FINAL REPORT
LNAPL ASSESSMENT AND
GROUNDWATER CHARACTERIZATION EVALUATION
(VOLUME II - Appendices)
Part 4

Mill Springs Park Apartments
1809 Railroad Avenue
Livermore, California

Submitted to:

WINGFIELD VENTURE FUND
125 North Park Avenue
Hinsdale, Illinois 60521

Prepared by:

EARTH TECH
2030 Addison Street, Suite 500
Berkeley, CA 94704

October 9, 1995
Project Nº. 687157.08

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LNAPL ASSESSMENT AND
GROUNDWATER CHARACTERIZATION EVALUATION
Volume II
Part 4

Mill Springs Park Apartments
Livermore, California

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APPENDIX D

SUPPORTING DOCUMENTATION
BEACON

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

RAFAT A. SHAHID, Assistant Agency Director

DEPARTMENT OF ENVIRONMENTAL HEALTH
Hazardous Materials Division
80 Swan Way, Rm. 200
Oakland, CA 94621
(510) 271-4320

StID 4032

June 23, 1995

Mr. Terrence Fox
Ultramar
525 W. Third Street
Hanford, CA 93230

RE: Workplan Approval for Beacon Station N. 604, 1619 1st St, Livermore

Dear Mr. Fox:

I have completed review of GCL's May 1995 Revised Remediation System Implementation Work Plan for the above referenced site. The proposal to remediate, in two phases, the vadose zone plume and the dissolved-phase groundwater plume both onsite and at the Livermore Arcade Shopping Center is acceptable. This will be accomplished with the installation of soil-vapor extraction and air injection wells at various locations.

Field work should commence within 45 days of the date of this letter, or **by August 7, 1995.** Please notify me at least 72 hours prior to the start of field work.

Be advised that additional monitoring wells should be installed to better delineate the extent of the contaminant plume and to evaluate the effectiveness of remediation. Please submit a workplan for the well installation within 60 days of the date of this letter.

If you have any questions, I can be reached at (510) 567-6762.

eva chu
Hazardous Materials Specialist

cc: Leon Crain, GCL, 11501 Dublin Blvd, Dublin 94688
files

beacon1.7

El Dorado Environmental, Inc.

2221 Goldorado Trail, El Dorado, California 95623 (916) 626-3898
Fax (916) 626-3899

95 AUG 18 PM 3:09

decrease [ ] in MW1 and 5 may be due to GW above screen (~ 9')

Mr. Terrence A. Fox
Ultramar Inc.
525 West Third Street
Hanford, California 93230

August 8, 1995

Subject: **Ground Water Monitoring Report, Second Quarter 1995**
Beacon Station #604, 1619 West First Street, Livermore, California

Dear Mr. Fox:

El Dorado Environmental, Inc. (EDE) is pleased to provide this report which documents the results of quarterly ground water monitoring conducted on June 15, 1995 at the subject site (Figure 1). Fieldwork, conducted by Doulos Environmental (Doulos), included measurements of depth to ground water, subjective analysis of ground water in wells for the presence or absence of free petroleum product, well purging, and collection of ground water samples. Doulos reports that all field activities were conducted in accordance with field procedures described in Attachment A.

Ground Water Conditions

Prior to well purging, Doulos collected depth to ground water measurements in each well at the site. Depth to ground water measurements made at the site since June 1993 are contained in Table 1. Field notes are contained in Attachment B. Current depth to ground water measurements indicate a direction of ground water flow toward the northwest (Figure 2) at a gradient of approximately 0.01 foot per foot. Ground water elevation beneath the site has decreased an average of 6.32 feet since the previous monitoring event.

Ground Water Sampling and Analysis

Ground water samples were collected from seven monitoring wells at the site. Sampling field notes are contained in Attachment B. Each sample collected was analyzed for dissolved benzene, toluene, ethylbenzene, total xylenes (BTEX), and total petroleum hydrocarbons as gasoline (TPHg) using methods approved by the U.S. Environmental Protection Agency (EPA). Analytical results since June 1993 are compiled in Table 2; copies of certified analytical reports for ground water samples collected during the current monitoring event are contained in Attachment C.

Dissolved benzene concentrations decreased in samples collected from monitoring wells MW-1, MW-3, MW-5, and MW-7. Benzene concentrations remained essentially unchanged in samples

collected from monitoring wells MW-2, MW-4, and MW-6. Figure 3 illustrates the current interpreted distribution of dissolved benzene in ground water underlying the site.

A copy of this quarterly monitoring report should be submitted to:

Ms. Eva Chu
Department of Environmental Health
Alameda County Health Care Services
80 Swan Way, Room 20
Oakland, California 94612

Mr. Cecil Fox
California Regional Water Quality Control
Board, San Francisco Bay Region
2101 Webster Street, Room 500
Oakland, California 94612

The interpretations and/or conclusions contained in this report represent our professional opinions. These opinions are based on currently available information. Other than this, no warranty is implied nor intended. This report has been prepared solely for the use of Ultramar Inc. Any reliance upon or use of this report by third parties will be at such parties' sole risk.

If you have any comments or questions, please contact the undersigned at (916) 626-3898.

Regards,

EL DORADO ENVIRONMENTAL, INC.

Dale A. van Dam

Dale A. van Dam, R.G.
Hydrogeologist

DAvD/davd

encl.

TABLE 1
GROUND WATER ELEVATION DATA

Beacon Station #604
1619 West First Street, Livermore, California

Monitoring Well	Top of Riser (feet)	Depth to Top/Bottom of Screened Interval (feet)	Monitoring Date	Depth to Water (feet)	Ground Water Elevation (feet)	Physical Observation
MW-1	100.00	34/54	06/01/93	37.50	62.50	No Product
			06/22/93	38.46	61.54	No Product
			10/06/93	42.22	57.78	No Product
			01/13/94	34.52	65.48	No Product
			03/30/94	31.93	68.07	No Product
			04/25/94	33.49	66.51	No Product
			08/12/94	41.03	58.97	No Product
			12/14/94	38.63	61.37	No Product
			02/10/95	30.80	69.20	No Product
			06/15/95	25.46	74.54	No Product
MW-2	98.68	34/54	06/01/93	38.02	60.66	No Product
			06/22/93	39.07	59.61	No Product
			10/06/93	43.72	54.96	No Product
			01/13/94	35.85	62.83	No Product
			03/30/94	32.82	65.86	No Product
			04/25/94	34.76	63.92	No Product
			08/12/94	44.33	54.35	No Product
			12/14/94	40.00	58.68	No Product
			02/10/95	32.16	66.52	No Product
			06/15/95	25.93	72.75	No Product
MW-3	97.08	33/53	06/01/93	36.18	60.90	No Product
			06/22/93	37.11	59.97	No Product
			10/06/93	41.15	55.93	No Product
			01/13/94	33.95	63.13	No Product
			03/30/94	30.97	66.11	No Product
			04/25/94	32.46	64.62	No Product
			08/12/94	41.72	55.36	No Product
			12/14/94	37.62	59.46	No Product
			02/10/95	29.96	67.12	No Product
			06/15/95	23.66	73.42	No Product
MW-4	99.35	27/47	03/30/94	31.56	67.79	No Product
			04/25/94	32.73	66.62	No Product
			08/12/94	41.61	57.74	No Product
			12/14/94	38.11	61.24	No Product
			02/10/95	30.50	68.85	No Product
			06/15/95	23.63	75.72	No Product

See notes at end of table

TABLE 1
GROUND WATER ELEVATION DATA

Beacon Station #604
1619 West First Street, Livermore, California

Monitoring Well	Top of Riser (feet)	Depth to Top/Bottom of Screened Interval (feet)	Monitoring Date	Depth to Water (feet)	Ground Water Elevation (feet)	Physical Observation
MW-5	98.37	27/47	03/30/94	32.07	66.30	No Product
			04/25/94	33.65	64.72	No Product
			08/12/94	42.73	55.64	No Product
			12/14/94	38.89	59.48	No Product
			02/10/95	31.44	66.93	No Product
			06/15/95	24.99	73.38	No Product
MW-6	97.62	28/48	03/30/94	33.38	64.24	No Product
			04/25/94	35.49	62.13	No Product
			08/12/94	45.14	52.48	No Product
			12/14/94	40.99	56.63	No Product
			02/10/95	33.34	64.28	No Product
			06/15/95	26.88	70.74	No Product
MW-7	98.03	27/47	03/30/94	31.98	66.05	No Product
			04/25/94	33.56	64.47	No Product
			08/12/94	43.35	54.68	No Product
			12/14/94	39.34	58.69	No Product
			02/10/95	32.11	65.92	No Product
			06/15/95	25.51	72.52	No Product

Note: Monitoring well casing elevations were surveyed relative to an arbitrary bench mark at the top of the casing of monitoring well MW-1 with an assumed elevation of 100.00 feet.

TABLE 2
GROUND WATER SAMPLE ANALYTICAL RESULTS

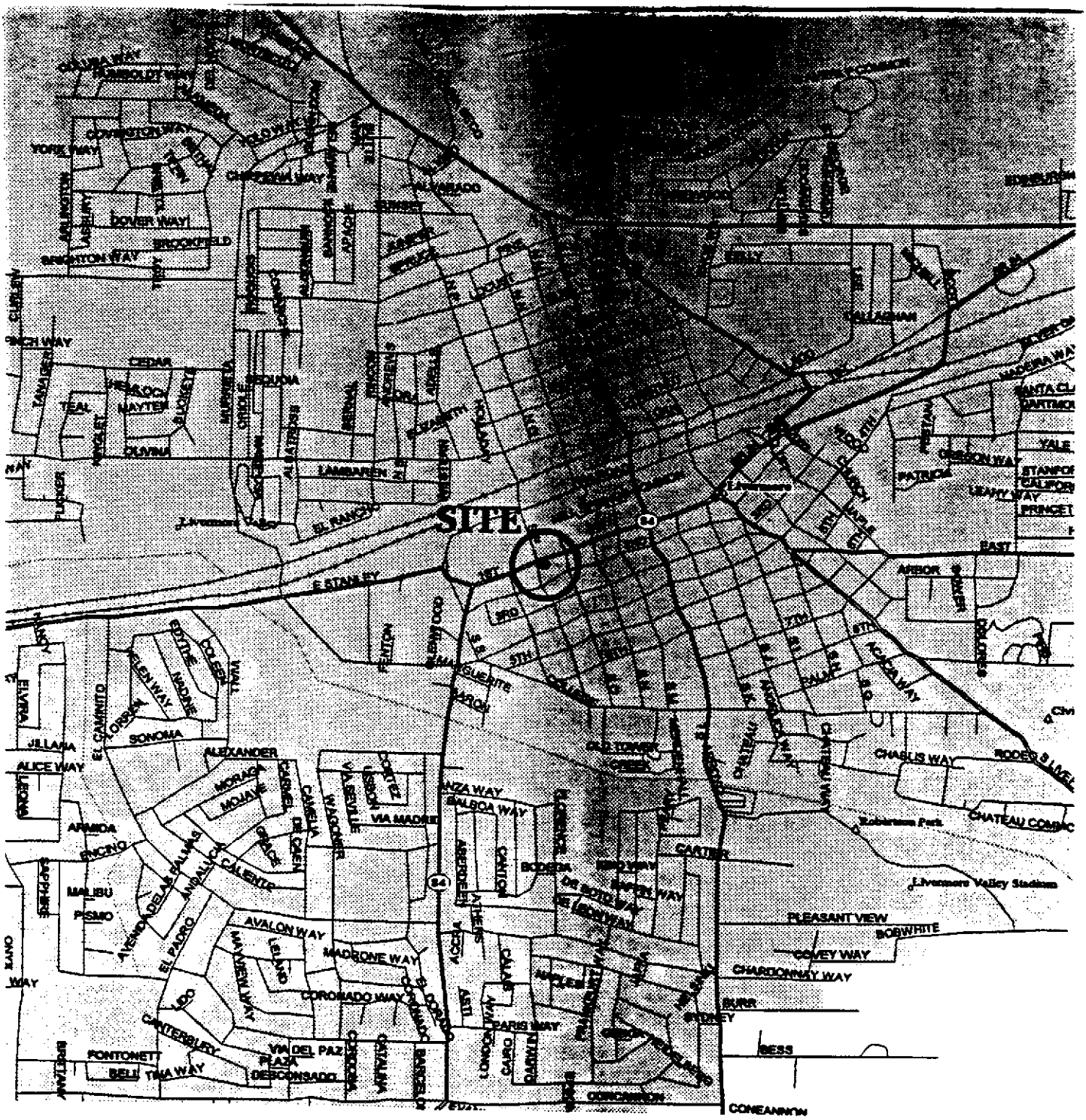
Beacon Station #604
1619 West First Street, Livermore, California
Concentrations in micrograms per Liter

Monitoring Well	Monitoring Date	Benzene	Toluene	Ethylbenzene	Xylenes	Total Petroleum Hydrocarbons as Gasoline
MW-1	06/01/93	2200	400	<50	4900	27000
	06/22/93	8000	10000	260	10000	87000
	10/06/93	4700	6500	740	5300	40000
	01/13/94	1300	950	110	850	9400
	04/25/94	1500	1800	290	1700	11000
	08/12/94	550	330	260	1400	11000
	12/14/94	1000	1200	320	1500	11000
	02/10/95	1200	1500	280	1500	9300
	06/15/95	5.6 ?	<0.50	<0.50	<0.50	140
MW-2	06/01/93	20000	21000	3300	18000	170000
	06/22/93	19000	22000	3500	18000	160000
	10/06/93	17000	17000	3000	15000	110000
	01/13/94	20000	19000	2300	14000	93000
	04/25/94	9600	7300	840	7800	41000
	08/12/94	11000	11000	2300	11000	59000
	12/14/94	13000	13000	2200	12000	63000
	02/10/95	12000	12000	2200	11000	63000
	06/15/95	11000 ✓	12000	1900	11000	61000 ✓
MW-3	06/01/93	4.6	<0.50	<0.50	1.9	270
	06/22/93	8.2	<0.50	<0.50	0.72	160
	10/06/93	57	110	24	120	740
	01/13/94	2.6	0.67	0.78	4.2	83
	04/25/94	0.75	3.2	0.50	3.6	60
	08/12/94	7.3	14	2.6	13	310
	12/14/94	<0.50	<0.50	<0.50	<0.50	75
	02/10/95	1.4	<0.50	<0.50	1.8	96
	06/15/95	<0.50 ✓	<0.50	<0.50	<0.50	<50 ✓
MW-4	03/30/94	4.2	15	2.5	26	120
	04/25/94	<0.50	1.8	<0.50	2.1	65
	08/12/94	<0.50	<0.50	<0.50	<0.50	<50
	12/14/94	<0.50	<0.50	<0.50	<0.50	<50
	02/10/95	<0.50	<0.50	<0.50	<0.50	<50
	06/15/95	<0.50 ✓	<0.50	<0.50	<0.50	<50 ✓

TABLE 2
GROUND WATER SAMPLE ANALYTICAL RESULTS

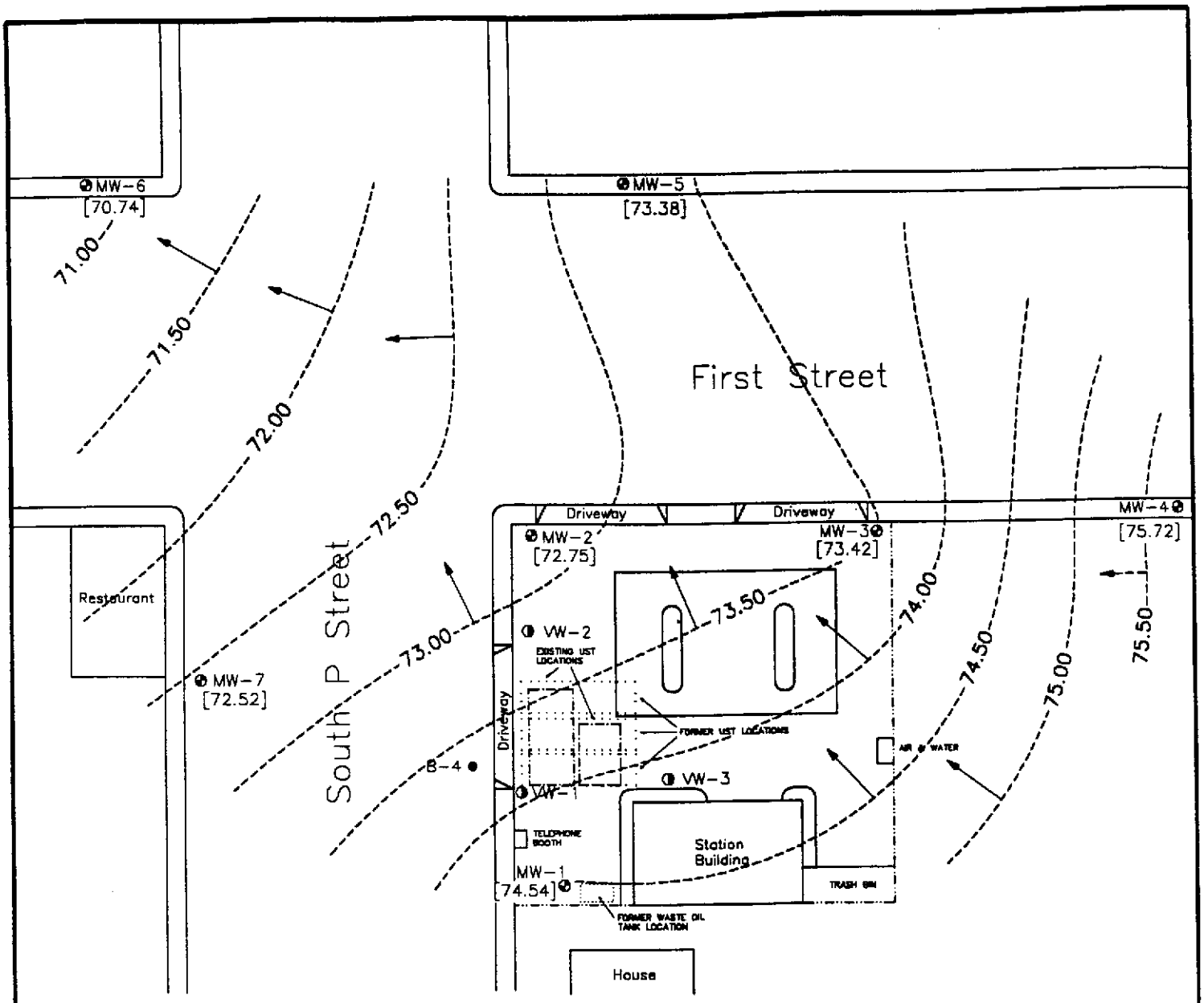
Beacon Station #604
1619 West First Street, Livermore, California
Concentrations in micrograms per Liter

Monitoring Well	Monitoring Date	Benzene	Toluene	Ethylbenzene	Xylenes	Total Petroleum Hydrocarbons as Gasoline
MW-5	03/30/94	1300	20	<13	160	7500
	04/25/94	1100	41	130	740	6500
	08/12/94	420	2.9	41	98	4000
	12/14/94	660	<2.5	33	13	4800
	02/10/95	490	<13	23	19	5200
	06/15/95	<0.50 ?	<0.50	<0.50	<0.50	460
MW-6	03/30/94	21000	8600	1700	12000	63000
	04/25/94	22000	12000	2300	16000	77000
	08/12/94	12000	8100	2200	16000	65000
	12/14/94	18000	9500	2200	14000	65000
	02/10/95	21000	8400	2000	14000	63000
	06/15/95	20000 ✓	11000	2100	15000	75000 ✓
MW-7	03/30/94	7200	2400	1600	11000	43000
	04/25/94	3900	1000	940	6900	30000
	08/12/94	3800	1400	1300	7500	30000
	12/14/94	3600	1200	900	6400	31000
	02/10/95	4000	900	890	5100	27000
	06/15/95	920 ✓	680	740	4100	17000 ✓



SOURCE: STREET ATLAS U.S.A., DELORME MAPPING, 1994

SITE LOCATION MAP	FIGURE 1
BEACON STATION #604 1619 WEST FIRST STREET LIVERMORE, CALIFORNIA	PROJECT NUMBER: U013.01 DRAWN BY: D.A.V.D.
EL DORADO ENVIRONMENTAL, INC.	CHECKED BY: DVD



EXPLANATION

SB-4 ● Soil Boring Location and Number

VW-3 ◑ Vadose Well Location and Number

MW-5 ⊕ Monitoring Well Location and Number

[64.28] Ground Water Elevation in Feet

71.50 Line of Equal Elevation of Ground Water Measured in Feet Showing Inferred Direction of Flow

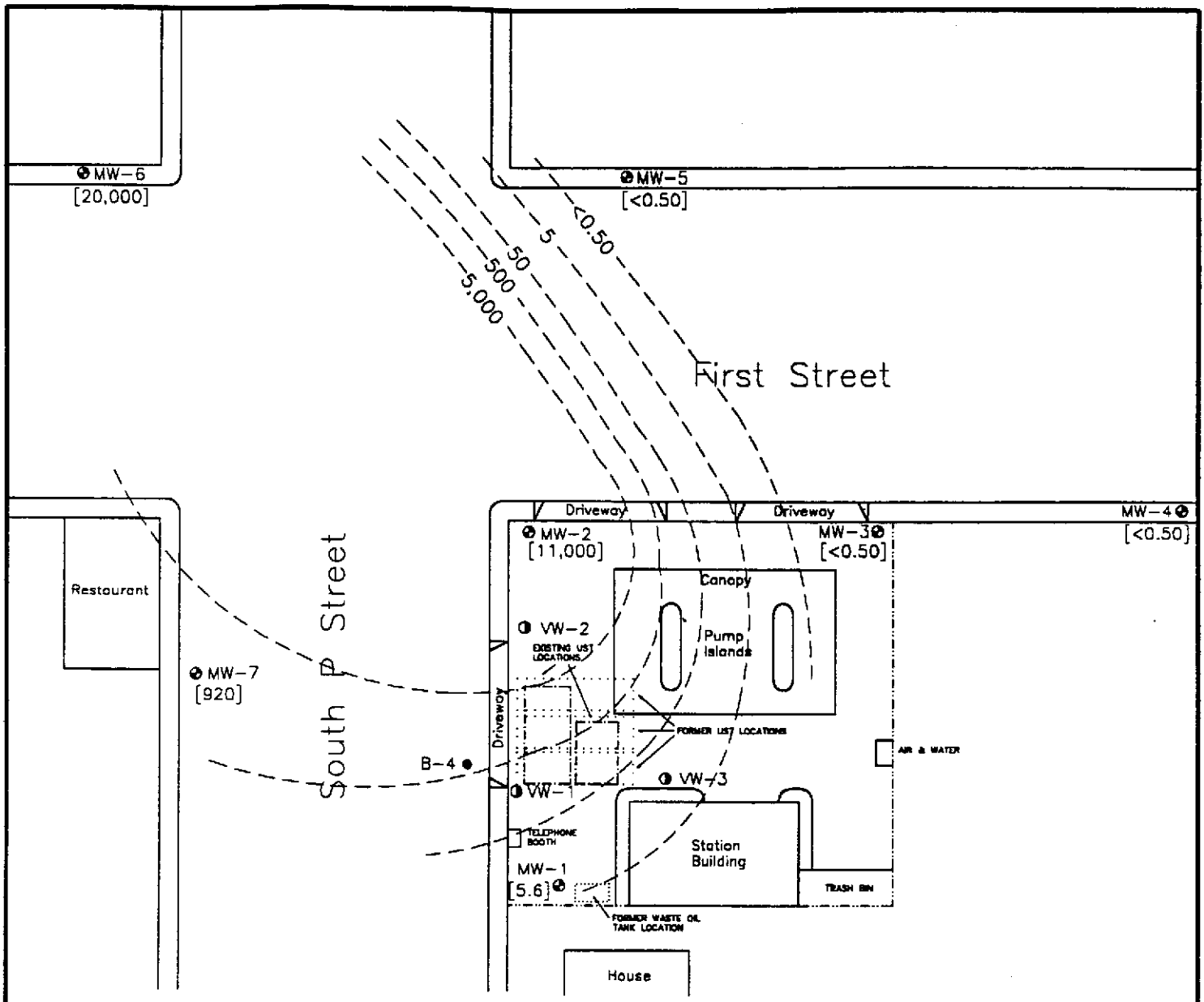
NORTH

0 40

SCALE IN FEET

GROUND WATER CONTOUR MAP, JUNE 15, 1995	FIGURE 2
BEACON STATION #604 1619 WEST FIRST STREET LIVERMORE, CALIFORNIA	PROJECT NUMBER: 0012.01 DRAWN BY: [illegible] CHECKED BY: DVS
EL DORADO ENVIRONMENTAL, INC.	

SOURCE: FIGURE MODIFIED FROM DRAWING PROVIDED BY ACTON•MICKELSON•ENVIRONMENTAL, INC.



EXPLANATION

SB-4 ●	Soil Boring Location and Number
VW-3 ◑	Vadose Well Location and Number
MW-5 ⊘	Monitoring Well Location and Number
[5.6]	Benzene Concentration in Micrograms/Liter
50	Benzene Isoconcentration Line in Micrograms/Liter

NORTH

0 40

SCALE IN FEET

SOURCE: FIGURE MODIFIED FROM DRAWING PROVIDED BY ACTON•MICKELSON•ENVIRONMENTAL, INC.

INFERRED DISTRIBUTION OF BENZENE IN GROUND WATER, JUNE 15, 1995	FIGURE 3
BEACON STATION #604 1619 WEST FIRST STREET LIVERMORE, CALIFORNIA	PROJECT NUMBER: 2150 DRAWN BY: D.A.D. CHECKED BY: D.N.D.
EL DORADO ENVIRONMENTAL, INC.	

ATTACHMENT A

ULTRAMAR FIELD PROCEDURES

ATTACHMENT A - ULTRAMAR FIELD PROCEDURES

The following section describes procedures used by field personnel in the performance of ground water sampling at Ultramar Inc. sites.

Ground Water Level and Total Depth Determination

A water level indicator is lowered down the well and a measurement of the depth to water from an established reference point on the casing is taken. The indicator probe is used to sound the bottom of the well and a measurement of the total depth of the well is taken. Both the water level and total depth measurements are taken to the nearest 0.01-foot.

Visual Analysis of Ground Water

Prior to purging and sampling ground water monitoring wells, a water sample is collected from each well for subjective analysis. The visual analysis involves gently lowering a clean, disposable, polyethylene bailer to approximately one-half the bailer length past the water table interface. The bailer is then retrieved, and the sample contained within the bailer is examined fro floating product or the appearance of a petroleum product sheen. If measurable free product is noted in the bailer, a water/product interface probe is used to determine the thickness of the free product to the nearest 0.01-foot. The thickness of free product is determined by subtracting the depth to product from the depth to water.

Monitoring Well Purging and Sampling

Monitoring wells are purged by removing approximately four casing volumes of water from the well using a clean disposable bailer or electrical submersible purge pump. Purge volumes are calculated prior to purging. During purging, the temperature, pH, and electric conductivity of the purge water are monitored. The well is considered to be sufficiently purged when: The four casing volumes have been removed; the temperature, pH, and conductivity values have stabilized to within 10% of the initial readings; and the ground water being removed is relatively free of suspended solids. After purging, ground water levels are allowed to stabilize to within 80% of the initial water level reading. A water sample is then collected from each well with a clean, disposable polyethylene bailer. If the well is bailed or pumped dry prior to removing the minimum volume of water, the ground water is allowed to recharge. If the well has recharged to within 80% of the initial depth to water reading within two hours, the well will continue to be purged until the minimum volume of water has been removed. If the well has not recharged to at least 80% of the initial depth to water reading within two hours, the well is considered to contain formational water and a ground water sample is collected. Ground water removed from the well is stored in 55-gallon drums at the site and labeled pending disposal.

In wells where free product is detected, the wells will be bailed to remove the free product. An estimate of the volume of product and water well be recorded. If the free product thickness is reduced to the point where a measurable thickness is no longer present in the well, a ground water sample will be collected. If free product persists throughout the purging process, a final free product thickness measurement will be taken and a ground water sample will not be collected.

Ground water samples are stored in 40-milliliter vials so that air passage through the sample is minimized (to prevent volatilization of the sample). The vial is tilted and filled slowly until an upward convex meniscus forms over the mouth of the vial. The Teflon™ side of the septum (in cap) is then placed against the meniscus, and the cap is screwed on tightly. The sample is then inverted and the bottle is tapped lightly to check for air bubbles. If an air bubble is present in the vial, the cap is removed and more sample is transferred from the bailer. The vial is then resealed and rechecked for air bubbles. The sample is then appropriately labeled and stored on ice from the time of collection through the time of delivery to the laboratory. The Chain-of-Custody form is completed to ensure sample integrity. Ground water samples are transported to a state-certified laboratory and analyzed within the U.S. Environmental Protection Agency-specified hold times for the specified analytes.

ATTACHMENT B

FIELD NOTES
DOULOS ENVIRONMENTAL COMPANY

DOULOS ENVIRONMENTAL COMPANY
GROUNDWATER/LIQUID LEVEL DATA
(measurements in feet)

Project Address: Beacon #604, 1619 West First Street
Livermore, CA

Date: 6-15-95

Project No.: 95-604-01

Recorded by: Hal Hansen

Well No.	Time	Well Elev. TOC	Depth to Ground Water	Measured Total Depth	Ground Water Elevation	Depth to Product	Product Thickness	Comments
MW-1	10:15		25.46	54.02				SLIGHT ODOR NO SHEEN
MW-2	10:45		25.93	53.91				SLIGHT ODOR NO SHEEN
MW-3	10:20		23.66	52.62				NO ODOR NO SHEEN
MW-4	10:24		23.63	46.81				NO ODOR NO SHEEN
MW-5	10:29		24.99	46.25				NO ODOR NO SHEEN
MW-6	10:41		26.88	47.69				SLIGHT ODOR NO SHEEN
MW-7	10:35		25.51	46.70				SLIGHT ODOR NO SHEEN

NOTES:

DOULOS ENVIRONMENTAL COMPANY — **SAMPLING INFORMATION SHEET**

Client: Ultramar
Site: Beacon #604
1619 West First Street
Livermore, CA

Sampling Date: 6-15-95
Project No.: 95-604-01
Well Designation: MW- 1

Is setup of traffic control devices required? (NO) YES time: _____ hours
Is there standing water in well box? (NO) YES Above TOC Below TOC
Is top of casing cut level? NO (YES) If no, see remarks
Is well cap sealed and locked? NO (YES) If no, see remarks
Height of well casing riser (in inches): 10
Well cover type: 8" UV _____ 12" UV _____ 12" EMCO _____ 8" BK _____
12" BK _____ 12" DPW _____ 12" CNI _____ 36" CNI _____ Other 12" POMECO
General condition of wellhead assembly: Excellent (Good) Fair Poor

Purging Equipment:
_____ 2" disposable bailer
_____ 3" PVC bailer
_____ 4" PVC bailer
_____ Submersible pump
_____ Dedicated bailer
X Centrifugal pump
Sampled with: Disposable bailer: X Teflon bailer: _____

Well diameter: 2" _____ 4" X 6" _____ 8" _____
Purge Vol. Multiplier: 0.16 0.65 1.47 2.61 gal/ft.

Initial Measurement
Time: 10:15
Depth of well: 54.02
Depth to water: 25.46

Recharge Measurement
Time: 11:07
Depth to water: 26.34
Calculated purge: 74.3 gal
Actual purge: 74.3 gal

Start purge: 10:50
Sampling time: 11:10

Time	Temperature	E. C.	pH	Turbidity	Volume
10:52	70.5	1763	3.40	—	1
10:54	70.4	1756	3.21	—	2
10:58	70.6	1744	3.10	—	3
11:02	70.5	1731	3.08	—	4

Sample appearance: clear Lock: Dolphin

Equipment replaced: (Check all that apply) Note condition of replaced items
2" locking cap: _____ Lock #3753: _____ 7/32 Allenhead: _____
4" locking cap: _____ Lock-Dolphin: _____ 9/16 bolt: _____
6" locking cap: _____ Pinned Allenhead (DPW): _____

Remarks: _____

Signature _____

DOULOS ENVIRONMENTAL COMPANY — SAMPLING INFORMATION SHEET

Client: Ultramar
Site: Beacon #604
1619 West First Street
Livermore, CA

Sampling Date: 6-15-95
Project No.: 95-604-01
Well Designation: MW- 2

Is setup of traffic control devices required? (NO) YES time: _____ hours
Is there standing water in well box? NO (YES) Above TOC (Below TOC)
Is top of casing cut level? NO (YES) If no, see remarks
Is well cap sealed and locked? NO (YES) If no, see remarks
Height of well casing riser (in inches): 6
Well cover type: 8" UV _____ 12" UV _____ 12" EMCO _____ 8" BK _____
12" BK _____ 12" DPW _____ 12" CNI _____ 36" CNI _____ (Other) 10" POMECO
General condition of wellhead assembly: Excellent (Good) Fair Poor

Purging Equipment:
_____ 2" disposable bailer
_____ 3" PVC bailer
_____ 4" PVC bailer
_____ Submersible pump
_____ Dedicated bailer
X Centrifugal pump
Sampled with: Disposable bailer: X Teflon bailer: _____

Well diameter: 2" _____ 4" X 6" _____ 8" _____
Purge Vol. Multiplier: 0.16 0.65 1.47 2.61 gal/ft.

