OF BORING: 30.5'			

Field location of boring: (See Plate 2)	Project No.: 7809	Date: 08/06/90	Boring No: U-3
	Client: UNOCAL #5760		
	Location: 376 Lewelling Boulevard		
	City: San Lorenzo, California		Sheet 1 of 2
	Logged by: M.J.J.	Driller: Bayland	
Drilling method: Hollow Stem Auger	Casing installation data:		
Hole diameter: 8-Inches	Top of Box Elevation: 39.64		Datum: MSL

Water Level	19.5'	20.80'
Time	14:25	16:05
Date	08/06/90	08/06/90

PID (ppm)	Blows/ft. or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
								PAVEMENT SECTION - 0.5 feet
				1				
								FILL - Gravel (GW) - dark gray (2.5Y N9/0), loose, dry;
				2				85% fine to coarse gravel; 15% coarse sand; trace silt;
								no chemical odor.
				3				SANDY SILT (ML) - olive brown (2.5Y 4/4), medium stiff,
								damp; 70% silt; 30% fine sand; no chemical odor.
	175			4				SILTY SAND (SM) - light olive brown (2.5Y 5/6), loose,
0	175	S&H	U-3-5					damp; 60% fine sand; 35% silt; 5% clay; trace fine gravel;
	175	push		5				no chemical odor.
				6				
				7				
				8				Moist at 8.0 to 9.0 feet.
	150			9				
	150	S&H	U-3-10					SILTY CLAY (CL-ML) - dark grayish brown (2.5Y 4/2),
0.7	150	push		10				medium stiff, damp; 50% clay; 35% silt; 15% fine sand;
								no chemical odor.
				11				
				12				
				13				
	3			14				COLOR CHANGE to very dark gray (5Y 3/1) at 14.0 feet;
1.8	3	S&H	U-3-15					rootholes; 5% organic content; weak chemical odor.
	4			15				
				16				
				17				
				18				
	2			19				
235	4	S&H	U-3-20			▽		
	5			20				

Remarks:

GeoStrategies Inc.

Log of Boring

BORING NO. U-3

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7809	CWP CEG 1262	08/90		

Field location of boring: (See Plate 2)	Project No.: 7809	Date: 08/06/90	Boring No: U-3
	Client: UNOCAL #5760		
	Location: 376 Lewelling Boulevard		
	City: San Lorenzo, California		Sheet 2 of 2
	Logged by: M.J.J.	Driller: Bayland	
Drilling method: Hollow Stem Auger	Casing installation data:		
Hole diameter: 8-Inches	Top of Box Elevation:	Datum:	

	Water Level			
	Time			
	Date		-	

PID (ppm)	Blows/ft. or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				21		▼		SAND with GRAVEL (SW) - very dark gray (2.5Y N3/0), loose, saturated; 80% medium to coarse sand; 20% fine to coarse gravel; strong chemical odor.
				22				
				23				
	3			24				
0.7	4	S&H	U-3-25					CLAY (CL) - light olive brown (2.5Y 5/4), stiff, damp,
	9			25				medium plasticity; 85% clay; 15% silt; trace sand; no chemical odor.
				26				
				27				
	4			28				
0	5	S&H	U-3-29					no chemical odor.
	5			29				
				30				Bottom of sample at 29.0 feet. Bottom of boring at 29.0 feet. 08/06/90
				31				
				32				
				33				
				34				
				35				
				36				
				37				
				38				
				39				
				40				

Remarks:

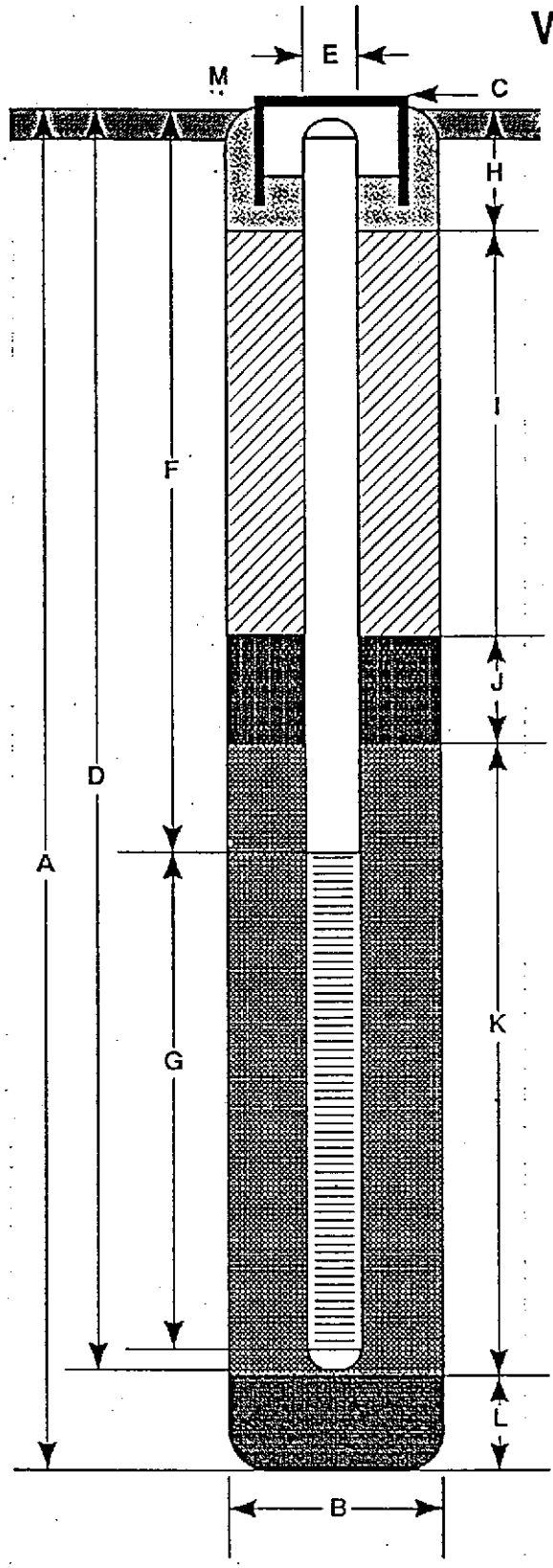
GeoStrategies Inc.

Log of Boring

BORING NO. U-3

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7809	CEG 12/92	08/90		

WELL CONSTRUCTION DETAIL



A Total Depth of Boring 29.0 ft.

B Diameter of Boring 8 in.
Drilling Method Hollow Stem Auger

C Top of Box Elevation 39.64 ft.
[X] Referenced to Mean Sea Level
[ ] Referenced to Project Datum

D Casing Length 25.0 ft.
Material Schedule 40 PVC

E Casing Diameter 3 in.

F Depth to Top Perforations 15.0 ft.

G Perforated Length 10.0 ft.
Perforated Interval from 15.0 to 25.0 ft.
Perforation Type Machine Slot
Perforation Size 0.020 in.

H Surface Seal from 0.5 to 1.5 ft.
Seal Material Concrete

I Backfill from 1.5 to 11.0 ft.
Backfill Material Concrete Grout

J Seal from 11.0 to 13.0 ft.
Seal Material Bentonite

K Gravel Pack from 13.0 to 25.0 ft.
Pack Material #2/12 Graded Sand

L Bottom Seal 4.0 ft.
Seal Material Bentonite

M Waterproof vault with locking well cap and lock.

Note: Depths measured from initial ground surface.

GeoStrategies Inc.

Well Construction Detail

WELL NO. U-3

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7809	CWP CEG 1262	08/90		