LETTER REPORT
QUARTERLY GROUND-WATER MONITORING
at
UNOCAL Station No. 5367
500 Bancroft Avenue
San Leandro, California

AGS Job No. 87091-2

8/30/90

August 30, 1990
AGS 87091-2

Mr. Ron Bock
Unocal Corporation
2000 Crow Canyon Place, Suite 400
San Ramon, California 94583

Subject: Letter report on second quarter 1990 ground-water monitoring at Unocal Station No. 5367, 500 Bancroft Avenue, San Leandro, California.

Mr. Bock:

This letter report summarizes the results of quarterly ground-water monitoring performed by Applied GeoSystems (AGS) at the above-referenced site, as authorized by Unocal Corporation (Unocal). The site is located at the intersection of Bancroft Avenue and Dowling Boulevard in San Leandro, California, as shown on the Site Vicinity Map, Plate P-1. Locations of the wells are shown on the Generalized Site Plan, Plate P-2.

Background

At the request of Unocal, monitoring well MW-1 was installed by AGS in September 1987 (AGS Report No. 87091-1, dated December 1987). Monitoring wells MW-2 through MW-4 were installed by AGS in September 1988 (AGS Report No. 87091-3, dated November 18, 1988). Wells MW-5 and MW-6, MW-7 and MW-8 were installed in May 1989 and February 1990, respectively (AGS report pending). Quarterly ground-water monitoring was recommended by Applied GeoSystems after elevated levels of hydrocarbons were detected in ground water at the site.

Sampling Procedures

The quarterly monitoring program conducted by AGS includes measuring depths to water, subjectively evaluating ground-water samples, and purging and sampling ground water from monitoring wells MW-2 through MW-8. Well MW-1 was dry, consequently, no water sample was collected. This quarterly monitoring was performed on May 15 and July 19, 1990, according to the attached Field Procedures (Attachment I). On May 15, 1990, ground-water samples were collected for analysis. Because of equipment failure on May 15, AGS

personnel returned to the site on July 19, 1990, to measure depths to ground water and subjectively evaluate ground-water samples. Storage and disposal of purge water are also described in Attachment I.

Results of Subjective Evaluations

No evidence of floating product or sheen was observed in any of the wells. Cumulative results of subjective evaluations are presented in Table 1.

Ground-Water Gradient and Flow Direction

Ground-water depths and wellhead elevations were used to calculate differences in water-level elevations. Ground-water elevations measured on July 19, 1990, are presented in Table 2. A graphical interpretation of the ground-water surface elevation at the time of this measurement is shown on the Ground-Water Elevation Map, Plate P-3. The ground-water gradient calculated from these measurements is 0.001 with a direction of flow toward the west to southwest. The ground-water gradient and flow direction are approximately the same as those measured during the previous monitoring period in February 1990.

Analytical Methods and Results

Ground-water samples collected on May 15, 1990, were analyzed for total petroleum hydrocarbons as gasoline (TPHg) using Environmental Protection Agency (EPA) modified Method 8015 and for benzene, toluene, ethylbenzene, and total xylenes (BTEX) using EPA Method 602. These analyses were conducted at the Applied Analytical laboratory in Fremont, California (Hazardous Waste Testing Laboratory, State Certification No. 153). Copies of the Chain of Custody Record and the certified analysis reports are in Attachment II.

The results of laboratory analyses suggest a decreasing trend in TPHg and BTEX in the water samples from wells MW-2, MW-5, and MW-8, except for a slight increase in ethylbenzene in MW-2 since initial quarterly monitoring results in October 1988 (well MW-2) and February 1990 (wells MW-5 and MW-8). Well MW-3, located west and downgradient of the gasoline USTs, showed substantial increases in TPHg and BTEX in February and May 1990 compared with 1988 and 1989 results.

Laboratory analyses also show no detectable and very low concentrations of TPHg (24 parts per billion [ppb] in MW-7 only) in the water samples from wells MW-4 through MW-7. Results indicate very low BTEX concentrations (maximum 0.74 ppb ethylbenzene and 1.7 ppb xylenes) in the water samples from wells MW-4 and MW-7, and no detectable BTEX

in wells MW-5 and MW-6. This indicates slightly increased levels of hydrocarbons in MW-4 and MW-7, and decreased levels in MW-5 since the previous sampling episode in February 1990.