Initial Measurement
Time: 10:45
Depth of well: 53.91
Depth to water: 25.93

Recharge Measurement
Time: 1:38
Depth to water: 27.03

Calculated purge: 72.7 gal
Actual purge: 72.7 gal

Start purge: 1:15 Sampling time: 1:40

Time	Temperature	E. C.	pH	Turbidity	Volume
1:19	68.7	1339	4.53	—	1
1:23	68.9	1327	4.41	—	2
1:27	68.8	1320	4.37	—	3
1:32	68.4	1314	4.31	—	4

Sample appearance: clear Lock: NONE

Equipment replaced: (Check all that apply)
2" locking cap: _____
4" locking cap: X
6" locking cap: _____
Lock #3753: _____
Lock-Dolphin: X
Note condition of replaced items
7/32 Allenhead: _____
9/16 bolt: _____
Pinned Allenhead (DPW): _____

Remarks: BROKEN CAP

Signature: Hal Hansen

DOULOS ENVIRONMENTAL COMPANY — **SAMPLING INFORMATION SHEET**

Client: Ultramar
Site: Beacon #604
1619 West First Street
Livermore, CA

Sampling Date: 6-15-95
Project No.: 95-604-01
Well Designation: MW- 3

Is setup of traffic control devices required? (NO) YES time: _____ hours
Is there standing water in well box? NO (YES) Above TOC (Below TOC)
Is top of casing cut level? NO (YES) If no, see remarks
Is well cap sealed and locked? NO (YES) If no, see remarks
Height of well casing riser (in inches): 4
Well cover type: 8" UV _____ 12" UV X 12" EMCO _____ 8" BK _____
12" BK _____ 12" DPW _____ 12" CNI _____ 36" CNI _____ Other _____
General condition of wellhead assembly: Excellent (Good) Fair Poor

Purging Equipment:
_____ 2" disposable bailer
_____ 3" PVC bailer
_____ 4" PVC bailer
_____ Submersible pump
_____ Dedicated bailer
X Centrifugal pump
Sampled with: Disposable bailer: X Teflon bailer: _____

Well diameter: 2" _____ 4" X 6" _____ 8" _____
Purge Vol. Multiplier: 0.16 0.65 1.47 2.61 gal/ft.

Initial Measurement
Time: 10:20
Depth of well: 52.62
Depth to water: 23.66

Recharge Measurement
Time: 11:48
Depth to water: 24.06

Calculated purge: 75.3 gal
Actual purge: 75.3 gal

Start purge: 11:20 Sampling time: 11:50

Time	Temperature	E. C.	pH	Turbidity	Volume
11:25	70.3	1857	2.56	—	1
11:27	70.1	1848	2.45	—	2
11:33	70.4	1841	2.31	—	3
11:46	70.5	1838	2.29	—	4

Sample appearance: clear Lock: Dolphin

Equipment replaced: (Check all that apply) Note condition of replaced items
2" locking cap: _____ Lock #3753: _____ 7/32 Allenhead: _____
4" locking cap: _____ Lock-Dolphin: _____ 9/16 bolt: _____
6" locking cap: _____ Pinned Allenhead (DPW): _____

Remarks: _____

Signature Hal Hansen

DOULOS ENVIRONMENTAL COMPANY SAMPLING INFORMATION SHEET

Client: Ultramar
Site: Beacon #604
1619 West First Street
Livermore, CA

Sampling Date: 6-15-95
Project No.: 95-604-01
Well Designation: MW- 4

Is setup of traffic control devices required? (NO) YES time: _____ hours
Is there standing water in well box? (NO) YES Above TOC Below TOC
Is top of casing cut level? NO (YES) If no, see remarks
Is well cap sealed and locked? NO (YES) If no, see remarks
Height of well casing riser (in inches): 14
Well cover type: 8" UV X 12" UV _____ 12" EMCO _____ 8" BK _____
12" BK _____ 12" DPW _____ 12" CNI _____ 36" CNI _____ Other _____
General condition of wellhead assembly: Excellent (Good) Fair Poor

Purging Equipment:
_____ 2" disposable bailer
_____ 3" PVC bailer
_____ 4" PVC bailer
_____ Submersible pump
_____ Dedicated bailer
X Centrifugal pump
Sampled with: Disposable bailer: X Teflon bailer: _____

Well diameter: 2" X 4" _____ 6" _____ 8" _____
Purge Vol. Multiplier: 0.16 0.65 1.47 2.61 gal/ft.

Initial Measurement
Time: 10:24
Depth of well: 46.81
Depth to water: 23.63

Recharge Measurement
Time: 12:14
Depth to water: 24.71
Calculated purge: 14.8 gal
Actual purge: 14.8 gal

Start purge: 12:05 Sampling time: 12:16

Time	Temperature	E. C.	pH	Turbidity	Volume
12:06	68.3	1997	4.71	—	1
12:08	68.3	1981	4.41	—	2
12:10	68.0	1978	4.10	—	3
12:11	68.4	1974	4.11	—	4

Sample appearance: clear Lock: Dolphin

Equipment replaced: (Check all that apply) Note condition of replaced items
2" locking cap: _____ Lock #3753: _____ 7/32 Allenhead: _____
4" locking cap: _____ Lock-Dolphin: _____ 9/16 bolt: _____
6" locking cap: _____ Pinned Allenhead (DPW): _____

Remarks: _____

Signature: [signature]

DOULOS ENVIRONMENTAL COMPANY SAMPLING INFORMATION SHEET

Client: Ultramar
Site: Beacon #604
1619 West First Street
Livermore, CA

Sampling Date: 6-15-95
Project No.: 95-604-01
Well Designation: MW- 5

Is setup of traffic control devices required? (NO) YES time: _____ hours
Is there standing water in well box? NO (YES) Above TOC (Below TOC)
Is top of casing cut level? NO (YES) If no, see remarks
Is well cap sealed and locked? NO (YES) If no, see remarks
Height of well casing riser (in inches): 4
Well cover type: 8" UV X 12" UV _____ 12" EMCO _____ 8" BK _____
12" BK _____ 12" DPW _____ 12" CNI _____ 36" CNI _____ Other _____
General condition of wellhead assembly: Excellent (Good) Fair Poor

Purging Equipment:
_____ 2" disposable bailer
_____ 3" PVC bailer
_____ 4" PVC bailer
_____ Submersible pump
_____ Dedicated bailer
X Centrifugal pump
Sampled with: Disposable bailer: X Teflon bailer: _____

Well diameter: 2" X 4" _____ 6" _____ 8" _____
Purge Vol. Multiplier: 0.16 0.65 1.47 2.61 gal/ft.

Initial Measurement
Time: 10:29
Depth of well: 46.25
Depth to water: 24.99

Recharge Measurement
Time: 12:34 Calculated purge: 13.6 gal
Depth to water: 26.71 Actual purge: 13.6 gal

Start purge: 12:25 Sampling time: 12:35

Time	Temperature	E. C.	pH	Turbidity	Volume
12:26	68.7	1937	4.31	—	1
12:27	68.6	1421	4.21	—	2
12:29	68.7	1413	4.10	—	3
12:31	68.9	1311	4.16	—	4

Sample appearance: clear Lock: Dolphin

Equipment replaced: (Check all that apply) Note condition of replaced items
2" locking cap: _____ Lock #3753: _____ 7/32 Allenhead: _____
4" locking cap: _____ Lock-Dolphin: _____ 9/16 bolt: _____
6" locking cap: _____ Pinned Allenhead (DPW): _____

Remarks: _____

Signature: [signature]

DOULOS ENVIRONMENTAL COMPANY SAMPLING INFORMATION SHEET

Client: Ultramar
Site: Beacon #604
1619 West First Street
Livermore, CA

Sampling Date: 6-15-95
Project No.: 95-604-01
Well Designation: MW- 6

Is setup of traffic control devices required? (NO) YES time: ______ hours
Is there standing water in well box? NO (YES) Above TOC (Below TOC)
Is top of casing cut level? NO (YES) If no, see remarks
Is well cap sealed and locked? NO (YES) If no, see remarks
Height of well casing riser (in inches): 4
Well cover type: 8" UV X 12" UV ____ 12" EMCO ____ 8" BK ____
12" BK ____ 12" DPW ____ 12" CNI ____ 36" CNI ____ Other ____
General condition of wellhead assembly: Excellent (Good) Fair Poor

Purging Equipment:
____ 2" disposable bailer
____ 3" PVC bailer
____ 4" PVC bailer
____ Submersible pump
____ Dedicated bailer
X Centrifugal pump

Sampled with: Disposable bailer : X Teflon bailer: ____

Well diameter: 2" X 4" ____ 6" ____ 8" ____
Purge Vol. Multiplier : 0.16 0.65 1.47 2.61 gal/ft.

Initial Measurement
Time: 10:41
Depth of well: 47.69
Depth to water: 26.88

Recharge Measurement
Time: 1:04
Depth to water: 29.10

Calculated purge: 13.3 gal
Actual purge: 13.3 gal

Start purge : 12:55 Sampling time: 1:06

Time	Temperature	E. C.	pH	Turbidity	Volume
12:57	69.3	1371	4.45	—	1
12:58	69.4	1359	4.39	—	2
12:59	69.3	1340	4.37	—	3
1:02	69.1	1313	4.30	—	4

Sample appearance : Cloudy Lock: Dolphin

Equipment replaced: (Check all that apply) Note condition of replaced items
2" locking cap: ____ Lock #3753: ____ 7/32 Allenhead: ____
4" locking cap: ____ Lock-Dolphin: ____ 9/16 bolt: ____
6" locking cap: ____ Pinned Allenhead (DPW): ____

Remarks: ____

Signature [signature]

DOULOS ENVIRONMENTAL COMPANY SAMPLING INFORMATION SHEET

Client: Ultramar
Site: Beacon #604
1619 West First Street
Livermore, CA

Sampling Date: 6-15-95
Project No.: 95-604-01
Well Designation: MW- 7

Is setup of traffic control devices required? (NO) YES time: ______ hours
Is there standing water in well box? NO (YES) Above TOC (Below TOC)
Is top of casing cut level? NO (YES) If no, see remarks
Is well cap sealed and locked? NO (YES) If no, see remarks
Height of well casing riser (in inches): ______
Well cover type: 8" UV ______ 12" UV ______ 12" EMCO ______ 8" BK ______
12" BK ______ 12" DPW ______ 12" CNI ______ 36" CNI ______ Other ______
General condition of wellhead assembly: Excellent (Good) Fair Poor

Purging Equipment:
______ 2" disposable bailer
______ 3" PVC bailer
______ 4" PVC bailer
______ Submersible pump
______ Dedicated bailer
X Centrifugal pump

Sampled with: Disposable bailer: X Teflon bailer: ______

Well diameter: 2" X 4" ______ 6" ______ 8" ______
Purge Vol. Multiplier: 0.16 0.65 1.47 2.61 gal/ft.

Initial Measurement
Time: ______
Depth of well: 46.70
Depth to water: 25.51

Recharge Measurement
Time: 12:49
Depth to water: 26.31

Calculated purge: 13.6 gal
Actual purge: 13.6 gal

Start purge: 12:40
Sampling time: 12:51

Time	Temperature	E. C.	pH	Turbidity	Volume
12:41	69.3	1481	3.56	—	1
12:43	69.4	1478	3.47	—	2
12:45	69.3	1414	3.42	—	3
12:47	69.1	1412	3.41	—	4

Sample appearance: Clear
Lock: NONE

Equipment replaced: (Check all that apply) Note condition of replaced items
2" locking cap: X
4" locking cap: ______
6" locking cap: ______
Lock #3753: ______
Lock-Dolphin: X
7/32 Allenhead: ______
9/16 bolt: ______
Pinned Allenhead (DPW): ______

Remarks: BROKEN CAP

Signature: [signature]

ATTACHMENT C

GROUND WATER SAMPLE ANALYTICAL RESULTS

WEST LABORATORY

June 30, 1995
Sample Log 12067

Sheila Richgels
Fugro West, Inc.
1050 Melody Lane, Suite 160
Roseville, CA 95678

Subject: Analytical Results for 7 Water Samples
Identified as: Beacon 604 (Proj. # 94-604-01)
Received: 06/21/95

Dear Ms. Richgels:

Analysis of the sample(s) referenced above has been completed. This report is written to confirm results communicated on June 30, 1995 and describes procedures used to analyze the samples.

Sample(s) were analyzed using the following method(s):

"BTEX" (EPA Method 602/Purge-and-Trap)
"TPH as Gasoline" (Modified EPA Method 8015/Purge-and-Trap)

Please refer to the following table(s) for summarized analytical results and contact us at 916-753-9500 if you have questions regarding procedures or results. The chain-of-custody document is enclosed.

Approved by:

Joel Kiff
Senior Chemist

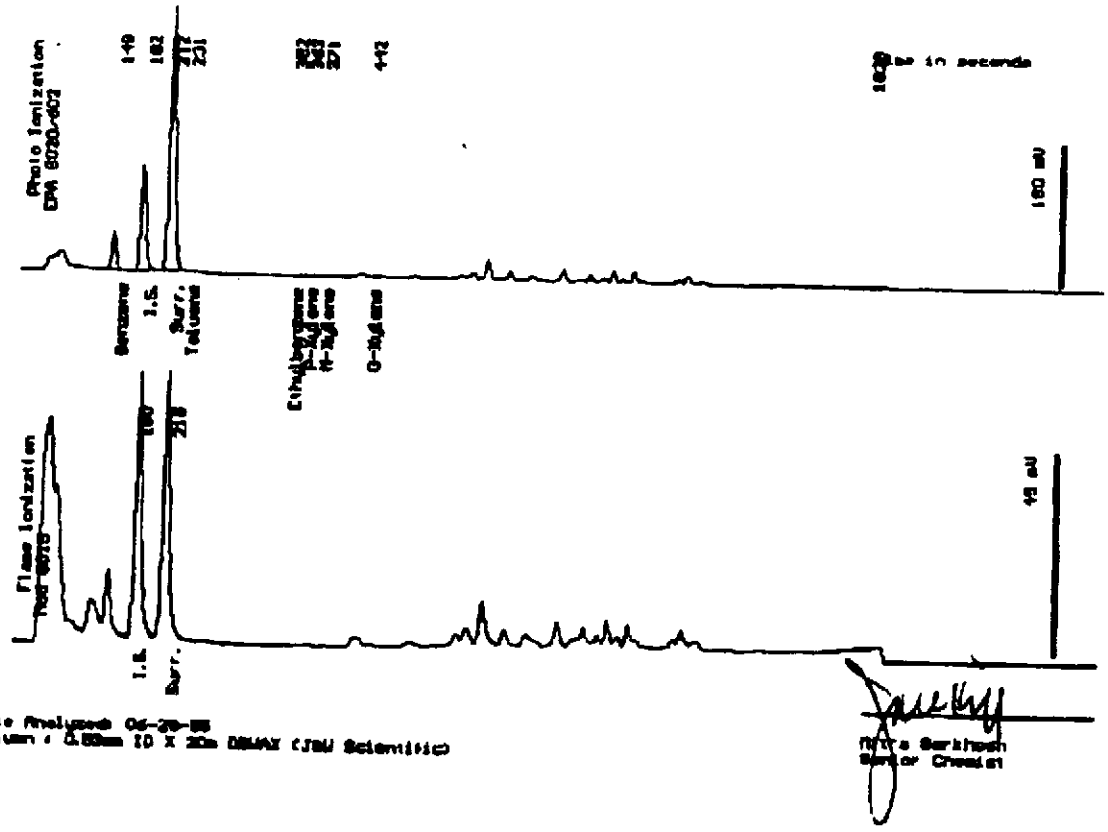
LABORATORY

Sample Log 12067
12067-01

Sample: MW-1

From : Beacon 604 (Proj. # 94-604-01)
Sampled : 06/15/95
Dilution : 1:1 QC Batch : 2123J
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(.50)	5.6
Toluene	(.50)	<.50
Ethylbenzene	(.50)	<.50
Total Xylenes	(.50)	<.50
TPH as Gasoline	(50)	140
Surrogate Recovery		102 %



Date Analyzed: 06-20-95
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

Nitra Sarkisian
Senior Chemist

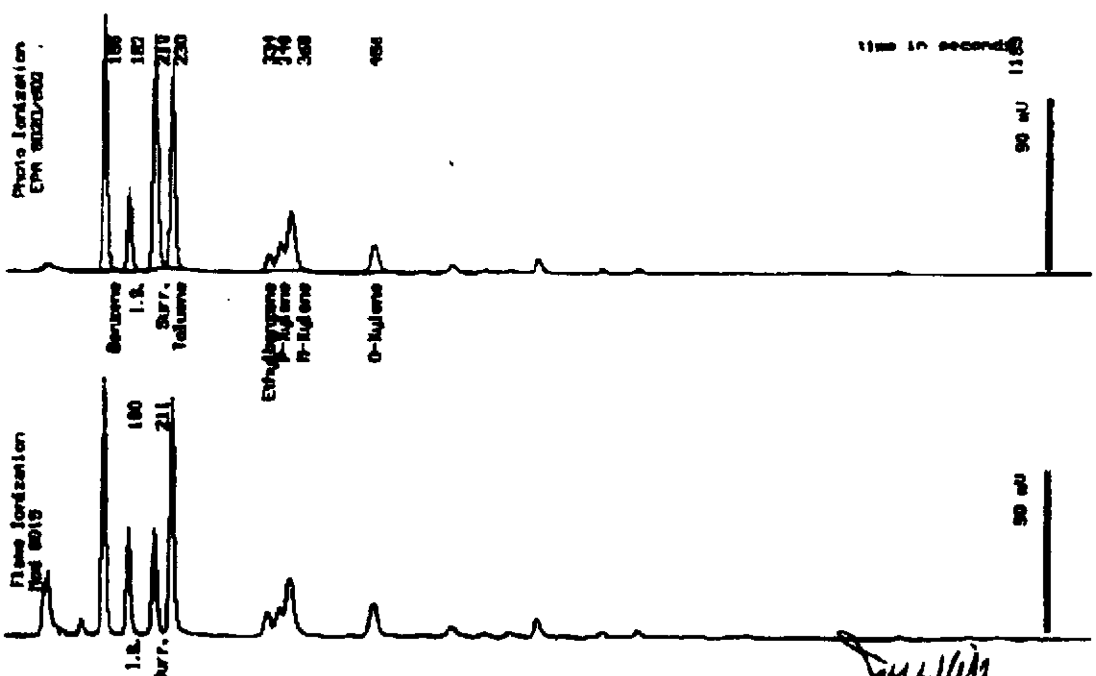
WEST LABORATORY

Sample Log 12067
12067-03

Sample: MW-2

From : Beacon 604 (Proj. # 94-604-01)
Sampled : 06/15/95
Dilution : 1:250 **QC Batch : 4125J**
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(130)	11000
Toluene	(130)	12000
Ethylbenzene	(130)	1900
Total Xylenes	(130)	11000
TPH as Gasoline	(13000)	61000
Surrogate Recovery		85 %



Date Analyzed: 06-20-95
Column : 0.53mm ID X 30m DB-WAX (J&W Scientific)

Mitra Sarkhosh
Senior Chemist

WEST LABORATORY

Sample Log 12067

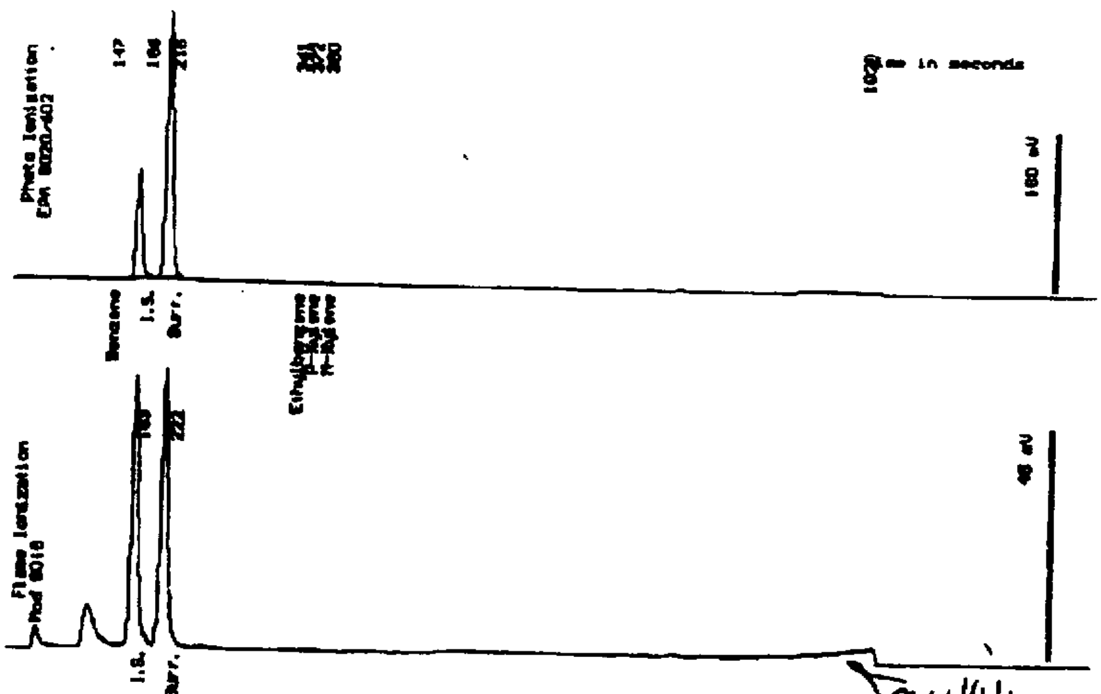
12067-03

Sample: MW-3

From : Beacon 604 (Proj. # 94-604-01)
Sampled : 06/15/95
Dilution : 1:1
Matrix : Water

QC Batch : 2123J

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(.50)	<.50
Toluene	(.50)	<.50
Ethylbenzene	(.50)	<.50
Total Xylenes	(.50)	<.50
TPH as Gasoline	(50)	<50
Surrogate Recovery		102 %



Date Analyzed: 06-20-95
Column : 0.53mm ID X 30m DB624 (J&W Scientific)

Senior Chemist

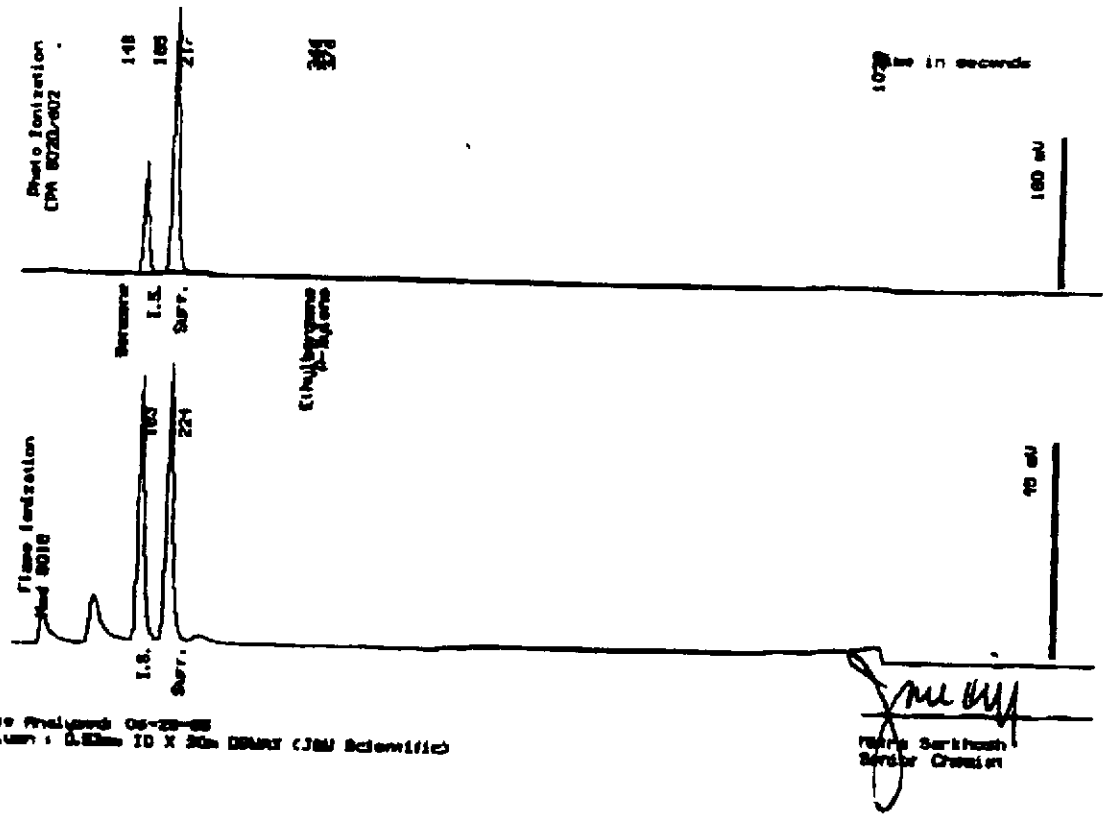
ESI LABORATORY

Sample Log 12067

Sample: MW-4

From : Beacon 604 (Proj. # 94-604-01)
Sampled : 06/15/95
Dilution : 1:1 QC Batch : 2123J
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(.50)	<.50
Toluene	(.50)	<.50
Ethylbenzene	(.50)	<.50
Total Xylenes	(.50)	<.50
TPH as Gasoline	(50)	<50
Surrogate Recovery		105 %



LABORATORY

Sample Log 12067

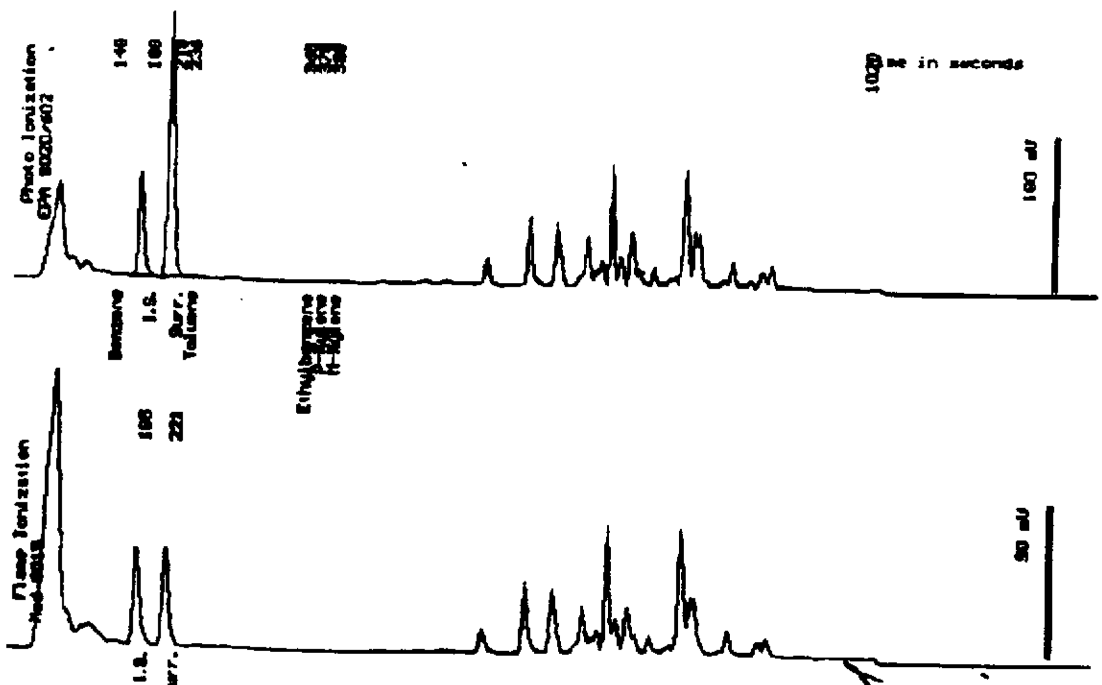
12067-05

Sample: MW-5

From : Beacon 604 (Proj. # 94-604-01)
Sampled : 06/15/95
Dilution : 1:1
Matrix : Water

QC Batch : 2123J

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(.50)	<.50
Toluene	(.50)	<.50
Ethylbenzene	(.50)	<.50
Total Xylenes	(.50)	<.50
TPH as Gasoline	(50)	460
Surrogate Recovery		98 %



Date Analyzed: 06-2[illegible]
Column : 0.53mm ID X 30m DB[illegible] (J&W Scientific)

[illegible]
Senior Chemist

WEST LABORATORY

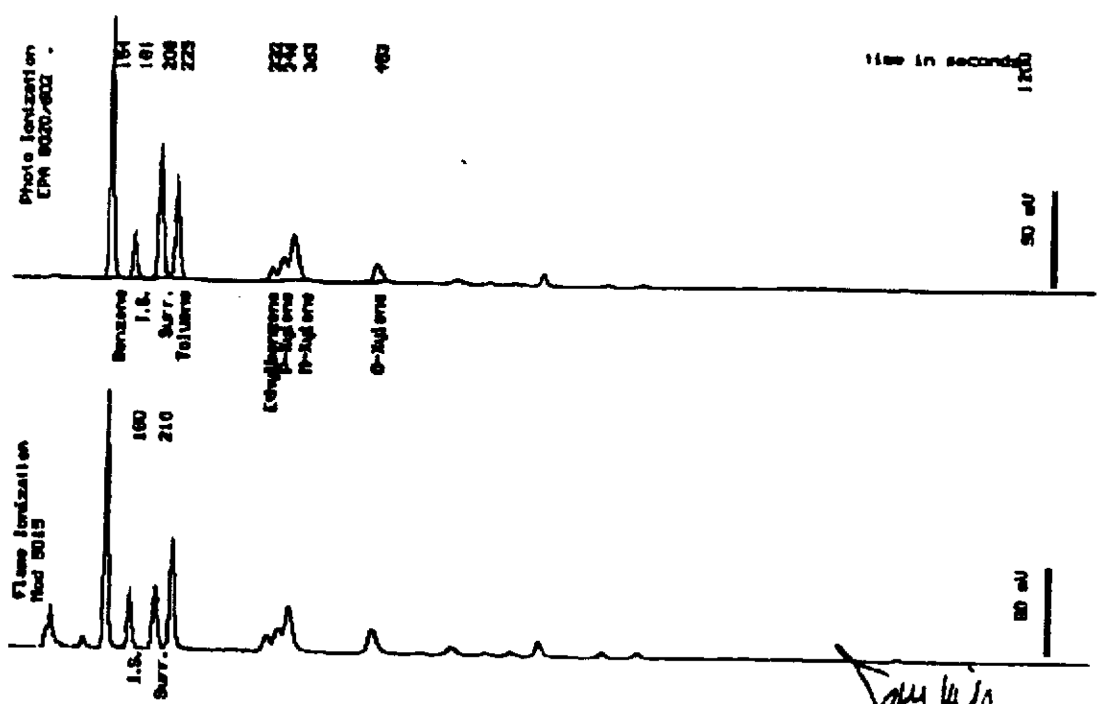
Sample Log 12067
12067-06

Sample: MW-6

From : Beacon 604 (Proj. # 94-604-01)
Sampled : 06/15/95
Dilution : 1:250
Matrix : Water

QC Batch : 4125J

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(130)	20000
Toluene	(130)	11000
Ethylbenzene	(130)	2100
Total Xylenes	(130)	15000
TPH as Gasoline	(13000)	75000
Surrogate Recovery		85 %



Date Analyzed: 06-29-95
Column : 0.53mm ID X 30m DB624 (J&W Scientific)

Mira Barkhash
Senior Chemist

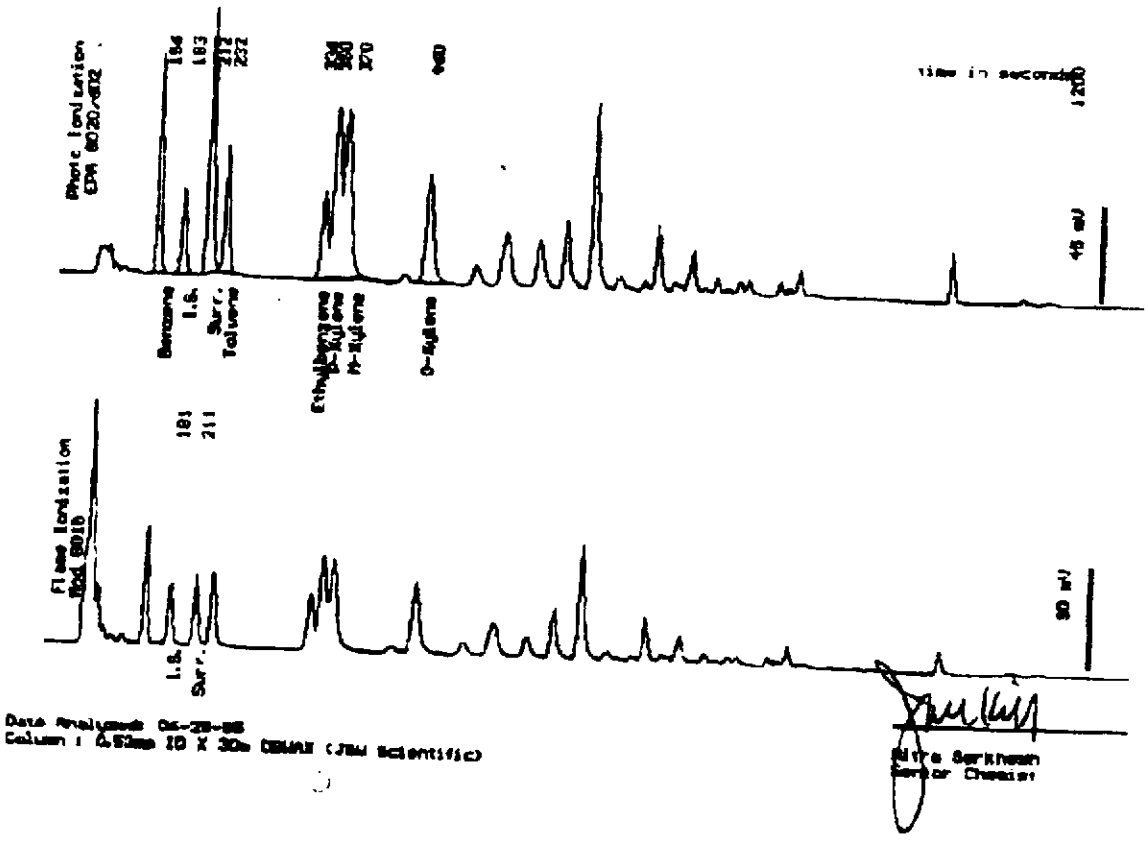
WEST LABORATORY

Sample Log 12067
12067-07

Sample: MW-7

From : Beacon 604 (Proj. # 94-604-01)
Sampled : 06/15/95
Dilution : 1:25
Matrix : Water
QC Batch : 4125F

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(13)	920
Toluene	(13)	680
Ethylbenzene	(13)	740
Total Xylenes	(13)	4100
TPH as Gasoline	(1300)	17000
Surrogate Recovery		88 %



Data Analyzed: 06-28-95
Column : 0.53mm ID x 30m DB624 (J&W Scientific)

Mike Gerkhaan
Senior Chemist

Ultramar

Ultramar Inc.

CHAIN OF CUSTODY REPORT

BEACON

Beacon Station No. Beacon 604	Sampler (Print Name) Hal Hansen	ANALYSES	Date 6-15-95	Form No. 1 of 1
Project No. 94-604-01	Sampler (Signature) Hal Hansen		Standard TAT	
Project Location Livermore, CA	Affiliation Doulos Environmental			

Sample No./Identification	Date	Time	Lab No.	BTEX	TPH (Gasoline)	TPH (Diesel)						No. of Containers	REMARKS
MW-1	6-15-95	1110	12067-01	X	X							2	
MW-2		1140	12067-02										
MW-3		1150	12067-03										
MW-4		1216	12067-04										RECEIVED
MW-5		1235	12067-05										DATE 6/21 TIME 1010
MW-6		106	12067-06										TEMP 00
MW-7	✓	1251	12067-07	✓	✓							✓	INITIAL
			12067-										WEST. LAB

Relinquished by:(Signature/Affiliation)	Date	Time	Received by:(Signature/Affiliation)	Date	Time
Hal Hansen Doulos Env.					
Relinquished by:(Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Relinquished by:(Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
			[signature]	6/21/95	1010

Report To: Sheila Richgels
Fugro West, Inc.
1050 Melody Lane, Suite 160
Roseville, CA 95678

Bill To: Ultramar
525 W. 3rd Street
Hanford, CA 93230
Attention: Terry Fox

GCL
Environmental Science and Engineering
A BDM International Company

505 Marquette NW, Ste. 1100 • Albuquerque, NM 87102
(505) 842-0001 • FAX: (505) 842-0595

May 5, 1995

RECEIVED
JUN 07 1995

Mr. Terrance A. Fox
Ultramar Inc.
Senior Project Manager
Marketing Environmental Department
P.O. Box 466
525 W. Third Street
Hanford, California 93232-0466

RE: REVISED REMEDIATION SYSTEM IMPLEMENTATION WORK PLAN FOR BEACON SERVICE STATION NO. 604, 1619 FIRST STREET, LIVERMORE, CALIFORNIA

Dear Mr. Fox:

Geoscience Consultants, Ltd. (GCL) is pleased to submit this revised work plan for resolution of environmental issues at the above-referenced site. We have revised the February work plan based upon our meeting in March and significant modifications of our original conceptual design and scope of work. GCL is presenting the costs for the design, implementation, and monitoring as time and materials costs not to exceed projected estimates for the installation and operation of Phase I and Phase II systems. Per your discussion, we have eliminated all direct costs for remediation equipment, labor associated with interaction with the agency and Ellis Partners and due to recent evaluation of our PCE remediation performance, we also eliminated a large element of the conceptual design. If during the operation of the Phase I system warrants any design modifications for the Phase II installation a subsequent cost estimate will be provided. The remainder of this letter is essentially identical to our previous submission with the incorporated changes in scope.

The proposed technical scope of work presented herein was developed after careful review of the December 14, 1994 remedial action plan (RAP) prepared by Acton, Mickelson and van Dam (AMV). We also employed our extensive knowledge of the immediate area. Initial response from the adjacent property owners (Ellis Partners) is favorable for the proposed remedial system layout and construction.

GCL hereby submits a task-based work plan to implement a groundwater recovery and treatment and air injection/soil-vapor extraction reclamation system. GCL understands only GCL labor, estimated installation, and drilling costs will be provided in this estimate. System equipment laboratory testing, meeting time with Ellis Partners and the county, and costs related to the previously costed groundwater recovery system have been deleted in this revised scope and cost estimate. Site reclamation will be addressed as a Phased approach to installation. The Phase I reclamation system is intended to address the source area of dissolved BTEX constituents at the Beacon Service Station. The Phase II reclamation system addresses the impacted groundwater and vadose zone soils in the LASC parking area. An engineering cost estimate for construction of the Phase I and Phase II reclamation system incorporating modifications based upon your comments from the original conceptual design during our March meeting and our telephone conservation on May 3, 1995 is provided in Attachment A.

The objectives of the proposed remediation system is to remediate the vadose zone plume, eliminate the threat caused by the dissolved-phase groundwater plume and the remainder of the dissolved-phase groundwater plume at the Livermore Arcade Shopping Center. Phase I activities include installation of a air injection/vacuum extraction system at the Beacon station. During system operation, the effectiveness of the Phase I system will be evaluated. System effectiveness of the Phase I system will assist in any necessary system modifications and refinements prior to the installation of the Phase II system.

General System Description

Previously reported background data and soil/groundwater chemistry have been taken into consideration for the design of the remediation system. Impacts associated with gasoline-related volatile organic compounds (VOCs) are amenable to phase transfer and the remedial approach included in the following sections. Figure 1 is a site vicinity map showing the observed groundwater flow direction based upon the most recent data, the horizontal extent of the dissolved-phase hydrocarbon plume, capture zone and the proposed Phase I remediation system layout. Figure 2 shows the proposed Phase II remedial system layout.

Phase I: Source Area (Beacon Site) Remediation

The proposed source area remedial system shown in Figure 1 includes soil-vapor extraction and air injection in the vicinity of the station. The objectives of the proposed source area remediation system is to accomplish the following:

- Remediation of residual hydrocarbon-affected soils and associated subsurface soil vapors in the vicinity of the former Beacon Service Station
- Remediation of the source area portion of the dissolved-phase groundwater plume
- Oxygenation of groundwater and subsequent passive remediation of the downgradient off-site dissolved-phase hydrocarbon plume

The proposed active air injection and vapor extraction remediation system, enhanced by passive bioremediation, will efficiently accomplish each of the above objectives by allowing mechanical in situ stripping, volatilization, subsequent mobilization of the vapor-phase hydrocarbons, and passive bioremediation (hyperoxygenation) to act together to remediate the dissolved-phase hydrocarbons present in the soils and groundwater. The air injection/vapor extraction treatment system offers a reliable alternative to traditional on-site pump-and-treat technology. By employing a phased approach, future system modifications will be tailored to site conditions resulting in cost effective closure.

The proposed air injection system will consist of well locations incorporating the areas of highest dissolved-phase hydrocarbon concentrations. The air injection wells will be constructed 10 feet below the historical groundwater lows. The air injection wells will be manifolded together and will be connected to a high capacity high-pressure air compressor. The compressor will be sized to overcome the expected hydrostatic pressure exerted by the column of water over the air injection location.

Phase I Vapor Extraction and Air Injection System Specifications - The proposed site remediation system involves the creation of negative and positive pressure cells within the subsurface soils and groundwater. The positive pressure (air injection) will be used to strip dissolved hydrocarbon compounds from the groundwater and mitigate any phase-separated hydrocarbons (should they occur) in the affected area of the site. The air injection activity will also increase the dissolved oxygen concentration and relative moisture content in the subsurface, thereby stimulating microbiological activity and promoting metabolic consumption of hydrocarbons. The negative pressure cells will provide the removal of the hydrocarbon vapors (by vacuum displacement) generated from the site subsurface materials. The proposed system will include:

- Installation of 5 vapor extraction wells.
- Installation of 9 air injection wells.
- Construction of air injection and vapor extraction manifolds below ground from the blower(s)/compressor(s) to the wells.
- Installation of an air injection compressor and a blower equipped catalytic oxidizer unit.
- Connection to the manifold from the air injection compressor and vacuum extraction blower unit inside a secured treatment system stockade.
- Installation of system monitoring and control equipment.

GCL anticipates that this design will effectively remediate all phases of released hydrocarbons in the subsurface adjacent to the release source. GCL reserves the opportunity to make blower/compressor specification modifications and is willing to incorporate system hardware owned by Ultramar if the basic design specifications are met.

Phase II: Livermore Arcade Shopping Center Remediation

The design information used to develop the Phase I system was also used as a basis for the Phase II system. Figure 2 is a site vicinity map showing the observed groundwater flow direction based upon the most recent data, the horizontal distribution of the dissolved-phase hydrocarbon plume, and the proposed Phase II remediation system layout.

The proposed system will include:

- Installation of 10 vapor extraction wells.
- Installation of 20 air injection wells.
- Construction of air injection and vapor extraction manifolds below ground from the blower(s)/compressor(s) to the wells.

- Installation of an air injection compressor and a blower equipped catalytic oxidizer unit.
- Connection to the manifold from the air injection compressor and vacuum extraction blower unit inside a secured treatment system stockade.
- Installation of system monitoring and control equipment.

Work Plan Tasks

The following tasks have been identified for this project:

Task 1 - System Design/Permits
Task 2 - Phase I System Installation
Task 3 - Phase II System Installation
Task 4 - Start up Report
Task 5 - Operation and Maintenance
Task 6 - 1 Year Site Monitoring

A description of the work to be performed for each of the identified tasks is described below.

Task 1 - System Design/Permits

GCL will prepare a design for the reclamation system that will include the plans and specifications for the construction of the proposed groundwater recovery and treatment and air injection/soil-vapor extraction system. GCL and/or its subcontractors will also obtain permits for construction, well drilling, and air emissions, as necessary and will provide a health and safety plan.

Task 2 - Phase I System Installation

GCL will provide construction management during the installation process to monitor compliance with the design specifications. This construction management will be provided by GCL's resident construction inspector (RCI), as well as by staff hydrogeologists and the project manager, as needed. GCL will be on site continuously during well construction, then periodically for construction inspection at key construction points to monitor installation status with the design plans and specifications. The Phase I system will include source area remediation and downgradient groundwater containment. The system will operate for a short duration and data will be collected and evaluated to determine any necessary modification to the Phase II installation.

In conjunction with the completion of the installation of the Phase I reclamation system, GCL will conduct a system start-up test to determine optimal performance of the system flow rates. System/equipment operational data will be collected for future assessment. The air emission monitoring schedule will conform to the permit requirements. It is assumed that a vapor control emission treatment system is required and the system will incorporate a thermal catalytic oxidizer unit. This method for emission treatment was preliminarily selected based upon the observed lower explosive levels (LEL) data collected during the vapor extraction pilot test.

Task 3 - Phase II System Installation

The proposed Phase II system installation will incorporate similar air injection/vapor extraction methodologies discussed previously. The conceptual full-scale system will include the installation of approximately 20 air injection wells and 10 vapor extraction wells (Figure 2). Phase II system implementation will be incorporated in stages based upon reduction in dissolved-phase hydrocarbon concentration observed during Phase I operation at the site.

Task 4 - Start up Report

In conjunction with the completion of the installation of the Phase I and Phase II reclamation system, GCL will conduct a system start-up test to determine optimal performance of the system flow rates. System/equipment operational data will be collected for future assessment. An air emission monitoring schedule will be implemented and will conform to the permit requirements. The evaluation of air monitoring data will assist in the determination of the mass of hydrocarbons recovered as remedial efforts continue. The start up report will serve as the baseline document establishing the parameters for system evaluation and will be updated quarterly to maintain the status of the system operating criteria.

Task 5 - Operation and Maintenance

Operation and Maintenance is scheduled to begin after completion of Phase I installation. The system will be automatic in operation, with continuous monitoring and reporting capabilities. The system will shut down automatically in case of a malfunction, and alarm messages will be relayed to our office by fax. Monitoring of the proposed system will include:

- Automatic monitoring of operating voltages, temperatures, pressures, and flow rates of the various system components.
- The outlet air temperature and VOC levels from the vapor extraction system.
- Effectiveness of the oxygen injection system.
- Monthly site monitoring - The vapor extraction and oxygen injection system will be inspected and off-gas concentrations at the vapor extraction system will be measured using a photoionization detector (PID). Carbon dioxide production and dissolved oxygen content in selected on-site monitoring wells (indicator of microbiological activity) will be measured using carbon dioxide and dissolved oxygen meters.

All site monitoring results will be provided in quarterly reports. Additionally, it may be possible to evaluate progression of site remediation by measuring influent benzene concentrations from the pumping well system. Aqueous benzene concentrations vs. time will be plotted to determine preliminary evaluation of the reduction of the dissolved phase benzene plume. The compliance standard referenced for groundwater samples will be the RWQCB's groundwater standards for listed compounds.

Based upon the previous monitoring results, system effectiveness will be evaluated and adjusted as needed to conform to operating guidelines set forth by permit requirements. When a history of acceptable discharge is established, monitoring of system effluent will be conducted on a quarterly basis.

Ongoing operation and maintenance activities will include collecting vapor and water samples to verify proper operation and perform scheduled maintenance, such as lubrication of moving parts. Pressure and vacuum readings will also be monitored on a regular basis, as will air flow and water flow measurements. It will be necessary to clean the air stripper to remove scale that may accumulate on the packing. Circulation of a cleaning solution through the stripper may be used. The adjustment of pH will also tend to remove the accumulation of minerals in the air stripper and other components.

Monthly equipment maintenance will be conducted for the system in conjunction with the monthly site monitoring. Future maintenance schedules for the system will be based upon system performance, determined during initial full-scale system operation.

Task 6 - 1 Year Quarterly Monitoring

Groundwater samples will be collected from appropriate monitoring wells every quarter along with the regular monthly evaluations.

Prior to well sampling, all monitoring wells will be gauged to determine groundwater levels. A decontaminated oil/water interface probe will be utilized to compile the water level readings to the nearest 0.01 foot.

Groundwater samples will be collected from compliance monitoring wells. These wells will be purged of a minimum of three well volumes and then sampled pursuant to GCL standard operating procedures. The collected water samples will be placed in new 40-milliliter glass appropriately sized laboratory containers, placed on ice, documented with chain-of-custody forms, and sent by overnight courier to the selected laboratory. These samples will be analyzed by Environmental Protection Agency (EPA) Test Method 602 for BTEX and TPH (gasoline).

Following completion of the field activities and receipt of analytical results, GCL will prepare and submit detailed reports that will contain the following key elements:

- Well/site location map
- Current groundwater elevation map
- Analytical laboratory reports
- Summary of water quality data
- Isopleth maps for selected dissolved-phase groundwater compounds
- Benzene concentrations in groundwater and air emissions vs. time graphs
- Evaluation of the reclamation system
- Current results and conclusions

Staffing

GCL has assembled a team of specialists experienced with remedial design, construction inspection, and troubleshooting of the operations and maintenance of system equipment. Mr Leon Crain from our Dublin, California office has been designated as project manager. Mr Crain will be responsible for subcontractor and staff coordination, cost and budgetary control, scheduling and communication with the Department of Environmental Health and the RWQCB, as appropriate. Mr. Claude Schleyer, PE, will serve as principal engineer and provide design and construction oversight. Mr. Jeffery Firebaugh will serve as project hydrogeologist primarily responsible for coordination of the technical aspects of the remedial system design, monitoring and modeling reports, and evaluation of system efficiency.

Mr. Steve Beavers, GCL's health and safety officer, will prepare a site-specific health and safety plan in cooperation with the project manager for the system installation, construction monitoring, and system monitoring activities to be performed at the facility.

GCL will designate senior engineering and technical staff members to serve as quality assurance/ quality control officers for this project. These individuals will be responsible for reviewing all procedures and deliverables, including engineering contract documents, for technical quality and completeness, and be available for consultation on an ongoing basis during the completion of this project.

Project Schedule

GCL has determined that the remedial contractor can begin installing the system within two weeks of receipt of notice to proceed. An estimated construction completion date for the pilot-scale system will be approximately 60 days after beginning construction. The start-up of the system will be dependent upon the delivery and installation of the emission control, air stripper, and blower unit.

Standard of Care

The services provided by GCL will be performed in accordance with generally accepted professional engineering practice when and where the proposed project services are rendered.

Cost Estimate

GCL is proposing to perform the project workscope on a time and materials not to exceed basis. The tasks, lump sum costs, and activities for each task have been presented as Attachment A. This conceptual design cost estimate reflects the GCL labor, other direct costs, and outside professional services. This type of invoicing will minimize administrative and management costs. These savings are reflected in the project budget/upper limit. The labor hours are an estimate to provide the services discussed in the Tasks. If Ultramar owns system hardware that can be utilized for this project we would be happy to deduct the capital expenses as shown on the spreadsheet. The costs for operating the equipment is based upon known utility usage and hook up charges. The capital expense of the

system hardware is presented as the purchase price of the equipment. These costs are presented for comparison purposes and, if a lease arrangement is preferred, we can provide a monthly lease cost instead. GCL will evaluate the cost of a water reinjection system and will determine if implementation will reflect a cost savings of the POTW expenditures.

Please contact us at (505) 842-0001 if you have any questions regarding this work plan or the subject site. We are prepared to move forward with Task 1, Task 2, portions of Task 5 and Task 6 at this time and will prepare a revised cost estimate for the remaining tasks after finalization of the Phase II design. If preferred we can move forward with all tasks based upon the conceptual design and estimated costs provided herein.

Sincerely,
Geoscience Consultants, Ltd. (GCL)

Claude Schleyer P.E.
Project Manager/Engineer

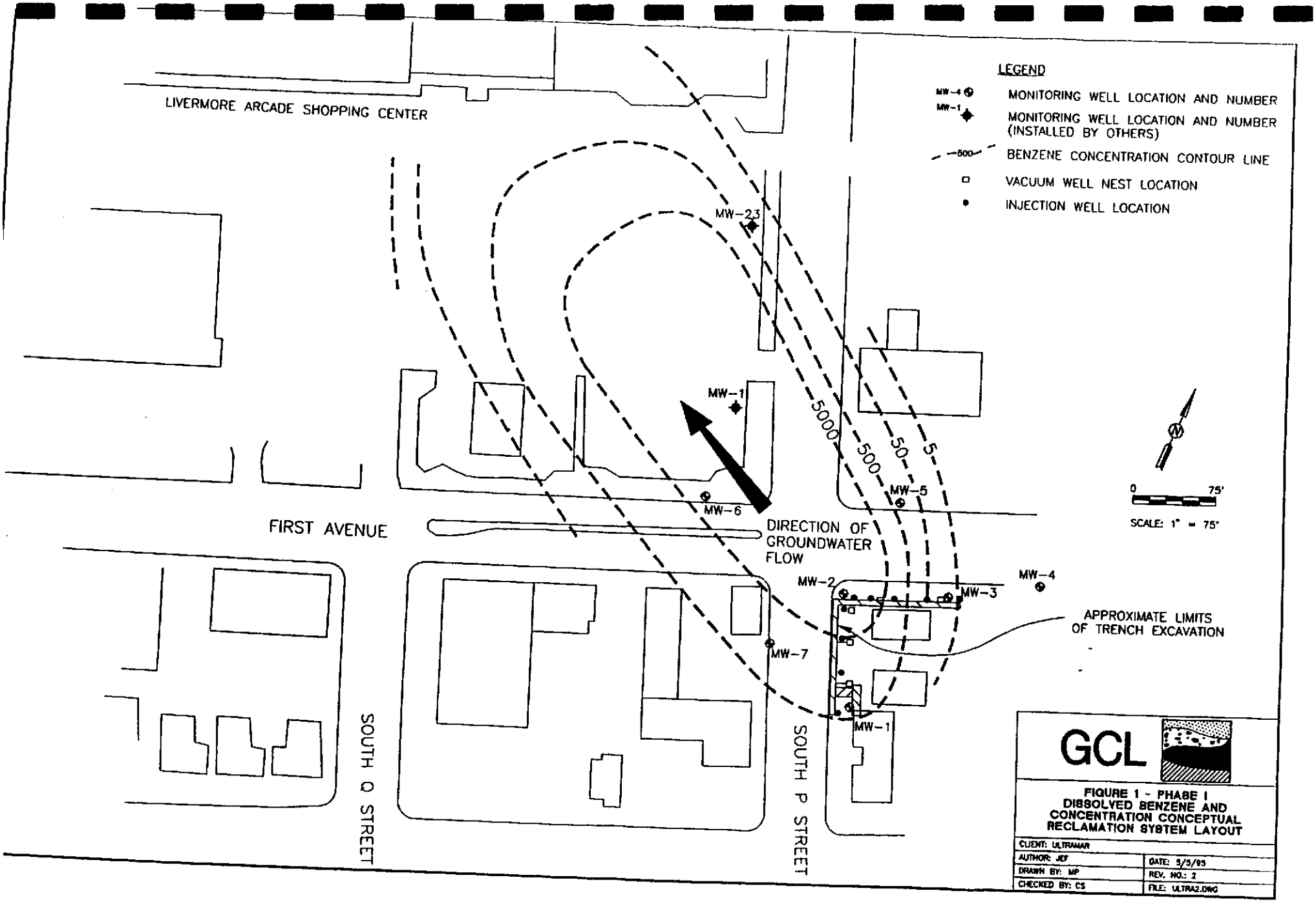
Jeffery E. Firebaugh
Project Hydrogeologist

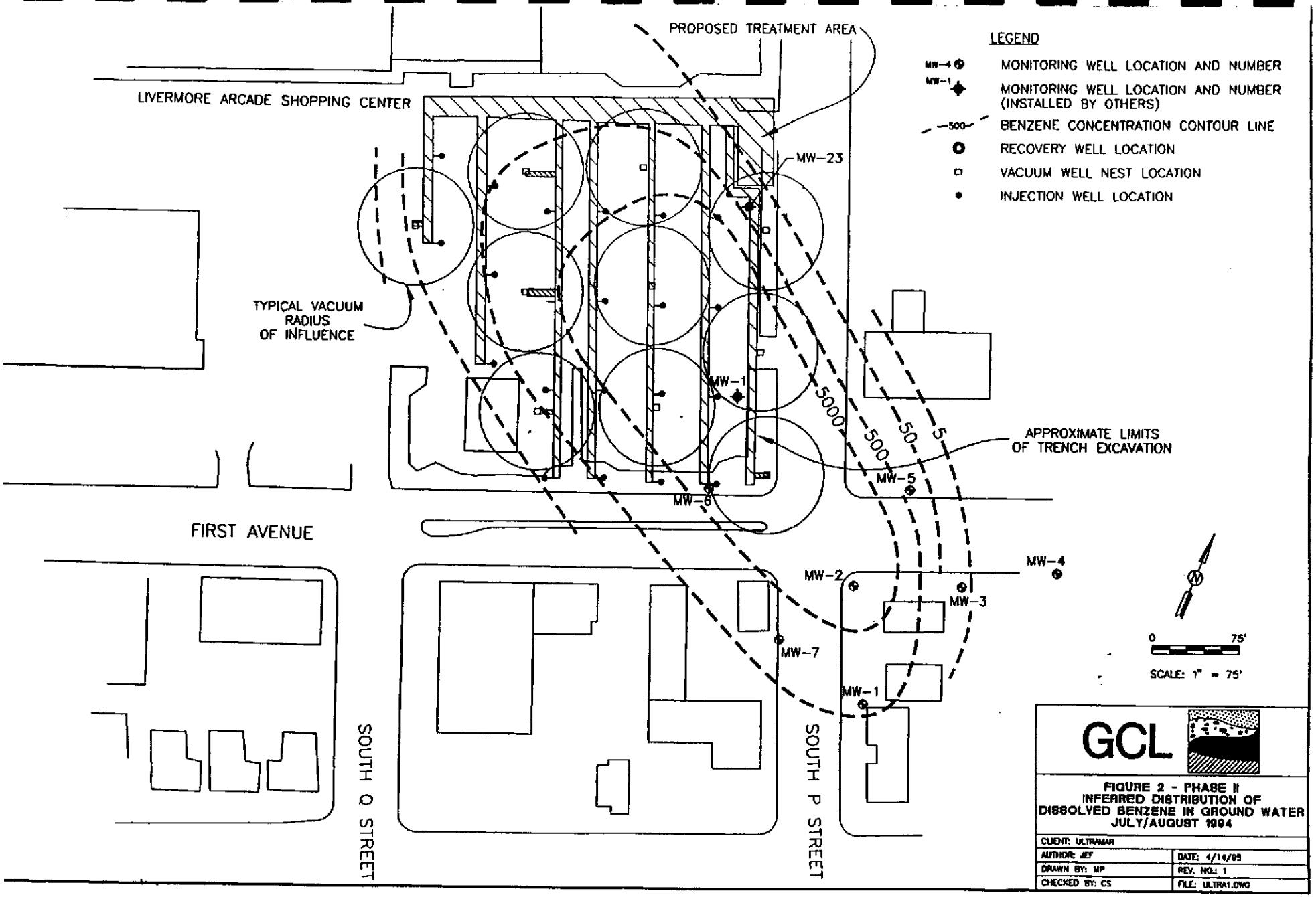
Randall H. Hicks CPG
Vice President

RMARKET/PROP95/AQ95024B.PRO

cc: Leon Crain, GCL-Dublin
Ellis Partners

11501 Dublin Blvd
Dublin 94568
(510) 551-5011
mobile 599-6736


LEGEND
MW-4 MONITORING WELL LOCATION AND NUMBER
MW-1 MONITORING WELL LOCATION AND NUMBER (INSTALLED BY OTHERS)
500 BENZENE CONCENTRATION CONTOUR LINE
VACUUM WELL NEST LOCATION
INJECTION WELL LOCATION
LIVERMORE ARCADE SHOPPING CENTER
MW-23
MW-1
MW-6
MW-5
MW-2
MW-3
MW-4
MW-7
MW-1
5000
500
50
5
FIRST AVENUE
DIRECTION OF GROUNDWATER FLOW
APPROXIMATE LIMITS OF TRENCH EXCAVATION
SOUTH Q STREET
SOUTH P STREET
0 75'
SCALE: 1" = 75'
GCL
FIGURE 1 - PHASE I
DISSOLVED BENZENE AND
CONCENTRATION CONCEPTUAL
RECLAMATION SYSTEM LAYOUT
CLIENT: ULTRAMAR
AUTHOR: JEF
DATE: 9/5/95
DRAWN BY: MP
REV. NO.: 2
CHECKED BY: CS
FILE: ULTRA2.DWG


PROPOSED TREATMENT AREA
LEGEND
MW-4 MONITORING WELL LOCATION AND NUMBER
MW-1 MONITORING WELL LOCATION AND NUMBER (INSTALLED BY OTHERS)
500 BENZENE CONCENTRATION CONTOUR LINE
RECOVERY WELL LOCATION
VACUUM WELL NEST LOCATION
INJECTION WELL LOCATION
LIVERMORE ARCADE SHOPPING CENTER
MW-23
TYPICAL VACUUM RADIUS OF INFLUENCE
MW-1
5000
500
50
5
APPROXIMATE LIMITS OF TRENCH EXCAVATION
MW-5
MW-6
FIRST AVENUE
MW-2
MW-4
MW-3
MW-7
MW-1
SOUTH Q STREET
SOUTH P STREET
0
75'
SCALE: 1" = 75'
GCL
FIGURE 2 - PHASE II
INFERRED DISTRIBUTION OF
DISSOLVED BENZENE IN GROUND WATER
JULY/AUGUST 1994
CLIENT: ULTRAMAR
AUTHOR: JEF
DATE: 4/14/95
DRAWN BY: MP
REV. NO.: 1
CHECKED BY: CS
FILE: ULTRA1.DWG

ACTON •
MICKELSON •
ENVIRONMENTAL, INC.

95 MAY 22 PM 2:49

Consulting Scientists, Engineers, and Geologists

May 5, 1995

Mr. Terrence A. Fox
Ultramar Inc.
525 West Third Street
Hanford, California 93230

19024.04/7

Subject: Ground Water Monitoring Report, First Quarter 1995
Beacon Station #604, 1619 West First Street, Livermore, California

Dear Mr. Fox:

Acton • Mickelson • Environmental, Inc. (AME), has been authorized by Ultramar Inc. (Ultramar), to continue a hydrogeologic investigation of ground water conditions at Beacon Station #604, located at 1619 West First Street, Livermore, California (Figures 1 and 2). The investigation is intended to assess the distribution of petroleum hydrocarbon constituents in the ground water beneath the site. This letter report summarizes the results of monitoring activities performed on February 10, 1995, including water level measurements, subjective analysis for the presence of liquid-phase hydrocarbon (LPH), and ground water sampling. The procedures used to purge and sample monitoring wells and measure water levels are described in Enclosure A.

Ground Water Level Measurements, Hydraulic Gradient, and Flow Direction

Depth to ground water was measured in monitoring wells MW-1 through MW-7 on February 10, 1995. Depth to ground water ranged from 29.96 (MW-3) to 33.34 (MW-6) feet below the top of respective well casings. Ground water level measurements from this sampling event, as well as previous ground water depth measurements, are presented in Table 1. Ground water elevations increased an average of approximately 7.61 feet between December 14, 1994 and February 10, 1995. The inferred direction of ground water flow was generally toward the west-northwest (Figure 3), which is consistent with previous monitoring events. Ground water gradient at the site on February 10, 1995, was calculated to be approximately 0.02 foot per foot. Measurable layers of LPH have not been detected in any monitoring well during this or previous quarters at the site.

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El Dorado Hills, California 95762

lrpt051.dmc
(916) 939-7550
Fax (916) 939-7570

Ground Water Sample Analytical Results

Ground water samples were collected from monitoring wells MW-1 through MW-7 on February 10, 1995, using the procedures outlined in Enclosure A. Field observations and ground water sampling documentation are presented in Enclosure B. Ground water samples were submitted to a state-certified laboratory for analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), and total petroleum hydrocarbons as gasoline (TPHg). Ground water sample analytical results from this sampling event and previous sampling events are compiled in Table 2. Copies of the certified laboratory analytical reports from this sampling event are presented in Enclosure C.

Discussion

Benzene concentrations in ground water ranged from 21,000 micrograms per liter (μg/l) in the sample collected from monitoring well MW-6 to less than the method detection limit of 0.50 μg/l in a sample collected from monitoring well MW-4. Compared to the previous monitoring event, benzene concentrations in water samples collected on February 10, 1995, decreased in monitoring wells MW-2 and MW-5, and increased in MW-1, MW-3, MW-6, and MW-7. Concentrations of BTEX and TPHg remained below the method detection limits in the ground water sample collected from monitoring well MW-4. Benzene concentrations reported from the February 10, 1995, ground water sample analytical results are illustrated on Figure 4.

Remarks

The opinions and conclusions contained in this letter report represent our professional opinions. These opinions are based on currently available information and were developed in accordance with currently accepted hydrogeologic and engineering practices at this time. Other than this, no warranty is implied or intended.

AME recommends that a copy of this quarterly monitoring report be forwarded to the following:

Ms. Eva Chu
Department of Environmental Health
Alameda County Health Care Services
80 Swan Way, Room 200
Oakland, California 94612

Mr. Cecil Fox
California Regional Water Quality Control Board,
San Francisco Bay Region
2101 Webster Street, Room 500
Oakland, California 94612

If you have any questions, please call the undersigned at (916) 939-7550.

Sincerely,

ACTON • MICKELSON • ENVIRONMENTAL, INC.