Conclusions and Recommendations

Elevated levels of TPHg and BTEX are present west and southwest of the gasoline USTs and of the service islands, respectively. Because elevated levels of some constituents are present in the ground water, we recommend that ground-water sampling and analysis for hydrocarbon compounds be continued on a quarterly schedule to monitor changes in hydrocarbon concentrations and ground-water flow.

A copy of this report should be sent to Mr. Lester Feldman of the Regional Water Quality Control Board, San Francisco Bay Region, 1800 Harrison Street, Suite 700, Oakland, California 94612, and Mr. Joe Ferreira at the San Leandro Fire Department, 835 East 14th Street, San Leandro, California 94577.

Scheduling

The third quarter 1990 monitoring was performed scheduled for August 15, 1990.

Please call if you have any questions regarding the contents of this letter report.

Sincerely,
Applied GeoSystems

Keith M. McVicker
Assistant Project Geologist

Joan E. Tiernan
Registered Civil Engineer
No. 044600

Enclosures: Site Vicinity Map, Plate P-1
Generalized Site Plan, Plate P-2
Ground-Water Elevation Map, Plate P-3
Results of Subjective Evaluations, Table 1
Ground-Water Elevation Data, Table 2
Results of Laboratory Analyses of Ground Water, Table 3
Attachment I: Field Procedures
Attachment II: Chain of Custody Record and Certified Analytical Reports

TABLE 1
RESULTS OF SUBJECTIVE EVALUATIONS
(Page 1 of 2)

Well	Date	Depth to Water	Floating Product	Sheen
MW-1	09/23/87	33.40	0.02	NA
	09/24/87	33.24	0.01	NA
	10/06/87	33.39	0.01	NA
	11/05/87	34.14	0.31	NA
	11/13/87	34.15	0.38	NA
	11/19/87	33.89	0.06	NA
	04/27/88	32.40	0.01	NA
	09/07/88	---	Well dry	--
	10/03/88	---	Well dry	--
	01/27/89	---	Well dry	--
	02/16/90	---	Well dry	--
	07/19/90	---	Well dry	--
MW-2	10/03/88	36.04	NONE	NONE
	01/27/89	34.77	NONE	NONE
	02/16/90	34.50	NONE	NONE
	07/19/90	35.72	NONE	NONE
MW-3	10/03/88	35.86	NONE	NONE
	01/27/89	34.60	NONE	NONE
	02/16/90	35.23	NONE	NONE
	07/19/90	35.50	NONE	NONE
MW-4	10/03/88	36.12	NONE	NONE
	01/27/89	34.87	NONE	NONE
	02/16/90	35.60	NONE	NONE
	07/19/90	35.78	NONE	NONE

See notes on page 2 of 2

TABLE 1
RESULTS OF SUBJECTIVE EVALUATIONS
(Page 2 of 2)

Well	Date	Depth to Water	Floating Product	Sheen
MW-5	02/16/90	35.89	NONE	NONE
	07/19/90	36.10	NONE	NONE
MW-6	02/16/90	34.50	NONE	NONE
	07/19/90	34.74	NONE	NONE
MW-7	02/16/90	35.75	NONE	NONE
	07/19/90	35.03	NONE	NONE
MW-8	02/16/90	35.10	NONE	NONE
	07/19/90	35.41	NONE	NONE

Depth to water measured in feet below top of casing.
Product thickness measured in feet.
NA = Not applicable

TABLE 2
GROUND-WATER ELEVATION DATA
(July 19, 1990)

Monitoring Well	Top of Casing Above MSL (C)	Static Water Level (W)	Water Level Above MSL (C-W)
MW-1	53.83	Dry	Dry
MW-2	58.13	35.72	22.41
MW-3	57.92	35.50	22.42
MW-4	58.29	35.78	22.51
MW-5	58.50	36.10	22.40
MW-6	56.96	34.74	22.22
MW-7	57.25	35.03	22.22
MW-8	57.71	35.41	22.30

Measurements are in feet.
Static water level was measured in feet below top of casing.
Datum is mean sea level based on City of San Leandro datum at the southeastern corner of the intersection of Dowling Boulevard and Bancroft Avenue, next to the storm inlet.