Todd J. Brown
Staff Geologist

Joseph E. Mello, R.G.
California Registered Geologist #6091

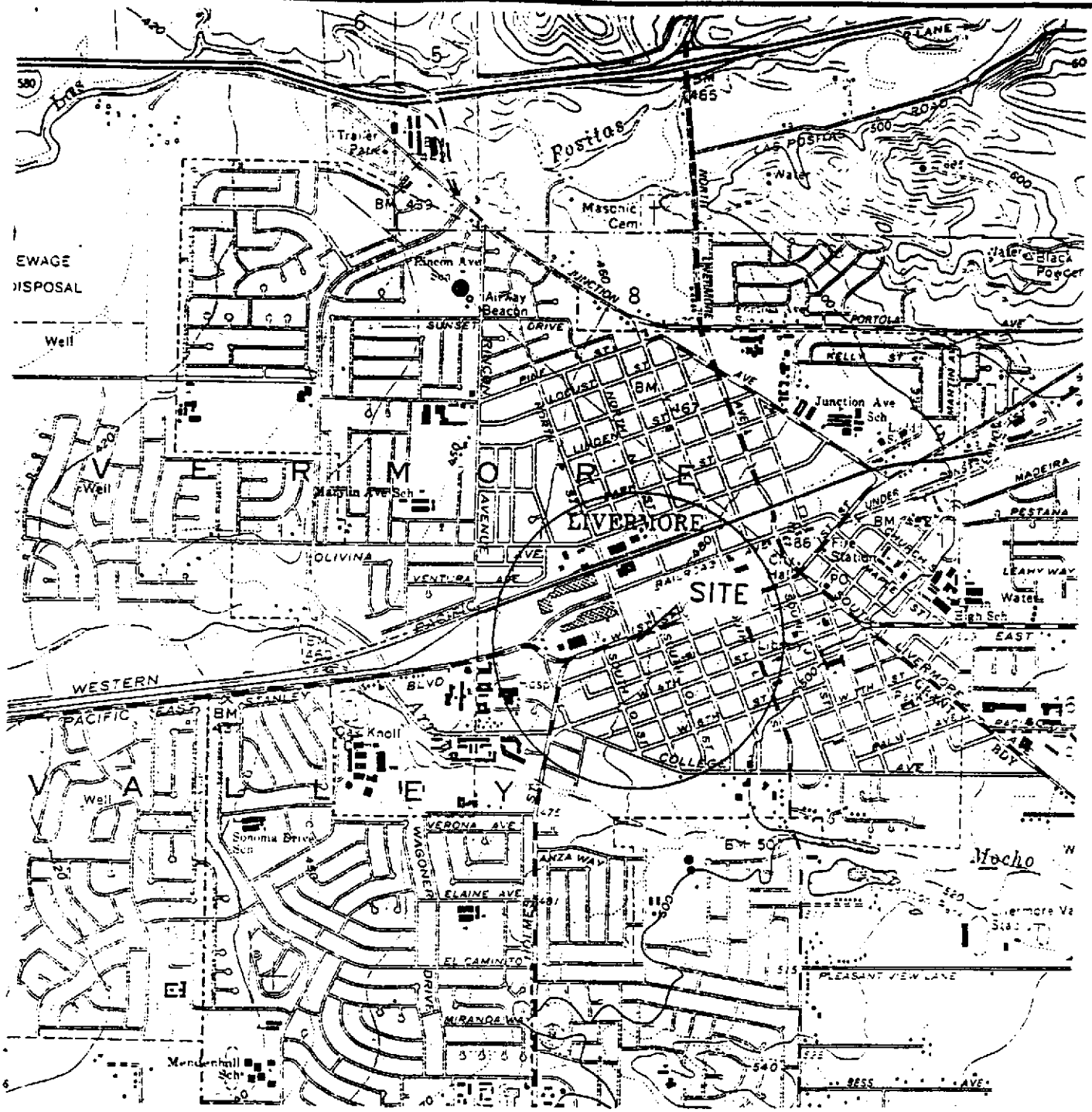
TJB:JEM:dmc
Enclosures

TABLE 1

GROUND WATER ELEVATION DATA
Beacon Station #604
1619 West First Street, Livermore, California

Monitoring Well	Date	Top of Riser (feet)	Depth to Top/Bottom of Screened Interval (feet)	Depth of Water (feet)	Ground Water Elevation (feet)	Physical Observation
MW-1	06-01-93	100.00	34/54	37.50	62.50	No Product
	06-22-93			38.46	61.54	No Product
	10-06-93			42.22	57.78	No Product
	01-13-94			34.52	65.48	No Product
	03-30-94			31.93	68.07	No Product
	04-25-94			33.49	66.51	No Product
	08-12-94			41.03	58.97	No Product
	12-14-94			38.63	61.37	No Product
	02-10-95			30.80	69.20	No Product
MW-2	06-01-93	98.68	34/54	38.02	60.66	No Product
	06-22-93			39.07	59.61	No Product
	10-06-93			43.72	54.96	No Product
	01-13-94			35.85	62.83	No Product
	03-30-94			32.82	65.86	No Product
	04-25-94			34.76	63.92	No Product
	08-12-94			44.33	54.35	No Product
	12-14-94			40.00	58.68	No Product
	02-10-95			32.16	66.52	No Product
MW-3	06-01-93	97.08	33/53	36.18	61.90	No Product
	06-22-93			37.11	61.97	No Product
	10-06-93			41.15	55.93	No Product
	01-13-94			33.95	63.13	No Product
	03-30-94			30.97	66.11	No Product
	04-25-94			32.46	64.62	No Product
	08-12-94			41.72	55.36	No Product
	12-14-94			37.62	59.46	No Product
	02-10-95			29.96	67.12	No Product
MW-4	03-30-94	99.35	27/47	31.56	67.79	No Product
	04-25-94			32.73	66.62	No Product
	08-12-94			41.61	57.74	No Product
	12-14-94			38.11	61.24	No Product
	02-10-95			30.50	68.85	No Product
MW-5	03-30-94	98.37	27/47	32.07	66.30	No Product
	04-25-94			33.65	64.72	No Product
	08-12-94			42.73	55.64	No Product
	12-14-94			38.89	59.48	No Product
	02-10-95			31.44	66.93	No Product
MW-6	03-30-94	97.62	28/48	33.38	64.24	No Product
	04-25-94			35.49	62.13	No Product
	08-12-94			45.14	52.48	No Product
	12-14-94			40.99	56.63	No Product
	02-10-95			33.34	64.28	No Product
MW-7	03-30-94	98.03	27/47	31.98	66.05	No Product
	04-25-94			33.56	64.47	No Product
	08-12-94			43.35	54.68	No Product
	12-14-94			39.34	58.69	No Product
	02-10-95			32.11	65.92	No Product

Note: Monitoring well casing elevations were surveyed relative to an arbitrary bench mark at the top of the casing of monitoring well MW-1 with an assumed elevation of 100.00 feet.



General Notes

Base Map from U.S.G.S.
Livermore, California
7.5 Minute Topographic
Quadrangle
Photorevised 1980

NORTH

QUADRANGLE LOCATION

0 2,000

Approximate Scale
(in feet)

FIGURE 1

SITE LOCATION MAP
BEACON STATION #604
1619 WEST FIRST STREET
LIVERMORE, CALIFORNIA

Project No.	Drawn
19024	CCB
File No.	Prepared
OM01SLM	SAL
Revision	Reviewed
0	

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Consulting Scientists, Engineers, and Geologists
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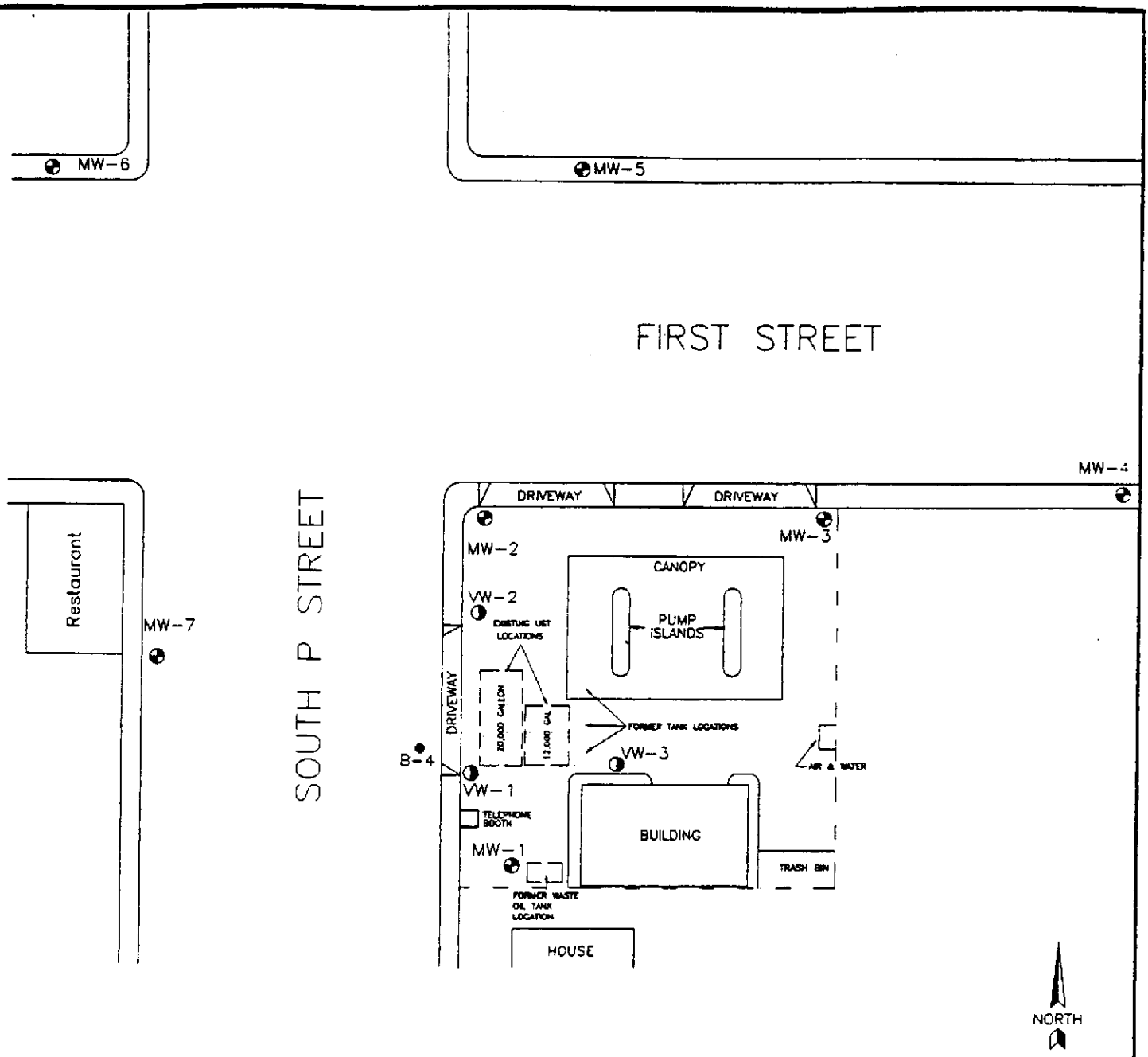

LEGEND

- VW-3 — VADOSE WELL LOCATION AND NUMBER
- MW-3 — MONITORING WELL LOCATION AND NUMBER
- B-4 — SOIL BORING LOCATION AND NUMBER
- — — PROPERTY BOUNDARY

FIGURE 2

SITE MAP

BEACON STATION #604
1619 WEST FIRST STREET
LIVERMORE, CALIFORNIA

Project No. 19024.04	Drawn CCB
File No. IR04SM	Prepared TAD
Revision	Reviewed

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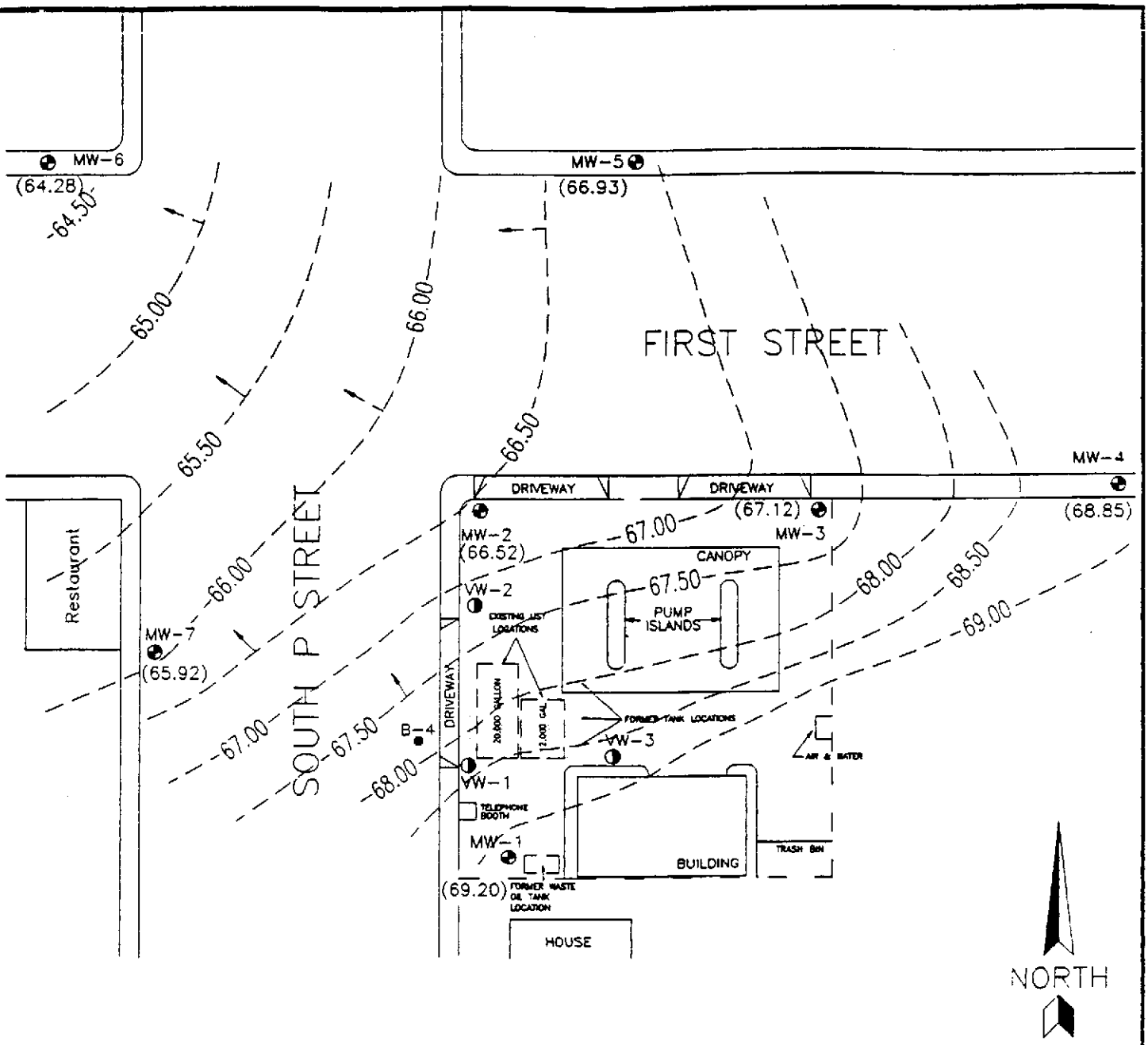

LEGEND

- VW-3 — VADOSE WELL LOCATION AND NUMBER
- MW-3 — MONITORING WELL LOCATION AND NUMBER
- B-4 — SOIL BORING LOCATION AND NUMBER
- — — PROPERTY BOUNDARY
- (69.20) — GROUND WATER ELEVATION (FEET)
- 68.00 — GROUND WATER ELEVATION CONTOUR WITH INFERRED DIRECTION OF FLOW

0 40 80

Approximate Scale (in feet)

FIGURE 3

GROUND WATER TABLE CONTOUR MAP (2/10/95)

BEACON STATION #604
1619 WEST FIRST STREET
LIVERMORE, CALIFORNIA

Project No. 19024.04	Drawn LMC
File No. QM25WTC3	Prepared TJB
Revision	Reviewed

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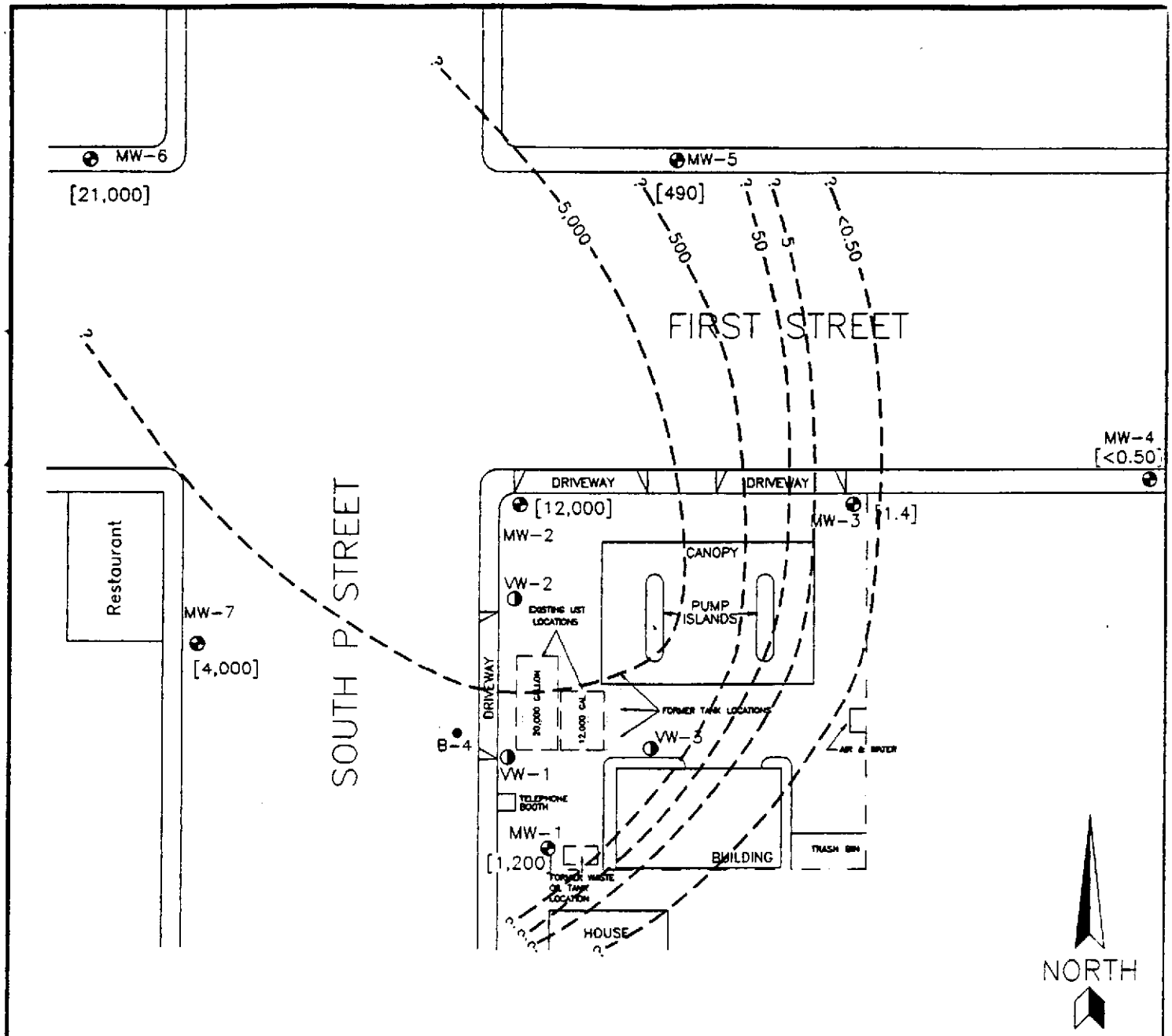

LEGEND

- VW-3 — VADOSE WELL LOCATION AND NUMBER
- MW-3 — MONITORING WELL LOCATION AND NUMBER
- B-4 — SOIL BORING LOCATION AND NUMBER
- — — PROPERTY BOUNDARY
- [1.4] — BENZENE CONCENTRATION IN MICROGRAMS PER LITER
- 5 — BENZENE ISOCONCENTRATION CONTOUR IN MICROGRAMS PER LITER

FIGURE 4
INFERRED DISTRIBUTION OF BENZENE IN GROUND WATER (2/10/95)

BEACON STATION #604
1619 WEST FIRST STREET
LIVERMORE, CALIFORNIA

Project No. 19024.04	Drawn CCB
File No. QM25ICD4	Prepared TJB
Revision	Reviewed

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ENCLOSURE A

SAMPLING TECHNIQUES

ENCLOSURE A

SAMPLING TECHNIQUES

Proper sampling techniques must be followed to assure that samples represent actual field conditions and that samples are labeled, preserved, and transported properly to retain sample integrity. This exhibit describes procedures to be followed by Acton • Mickelson • van Dam, Inc. (AMV), during collection of samples of subsurface soil and ground water. Sampling guidance documents from the American Society of Testing and Materials (ASTM), U.S. Environmental Protection Agency (EPA), and California Environmental Protection Agency (Cal-EPA) will be followed for all sampling procedures. Actual sampling procedures to be employed will be based on field conditions and may differ from those described here.

1.0 EXPLORATION BORING/SOIL SAMPLING PROCEDURES

Soil borings and soil sampling will be performed under the direction of an AMV geologist. The soil borings will be advanced using a truck-mounted, hollow-stem auger drill rig.

Soil samples will be collected at vertical intervals of not more than 5 feet. Soil sampling will be done in general accordance with ASTM D1586-84 (reapproved 1992), modified to allow the use of a 2-inch-diameter split-barrel sampler. Using this procedure, three 2-inch-diameter, 6-inch-length, brass tubes are placed in a California-type split-barrel sampler. The sampler is driven into the soil by a 140-pound weight falling 30 inches. After driving the sampler an initial set of 6 inches (seating drive), the number of blows required to drive the sampler an additional 12 inches is known as standard penetration resistance, or the "N" value. The "N" value is used as an empirical measure of the relative density of cohensionless soils and the consistency of cohesive soils.

Upon recovery of the split-barrel sampler, the brass tubes containing the soil will be removed. One of the three brass tubes will be sealed at the ends with Teflon tape and plastic end caps. The percent recovery of the sample will be recorded. The sample will be labeled with an identification number, time, date, location, and requested laboratory analysis. The sample will then be placed in a plastic bag and stored at approximately 4° Celsius (C) in an ice chest for transport to the laboratory. Sample custody procedures outlined in Section 5.0 of this exhibit will be followed. This will be performed for each sample collection.

Soil in one of the brass tubes will be extracted upon recovery, placed in a plastic bag, sealed, and placed out of direct sunlight for later screening for organic vapors using a photoionization detector (PID) or a flame ionization detector (FID). The remaining portion of the soil sample will be examined and a complete log of soil conditions will be recorded on a soil boring log (Enclosure A) using the Unified Soil Classification System (Enclosure B). The soil will be examined for composition, color, and moisture content.

The split-barrel sampler will be cleaned to prevent cross-contamination for each sampling interval using procedures described in Section 3.0.

Soil borings will normally be advanced with 8- or 10-inch-diameter, hollow-stem augers. The soil generated from the soil borings will be stored in 55-gallon drums and labeled with the corresponding boring number, date, and address of the facility. Alternatively, the soil generated from the soil borings may be wrapped in plastic and stored on site until characterized for disposal.

2.0 WATER LEVEL AND LIQUID-PHASE HYDROCARBON (LPH) THICKNESS MEASUREMENTS AND GROUND WATER SAMPLING

2.1 Water Level and LPH Thickness Measurements

Ground water sampling will be done in general accordance with ASTM D4448 (reapproved 1992). For sites where LPH may be present, the static water level and LPH thickness in each well will be measured with an electronic interface probe prior to purging or sampling. The wire of the interface probe is marked at 0.01 foot intervals. One tone is emitted from the interface probe if LPH is encountered; another tone for water. The wire of the interface probe will be lowered slowly until LPH or water is encountered. At this point, the mark on the interface wire opposite the permanent reference point on the top of the well casing will be read to the nearest 0.01 foot and recorded. If the first encountered substance is LPH, the probe will be lowered until the tone corresponding to water is emitted. This depth will also be recorded. The difference between the two depths corresponds to the LPH thickness. The interface probe will be rinsed in a cleaning solution and deionized water between measurements in different wells.

For sites where LPH is not present, either a conductance probe level meter or an electronic interface probe will be used to measure static water level. The conductance probe level meter emits a steady tone upon encountering any conductive fluid (i.e., water). Like the interface probe, the wire of the conductance probe level meter has markings at 0.01 foot intervals, and the procedure for obtaining static water levels with the conductance probe level meter is basically the same as for an interface probe when LPH is not encountered.

A permanent reference point will be marked on the well casings. The permanent reference point on the well casings will be surveyed to a common reference point. All well casing riser elevations will be known to within 0.01 foot.

Prior to well development, a disposable bailer will be used to collect a sample of LPH, if present in a well, for subjective analysis. The sample will be collected by gently lowering the bailer approximately one-half the bailer length past the air/LPH interface. The appearance (color, opacity, "freshness") will be described and noted on field notes.

2.2 Well Evacuation

After the static water level in a well is determined and prior to collection of a ground water sample, stagnant water will be removed from the well casing and the surrounding gravel pack by bailing, pumping, or with a vacuum truck. At least three casing volumes of water will be removed from each well from which a sample is to be collected. The volume of water in the casing will be determined from the known elevation of the water surface, the well bottom elevation (as measured when the well is installed), and the well diameter.

If the well is bailed or pumped during purging, samples will be collected and field analyzed for pH, temperature, and specific conductance. The well will be considered stabilized when repeated readings of the following parameters are within the ranges indicated as follows:

- Specific conductance — ±10 percent of the reading range
- pH — ±0.1 pH unit
- Temperature — ±0.5° C.

After stabilization, and after at least three casing volumes are evacuated, a sample will be collected for analysis. The field container used for well stabilization measurements, and the pH, temperature, and conductivity probes will be rinsed between wells with deionized water.

All purge water will be containerized and properly handled and documented for disposal. If the containers are stored on site, a label specifying the date of purging, source, and the known or suspected nature of the contents will be affixed to each container.

2.3 Hydropunch® Sampling

Undisturbed ground water samples may be obtained with a Hydropunch® sampling apparatus. When the termination depth of a boring is reached (i.e., when soil is observed to be wet, but not saturated, a Hydropunch® sampling apparatus will be driven approximately 5 feet into the saturated zone. The tool will then be withdrawn approximately 18 inches to expose the inlet screen and allow ground water to flow into the interior of the sampling device. The Hydropunch® will be withdrawn from the subsurface after allowing ample time for the sampling device to fill with ground water.

After the Hydropunch® is retrieved, a stop cock will be attached to the device for sample retrieval. The sample will then be placed in laboratory-supplied containers.

2.4 Sample Collection, Preservation, and Handling

After purging, a new polyethylene disposable bailer will be used to collect ground water samples for analysis. The bailer is attached to a new disposable rope and lowered slowly into the water to avoid agitation of the collected sample. Containers for volatile organics analyses will be filled completely so that no airspace remains in the vial after sealing.

All sample containers will be prewashed and prepared at the analyzing laboratory in accordance with quality assurance/quality control protocols of the laboratory. Only sample containers appropriate for the intended analyses will be used.

After sample collection, the samples will be placed into coolers with ice packs. Internal temperature of the cooler will be maintained at approximately 4 degrees Celsius. Samples will be kept in coolers during transport to the analyzing laboratory.

3.0 DECONTAMINATION AND DISPOSAL PROCEDURES

3.1 Equipment Decontamination

All equipment that comes in contact with potentially contaminated soil, drilling fluid, air, or water will be decontaminated before each use. Decontamination will consist of steam-cleaning, a high-pressure, hot-water rinse, or trisodium phosphate (TSP) or Alconox®/Liquinox® wash and freshwater rinse, as appropriate.

Drilling and sampling equipment will be decontaminated as follows:

1. Drill rig augers, drill rods, and drill bits will be steam-cleaned prior to use and between borings. Visible soil, grease, and other impurities will be removed.

2. Soil sampling equipment will be steam-cleaned prior to use and between each boring. Prior to individual sample collection, any sampling device will also be cleaned in a TSP or Alconox®/Liquinox® solution and rinsed twice in clean water. Any visible soil residue will be removed.

3. It is anticipated that disposable equipment will be used to collect water samples. If disposable equipment is not used, water sampling equipment will be decontaminated using methods described in Item 2 above for soil sampling equipment.

4. Water sampling containers will be cleaned and prepared by the respective analytical laboratories.

5. Stainless steel or brass soil sampling tubes will be steam-cleaned or washed in TSP or Alconox®/Liquinox® solution and rinsed with clean water.

6. Field monitoring equipment (pH, conductivity, or temperature probes) will be rinsed with clean water prior to use and between samples.

4.0 FIELD MEASUREMENTS

Field data will be collected during various sampling and monitoring activities; this section describes routine procedures to be followed by personnel performing field measurements. The methods presented below are intended to ensure that field measurements are consistent and reproducible when performed by various individuals.

4.1 Buried Utility Locations

Prior to commencement of work on site, AMV will contact appropriate utility companies to have underground utility lines located. All work associated with the borings will be preceded by hand augering to a minimum depth of 5 feet below grade to avoid contact with underground utilities.

4.2 Lithologic Logging

A log of soil conditions encountered during the drilling and sample collection (Enclosure A) will be maintained using the Unified Soil Classification System (Enclosure B) by an AMV geologist. All boring logs will be reviewed by a California registered geologist.

The collected soil samples will be examined and the following information recorded: boring location, sample interval and depth, blow counts, color, soil type, moisture content (qualitative), and depth at which ground water (if present) is first encountered. Also recorded on the soil boring logs will be the field screening results obtained using a portable PID or FID.

4.3 Disposal Procedures

Soils and fluids that are produced and/or used during the installation and sampling of borings, and that are known or suspected to contain potentially hazardous materials, will be contained during the above operations. These substances will be retained on site until chemical testing has been completed to determine the proper means of disposal. Handling and disposal of substances known or suspected to contain potentially hazardous materials will comply with the applicable regulations of the California Environmental Protection Agency (Cal-EPA), the California Department of Water Resources, and any other applicable regulations. Soils and fluids produced and/or used during the above-described operations that appear to contain potentially hazardous materials will be disposed of appropriately.

Residual substances generated during cleaning procedures that are known or suspected to pose a threat to human health or the environment will be placed in appropriate containers until chemical testing has been completed to determine the proper means for their disposal.

4.4 Conductivity, Temperature, and pH

Specific conductance, water temperature, and pH measurements will be made when a water sample is collected. Regardless of the sample collection method, a representative water sample will be placed in a transfer bottle used solely for field parameter determinations. A conventional pH meter with a combination electrode or equivalent will be used for field-specific conductance measurements. Temperature measurements will be performed using standard thermometers or equivalent temperature meters. Combination instruments capable of measuring two or all three of the parameters may also be used.

All instruments will be calibrated in accordance with manufacturer methods. The values for conductivity standards and pH buffers used in calibration will be recorded daily in a field notebook. All probes will be thoroughly cleaned and rinsed with fresh water prior to any measurements, in accordance with Section 3.1.

5.0 SAMPLE CUSTODY

This section describes standard operating procedures for sample custody and custody documentation. Sample custody procedures will be followed through sample collection, transfer, analysis, and ultimate disposal. The purpose of these procedures is to assure that (1) the integrity of samples is maintained during their collection, transportation, and storage prior to analysis and (2) post-analysis sample material is properly disposed of. Sample custody is divided into field procedures and laboratory procedures, as described below.

5.1 Field Custody Procedures

Sample quantities, types, and locations will be determined before the actual fieldwork commences. As few people as possible will handle samples. The field sampler is personally responsible for the care and custody of the collected samples until they are properly transferred.

5.1.1 Field Documentation

Each sample will be labeled and sealed properly immediately after collection. Sample identification documents will be carefully prepared so that identification and chain-of-custody records can be maintained and sample disposition can be controlled. Forms will be filled out with waterproof ink. The following sample identification documents will be utilized.

- Sample labels
- Field notebook
- Chain-of-custody forms

5.1.2 Sample Labels

Sample labels provide identification of samples. Preprinted sample labels will be provided. Where necessary, the label will be protected from water and solvents with clean label-protection tape. Each label will contain the following information:

- Name of collector
- Date and time of collection
- Place of collection
- AMV project number
- Sample number
- Preservative (if any)

5.1.3 Field Notebook

Information pertinent to a field survey, measurements, and/or sampling will be recorded in a bound notebook or on the daily field log. Entries in the notebook should include the following:

- Name and title of author, date and time of entry, and physical/environmental conditions during field activity.
- Location of sampling or measurement activity.
- Name(s) and title(s) of field crew.
- Type of sampled or measured media (e.g., soil, ground water, air, etc.)
- Sample collection or measurement method(s).
- Number and volume of sample(s) taken.
- Description of sampling point(s).
- Description of measuring reference points.
- Date and time of collection or measurement.
- Sample identification number(s).
- Sample preservative (if any).
- Sample distribution (e.g., laboratory).
- Field observations/comments.
- Field measurements data (pH, etc.).

5.1.4 Chain-of-Custody Record

A chain-of-custody record will be filled out for and will accompany every sample and every shipment of samples to the analytical laboratories in order to establish the documentation necessary to trace sample possession from the time of collection. The record will contain the following information:

- Sample or station number or sample I.D.
- Signature of collector, sampler, or recorder.
- Date and time of collection.
- Place of collection.

- Sample type.
- Signatures of persons involved in the chain of possession.
- Inclusive dates of possession.

The laboratory portion of the form should be completed by laboratory personnel and will contain the following information:

- Name of person receiving the sample.
- Laboratory sample number.
- Date and time of sample receipt.
- Analyses requested.
- Sample condition and temperature.

5.1.5 Sample Transfer and Shipment

Samples will always be accompanied by a chain-of-custody record. When transferring samples, the individuals relinquishing and receiving the samples will sign, date, and note the time on the chain-of-custody record. Samples will be packaged properly for shipment and dispatched to the appropriate laboratory for analysis. The chain-of-custody record will accompany each shipment. The method of shipment, courier name(s), and other pertinent information will be entered in the chain-of-custody record.

5.2 Laboratory Custody Procedures

A designated sample custodian will accept custody of the shipped samples and verify that the information on the sample label matches that on the chain-of-custody record. Information regarding method of delivery and sample conditions will also be checked on the chain-of-custody record. The custodian will then enter the appropriate data into the laboratory sample tracking system. The laboratory custodian may use the sample number on the sample label or may assign a unique laboratory number to each sample. The custodian will then transfer the sample(s) to the proper analyst(s) or store the sample(s) in the appropriate secure area.

Laboratory personnel are responsible for the care and custody of samples from the time they are received until the sample is exhausted. Once at the laboratory, the samples are handled in accordance with U.S. Environmental Protection Agency SW-846, Test Methods for Evaluating Solid Waste Physical/Chemical Methods, Third Edition, for the intended analyses. All data sheets, chromatographs, and laboratory records will be filed as part of the permanent documentation.