TABLE 3
RESULTS OF LABORATORY ANALYSES OF GROUND WATER
(Page 1 of 2)

Date	Sample Number	TPHg	B	E	T	X
WELL MW-1						
10/88	Well dry therefore water sample not collected					
01/89	Well dry therefore water sample not collected					
02/90	Well dry therefore water sample not collected					
05/90	Well dry therefore water sample not collected					
WELL MW-2						
10/88	W-37-MW2	1,760	47.8	20.9	7.4	81.6
01/89	W-35-MW2	510	58.0	22.6	8.7	20.3
02/90	W-36-MW2	840	50.0	28.0	0.5	44.0
05/90	W-36-MW2	1,000	39.0	32.0	<0.5	52.0
WELL MW-3						
10/88	W-37-MW2	61,000	1,060	1,520	3,380	8,720
01/89	W-35-MW3	39,000	1,570	1,250	2,830	7,070
02/90	W-36-MW3	22,000	710	690	410	33,000
05/90	W-36-MW3	19,000	330	310	170	1,500
WELL MW-4						
10/88	W-37-MW4	<20	<0.5	<0.5	<0.5	<0.5
01/89	W-35-MW3	<20	<0.5	<0.5	<0.5	<0.5
02/90	W-36-MW4	<20	<0.5	<0.5	<0.5	<0.5
05/90	W-36-MW4	<20	<0.5	0.68	<0.5	1.4
WELL MW-5						
02/90	W-36-MW5	67	0.51	2.9	1.6	7.5
05/90	W-36-MW5	<20	<0.5	<0.5	<0.5	<0.5
WELL MW-6						
02/90	W-35-MW6	<20	<0.5	<0.5	<0.5	<0.5
05/90	W-37-MW6	<20	<0.5	<0.5	<0.5	<0.5

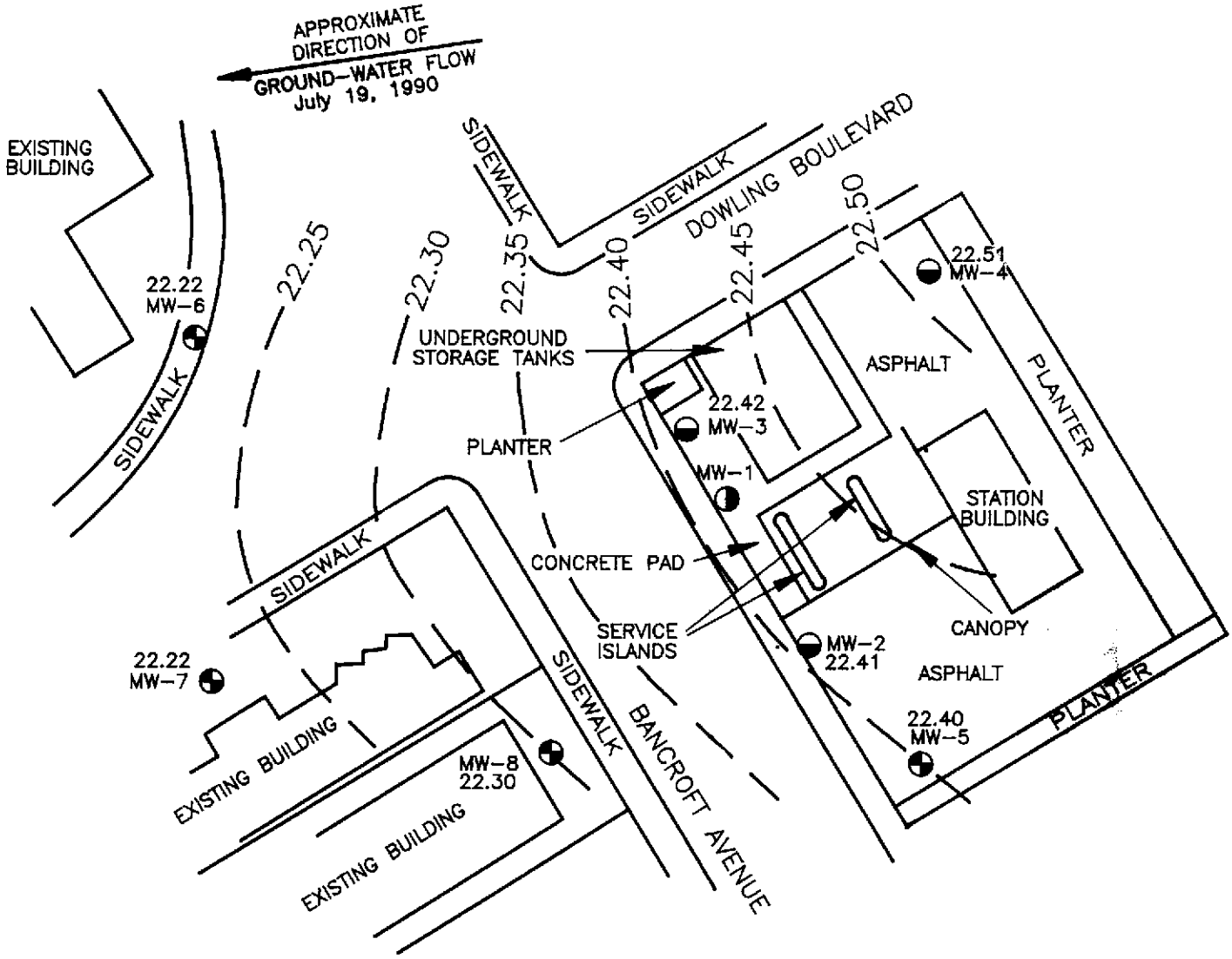
poor QA/QC on this data tabulation!

TABLE 3
RESULTS OF LABORATORY ANALYSES OF GROUND WATER
(Page 2 of 2)

Date	Sample Number	TPHg	B	E	T	X
WELL MW-7						
02/90	W-36-MW7	<20	<0.5	<0.5	<0.5	<0.5
05/90	W-35-MW7	24	<0.5	0.74	<0.5	1.7
WELL MW-7 BLANK						
02/90	W-BLANK-MW7	<20	<0.5	<0.5	<0.5	<0.5
WELL MW-8						
02/90	W-35-MW8	1,900	11	52	<0.5	55
05/90	W-36-MW8	770	6.5	20	<0.5	32

Results in ~~milli~~ micro grams/liter (µg/l) = parts per billion (ppb)
TPHg: Total petroleum hydrocarbons as gasoline
BETX: Benzene, ethylbenzene, toluene, total xylene isomers
<: Less than the detection limit for the method of analysis.
Sample designation: W-37-MW2

- W — Water sample
- 37 — Sample depth in feet
- MW2 — Monitoring well number



22.50 = Line of equal ground-water elevation in feet

22.51 = Elevation of ground-water in feet

MW-8 = New monitoring well (Applied GeoSystems, May 1989 and February 1990)

MW-4 = Existing monitoring well (Applied GeoSystems, September 1988)

MW-1 = Existing monitoring well (Applied GeoSystems, September 1987)

N

Approximate Scale

50 25 0 50 100

feet

NOTE: Elevation of ground-water in well MW-7 was anomalous and was not used to produce this map