5.3 Corrections to Documentation

Original data recorded in field notebooks, chain-of-custody records, and other forms should be written in ink. These documents should not be altered, destroyed, or discarded, even if they are illegible or contain inaccuracies that require a replacement document.

If an error is made or found on a document, the individual making the corrections will do so by crossing a single line through the error, entering the correct information, and initialing and dating the change. The erroneous information will be obliterated. Any subsequent error(s) discovered on a document will be corrected. All corrections will be initialed and dated.

5.4 Sample Storage and Disposal

Samples and extracts should be retained by the analytical laboratory for 30 days after receipt. Unless notified by the program manager, excess or unused samples should be disposed of by the laboratory in an appropriate manner consistent with applicable government regulations.

ENCLOSURE B

FIELD NOTES

ACTON • MICKELSON • van DAM, INC.

GROUND WATER LEVEL DATA

Project Name Beacon Station #604, 1619 West First Street, Livermore, CA Project Number 19024.04

Date 2-10-95 Field Crew TJB

Measuring Device and Number Interface Probe

Well No.	Time	Depth to Product (feet)	Depth to Ground Water (feet)	Product Thickness (feet)	Reference Elevation (feet)	Ground Water Elevation (feet)	Hard hat well lock	Physical Observations/Comments
MW-1	12:53		30.80		100.00	69.20	yes	
MW-2	12:44		32.16		98.68	66.52	yes	
MW-3	12:24		29.96		97.08	67.12	yes	
MW-4	12:01		30.50		99.35	68.85	yes	
MW-5	12:09		31.44		98.37	66.93	yes	
MW-6	12:19		33.34		97.62	64.28	yes	
MW-7	12:14		32.11		98.03	65.92	No	locking well cap needs replacing

Signature Todd J. Brown

ACTON • MICKELSON • van DAM, INC.

SAMPLING/DEVELOPMENT INFORMATION

Sampling/Development Point: MW 1
Sample I.D.: MW1
Describe Sampling/Development Point: Monitoring Well

Project Name: Beacon #604
Project No.: 1902.4.04
Work Order #:
Date: 2-10-95
Field Crew: TJB

Well Depth: 53.5 feet below MP
Depth to Water (below MP): 30.80 feet
Discharge Rate: gpm
Number of borehole volumes evacuated before sampling: 74

Casing Diameter: 4" inches
Time: 12:53 (AM) PM

Sampling/Development Method:
_____ Tap
X Submersible (Purge)
_____ Bailer Disposable (Sampling)
_____ Other
_____ Centrifugal Pump

Pump intake or bailer set at _____ feet below MP.

Sample Appearance: Clear
Note any Sampling Problems: None
Note any Equipment Washing: Decon. probe, hose Used disposable bailer to sample
Samples Collected/Time: 3 40 ml VOA's @ 7:42 P.M. for TPHg + BTEX

EVACUATION/STABILIZATION TEST DATA

Time	pH (units)	Temperature Corrected Conductance (umhos/cm)	Temperature (°C) °F	Water Level (nearest 0.01 foot)	Cumulative Volume of Water Removed from Well (gallons)	Pumping Rate (gpm)
4:32	8.85	1.40	68.4		10	
4:36	8.56	1.41	68.1		20	
4:41	8.33	1.41	67.7		30	
4:47	8.17	1.29	67.8		40	
4:51	8.12	1.28	67.1		50	
4:55	8.24	1.30	67.6		60	

Bailing Start Time: 4:30 WL: 30.80
Bailing Stop Time: 4:55 WL: 37.12

Comments:

Signature: Todd J. Brown
Date: 2-10-95

ACTON • MICKELSON • van DAM, INC.

SAMPLING/DEVELOPMENT INFORMATION

Sampling/Development Point MW-2
Sample I.D. MW-2
Describe Sampling/Development Point Monitoring Well

Project Name Beacon #604
Project No. 19024.04
Work Order #
Date 2-10-95
Field Crew TJB

Well Depth 54 feet below MP
Depth to Water (below MP) 32.16 feet
Discharge Rate gpm
Number of borehole volumes evacuated before sampling: > 4

Casing Diameter 4 inches
Time 12:44 AM/PM

Sampling/Development Method:
___ Tap
X Submersible (Purge)
X Bailer Disposable (Sample)
___ Other
___ Centrifugal Pump

Pump intake or bailer set at ___ feet below MP.

Sample Appearance: Clear
Note any Sampling Problems: None
Note any Equipment Washing: Decon probe, hose Used disposable bailer to sample
Samples Collected/Time: 3 40ml VOA's @ 7:31 P.M. for TPH$_g$ & BTEX

EVACUATION/STABILIZATION TEST DATA

Time	pH (units)	Temperature Corrected Conductance (umhos/cm)	Temperature ~~°C~~ °F	Water Level (nearest 0.01 foot)	Cumulative Volume of Water Removed from Well (gallons)	Pumping Rate (gpm)
5:15	8.62	1.32	65.4		10	
5:19	8.35	1.35	65.7		20	
5:24	8.09	1.35	66.6		30	
5:29	8.20	1.35	65.9		40	
5:32	8.11	1.34	65.8		50	
5:35	8.11	1.35	65.8		60	

Bailing Start Time 5:15
Bailing Stop Time 5:35
WL 32.16
WL 38.34

Comments:

Signature Todd J. Brown
Date 2-10-95

ACTON • MICKELSON • van DAM, INC.

SAMPLING/DEVELOPMENT INFORMATION

Sampling/Development Point: MW-3
Sample I.D.: MW-3
Describe Sampling/Development Point: Monitoring Well

Project Name: Beacon # 604
Project No.: 19024.04
Work Order #:
Date: 2-10-95
Field Crew: TSB

Well Depth: 52' feet below MP
Depth to Water (below MP): ~~29.96~~ feet
Discharge Rate: gpm
Number of borehole volumes evacuated before sampling: 74

Casing Diameter: 4 inches
Time: 12:24 AM/(PM)

Sampling/Development Method:
_____ Tap
X Submersible (Purging)
X Bailer (Disposable (Sample))
_____ Other
_____ Centrifugal Pump

Pump intake or bailer set at _____ feet below MP.

Sample Appearance: clear
Note any Sampling Problems: None
Note any Equipment Washing: Decon Probe, hose Used disposable bailer to sample
Samples Collected/Time: 3 40ml VOA's @ 7:19 P.M. for TPHg & BTEX

EVACUATION/STABILIZATION TEST DATA

Time	pH (units)	Temperature Corrected Conductance (umhos/cm)	Temperature (°C) °F	Water Level (nearest 0.01 foot)	Cumulative Volume of Water Removed from Well (gallons)	Pumping Rate (gpm)
~~4:30~~	8.78	1.24	65.8		10	
4:36	8.45	1.25	67.2		20	
4:44	8.33	1.27	67.0		30	
4:51	8.38	1.25	66.3		40	
4:56	8.33	1.25	66.2		50	
5:00	8.32	1.25	66.2		60	

Bailing Start Time: ~~3:55~~ 4:30 P.M.
Bailing Stop Time: 5:00
WL 29.96
WL 35.17

Comments:

Signature: Todd J. Brown
Date: 2-10-95

ACTON • MICKELSON • van DAM, INC.

SAMPLING/DEVELOPMENT INFORMATION

Sampling/Development Point: MW-4
Sample I.D.: MW-4
Describe Sampling/Development Point: Monitoring Well

Project Name: Beacon #604
Project No.: 19024.04
Work Order #:
Date: 2-10-95
Field Crew: TJB

Well Depth: 47 feet below MP
Depth to Water (below MP): 30.50 feet
Discharge Rate: gpm
Number of borehole volumes evacuated before sampling: 74

Casing Diameter: 2" inches
Time: 12:01 AM/(PM)

Sampling/Development Method:
_____ Tap
_____ Submersible
X Bailer (Disposable)
_____ Other
_____ Centrifugal Pump

Pump intake or bailer set at _____ feet below MP.

Sample Appearance: clear
Note any Sampling Problems: None
Note any Equipment Washing: Used disposable bailer
Samples Collected/Time: 3 40ml VoA's @ 3:36 for TPHg & BTEX

EVACUATION/STABILIZATION TEST DATA

Time	pH (units)	Temperature Corrected Conductance (umhos/cm)	Temperature (°C) °F	Water Level (nearest 0.01 foot)	Cumulative Volume of Water Removed from Well (gallons)	Pumping Rate (gpm)
1:20	7.83	1.40	66.6 °F		2.5	
1:25	7.52	1.43	66.2		≈ 5	
1:33	7.54	1.42	66.1		10	

Bailing Start Time: 1:15
Bailing Stop Time: 1:35

WL: 30.50
WL: 34.21

Comments:

Signature: Todd J. Brown
Date: 2-10-95

ACTON • MICKELSON • van DAM, INC.

SAMPLING/DEVELOPMENT INFORMATION

Sampling/Development Point: MW 5
Sample I.D.: MW 5
Describe Sampling/Development Point: Monitoring Well

Project Name: Beacon #604
Project No.: 19024.04
Work Order #:
Date: 2-10-95
Field Crew: TSB

Well Depth: 47 feet below MP
Depth to Water (below MP): 31.44 feet
Discharge Rate: gpm
Number of borehole volumes evacuated before sampling: 74

Casing Diameter: 2 inches
Time: 12:09 AM (PM)

Sampling/Development Method:
_____ Tap
X Submersible (purge)
X Bailer Disposable (sample)
_____ Other
_____ Centrifugal Pump

Pump intake or bailer set at _____ feet below MP.

Sample Appearance: clear
Note any Sampling Problems: None
Note any Equipment Washing: Decon Pumphose & probe Used disposable bailer to s
Samples Collected/Time: 3 40 ml VOA's @ 3:43 for TPHg & BTEX

EVACUATION/STABILIZATION TEST DATA

Time	pH (units)	Temperature Corrected Conductance (umhos/cm)	Temperature (°C) °F	Water Level (nearest 0.01 foot)	Cumulative Volume of Water Removed from Well (gallons)	Pumping Rate (gpm)
2:04	8.87	1.59	71.3		2.5	
2:08	8.58	1.61	71.1		5	
2:10	8.58	1.63	70.9		7.5	
2:15	8.52	1.68	70.3		10	

Bailing Start Time: 2:00
Bailing Stop Time: 2:15
WL: 31.44
WL: 34.67

Comments:

Signature: Todd J. Brown
Date: 2-10-95

ACTON • MICKELSON • van DAM, INC.

SAMPLING/DEVELOPMENT INFORMATION

Sampling/Development Point MW 6
Sample I.D. MW-6
Describe Sampling/Development Point Monitoring Well

Project Name Beacon #604
Project No. 19024.04
Work Order #
Date 2-10-95
Field Crew TJB

Well Depth 48 feet below MP
Depth to Water (below MP) 33.34 feet
Discharge Rate gpm
Number of borehole volumes evacuated before sampling: 7 4

Casing Diameter 2 inches
Time 12:19 AM/PM

Sampling/Development Method:
_____ Tap
X Submersible (Purge)
X Bailer (Disposable Sample)
_____ Other
_____ Centrifugal Pump

Pump intake or bailer set at _____ feet below MP.

Sample Appearance: Clear
Note any Sampling Problems: None
Note any Equipment Washing: Decon pump hose, probe. Used disposable bailer to sample
Samples Collected/Time: 3 40 ml VOA's @ 3:57 for TPHg & BTEX

EVACUATION/STABILIZATION TEST DATA

Time	pH (units)	Temperature Corrected Conductance (umhos/cm)	Temperature (°C)	Water Level (nearest 0.01 foot)	Cumulative Volume of Water Removed from Well (gallons)	Pumping Rate (gpm)
3:05	8.60	1.71	68.4		5	
3:06	9.78	1.71	68.9		10	
3:09	9.24	1.73	69.8		15	
3:16	8.13	1.73	70.3		20	

Bailing Start Time 3:05 WL 33.34
Bailing Stop Time 3:16 WL 35.89

Comments:

Signature Todd J. Brown
Date 2-10-95

ACTON • MICKELSON • van DAM, INC.

SAMPLING/DEVELOPMENT INFORMATION

Sampling/Development Point: MW-7
Sample I.D.: MW-7
Describe Sampling/Development Point: Monitoring Well

Project Name: Beacon #604
Project No.: 19024.04
Work Order #:
Date: 2-10-95
Field Crew: TJB

Well Depth: 47 feet below MP
Depth to Water (below MP): 32.11 feet
Discharge Rate: gpm
Number of borehole volumes evacuated before sampling: 74

Casing Diameter: 2 inches
Time: 12:14 AM/(PM)

Sampling/Development Method:
_____ Tap
X Submersible (Purge)
X Bailer (Disposable) (Sample)
_____ Other
_____ Centrifugal Pump

Pump intake or bailer set at _____ feet below MP.

Sample Appearance: clear
Note any Sampling Problems: None
Note any Equipment Washing: Decon Pump, hose, probe. Used disposable bailer to sample
Samples Collected/Time: 3 40ml VOA's @ 4:22 for TPHg & BTEX

EVACUATION/STABILIZATION TEST DATA

Time	pH (units)	Temperature Corrected Conductance (umhos/cm)	Temperature (°C) °F	Water Level (nearest 0.01 foot)	Cumulative Volume of Water Removed from Well (gallons)	Pumping Rate (gpm)
2:35	8.59	1.71	70.1		2.5	
2:37	8.53	1.71	70.5		5	
2:38	8.47	1.71	70.3		7.5	
2:39	8.26	1.71	70.7		10	
2:42	8.17	1.71	70.9		12	

Bailing Start Time: 2:30 WL: 32.11
Bailing Stop Time: 2:42 WL: 34.26

Comments:

Signature: Todd J. Brown
Date: 2-10-95

ENCLOSURE C

GROUND WATER SAMPLE ANALYTICAL RESULTS

WEST LABORATORY

February 16, 1995
Sample Log 11310

Dale van Dam
Acton, Mickelson, & van Dam
4511 Golden Foothill Parkway, Suite 1
El Dorado Hills, CA 95762

Subject: Analytical Results for 8 Water Samples
Identified as: Project # 19024.04 (Beacon 604)
Received: 02/10/95

Dear Mr. van Dam:

Analysis of the sample(s) referenced above has been completed. This report is written to confirm results communicated on February 16, 1995 and describes procedures used to analyze the samples.

Sample(s) were analyzed using the following method(s):

"BTEX" (EPA Method 602/Purge-and-Trap)
"TPH as Gasoline" (Modified EPA Method 8015/Purge-and-Trap)

Please refer to the following table(s) for summarized analytical results and contact us at 916-753-9500 if you have questions regarding procedures or results. The chain-of-custody document is enclosed.

Approved by:

Mitra Sarkhosh
Senior Chemist

WEST LABORATORY

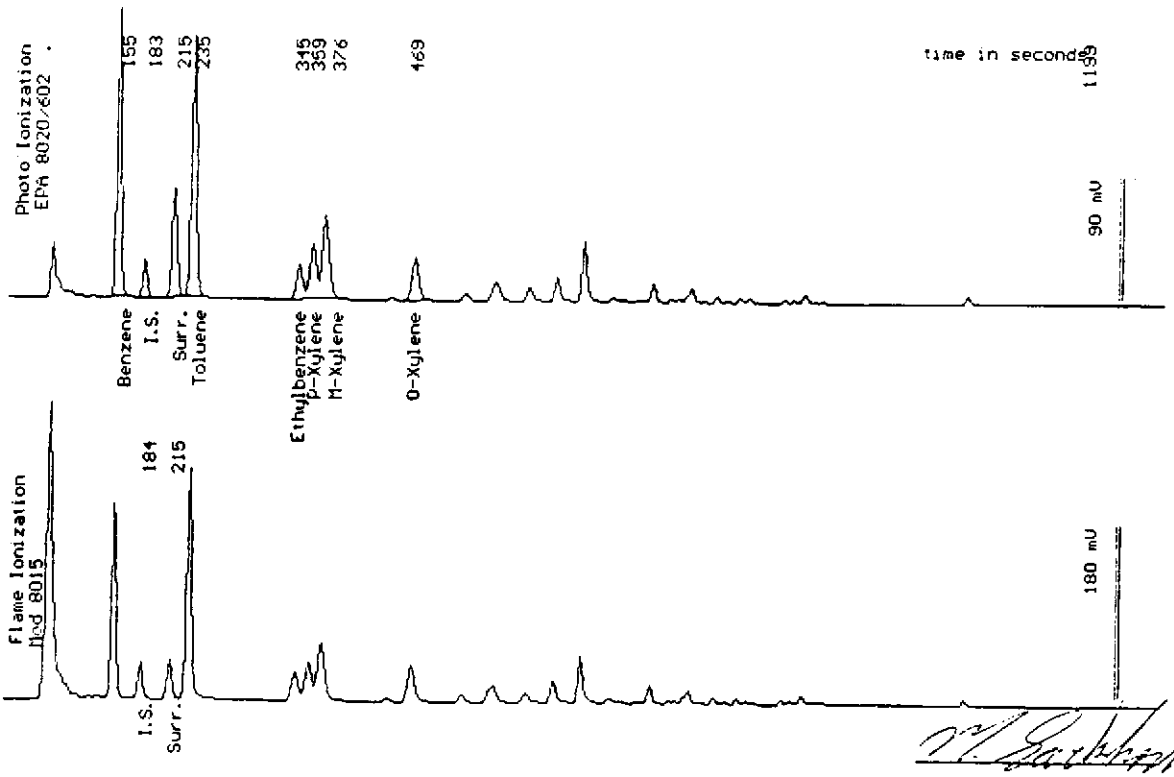
Sample Log 11310

11310-01

Sample: **MW-1**

From : Project # 19024.04 (Beacon 604)
Sampled : 02/10/95
Dilution : 1:10 QC Batch : 4113I
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(5.0)	1200
Toluene	(5.0)	1500
Ethylbenzene	(5.0)	280
Total Xylenes	(5.0)	1500
TPH as Gasoline	(500)	9300
Surrogate Recovery		99 %



Date Analyzed: 02-14-95
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

Mitra Sarkhosh
Senior Chemist

WEST LABORATORY

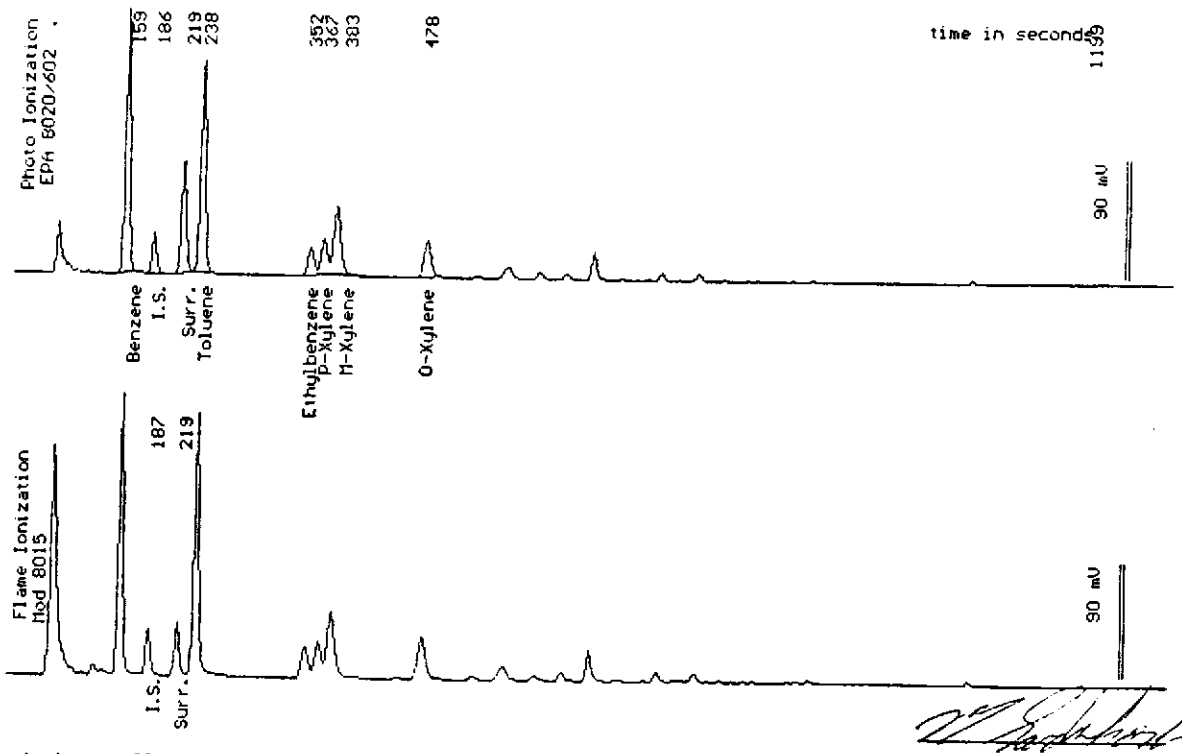
Sample Log 11310

11310-02

Sample: **MW-2**

From : Project # 19024.04 (Beacon 604)
Sampled : 02/10/95
Dilution : 1:100 QC Batch : 4113I
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(50)	12000
Toluene	(50)	12000
Ethylbenzene	(50)	2200
Total Xylenes	(50)	11000
TPH as Gasoline	(5000)	63000
Surrogate Recovery		100 %



Date Analyzed: 02-14-95
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

Mitra Sarkhosh
Senior Chemist

WEST LABORATORY

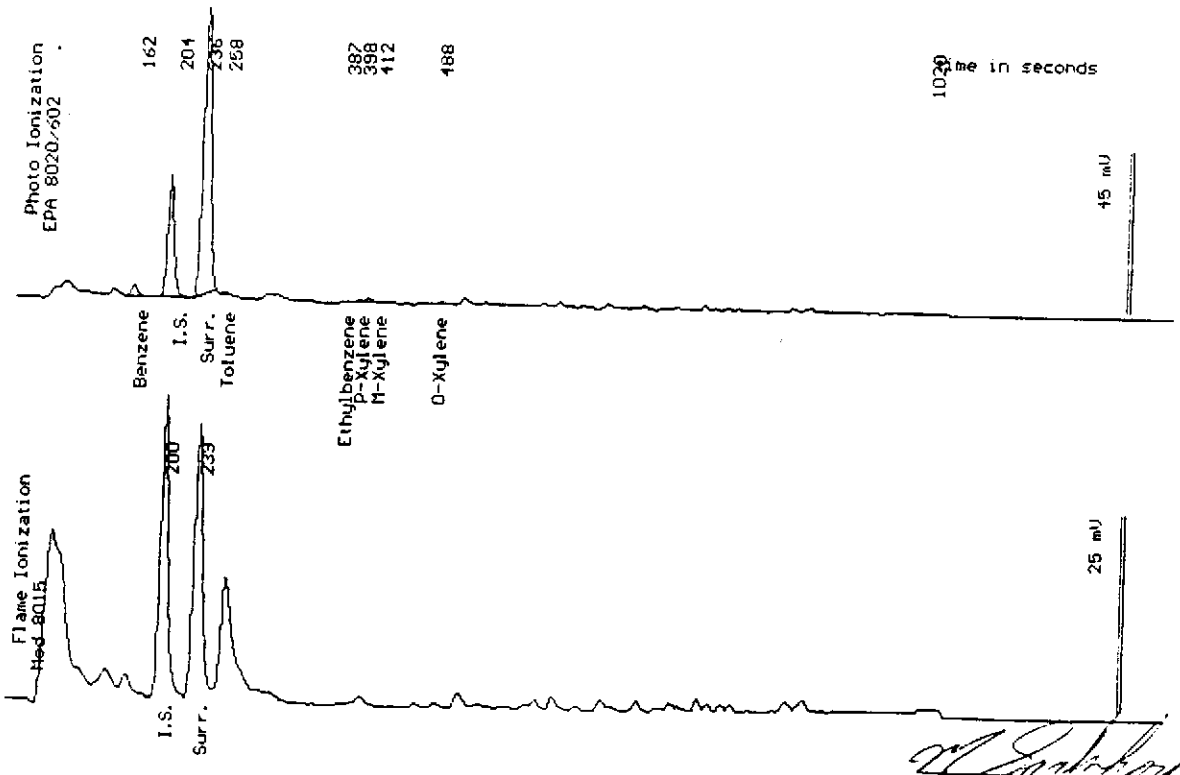
Sample Log 11310

11310-03

Sample: **MW-3**

From : Project # 19024.04 (Beacon 604)
Sampled : 02/10/95
Dilution : 1:1 QC Batch : 2113V
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(.50)	1.4
Toluene	(.50)	<.50
Ethylbenzene	(.50)	<.50
Total Xylenes	(.50)	1.8
TPH as Gasoline	(50)	96
Surrogate Recovery		113 %



Date Analyzed: 02-14-95
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

Mitra Sarkhosh
Senior Chemist

WEST LABORATORY

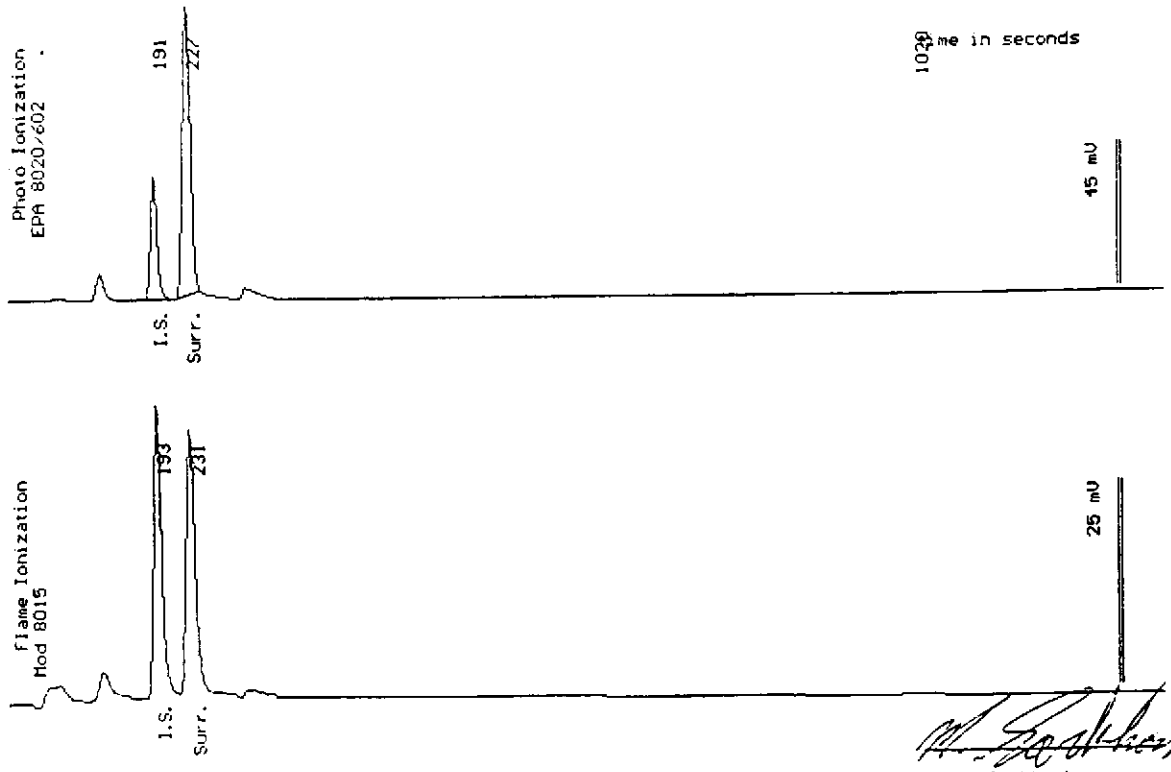
Sample Log 11310

11310-04

Sample: **MW-4**

From : Project # 19024.04 (Beacon 604)
Sampled : 02/10/95
Dilution : 1:1 QC Batch : 2113Y
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(.50)	<.50
Toluene	(.50)	<.50
Ethylbenzene	(.50)	<.50
Total Xylenes	(.50)	<.50
TPH as Gasoline	(50)	<50
Surrogate Recovery		110 %



Date Analyzed: 02-15-95
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

Mitra Sarkhosh
Senior Chemist

WEST LABORATORY

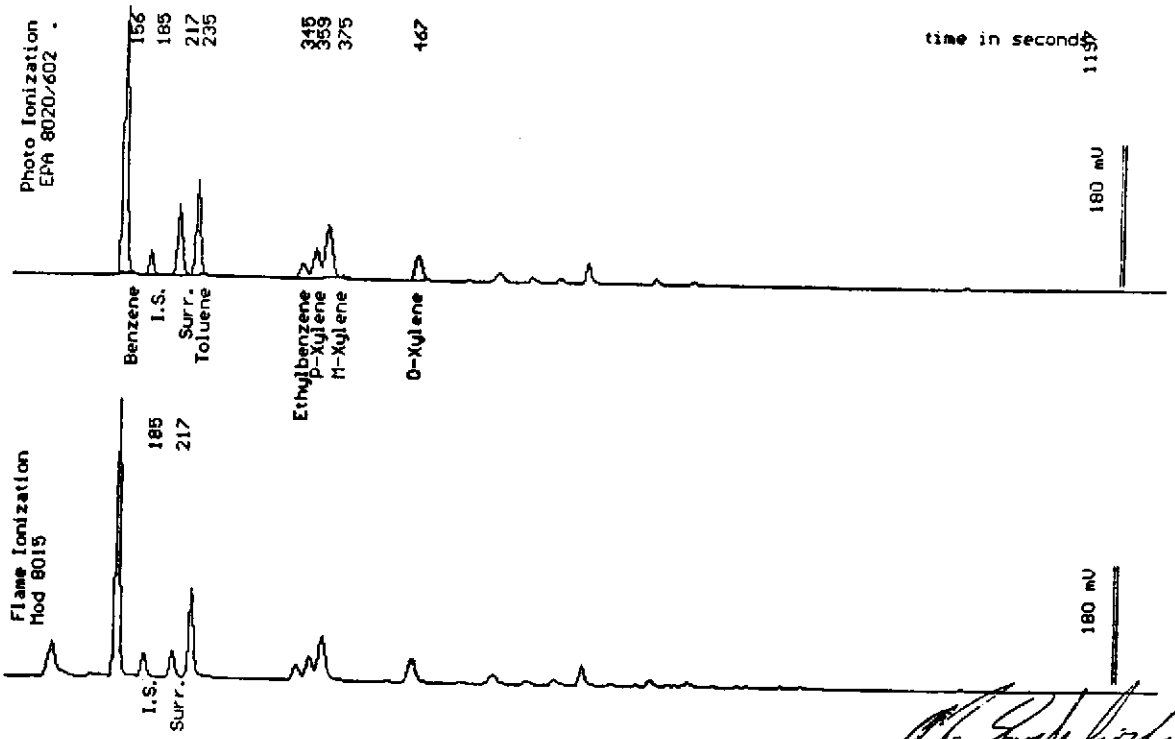
Sample Log 11310

11310-06

Sample: **MW-6**

From : Project # 19024.04 (Beacon 604)
Sampled : 02/10/95
Dilution : 1:100 **QC Batch : 4113K**
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(50)	21000
Toluene	(50)	8400
Ethylbenzene	(50)	2000
Total Xylenes	(50)	14000
TPH as Gasoline	(5000)	63000
Surrogate Recovery		99 %



Date Analyzed: 02-15-95
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

Mitra Sarkhosh
Senior Chemist

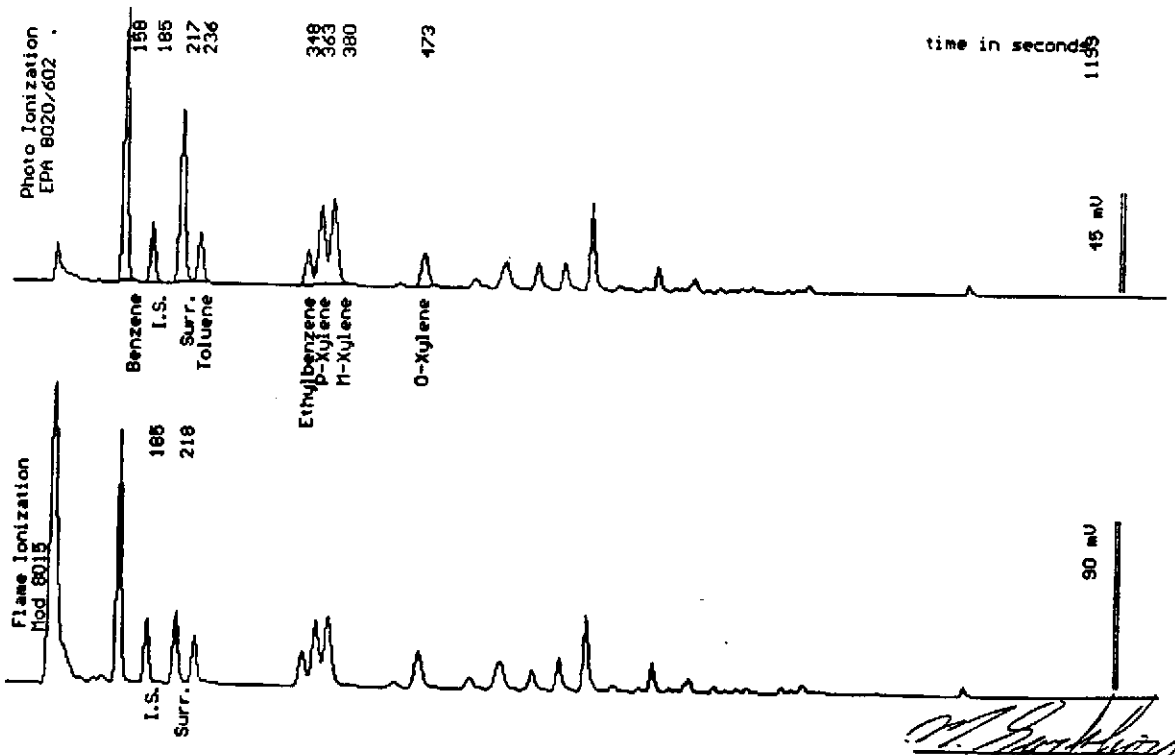
WEST LABORATORY

Sample Log 11310
11310-07

Sample: **MW-7**

From : Project # 19024.04 (Beacon 604)
Sampled : 02/10/95
Dilution : 1:50 QC Batch : 4113I
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(25)	4000
Toluene	(25)	900
Ethylbenzene	(25)	890
Total Xylenes	(25)	5100
TPH as Gasoline	(2500)	27000
Surrogate Recovery		102 %