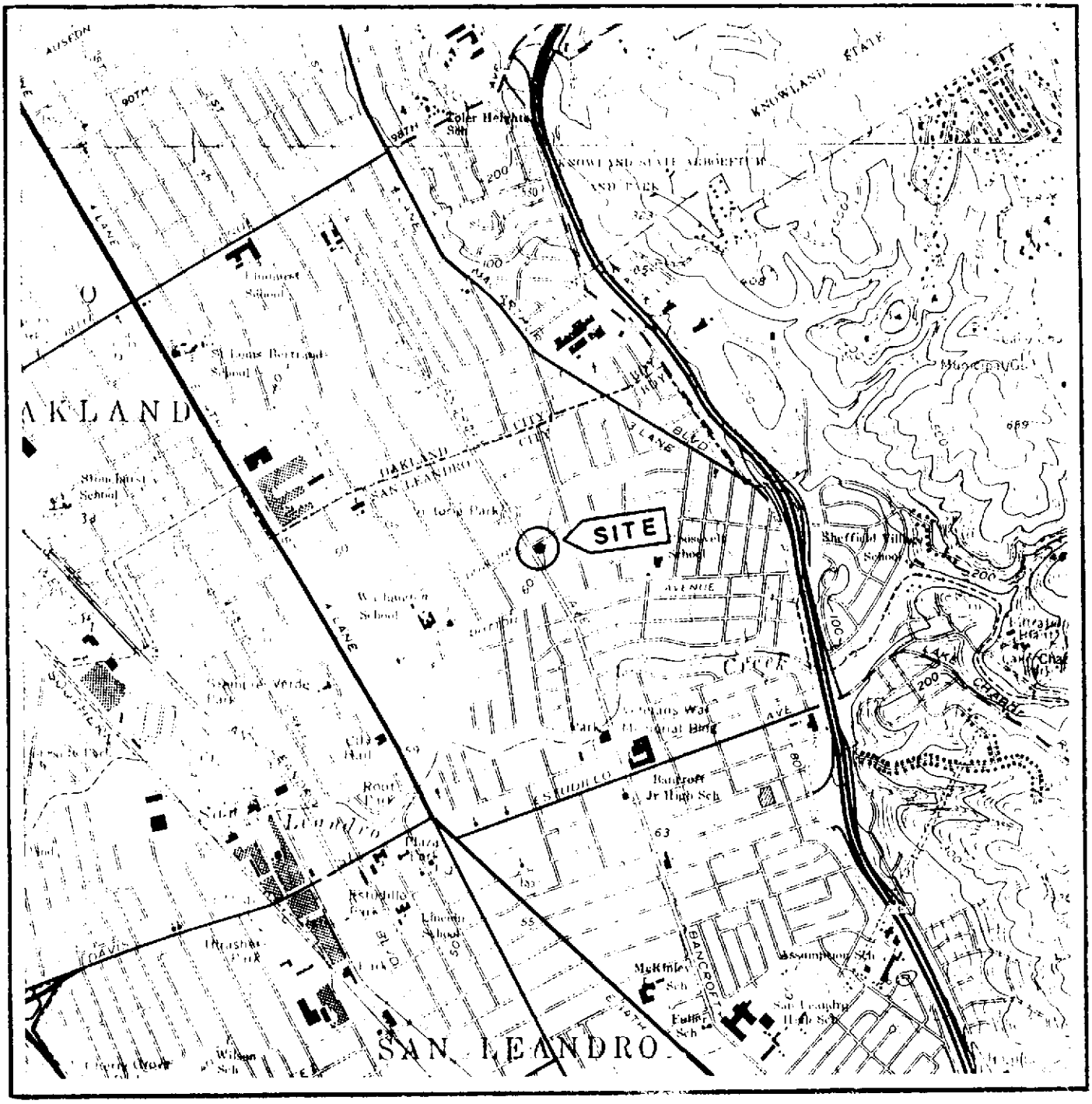
Applied GeoSystems

PROJECT NO. 87091-2

GROUND-WATER ELEVATION MAP
Unocal Station No. 5367
500 Bancroft Avenue
San Leandro, California

PLATE

P - 3



Source: U.S. Geological Survey
7.5-Minute Quadrangle
San Leandro, California
Oakland West, California
Photorevised 1980

N

Approximate Scale

2000 1000 0 2000 4000

feet

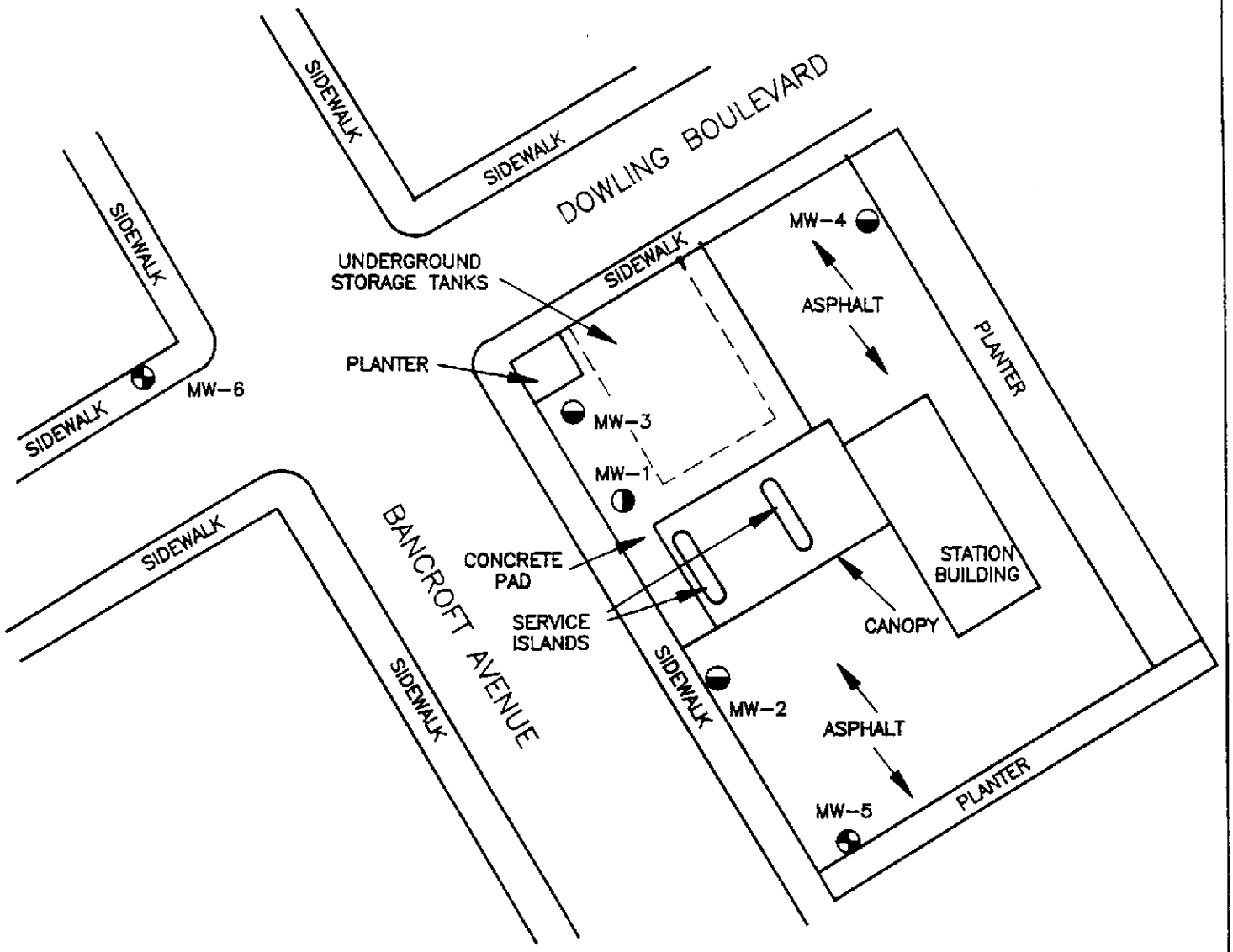
Applied GeoSystems

PROJECT NO. 87091-2

SITE VICINITY MAP
Unocal Station No. 5367
500 Bancroft Avenue
San Leandro, California

PLATE

P - 1



MW-6 = New monitoring well (Applied GeoSystems, May 1989)

MW-4 = Existing monitoring well (Applied GeoSystems, September 1988)

MW-1 = Existing monitoring well (Applied GeoSystems, September 1987)

N

Approximate Scale

40 20 0 40 80

feet

Source: Measured by tape and compass

Applied GeoSystems

PROJECT NO. 87091-2

GENERALIZED SITE PLAN
Unocal Station No. 5367
500 Bancroft Avenue
San Leandro, California

PLATE
P - 2

ATTACHMENT I
FIELD PROCEDURES

FIELD PROCEDURES

Ground-Water Monitoring

Static water level was measured to the nearest 0.01 foot with a Solinst water-level indicator. After the static ground-water level was recorded, an initial sample was collected from each well and checked for floating product and sheen. The samples were collected by gently lowering approximately half the length of a clean Teflon bailer past the air-water interface and collecting a sample from near the surface of the water in each well.

Ground-Water Sampling

The four wells were purged of at least 3 well volumes of water and allowed to recover to their approximate static water levels. Samples for laboratory analysis then were collected from the static water surface with a Teflon bailer that was thoroughly cleaned with Alconox (a commercial, biodegradable detergent) and water. The samples were transferred to laboratory-cleaned, 40-milliliter glass vials. Hydrochloric acid was added to the vials as a preservative. The samples were sealed with Teflon-lined caps, labeled, and placed in iced storage. The geologist initiated a Chain of Custody Record and it accompanied the samples to the State-certified analytical laboratory. A completed copy of this record is attached to this letter report.