Date Analyzed: 02-14-95
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

Mitra Sarkhosh
Senior Chemist

WEST LABORATORY

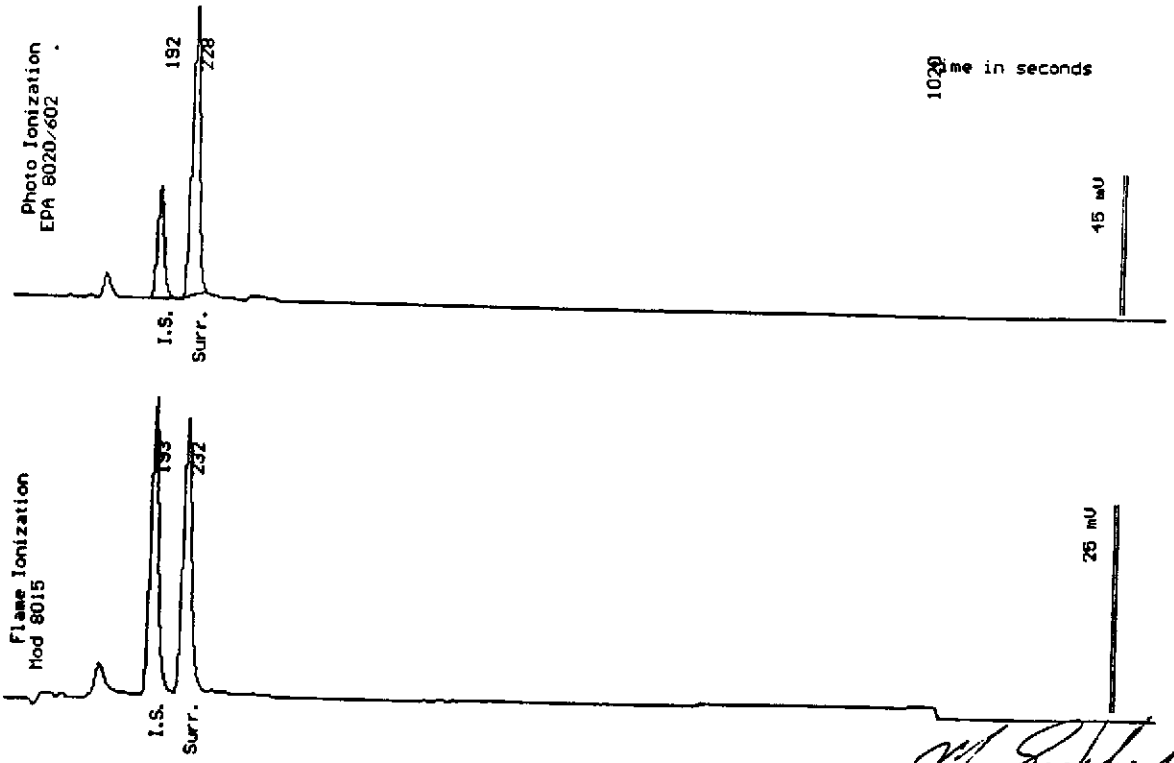
Sample Log 11310
11310-08

Sample: Trip Blank

From : Project # 19024.04 (Beacon 604)
Sampled : 02/10/95
Dilution : 1:1
Matrix : Water

QC Batch : 2113Y

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(.50)	<.50
Toluene	(.50)	<.50
Ethylbenzene	(.50)	<.50
Total Xylenes	(.50)	<.50
TPH as Gasoline	(50)	<50
Surrogate Recovery		112 %



Date Analyzed: 02-15-95
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

Mitra Sarkhosh
Senior Chemist

WEST
Western Environmental Science & Technology

1046 Olive Drive, Suite 3
Davis, CA 95616

916-753-9500
FAX #: 916-753-6091
LAB#: 916-757-4650

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: Dale van Dam
Phone #: (916) 939-7550

Company/Address: Acton, Mickelson, Van Dam, Inc (AMV, Inc.)
FAX #: (916) 939-7570

Project Number: 1902 4.04
P.O.#:
Project Name: Beacon #604

Project Location: 1619 West First Street, Livermore
Sampler Signature: Todd J. Brown

Sample ID	Sampling DATE	Sampling TIME	Container VOA	Container SLEEVE	Container 1L GLASS	Container 1L PLASTIC	Method Preserved HCl	Method Preserved HNO_3	Method Preserved ICE	Method Preserved NONE	Matrix WATER	Matrix SOIL
MW-1	2-10-95	7:42	3				X		X		X	
MW-2		7:31										
MW-3		7:19										
MW-4		3:36										
MW-5		3:43										
MW-6		3:57										
MW-7		4:22										
Trip blank			1									

ANALYSIS REQUEST

BTEX (602/8020)	BTEX/TPH as Gasoline (602/8020/8015)	TPH as Diesel/Oil (8015)	Total Oil & Grease (5520 B/E,F)	Total Oil & Grease IR (5520 B/E,F,C)	96 - Hour Fish Bioassay	EPA 601/8010	EPA 602/8020	EPA 615/8150	EPA 608/8080 - Pesticides	EPA 608/8080-PCBs	EPA 624/8240	EPA 625/8270	ORGANIC LEAD	Reactivity, Corrosivity, Ignitibility	W.E.T. (✓) / TOTAL (✓) CAM - 17 Metals	EPA - Priority Pollutant Metals	LEAD(7420/7421/239.2)	Cd, Cr, Pb, Zn, Ni
	X																	

TAT

- RUSH SERVICE (12 hr) or (24 hr)
- EXPEDITED SERVICE (48 hr) or (1 wk)
- STANDARD SERVICE (2 wk)

Relinquished by:	Date	Time	Received by:
Todd J. Brown	2/10/95	9:50	
Relinquished by	Date	Time	Received by:
Relinquished by	Date	Time	Received by Laboratory:
	2/10/95	9:50	

Remarks:
Report to: Dale van Dam of AMV, Inc.
Terry Fox of Ultramar
*STD. ULTRAMAR TAT

Bill To:

ACTON •
MICKELSON •
van DAM, INC.

Consulting Scientists, Engineers, and Geologists

Future investigations should include
① Analysis for MTBE from well closest to D line
② GW investigation of 2nd aquifer may be necessary

June 2, 1994

Mr. Terrence Fox
Ultramar Inc.
525 West Third Street
Hanford, California 93232

19024.03

Subject: Off-Site Soil and Ground Water Investigation--Beacon Station #604
1619 West First Street, Livermore, California

Dear Mr. Fox:

Acton • Mickelson • van Dam, Inc. (AMV), has been authorized by Ultramar Inc. (Ultramar), to continue an investigation of soil and ground water conditions at Beacon Station #604 located at 1619 West First Street, Livermore, Alameda County, California (Figures 1 and 2). This letter report summarizes the results of soil boring and soil sampling, ground water monitoring well installation, and ground water sampling performed at the site on March 29 and 30, 1994.

Scope of Work

The work included advancing four 8-inch-diameter soil borings at off-site locations to depths of between 47 and 48 feet below grade and completing each of these borings as 2-inch-diameter monitoring wells MW-4, MW-5, MW-6, and MW-7 (Figure 2). Methods used to drill and sample the soil borings are described in Enclosure A.

Selected soil samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), and total petroleum hydrocarbons as gasoline (TPHg). Analytical procedures conformed to U.S. Environmental Protection Agency (EPA) and California Environmental Protection Agency, Department of Toxic Substances Control (Cal-EPA) approved methods.

Soil Borings

Soil samples collected from the borings consisted of silty clay, clay, clayey sand, silty gravel, and/or sandy gravel. Approximately 1 foot of concrete or asphalt and gravel road base was encountered at the surface in the borings for monitoring wells MW-4 through MW-7. Soil samples collected from the soil boring for monitoring well MW-6 indicate the following vertical sediment sequence: from the ground surface to 4.5 feet below grade, the soil encountered

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El Dorado Hills, California 95762

(916) 939-7550
Fax (916) 939-7570

consisted of silty gravel; from 4.5 feet to 18 feet below grade, sandy gravel was encountered; silty clay is present from 18 to 24 feet below grade; from 24 to 31 feet below grade, sandy gravel is present; under the sandy gravel, clayey sand was encountered from 31 to 35 feet below grade; and from 35 to 48 feet below grade, sandy gravel was encountered. Ground water was encountered at approximately 33 feet below grade. The boring was terminated at 48 feet below grade. Soil borings for monitoring wells MW-4, MW-5, and MW-7, each terminated at 47 feet below grade, generally encountered approximately the same sequence of sedimentary materials. Contacts between the soil types varied between gradational and sharp. Soil boring logs containing detailed descriptions of soil conditions encountered in each boring are included in Enclosure B.

Soil Sample Collection

A portion of each soil sample collected from the soil borings was sealed in a plastic bag and allowed to reach ambient air temperature. The headspace of the bag was then screened in the field with a photoionization detector (PID). The PID reading for each sample was recorded on the right-hand side of the boring logs (Enclosure B).

Soil samples were selected for chemical analysis on the basis of PID screening results. Two soil samples collected from above the water table in the boring for monitoring wells MW-4 through MW-6 were submitted for analysis of concentrations of BTEX and TPHg. Three soil samples were submitted for chemical analysis from the boring for monitoring well MW-7. Analytical results of soil samples submitted by AMV are summarized in Table 1. Copies of certified analytical reports for each soil sample submitted to the laboratory during this phase of work are contained in Enclosure D.

Monitoring Well Installation

Ground water monitoring wells MW-4 though MW-7 were constructed of 2-inch-diameter, Schedule 40 PVC casing. Each new well consisted of 20 feet of 0.020 inch slot screened casing. Blank casing extended from the screened interval to the surface. Monitoring well construction details are contained in Enclosure C. The monitoring wells were developed, purged, and sampled in accordance with methods outlined in Enclosure A. A ground water sample from each new well (MW-4, MW-5, MW-6, and MW-7) was submitted for laboratory analysis of BTEX and TPHg by Cal-EPA and EPA-approved methods.

Ground Water Level Measurements

Depth to ground water was measured in the new and existing monitoring wells (MW-1 through MW-7) on March 30, 1994 (Table 2). Ground water was present at depths ranging from

30.97 (MW-3) to 33.38 (MW-6) feet below the top of the well casing. The casing riser on each newly installed monitoring well was surveyed to the casing riser on existing monitoring well MW-2 within the nearest 0.01 foot. Survey notes are included in Enclosure E. Water level measurements indicate an inferred direction of ground water flow toward the northwest as illustrated on Figure 3. Ground water gradient at the site on March 30, 1994, was calculated to be approximately 0.02 foot per foot (ft/ft). Liquid-phase hydrocarbons (LPH) were not detected in any of the monitoring wells on this date. Copies of field observations and data sheets from work performed at the site on March 29 and 30, 1994 are contained in Enclosure E.

Ground Water Sample Collection

After the newly installed monitoring wells were developed and purged on March 30, 1994, ground water samples were collected from monitoring wells MW-4 through MW-7. Samples were collected as described in Enclosure A. Each ground water sample was analyzed for BTEX and TPHg by EPA and Cal-EPA approved methods. Ground water samples from the newly installed wells were reported to contain petroleum hydrocarbon constituents. Analytical results of sampling conducted on March 30, 1994, are summarized in Table 3. Ground water sample analytical results from previous quarters are also included in Table 3. Copies of certified analytical reports for ground water samples collected on March 30, 1994, are contained in Enclosure F.

Ground water quality data for each of the newly installed ground water monitoring wells are presented on Figure 4. (Each well at the site was sampled by AMV on April 25, 1994, during the scheduled quarterly sampling event; these results will be reported in the quarterly monitoring report for the second quarter of 1994.)

Summary of Analytical Results

Soil samples collected at 30 and 35 feet below grade from the borings for monitoring wells MW-4 and MW-5 and from a depth of 20 feet in the boring for monitoring well MW-7 did not contain detectable concentrations of TPHg or BTEX. Soil samples collected at 30 and 35 feet below grade from the boring for monitoring well MW-6 contained TPHg concentrations of 42 and 3.7 mg/kg and benzene concentrations of 0.65 and 0.061 mg/kg, respectively. The soil samples collected from the 35 and 40 feet below grade from the boring for monitoring well MW-7 (within the zone of water table fluctuation) contained TPHg concentrations of 4.9 and 8.8 mg/kg and benzene concentrations of 0.016 and 0.064 mg/kg, respectively.

Petroleum hydrocarbon constituents were detected in the ground water samples collected from each newly constructed well (MW-4 through MW-7) on March 30, 1994. Benzene ~~concentrations in ground water samples collected on March 30, 1994, ranged from 4.2 µg/l~~

concentrations in ground water samples collected on March 30, 1994, ranged from 4.2 µg/l (MW-4) to 21,000 µg/l (MW-6).

It is recommended that copies of this report be submitted to the following agencies:

Ms. Eva Chu
Department of Environmental Health
Alameda County Health Care Services
80 Swan Way, Room 200
Oakland, California 94612

Mr. Cecil Felix
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street
Oakland, California 94612

If you have any questions regarding this project, please contact either of the undersigned immediately.

Sincerely,

ACTON • MICKELSON • van DAM, INC.

Steven A. Liaty
Staff Geologist

Dale A. van Dam, R.G.
California Registered Geologist #4632

SAL:maf/mjd
Enclosures

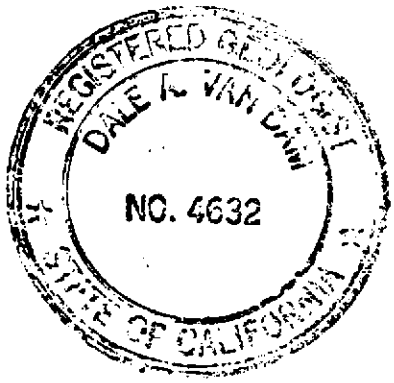


TABLE 1

SOIL SAMPLE ANALYTICAL RESULTS
Beacon Station #604
1619 West First Street, Livermore, California
(concentrations in milligrams per kilogram)

Boring No.	Sample No.	Date Sampled	Depth (feet below grade)	Benzene	Toluene	Ethylbenzene	Total Xylenes	TPHg[a]
MW-4	MW4-6	03-30-94	30	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
	MW4-7		35	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
MW-5	MW5-6	03-29-94	30	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
	MW5-7		35	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
MW-6	MW6-6	03-29-94	30	0.65	1.7	0.72	4.6	42
	MW6-7		35	0.061	0.16	0.094	0.55	3.7
MW-7	MW7-4	03-30-94	20	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
	MW7-7		35	0.016	0.013	0.025	0.048	4.9
	MW7-8		40	0.064	0.029	0.065	0.39	8.8

TABLE 2

GROUND WATER ELEVATION MEASUREMENTS
Beacon Station #604
1619 West First Street, Livermore, California

Monitoring Well	Date	Top of Riser (feet)	Depth of Water (feet)	Ground Water Elevation (feet)	Physical Observation
MW-1	06-01-93	100.00	37.50	62.50	No Product
	06-22-93		38.46	61.54	No Product
	10-06-93		42.22	57.78	No Product
	01-13-94		34.52	65.48	No Product
	03-30-94		31.93	68.07	No Product
MW-2	06-01-93	98.68	38.02	60.66	No Product
	06-22-93		39.07	59.61	No Product
	10-06-93		43.72	54.96	No Product
	01-13-94		35.85	62.83	No Product
	03-30-94		32.82	65.86	No Product
MW-3	06-01-93	97.08	36.18	61.90	No Product
	06-22-93		37.11	61.97	No Product
	10-06-93		41.15	55.93	No Product
	01-13-94		33.95	63.13	No Product
	03-30-94		30.97	66.11	No Product
MW-4	03-30-94	99.35	31.56	67.79	No Product
MW-5	03-30-94	98.37	32.07	66.30	No Product
MW-6	03-30-94	97.62	33.38	64.24	No Product
MW-7	03-30-94	98.03	31.98	66.05	No Product

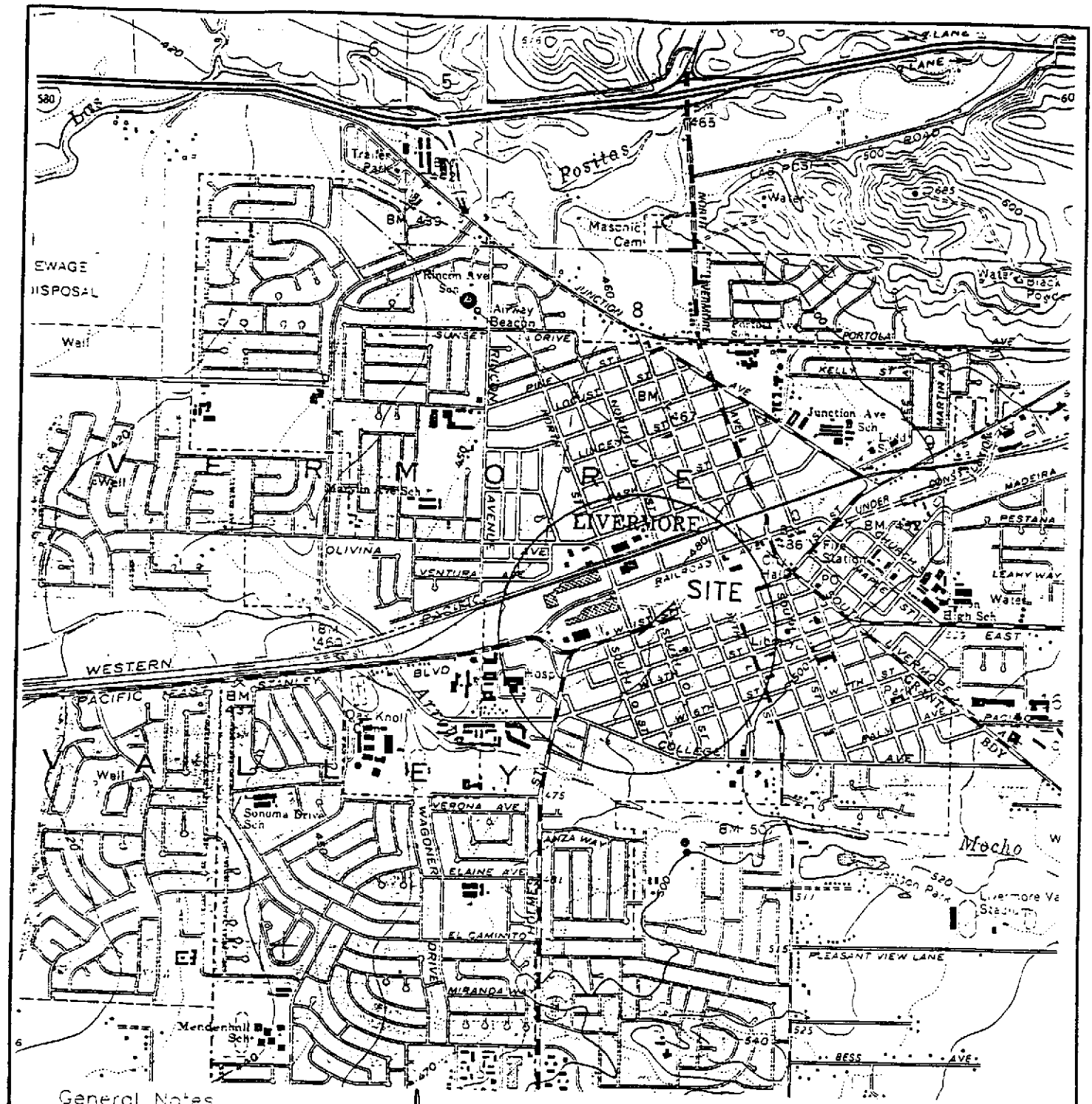
Note: Monitoring well casing elevations were surveyed relative to an arbitrary bench mark at the top of the casing of monitoring well MW-1 with an assumed elevation of 100.00 feet.

TABLE 3

GROUND WATER SAMPLE ANALYTICAL RESULTS
Beacon Station #604
1619 West First Street, Livermore, CA
Concentrations in micrograms per liter (µg/l)

Monitoring Well	Date Sampled	Benzene	Toluene	Ethylbenzene	Total Xylenes	TPHg[a]
MW-1	06-01-93	2,200	400	<50	4,900	27,000
	06-22-93	8,000	10,000	260	10,000	87,000
	10-06-93	4,700	6,500	740	5,300	40,000
	01-13-94	1,300	950	110	850	9,400
	03-30-94[b]					
MW-2	06-01-93	20,000	21,000	3,300	18,000	170,000
	06-22-93	19,000	22,000	3,500	18,000	160,000
	10-06-93	17,000	17,000	3,000	15,000	110,000
	01-13-94	20,000	19,000	2,300	14,000	93,000
	03-30-94[b]					
MW-3	06-01-93	4.6	<0.50	<0.50	1.9	270
	06-22-93	8.2	<0.50	<0.50	0.72	160
	10-06-93	57	110	24	120	740
	01-13-94	2.6	0.67	0.78	4.2	83
	03-30-94[b]					
MW-4	03-30-94	4.2	15	2.5	26	120
MW-5	03-30-94	1,300	20	<13	160	7,500
MW-6	03-30-94	21,000	8,600	1,700	12,000	63,000
MW-7	03-30-94	7,200	2,400	1,600	11,000	43,000

[a]Total petroleum hydrocarbons as gasoline
[b]Well not sampled on this date



General Notes

Base Map from U.S.G.S.
Livermore, California
7.5 Minute Topographic
Photorevised 1980

NORTH

QUADRANGLE LOCATION

0 2,000

Approximate Scale
(in feet)

FIGURE 1

SITE LOCATION MAP

BEACON STATION #604
1619 WEST FIRST STREET
LIVERMORE, CALIFORNIA

Project No.	Drawn
3004	LMC
File No.	Prepared
604	SAL
Revision	Reviewed

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4511 Golden Foothill Parkway, Suite 1
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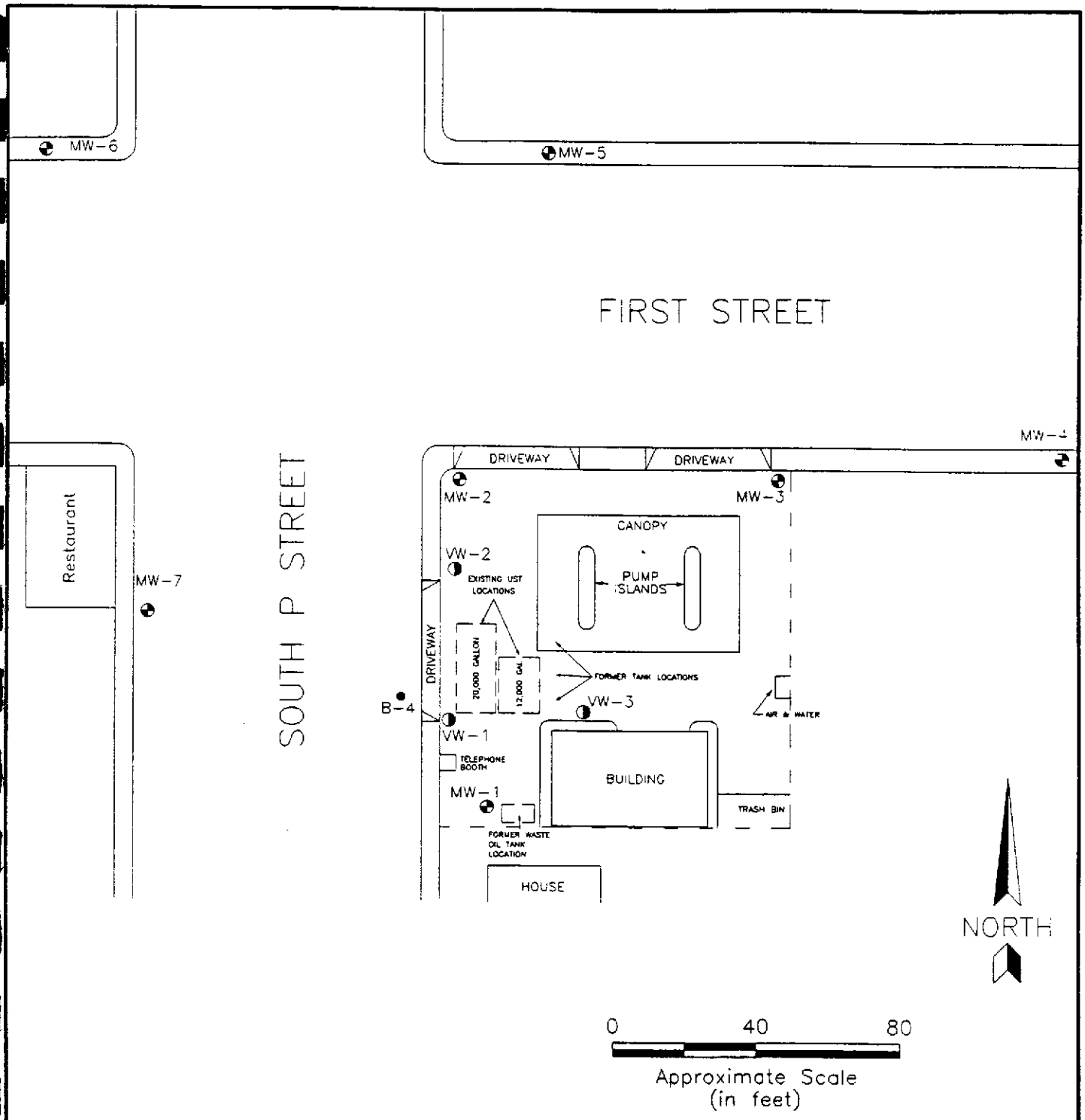
(916) 939-7550



LEGEND

- VW-3 — VADOSE WELL LOCATION AND NUMBER
- MW-3 — MONITORING WELL LOCATION AND NUMBER
- B-4 — SOIL BORING LOCATION AND NUMBER
- — — PROPERTY BOUNDARY

FIGURE 2

SITE MAP

BEACON STATION #604
1619 WEST FIRST STREET
LIVERMORE, CALIFORNIA

Project No.	Drawn
19024.03	LMC
File No.	Prepared
FIG2	TAD
Revision	Reviewed

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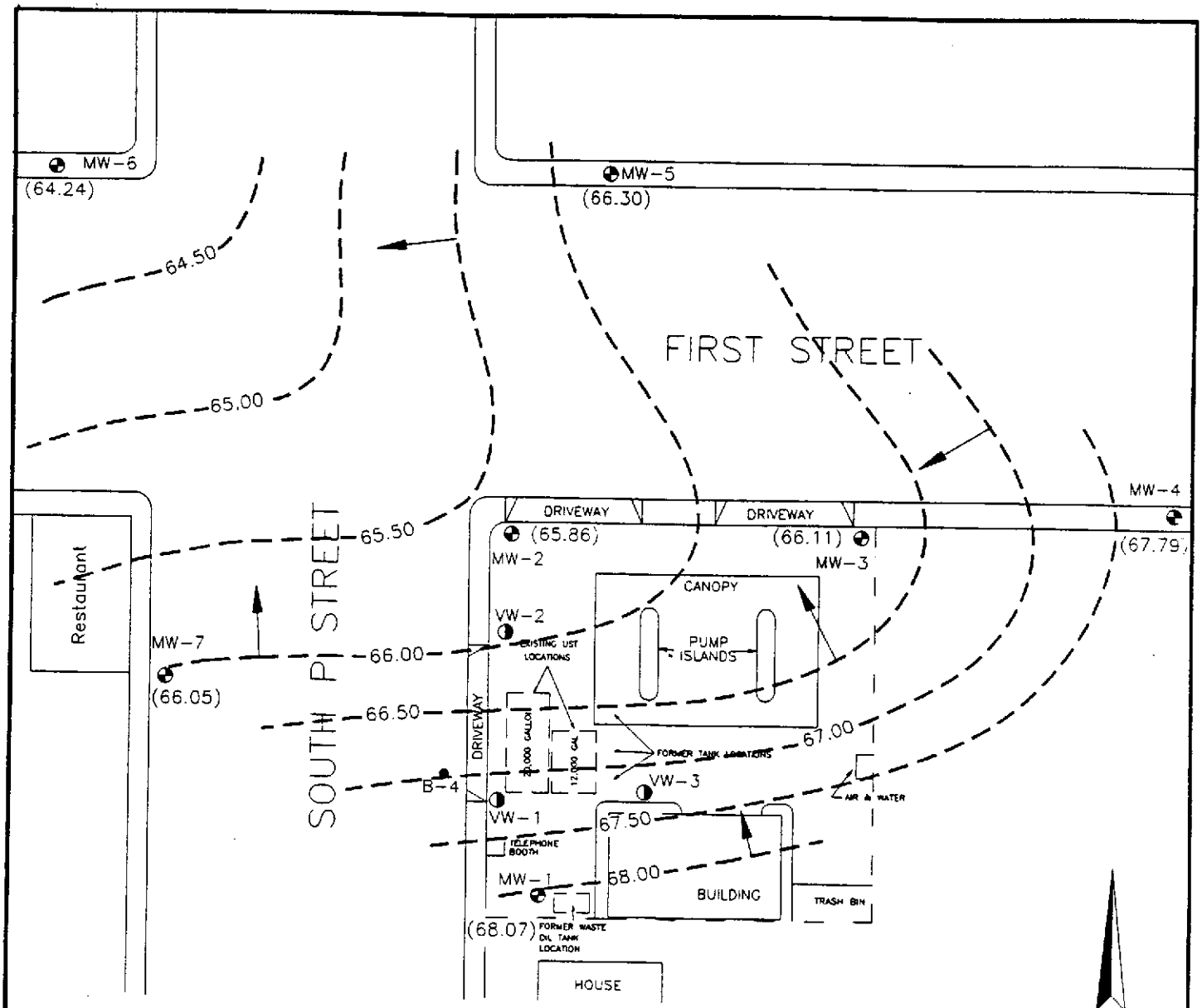

LEGEND

- VW-3 — VADOSE WELL LOCATION AND NUMBER
- MW-3 — MONITORING WELL LOCATION AND NUMBER
- B-4 — SOIL BORING LOCATION AND NUMBER
- — — PROPERTY BOUNDARY
- (66.05) — GROUND WATER ELEVATION (FEET)
- 68.00 — GROUND WATER ELEVATION CONTOUR WITH INFERRED DIRECTION OF FLOW

0 40 80

Approximate Scale (in feet)

FIGURE 3

GROUND WATER TABLE CONTOUR MAP (03/30/94)

BEACON STATION #604
1619 WEST FIRST STREET
LIVERMORE, CALIFORNIA

Project No.	Drawn
19024.03	LMC
File No.	Prepared
FIG3A	SAL
Revision	Reviewed

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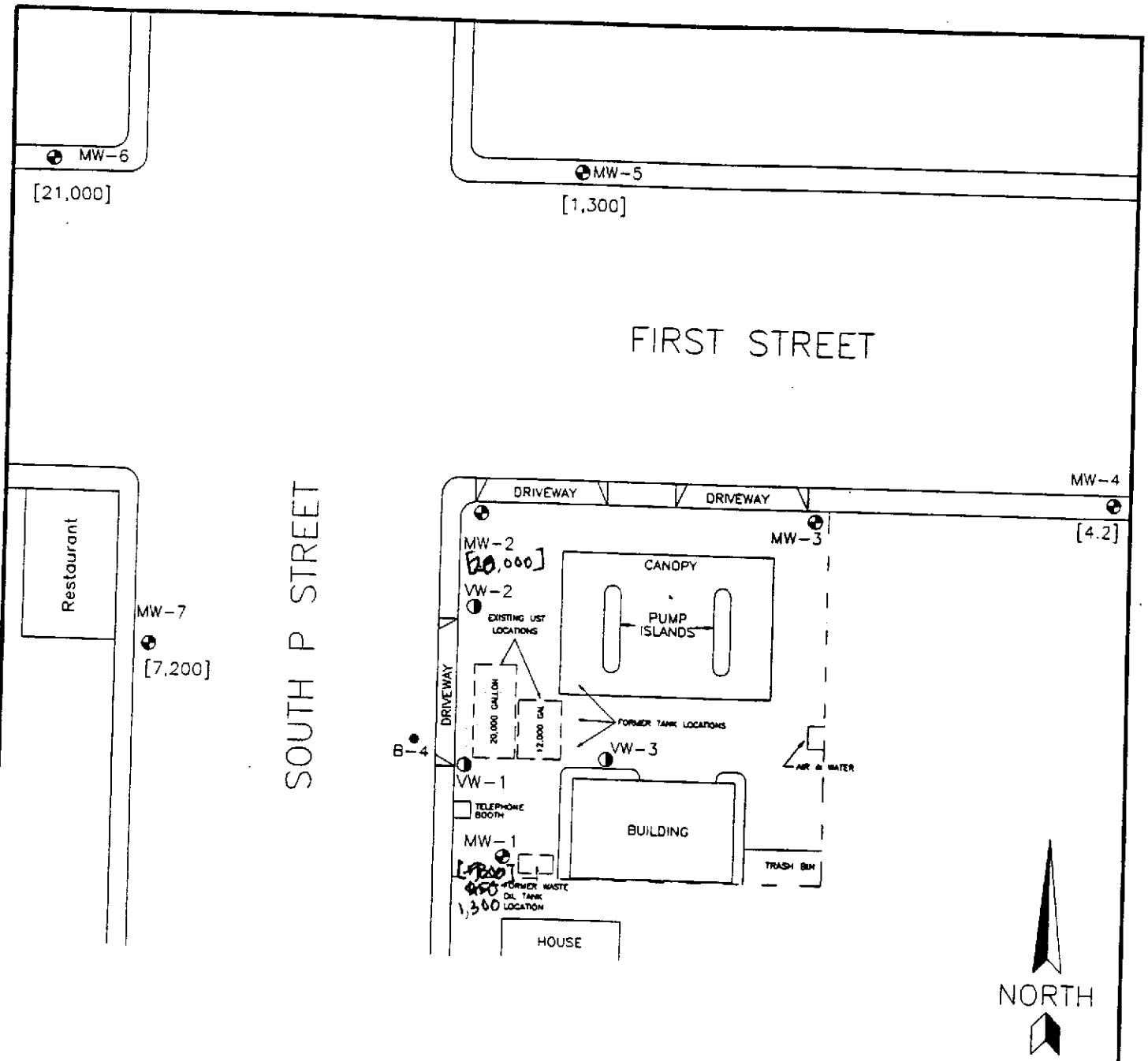

LEGEND

- VW-3 — VADOSE WELL LOCATION AND NUMBER
- MW-3 — MONITORING WELL LOCATION AND NUMBER
- B-4 — SOIL BORING LOCATION AND NUMBER
- — — PROPERTY BOUNDARY
- [4.2] — BENZENE CONCENTRATION IN MICROGRAMS PER/LITER

FIGURE 4
DISTRIBUTION OF BENZENE IN GROUND WATER (3/30/94)

BEACON STATION #604
1619 WEST FIRST STREET
LIVERMORE, CALIFORNIA

Project No.	Drawn
19024.03	LMC
File No.	Prepared
FIG4	SAL
Revision	Reviewed

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ENCLOSURE A

SAMPLING TECHNIQUES

ENCLOSURE A

SAMPLING TECHNIQUES

Proper sampling techniques must be followed to assure that samples represent actual field conditions and that samples are labeled, preserved, and transported properly to retain sample integrity. This exhibit describes procedures to be followed by Acton • Mickelson • van Dam, Inc. (AMV), during collection of samples of subsurface soil and ground water. Sampling guidance documents from the American Society of Testing and Materials (ASTM), U.S. Environmental Protection Agency (EPA), and California Environmental Protection Agency (Cal-EPA) will be followed for all sampling procedures. Actual sampling procedures to be employed will be based on field conditions and may differ from those described here.