Water Storage and Disposal

The water purged from the wells was temporarily stored onsite in labelled, sealed 17E 55-gallon liquid-waste drums approved for this use by the Department of Transportation. The purge water was removed from the site for disposal on July 17, 1990 by H & H Environmental of San Francisco, California.

ATTACHMENT II
CHAIN OF CUSTODY RECORD
AND
LABORATORY ANALYSIS REPORTS

Applied GeoSystems

CHAIN-OF-CUSTODY RECORD

PROJ. NO.	PROJECT NAME
87091-2	UNOCAL - SAN LEANDRO
P.O. NO.	SAMPLERS (Signature)

DATE (MM/DD/YY)	TIME		No. of Containers	ANALYSIS: TPHgasoline (8015)	BTEX (602/8020)	TPHdiesel (8015)					Preserved?	REMARKS	LABORATORY I.D. NUMBER
8/24/90		W-36-MW2	4	X	X						HCl/Ice		
		W-36-MW3		X	X								
		W-36-MW4		X	X								
		W-36-MW5		X	X								
		W-35-MW6		X	X								
		W-35-MW7		X	X								
		W-36-MW8		X	X								

RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):
	8/27/90 900	
RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):
RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED FOR LABORATORY BY (Signature):
	8/27/90 900	Dana Kurtz

Laboratory: AGS

Turn Around: 2 wk.

SEND RESULTS TO:

Applied GeoSystems
43255 Mission Boulevard
Fremont, California 95826
(415) 651-1906

Proj. Mgr.: Kieda McVicker

APPLIED ANALYTICAL

Environmental Laboratories

42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

1020lab.frm

Attention:	Mr. Keith McVicker	Date Sampled:	08-24-90
	Applied GeoSystems	Date Received:	08-27-90
	42501 Albrae Street	BTEX Analyzed:	09-06-90
	Fremont, CA 94538	TPHg Analyzed:	09-06-90
Project:	AGS 87091-2	TPHd Analyzed:	NR
		Matrix:	Water

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppb	ppb	ppb	ppb	ppb	ppb
Detection Limit:	0.5	0.5	0.5	0.5	20	100
SAMPLE Laboratory Identification						
W-36-MW2 W1008283	17	ND	19	20	330	NR

ppb = parts per billion = µg/L = micrograms per liter.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX– Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg–Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd–Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Laboratory Representative

September 11, 1990
Date Reported

APPLIED ANALYTICAL

Environmental Laboratories

42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

1020lab.frm

Attention:	Mr. Keith McVicker	Date Sampled:	08-24-90
	Applied GeoSystems	Date Received:	08-27-90
	42501 Albrae Street	BTEX Analyzed:	09-06-90
	Fremont, CA 94538	TPHg Analyzed:	09-06-90
Project:	AGS 87091-2	TPHd Analyzed:	NR
		Matrix:	Water

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppb	ppb	ppb	ppb	ppb	ppb
Detection Limit:	5.0	5.0	5.0	5.0	200	100
SAMPLE Laboratory Identification						
W-36-MW3 W1008284	480	160	510	1500	19000	NR

ppb = parts per billion = µg/L = micrograms per liter.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX– Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

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Laura Kuck
Laboratory Representative

September 11, 1990
Date Reported

APPLIED ANALYTICAL

Environmental Laboratories

42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

1020lab.frm

Attention: Mr. Keith McVicker
Applied GeoSystems
42501 Albrae Street
Fremont, CA 94538
Project: AGS 87091-2

Date Sampled: 08-24-90
Date Received: 08-27-90
BTEX Analyzed: 09-06-90
TPHg Analyzed: 09-06-90
TPHd Analyzed: NR
Matrix: Water

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppb	ppb	ppb	ppb	ppb	ppb
Detection Limit:	0.5	0.5	0.5	0.5	20	100
SAMPLE Laboratory Identification						
W-36-MW4 W1008285	ND	ND	ND	ND	ND	NR
W-35-MW5 W1008286	ND	ND	ND	ND	ND	NR
W-35-MW6 W1008287	ND	ND	ND	ND	ND	NR
W-35-MW7 W1008288	ND	ND	ND	ND	ND	NR
W-36-MW8 W1008289	13	ND	48	66	990	NR

ppb = parts per billion = µg/L = micrograms per liter.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

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Laura Kurk
Laboratory Representative

September 11, 1990
Date Reported