1.0 EXPLORATION BORING/SOIL SAMPLING PROCEDURES

Soil borings and soil sampling will be performed under the direction of an AMV geologist. The soil borings will be advanced using a truck-mounted, hollow-stem auger drill rig.

Soil samples will be collected at 5-foot vertical intervals. Soil sampling will be done in accordance with ASTM 1586-84. Using this procedure, three 2-inch-diameter, 6-inch-length, brass tubes are placed in a California-type split-barrel sampler. The sampler is driven into the soil by a 140-pound weight falling 30 inches. After an initial set of 6 inches, the number of blows required to drive the sampler an additional 12 inches is known as penetration resistance, or the "N" value. The "N" value is used as an empirical measure of the relative density of cohensionless soils and the consistency of cohesive soils.

Upon recovery of the split-barrel sampler, the brass tubes containing the soil will be removed. One of the three brass tubes will be sealed at the ends with Teflon tape and plastic end caps. The sample will be labeled with an identification number, time, date, location, and requested laboratory analysis. The sample will then be placed in a plastic bag and stored at approximately 4° Celsius (C) in an ice chest for transport to the laboratory. Sample custody procedures outlined in Section 5.0 of this exhibit will be followed. This will be performed for each sample collection.

Soil in one of the brass tubes will be extracted upon recovery, placed in a plastic bag, and sealed for later screening for organic vapors using a photoionization detector (PID) or a flame ionization detector (FID). The remaining portion of the soil sample will be examined and a complete log of soil conditions will be recorded on a soil boring log (Enclosure A) using the Unified Soil Classification System (Enclosure B). The soil will be examined for grain size, color, and moisture content.

The split-barrel sampler will be cleaned to prevent cross-contamination for each sampling interval using procedures described in Section 3.0.

Soil borings will normally be advanced with 8- or 10-inch-diameter, hollow-stem augers. The soil generated from the soil borings will be wrapped in plastic sheeting and stored on site until characterized for disposal.

2.0 WATER LEVEL AND LIQUID-PHASE HYDROCARBON (LPH) THICKNESS MEASUREMENTS AND GROUND WATER SAMPLING

2.1 Water Level and LPH Thickness Measurements

The static water level and LPH thickness in each well will be measured prior to purging or sampling.

The depth to water/product will be measured using an electronic interface probe. The wire of the interface probe is marked at 0.01 foot intervals. One tone is emitted from the interface probe if LPH is encountered; another tone for water. The wire of the interface probe will be lowered slowly until LPH or water is encountered. At this point, the mark on the interface wire opposite the permanent reference point on the top of the well casing will be read to the nearest 0.01 foot and recorded. If the first encountered substance is LPH, the probe will be lowered until the tone corresponding to water is emitted. This depth will also be recorded. The difference between the two depths corresponds to the LPH thickness. The interface probe will be rinsed in a cleaning solution and deionized water between measurements in different wells.

A permanent reference point will be marked on the well casings. The permanent reference point on the well casings will be surveyed to a common reference point. All well casing riser elevations will be known to within 0.01 foot.

Prior to well development, a disposable bailer will be used to collect a sample of LPH, if present in a well, for subjective analysis. The sample will be collected by gently lowering the bailer approximately one-half the bailer length past the air/LPH interface. The appearance (color, opacity, "freshness") will be described and noted on field notes.

If LPH is encountered in the well, it will be removed by bailing or pumping and the approximate volume of LPH removed will be recorded. LPH thickness will be remeasured. If LPH is still present, the thickness will be recorded and the well will not be sampled. If LPH is not present, the well will be developed, purged, and sampled as described below.

2.2 Well Evacuation

After the static water level in a well is determined and prior to collection of a ground water sample, stagnant water will be removed from the well casing and the surrounding gravel pack by bailing, pumping, or with a vacuum truck. At least three casing volumes of water will be

removed from each well from which a sample was collected. The volume of water in the casing will be determined from the known elevation of the water surface, the well bottom elevation (as measured when the well is installed), and the well diameter.

If the well is bailed or pumped during purging, samples will be collected and field analyzed for pH, temperature, and specific conductance. The well will be considered stabilized when repeated readings of the following parameters are within the ranges indicated as follows:

- Specific conductance ±10 percent of the reading range
- pH ±0.1 pH unit
- Temperature ±0.5° C.

After stabilization, and after at least three well volumes are evacuated, a sample will be collected for analysis. The field container used for well stabilization measurements, and the pH, temperature, and conductivity probes will be rinsed between wells with deionized water.

All purge water will be containerized and properly handled and documented for disposal. If the containers are stored on site, a label specifying the date of purging, source, and the known or suspected nature of the contents will be affixed to each container.

2.3 Sample Collection, Preservation, and Handling

After purging, a new polyethylene disposable bailer will be used to collect samples for analysis. The bailer is attached to a new disposable rope and lowered slowly into the water to avoid agitation of the collected sample. Containers for volatile organics analyses will be filled completely so that no airspace remains in the vial after sealing.

All sample containers will be prewashed and prepared at the analyzing laboratory in accordance with quality assurance/quality control protocols of the laboratory. Only sample containers appropriate for the intended analyses will be used.

3.0 DECONTAMINATION AND DISPOSAL PROCEDURES

3.1 Equipment Decontamination

All equipment that comes in contact with potentially contaminated soil, drilling fluid, air, or water will be decontaminated before each use. Decontamination will consist of steam-cleaning, a high-pressure, hot-water rinse, or trisodium phosphate (TSP) wash and freshwater rinse, as appropriate.

Drilling and sampling equipment will be decontaminated as follows:

1. Drill rig augers, drill rods, and drill bits will be steam-cleaned prior to use and between borings. Visible soil, grease, and other impurities will be removed.

2. Soil sampling equipment will be steam-cleaned prior to use and between each boring. Prior to individual sample collection, any sampling device will also be cleaned in a TSP solution and rinsed twice in clean water. Any visible soil residue will be removed.

3. It is anticipated that disposable equipment will be used to collect water samples. If disposable equipment is not used, water sampling equipment will be decontaminated using methods described in Item 2 above for soil sampling equipment.

4. Water sampling containers will be cleaned and prepared by the respective analytical laboratories.

5. Stainless steel or brass soil sampling tubes will be steam-cleaned or washed in TSP solution and rinsed with clean water.

6. Field monitoring equipment (pH, conductivity, or temperature probes) will be rinsed with clean water prior to use and between samples.

4.0 FIELD MEASUREMENTS

Field data will be collected during various sampling and monitoring activities; this section describes routine procedures to be followed by personnel performing field measurements. The methods presented below are intended to ensure that field measurements are consistent and reproducible when performed by various individuals.

4.1 Buried Utility Locations

Prior to commencement of work on site, AMV will contact appropriate utility companies to have underground utility lines located. All work associated with the borings will be preceded by hand augering to a minimum depth of 5 feet below grade to avoid contact with underground utilities.

4.2 Lithologic Logging

A log of soil conditions encountered during the drilling and sample collection (Enclosure A) will be maintained using the Unified Soil Classification System (Enclosure B) by an AMV geologist. All boring logs will be reviewed by a California registered geologist.

The collected soil samples will be examined and the following information recorded: boring location, sample interval and depth, blow counts, color, soil type, moisture content (qualitative), and depth at which ground water (if present) is first encountered. Also recorded on the soil boring logs will be the field screening results derived from the use of a portable PID or FID.

4.3 Disposal Procedures

Soils and fluids that are produced and/or used during the installation and sampling of borings, and that are known or suspected to contain potentially hazardous materials, will be contained during the above operations. These substances will be retained on site until chemical testing has been completed to determine the proper means of disposal. Handling and disposal of substances known or suspected to contain potentially hazardous materials will comply with the applicable regulations of Cal-EPA, the California Department of Water Resources, and any other applicable regulations. Soils and fluids produced and/or used during the above-described operations that appear to contain potentially hazardous materials will be disposed of appropriately.

Residual substances generated during cleaning procedures that are known or suspected to pose a threat to human health or the environment will be placed in appropriate containers until chemical testing has been completed to determine the proper means for their disposal.

4.4 Conductivity, Temperature, and pH

Specific conductance, water temperature, and pH measurements will be made when a water sample is collected. Regardless of the sample collection method, a representative water sample will be placed in a transfer bottle used solely for field parameter determinations. A conventional pH meter with a combination electrode or equivalent will be used for field-specific conductance measurements. Temperature measurements will be performed using standard thermometers or equivalent temperature meters. Combination instruments capable of measuring two or all three of the parameters may also be used.

All instruments will be calibrated in accordance with manufacturer methods. The values for conductivity standards and pH buffers used in calibration will be recorded daily in a field notebook. All probes will be thoroughly cleaned and rinsed with fresh water prior to any measurements, in accordance with Section 3.1.

5.0 SAMPLE CUSTODY

This section describes standard operating procedures for sample custody and custody documentation. Sample custody procedures will be followed through sample collection, transfer, analysis, and ultimate disposal. The purpose of these procedures is to assure that (1) the

integrity of samples is maintained during their collection, transportation, and storage prior to analysis and (2) post-analysis sample material is properly disposed of. Sample custody is divided into field procedures and laboratory procedures, as described below.

5.1 Field Custody Procedures

Sample quantities, types, and locations will be determined before the actual fieldwork commences. As few people as possible will handle samples. The field sampler is personally responsible for the care and custody of the collected samples until they are properly transferred.

5.1.1 Field Documentation

Each sample will be labeled and sealed properly immediately after collection. Sample identification documents will be carefully prepared so that identification and chain-of-custody records can be maintained and sample disposition can be controlled. Forms will be filled out with waterproof ink. The following sample identification documents will be utilized.

- Sample labels
- Field notebook
- Chain-of-custody forms

5.1.2 Sample Labels

Sample labels provide identification of samples. Preprinted sample labels will be provided. Where necessary, the label will be protected from water and solvents with clean label-protection tape. Each label will contain the following information:

- Name of collector
- Date and time of collection
- Place of collection
- AMV project number
- Sample number
- Preservative (if any)

5.1.3 Field Notebook

Information pertinent to a field survey, measurements, and/or sampling must be recorded in a bound notebook. Entries in the notebook should include the following:

- Name and title of author, date and time of entry, and physical/environmental conditions during field activity.
- Location of sampling or measurement activity.
- Name(s) and title(s) of field crew.

- Type of sampled or measured media (e.g., soil, ground water, air, etc.)
- Sample collection or measurement method(s).
- Number and volume of sample(s) taken.
- Description of sampling point(s).
- Description of measuring reference points.
- Date and time of collection or measurement.
- Sample identification number(s).
- Sample preservative (if any).
- Sample distribution (e.g., laboratory).
- Field observations/comments.
- Field measurements data (pH, etc.).

5.1.4 Chain-of-Custody Record

A chain-of-custody record will be filled out for and will accompany every sample and every shipment of samples to the analytical laboratories in order to establish the documentation necessary to trace sample possession from the time of collection. The record will contain the following information:

- Sample or station number or sample I.D.
- Signature of collector, sampler, or recorder.
- Date and time of collection.
- Place of collection.
- Sample type.
- Signatures of persons involved in the chain of possession.
- Inclusive dates of possession.

The laboratory portion of the form should be completed by laboratory personnel and will contain the following information:

- Name of person receiving the sample.
- Laboratory sample number.
- Date and time of sample receipt.
- Analyses requested.
- Sample condition and temperature.

5.1.5 Sample Transfer and Shipment

Samples will always be accompanied by a chain-of-custody record. When transferring samples, the individuals relinquishing and receiving the samples will sign, date, and note the time on the chain-of-custody record. Samples will be packaged properly for shipment and dispatched to the

appropriate laboratory for analysis. The chain-of-custody record will accompany each shipment. The method of shipment, courier name(s), and other pertinent information will be entered in the chain-of-custody record.

5.2 Laboratory Custody Procedures

A designated sample custodian will accept custody of the shipped samples and verify that the information on the sample label matches that on the chain-of-custody record. Information regarding method of delivery and sample conditions will also be checked on the chain-of-custody record. The custodian will then enter the appropriate data into the laboratory sample tracking system. The laboratory custodian may use the sample number on the sample label or may assign a unique laboratory number to each sample. The custodian will then transfer the sample(s) to the proper analyst(s) or store the sample(s) in the appropriate secure area.

Laboratory personnel are responsible for the care and custody of samples from the time they are received until the sample is exhausted. Once at the laboratory, the samples are handled in accordance with U.S. Environmental Protection Agency SW-846, Test Methods for Evaluating Solid Waste Physical/Chemical Methods, Third Edition, for the intended analyses. All data sheets, chromatographs, and laboratory records will be filed as part of the permanent documentation.

5.3 Corrections to Documentation

Original data recorded in field notebooks, chain-of-custody records, and other forms should be written in ink. These documents should not be altered, destroyed, or discarded, even if they are illegible or contain inaccuracies that require a replacement document.

If an error is made or found on a document, the individual making the corrections will do so by crossing a single line through the error, entering the correct information, and initialing and dating the change. The erroneous information will be obliterated. Any subsequent error(s) discovered on a document will be corrected. All corrections will be initialed and dated.

5.4 Sample Storage and Disposal

Samples and extracts should be retained by the analytical laboratory for 60 days after a written report is issued by the laboratory. Unless notified by the program manager, excess or unused samples should be disposed of by the laboratory in an appropriate manner consistent with applicable government regulations.

ENCLOSURE B

SOIL BORING LOGS

Acton • Mickelson • van Dam, Inc.

Consulting Scientists, Engineers, and Geologists

Log of Soil Boring: MW-4

Project Number: 19024.03

Location: Beacon #604
1619 West First Street
Livermore, Califorina

Drilling Company: V & W Drilling
Drilled By: Robert Vickery
Drilling Method: 8" O.D. HSA, B-61 HDX Mobile Drill Rig
Sampling Method: Califorina Modified Split Spoon Sampler
Fitted With 2"x6" Brass Sample Sleeves

OVM/OVA: hNu PID with 10.2 eV probe

Drilling	Time	Date
Start	1115	3/30/94
Finish	1300	3/30/94

Water Depth (Date): 31.56 Feet (3/30/94)
Casing Elevation: 99.35 Feet
Completion Depth: 47 Feet
Logged By: S. Liaty
Checked By:

DEPTH (feet)	SAMPLE INTERVAL	DESCRIPTION	GRAPHIC LOG	USCS CLASS	WELL CONSTRUCTION	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOVD	COMMENTS	SAMPLE NO.	FIELD OVM/OVA READING (ppm)
		CONCRETE AND ROAD BASE							Gravel up to 1.75 inches in diameter.		
		SILTY GRAVEL, moderately dark yellowish brown, damp, dense,		GM							
5		SANDY GRAVEL, yellowish brown, damp, very dense, fine- to medium-grained sand		GW		13 15 15	18	18	Gravel up to 1.5 inches in diameter.	MW4-1	<1
10						26 50/ 6"	12	12		MW4-2	<1
15		Mottled reddish brown, partially cemented at 15 feet				22 50/ 6"	12	12		MW4-3	<1
		SILTY CLAY with trace sand, dark yellowish brown, moist, dense, fine- to medium-grained sand		CL							
20						12 13 16	18	18	Gravel up to 1.5 inches in diameter.	MW4-4	<1
25		SANDY GRAVEL, yellowish brown, moist, dense, fine- to medium-grained sand		GW		11 17 26	18	18		MW4-5	<1
		CLAYEY SAND with minor gravel, dark yellowish brown, very dense, coarse-grained		SC							
30											

(Boring continued on next page)

Acton • Mickelson • van Dam, Inc.

Consulting Scientists, Engineers, and Geologists

Log of Soil Boring: MW-4

Project Number: 19024.03

Location: Beacon #604
1619 West First Street
Livermore, Califorina

Drilling Company: V & W Drilling
Drilled By: Robert Vickery
Drilling Method: 8" O.D. HSA, B-61 HDX Mobile Drill Rig
Sampling Method: Califorina Modified Split Spoon Sampler
Fitted With 2"x6" Brass Sample Sleeves

OVM/OVA: hNu PID with 10.2 eV probe

Drilling	Time	Date
Start	1115	3/30/94
Finish	1300	3/30/94

Water Depth (Date): 31.56 Feet (3/30/94)
Casing Elevation: 99.35 Feet
Completion Depth: 47 Feet
Logged By: S. Liaty
Checked By:

DEPTH (feet)	SAMPLE INTERVAL	DESCRIPTION	GRAPHIC LOG	USCS CLASS	WELL CONSTRUCTION	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOV'D	COMMENTS	SAMPLE NO.	FIELD OVM/OVA READING (ppm)
		CLAYEY SAND with minor gravel, dark yellowish brown, very dense, coarse-grained		SC		29 32 34	18	18		MW4-6	<1
35		SANDY GRAVEL, dark yellowish brown, saturated, very dense, fine- to medium-grained sand		GW		29 50/ 6"	12	12	Gravel up to 1.5 inches in diameter.	MW4-7	<1
40						17 23 36	18	14		MW4-8	<1
45						16 22 35	18	10	Boring terminated approximately 15 feet below the water table.	MW4-9	<1
		Boring terminated. Total depth = 47 feet									
50											
55											
60											

Acton • Mickelson • van Dam, Inc.

Consulting Scientists, Engineers, and Geologists

Log of Soil Boring: MW-5

Project Number: 19024.03

Location: Beacon #604
1619 West First Street
Livermore, Califorina

Drilling Company: V & W Drilling
Drilled By: Robert Vickery
Drilling Method: 8" O.D. HSA, B-61 HDX Mobile Drill Rig
Sampling Method: Califorina Modified Split Spoon Sampler
Fitted With 2"x6" Brass Sample Sleeves

OVM/OVA: hNu PID with 10.2 eV probe

Drilling	Time	Date
Start	1000	3/29/94
Finish	1130	3/29/94

Water Depth (Date): 32.07 Feet (3/30/94)
Casing Elevation: 98.37 Feet
Completion Depth: 47 Feet
Logged By: S. Liaty
Checked By:

DEPTH (feet)	SAMPLE INTERVAL	DESCRIPTION	GRAPHIC LOG	USCS CLASS	WELL CONSTRUCTION	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOV'D	COMMENTS	SAMPLE NO.	FIELD OVM/OVA READING (ppm)
		CONCRETE AND ROAD BASE									
5		SILTY GRAVEL, moderate yellowish brown, damp, very dense		GM		50/6"	8	8	Gravel up to 1.5 inches in diameter.	MW5-1	<1
10		SANDY GRAVEL, dark yellowish brown, damp, very dense, fine- to medium-grained sand		GW		50 50/3"	9	9	Gravel up to 1.5 inches in diameter.	MW5-2	<1
15						38 50/6"	12	12		MW5-3	<1
20		SILTY SAND, yellowish brown, moist, medium dense, slightly stiff, fine-grained		SM		7 11 14	18	18		MW5-4	<1
25		CLAY, dark yellowish brown, moist, hard Minor gravel at 25 feet		CL		15 21 19	18	18		MW5-5	<1
30		SANDY GRAVEL, gray, moist, dense, saturated, fine- to medium-grained sand									

(Boring continued on next page)

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Consulting Scientists, Engineers, and Geologists

Log of Soil Boring: MW-5

Project Number: 19024.03

Location: Beacon #604
1619 West First Street
Livermore, Califorina

Drilling Company: V & W Drilling
Drilled By: Robert Vickery
Drilling Method: 8" O.D. HSA, B-61 HDX Mobile Drill Rig
Sampling Method: Califorina Modified Split Spoon Sampler
Fitted With 2"x6" Brass Sample Sleeves

OVM/OVA: hNu PID with 10.2 eV probe

Drilling	Time	Date
Start	1000	3/29/94
Finish	1130	3/29/94

Water Depth (Date): 32.07 Feet (3/30/94)
Casing Elevation: 98.37 Feet
Completion Depth: 47 Feet
Logged By: S. Liaty
Checked By:

DEPTH (feet)	SAMPLE INTERVAL	DESCRIPTION	GRAPHIC LOG	USCS CLASS	WELL CONSTRUCTION	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOV'D	COMMENTS	SAMPLE NO.	FIELD OVM/OVA READING (ppm)
35		SANDY GRAVEL, gray, dense, saturated, fine- to medium-grained sand		CL GW		10 21 28	18	18	Gravel up to 1 inch in diameter.	MW5-6	<1
						26 50/5"	11	10		MW5-7	<1
40						25 30 50/6"	18	18		MW5-8	<1
45									No sample collected at 45 feet.		
		Boring terminated. Total depth = 47 feet							Boring terminated approximately 15 feet below the water table.		
50											
55											
60											

Acton • Mickelson • van Dam, Inc.

Consulting Scientists, Engineers, and Geologists

Log of Soil Boring: MW-6

Project Number: 19024.03

Location: Beacon #604
1619 West First Street
Livermore, Califorina

Drilling Company: V & W Drilling
Drilled By: Robert Vickery
Drilling Method: 8" O.D. HSA, B-61 HDX Mobile Drill Rig
Sampling Method: Califorina Modified Split Spoon Sampler
Fitted With 2"x6" Brass Sample Sleeves

OVM/OVA: hNu PID with 10.2 eV probe

Drilling	Time	Date
Start	1310	3/29/94
Finish	1445	3/29/94

Water Depth (Date): 33.38 Feet (3/30/94)
Casing Elevation: 97.62 Feet
Completion Depth: 48 Feet
Logged By: S. Liaty
Checked By:

DEPTH (feet)	SAMPLE INTERVAL	DESCRIPTION	GRAPHIC LOG	USCS CLASS	WELL CONSTRUCTION	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOV'D	COMMENTS	SAMPLE NO.	FIELD OVM/OVA READING (ppm)
		CONCRETE AND ROAD BASE									
		SILTY GRAVEL, dark yellowish brown, damp, very dense		GM					Gravel up to 1 inch in diameter.		
5		SANDY GRAVEL, dark yellowish brown, moist, very dense, fine- to medium-grained sand		GW		11 21 34	18	14	Gravel up to 1.5 inches in diameter.	MW6-1	<1
10						12 50/ 5"	11	11		MW6-2	<1
15						10 28 36	18	16		MW6-3	<1
20		SILTY CLAY, dark yellowish brown, moist, very stiff		CL		6 8 10	18	18		MW6-4	<1
25		SANDY GRAVEL, yellowish brown, moist, moderately dense, fine- to medium-grained sand		GW		7 17 25	18	18	Gravel up to 1.5 inches in diameter.	MW6-5	<1
30											

(Boring continued on next page)

Acton • Mickelson • van Dam, Inc.

Consulting Scientists, Engineers, and Geologists

Log of Soil Boring: MW-6

Project Number: 19024.03

Location: Beacon #604
1619 West First Street
Livermore, Califorina

Drilling Company: V & W Drilling
Drilled By: Robert Vickery
Drilling Method: 8" O.D. HSA, B-61 HDX Mobile Drill Rig
Sampling Method: California Modified Split Spoon Sampler
Fitted With 2"x6" Brass Sample Sleeves

OVM/OVA: hNu PID with 10.2 eV probe

Drilling	Time	Date
Start	1310	3/29/94
Finish	1445	3/29/94

Water Depth (Date): 33.38 Feet (3/30/94)
Casing Elevation: 97.62 Feet
Completion Depth: 48 Feet
Logged By: S. Liaty
Checked By:

DEPTH (feet)	SAMPLE INTERVAL	DESCRIPTION	GRAPHIC LOG	USCS CLASS	WELL CONSTRUCTION	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOV'D	COMMENTS	SAMPLE NO.	FIELD OVM/OVA READING (ppm)
		SANDY GRAVEL, yellowish brown, moist, moderately dense, fine- to medium-grained sand		GW		6 9 12	18	18	Gravel up to .5 inches in diameter.	MW6-6	<1
		CLAYEY SAND with minor gravel, dark yellowish brown, moist, fine- to medium-grained sand		SC							
35		SANDY GRAVEL, gray, saturated, very dense, medium- to coarse-grained sand		GW		10 28 40	18	18		MW6-7	<1
40						29 50/ 5"	11	11	Soil appears to be stained. Gravel up to 1 inch in diameter.	MW6-8	<1
45											
		Boring terminated. Total depth = 48 feet							Boring terminated approximately 15 feet below the water table.		
50											
55											
60											

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Consulting Scientists, Engineers, and Geologists

Log of Soil Boring: MW-7

Project Number: 19024.03

Location: Beacon #604
1619 West First Street
Livermore, Califorina

Drilling Company: V & W Drilling
Drilled By: Robert Vickery
Drilling Method: 8" O.D. HSA, B-61 HDX Mobile Drill Rig
Sampling Method: Califorina Modified Split Spoon Sampler
Fitted With 2"x6" Brass Sample Sleeves

OVM/OVA: hNu PID with 10.2 eV probe

Drilling	Time	Date
Start	0815	3/30/94
Finish	0935	3/30/94

Water Depth (Date): 31.98 Feet (3/30/94)
Casing Elevation: 98.03 Feet
Completion Depth: 47 Feet
Logged By: S. Liaty
Checked By:

DEPTH (feet)	SAMPLE INTERVAL	DESCRIPTION	GRAPHIC LOG	USCS CLASS	WELL CONSTRUCTION	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOV'D	COMMENTS	SAMPLE NO.	FIELD OVM/OVA READING (ppm)
		ASPHALT AND ROAD BASE							Gravel up to 1.5 inches in diameter.		
		SILTY GRAVEL, yellowish brown, damp, dense to very dense		GM		11 24 28	18	18		MW7-1	<1
5									Gravel up to 1.5 inches in diameter.		
		SANDY GRAVEL, dark yellowish brown with gray mottling, moist, very dense, fine- to medium-grained sand		GW		50 50/ 6"	12	12		MW7-2	<1
10											
15						37 50/ 6"	12	12		MW7-3	<1
		SILTY CLAY, dark yellowish brown, moist, hard		CL		10 17 17	18	18		MW7-4	<1
20											
		SANDY GRAVEL, yellowish brown, moist, very dense, fine- to medium-grained sand		GW		21 50/ 6"	12	12	Gravel up to 1.5 inches in diameter.	MW7-5	<1
25											
30						23					

(Boring continued on next page)

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Consulting Scientists, Engineers, and Geologists

Log of Soil Boring: MW-7

Project Number: 19024.03

Location: Beacon #604
1619 West First Street
Livermore, Califorina

Drilling Company: V & W Drilling
Drilled By: Robert Vickery
Drilling Method: 8" O.D. HSA, B-81 HDX Mobile Drill Rig
Sampling Method: Califorina Modified Split Spoon Sampler
Fitted With 2"x6" Brass Sample Sleeves

OVM/OVA: hNu PID with 10.2 eV probe

Drilling	Time	Date
Start	0815	3/30/94
Finish	0935	3/30/94

Water Depth (Date): 31.98 Feet (3/30/94)
Casing Elevation: 98.03 Feet
Completion Depth: 47 Feet
Logged By: S. Liaty
Checked By:

DEPTH (feet)	SAMPLE INTERVAL	DESCRIPTION	GRAPHIC LOG	USCS CLASS	WELL CONSTRUCTION	BLOWS/6 IN.	INCHES DRIVEN	INCHES RECOV'D	COMMENTS	SAMPLE NO.	FIELD OVM/OVA READING (ppm)
		SANDY GRAVEL, yellowish brown, moist, very dense, fine- to medium-grained sand		GW		50/5"	11	11	Gravel up to .5 inches in diameter.	MW7-6	<1
35		CLAYEY SAND with minor gravel, dark yellowish brown, saturated, very dense, medium- to coarse-grained sand		SC		28 31 50/5"	17	17		MW7-7	19
		SANDY GRAVEL, light gray, saturated, very dense, fine- to coarse- grained sand		GW					Soil appears to be stained. Gravel up to 1.5 inches in diameter.		
40						9 17 36	18	15		MW7-8	21
45									No sample collected at 45 feet.		
		Boring terminated. Total depth = 47 feet							Boring terminated approximately 15 feet below the water table.		
50											
55											
60											

ENCLOSURE C

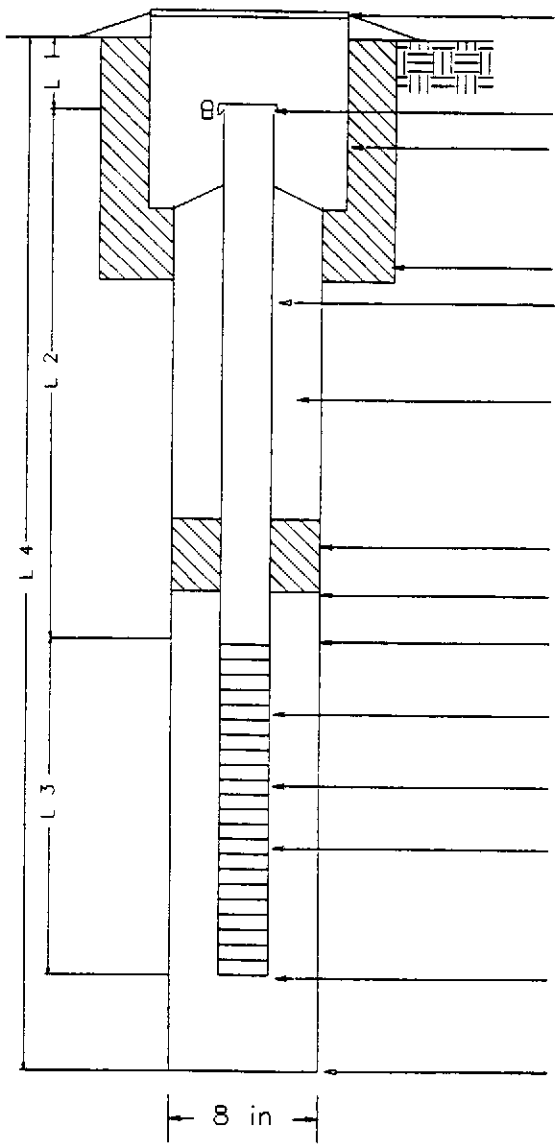
MONITORING WELL CONSTRUCTION DETAILS

MONITORING WELL CONSTRUCTION DETAILS

PROJECT NO: 19024.03
LOCATION: Beacon #604
1619 West First Street
Livermore, California

MONITORING WELL NO.: MW-4

ELEVATION: 99.35 feet



Protective Casing	
Locking Water Tight Cap	
Flush Grade Well Construction	
Diameter and Mat'l	8-inch steel
Total length	12 inches
Length Above Ground	1/4 inch
Thickness and Type of Seal	2 feet, concrete
Diameter, Mat'l and Joint Type of Riser Pipe	2 inch, SCH 40 PVC flush thread
Type of Backfill Around Riser	cement/ 5% bentonite grout
Thickness and Type of Seal	2 feet bentonite chips
Distance of Filter Sand Above Top of Screen	2 feet
Type of Filter Around Screen	#3 lonestar
Monitoring Well Mat'l	SCH 40 PVC
Screen Gauge/Slot Size	0.020 inch
Diameter and Length of Screen	2 inch, 20 feet
Depth to Bottom of Monitoring Well	47 feet
Depth to the Bottom of Filter Sand	47 feet

L1 = 0.25 feet
L2 = 26.75 feet
L3 = 20.00 feet
L4 = 47.00 feet

MONITORING WELL WATER LEVEL MEASUREMENTS

Date:	Time:	Water Level*
03/30/94	1545	31.56

Completion Date and Time: 03/30/94 1500

* Measuring Point: Top Of Casing

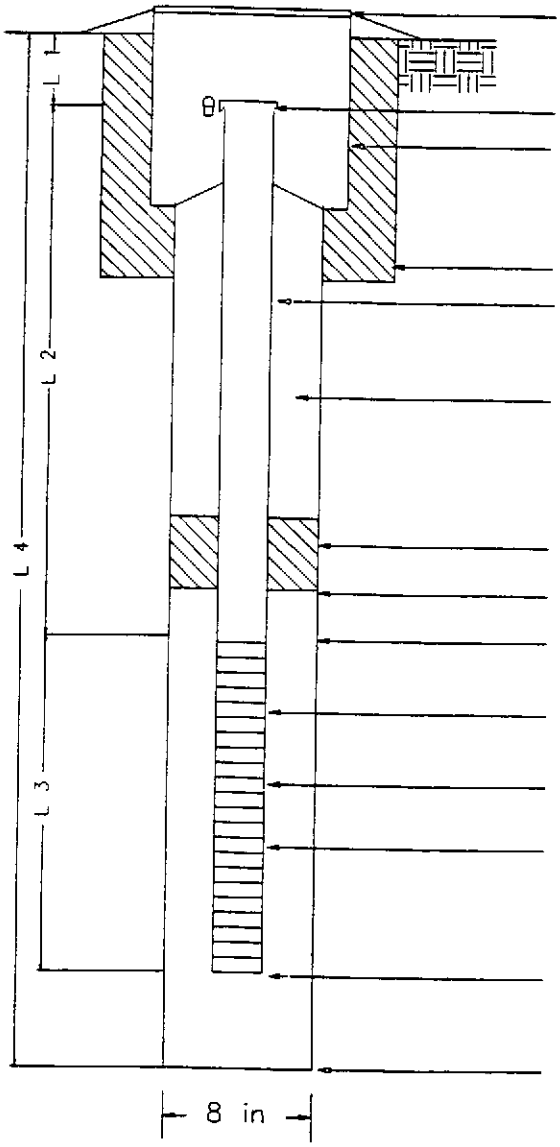
ACTON • MICKELSON • VAN DAM, INC.
4511 Golden Foothill Parkway, Suite 1
El Dorado Hills, CA 95762

MONITORING WELL CONSTRUCTION DETAILS

PROJECT NO: 19024.03
LOCATION: Beacon #604
1619 West First Street
Livermore, California

MONITORING WELL NO.: MW-5

ELEVATION: 98.37 feet



Protective Casing	
Locking Water Tight Cap	
Flush Grade Well Construction	
Diameter and Mat'l	8-inch steel
Total length	12 inches
Length Above Ground	1/4 inch
Thickness and Type of Seal	2 feet, concrete
Diameter, Mat'l and Joint Type of Riser Pipe	2 inch, SCH 40 PVC flush thread
Type of Backfill Around Riser	cement/ 5% bentonite grout
Thickness and Type of Seal	2 feet bentonite chips
Distance of Filter Sand Above Top of Screen	2 feet
Type of Filter Around Screen	#3 lonestar
Monitoring Well Mat'l	SCH 40 PVC
Screen Gauge/Slot Size	0.020 inch
Diameter and Length of Screen	2 inch, 20 feet
Depth to Bottom of Monitoring Well	47 feet
Depth to the Bottom of Filter Sand	47 feet

L1 = 0.25 feet
L2 = 26.75 feet
L3 = 20.00 feet
L4 = 47.00 feet

MONITORING WELL WATER LEVEL MEASUREMENTS

Date:	Time:	Water Level*
03/30/94	1525	32.07

Completion Date and Time: 03/29/94 1300

* Measuring Point: Top Of Casing

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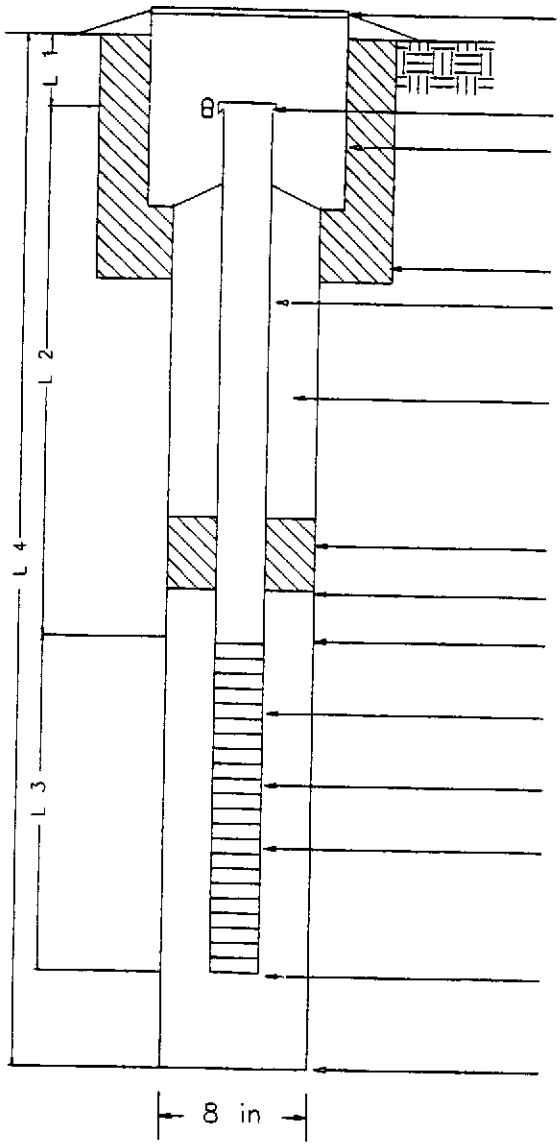
4511 Golden Foothill Parkway, Suite 1
El Dorado Hills, CA 95762

MONITORING WELL CONSTRUCTION DETAILS

PROJECT NO: 19024.03
LOCATION: Beacon #604
1619 West First Street
Livermore, California

MONITORING WELL NO.: MW-6

ELEVATION: 97.62 feet



Protective Casing	
Locking Water Tight Cap	
Flush Grade Well Construction	
Diameter and Mat'l	8-inch steel
Total length	12 inches
Length Above Ground	1/4 inch
Thickness and Type of Seal	2 feet, concrete
Diameter, Mat'l and Joint Type of Riser Pipe	2 inch, SCH 40 PVC flush thread
Type of Backfill Around Riser	cement/ 5% bentonite grout
Thickness and Type of Seal	2 feet bentonite chips
Distance of Filter Sand Above Top of Screen	2 feet
Type of Filter Around Screen	#3 lonestar
Monitoring Well Mat'l	SCH 40 PVC
Screen Gauge/Slot Size	0.020 inch
Diameter and Length of Screen	2 inch, 20 feet
Depth to Bottom of Monitoring Well	48 feet
Depth to the Bottom of Filter Sand	48 feet

L1 = 0.25 feet
L2 = 27.75 feet
L3 = 20.00 feet
L4 = 48.00 feet

MONITORING WELL WATER LEVEL MEASUREMENTS

Date:	Time:	Water Level*
03/30/94	1521	33.38

Completion Date and Time: 03/29/94 1600

* Measuring Point: Top Of Casing

ACTON • MICKELSON • VAN DAM, INC.
4511 Golden Foothill Parkway, Suite 1
El Dorado Hills, CA 95762

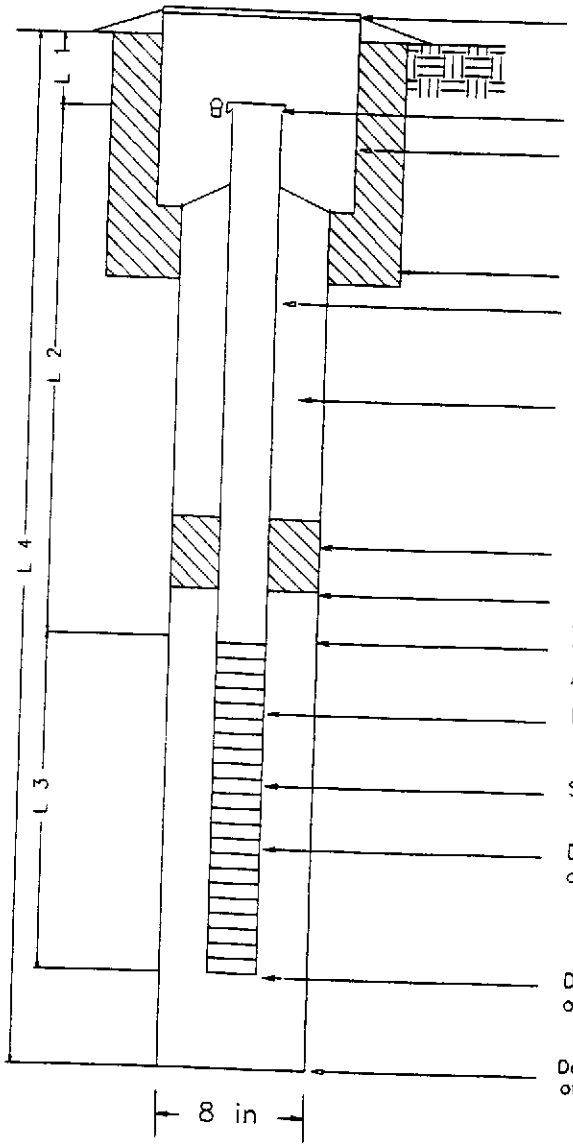
MONITORING WELL CONSTRUCTION DETAILS

PROJECT NO: 19024.03

LOCATION: Beacon #604
1619 West First Street
Livermore, California

MONITORING WELL NO.: MW-7

ELEVATION: 98.03 feet



Protective Casing	
Locking Water Tight Cap	
Flush Grade Well Construction	
Diameter and Mat'l	8-inch steel
Total length	12 inches
Length Above Ground	1/4 inch
Thickness and Type of Seal	2 feet, concrete
Diameter, Mat'l and Joint Type of Riser Pipe	2 inch, SCH 40 PVC flush thread
Type of Backfill Around Riser	cement/ 5% bentonite grout
Thickness and Type of Seal	2 feet bentonite chips
Distance of Filter Sand Above Top of Screen	2 feet
Type of Filter Around Screen	#3 lonestar
Monitoring Well Mat'l	SCH 40 PVC
Screen Gauge/Slot Size	0.020 inch
Diameter and Length of Screen	2 inch, 20 feet
Depth to Bottom of Monitoring Well	47 feet
Depth to the Bottom of Filter Sand	47 feet

L1 = 0.25 feet
L2 = 26.75 feet
L3 = 20.00 feet
L4 = 47.00 feet

MONITORING WELL WATER LEVEL MEASUREMENTS

Date:	Time:	Water Level*
03/30/94	1519	31.98

Completion Date and Time: 03/30/94 1100

* Measuring Point: Top Of Casing

ACTON • MICKELSON • VAN DAM, INC.
4511 Golden Foothill Parkway, Suite 1
El Dorado Hills, CA 95762

ENCLOSURE D

SOIL SAMPLE ANALYTICAL REPORTS

April 13, 1994
Sample Log 9043

Steve Liaty
Acton, Mickelson & van Dam
5090 Robert J. Matthews Pkwy
El Dorado Hills, CA 95762

Subject: Analytical Results for 4 Water Samples and 10 Soil Samples
Identified as: Project # 19024.03 (Beacon 604)
Received: 04/01/94

Dear Mr. Liaty:

Analysis of the sample(s) referenced above has been completed. This report is written to confirm results communicated on April 8, 1994 and describes procedures used to analyze the samples.

Sample(s) were received in 40-mL glass vials sealed with TFE lined septae, and in brass sleeves sealed with TFE sheets and endcaps. Each sample was transported and received under documented chain of custody and stored at 4 degrees C until analysis was performed.

Sample(s) were analyzed using the following method(s):

"BTEX" (EPA Method 8020/Purge-and-Trap)
"BTEX" (EPA Method 602/Purge-and-Trap)
"TPH as Gasoline" (Modified EPA Method 8015/Purge-and-Trap)
"Total Lead" (EPA 6010)

Please refer to the following table(s) for summarized analytical results and contact us at 916-753-9500 if you have questions regarding procedures or results. The chain-of-custody document is enclosed.

Approved by:

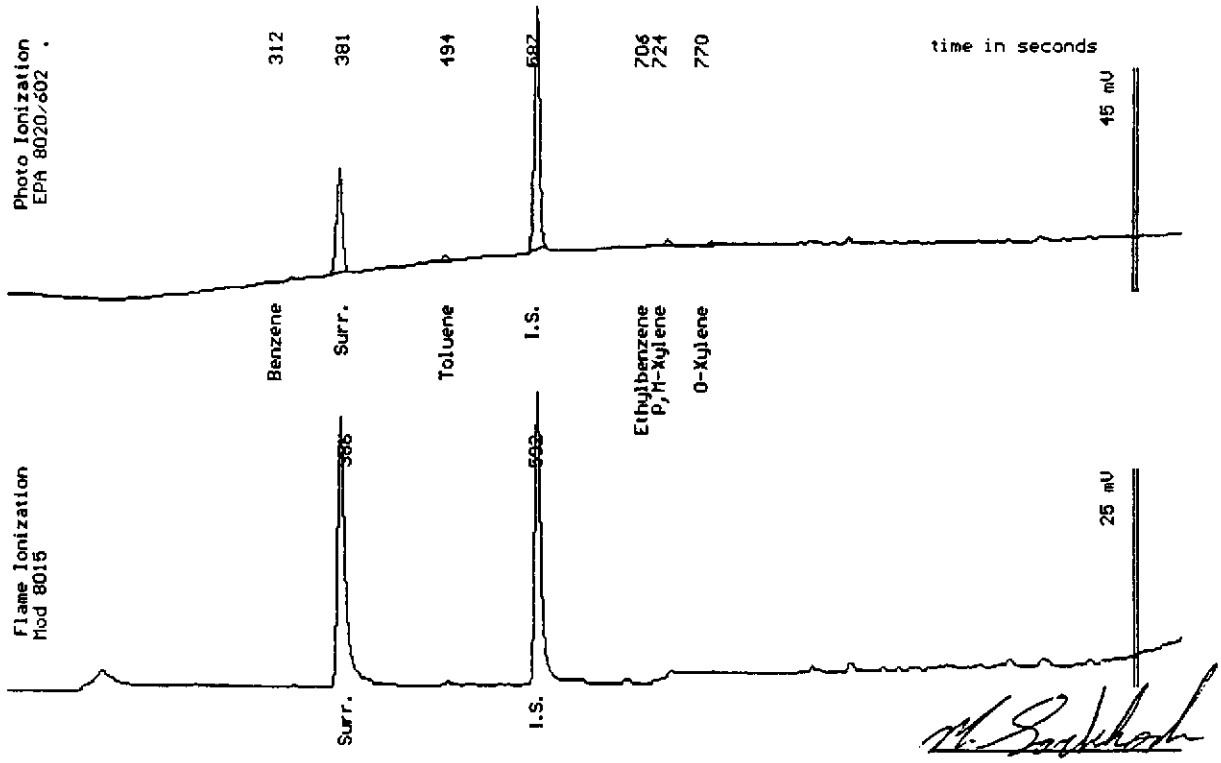
Stewart Podolsky
Senior Chemist

Sample Log 9043
9043-30

Sample: **MW4-6**

From : Project # 19024.03 (Beacon 604)
Sampled : 03/29/94
Dilution : 1:1 QC Batch : 6099B
Matrix : Soil

Parameter	(MRL) ug/kg	Measured Value ug/kg
Benzene	(.0050)	<.0050
Toluene	(.0050)	<.0050
Ethylbenzene	(.0050)	<.0050
Total Xylenes	(.0050)	<.0050
TPH as Gasoline	(1.0)	<1.0
Surrogate Recovery		99 %



Date Analyzed: 04-11-94
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

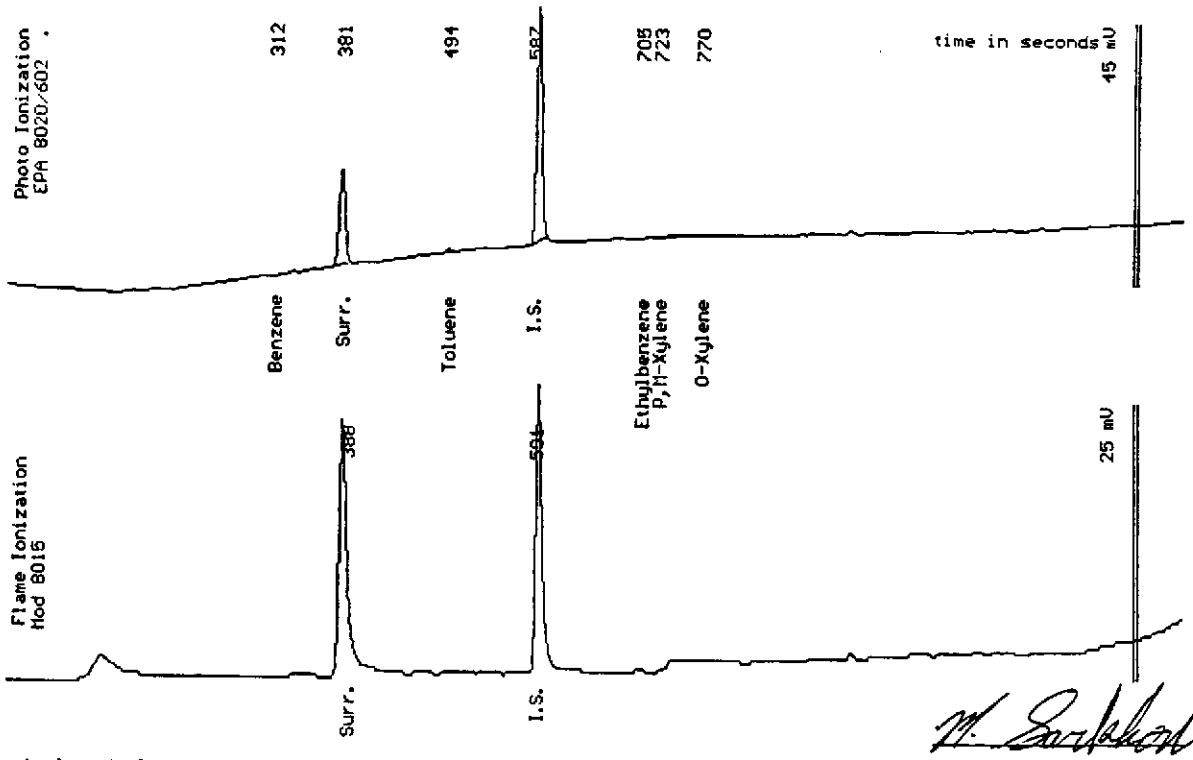
Mitra Sarkhosh
Senior Chemist

Sample Log 9043
9043-31

Sample: **MW4-7**

From : Project # 19024.03 (Beacon 604)
Sampled : 03/29/94
Dilution : 1:1 QC Batch : 6099B
Matrix : Soil

Parameter	(MRL) ug/kg	Measured Value ug/kg
Benzene	(.0050)	<.0050
Toluene	(.0050)	<.0050
Ethylbenzene	(.0050)	<.0050
Total Xylenes	(.0050)	<.0050
TPH as Gasoline	(1.0)	<1.0
Surrogate Recovery		95 %



Date Analyzed: 04-11-94
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

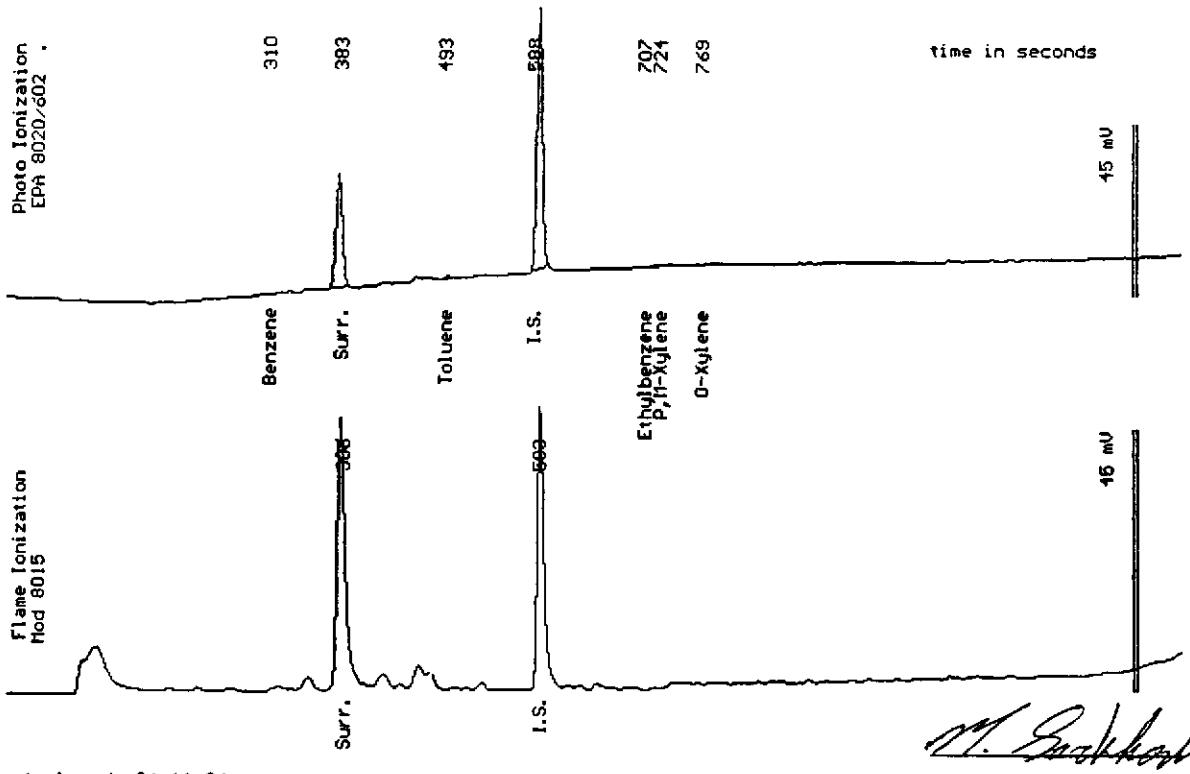
Mitra Sarkhosh
Senior Chemist

Sample Log 9043
9043-6

Sample: **MW5-6**

From : Project # 19024.03 (Beacon 604)
Sampled : 03/29/94
Dilution : 1:1 QC Batch : 6099B
Matrix : Soil

Parameter	(MRL) mg/kg	Measured Value mg/kg
Benzene	(.0050)	<.0050
Toluene	(.0050)	<.0050
Ethylbenzene	(.0050)	<.0050
Total Xylenes	(.0050)	<.0050
TPH as Gasoline	(1.0)	<1.0
Surrogate Recovery		103 %



Date Analyzed: 04-11-94
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

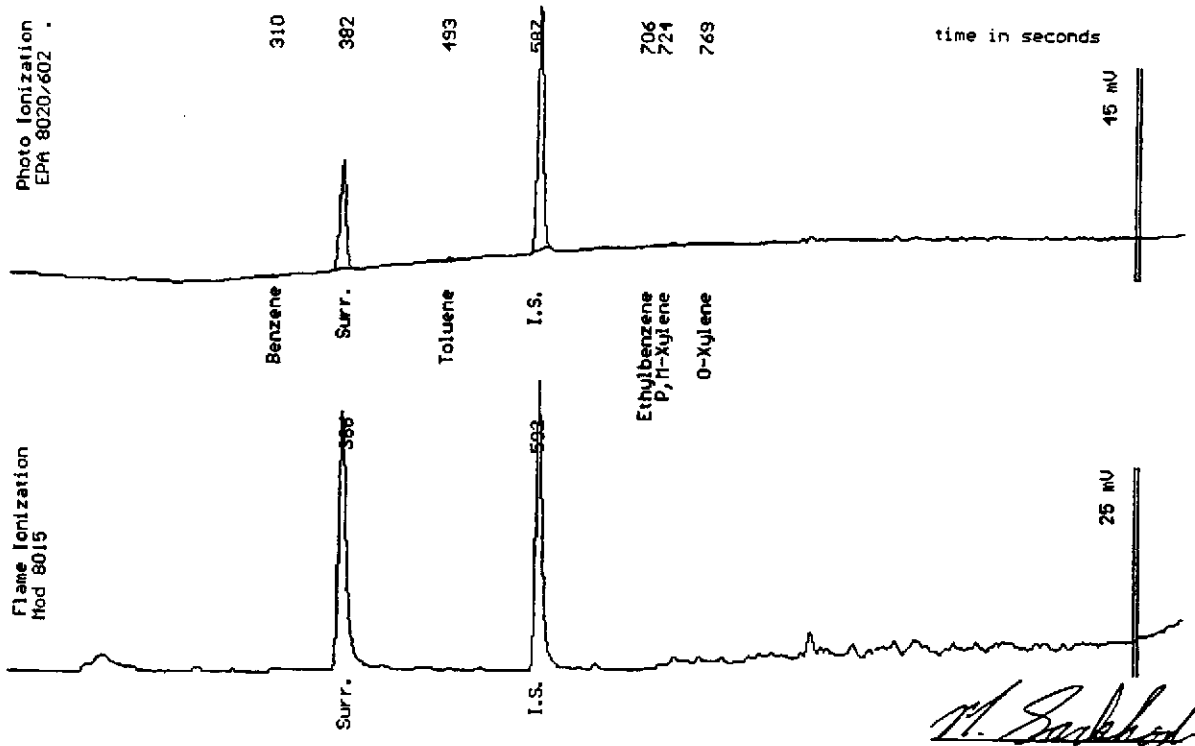
Mitra Sarkhosh
Senior Chemist

Sample Log 9043
9043-7

Sample: **MW5-7**

From : Project # 19024.03 (Beacon 604)
Sampled : 03/29/94
Dilution : 1:1 QC Batch : 6099B
Matrix : Soil

Parameter	(MRL) ug/kg	Measured Value ug/kg
Benzene	(.0050)	<.0050
Toluene	(.0050)	<.0050
Ethylbenzene	(.0050)	<.0050
Total Xylenes	(.0050)	<.0050
TPH as Gasoline	(1.0)	<1.0
Surrogate Recovery		100 %



Date Analyzed: 04-11-94
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

M. Sarkhosh

Mitra Sarkhosh
Senior Chemist

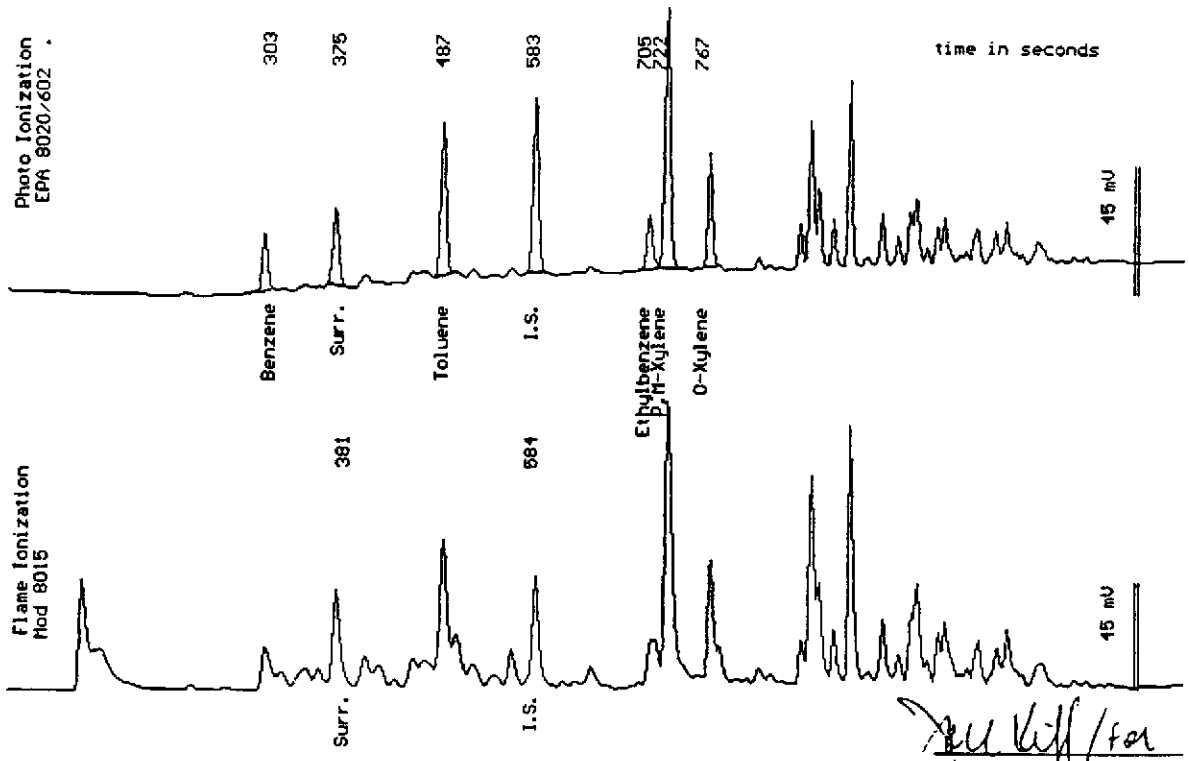
Sample Log 9043

9043-14

Sample: **MW6-6**

From : Project # 19024.03 (Beacon 604)
Sampled : 03/29/94
Dilution : 1:10 QC Batch : 6099D
Matrix : Soil

Parameter	(MRL) mg/kg	Measured Value mg/kg
Benzene	(.050)	.65
Toluene	(.050)	1.7
Ethylbenzene	(.050)	.72
Total Xylenes	(.050)	4.6
TPH as Gasoline	(10)	42
Surrogate Recovery		98 %



Date Analyzed: 04-12-94
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

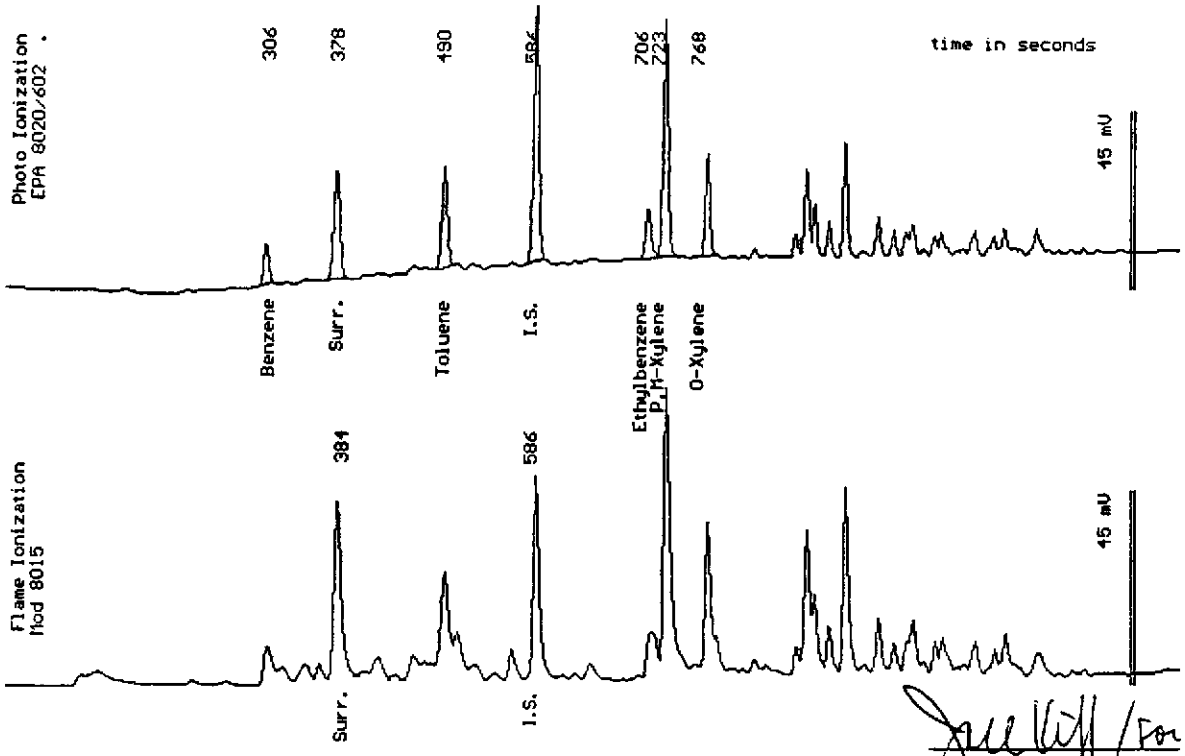
Mitra Sarkhosh
Senior Chemist

Sample Log 9043
9043-15

Sample: **MW6-7**

From : Project # 19024.03 (Beacon 604)
Sampled : 03/29/94
Dilution : 1:1 QC Batch : 6099D
Matrix : Soil

Parameter	(MRL) ug/kg	Measured Value ug/kg
Benzene	(.0050)	.061
Toluene	(.0050)	.16
Ethylbenzene	(.0050)	.094
Total Xylenes	(.0050)	.55
TPH as Gasoline	(1.0)	3.7
Surrogate Recovery		103 %



Date Analyzed: 04-12-94
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

Mitra Sarkhosh
Senior Chemist

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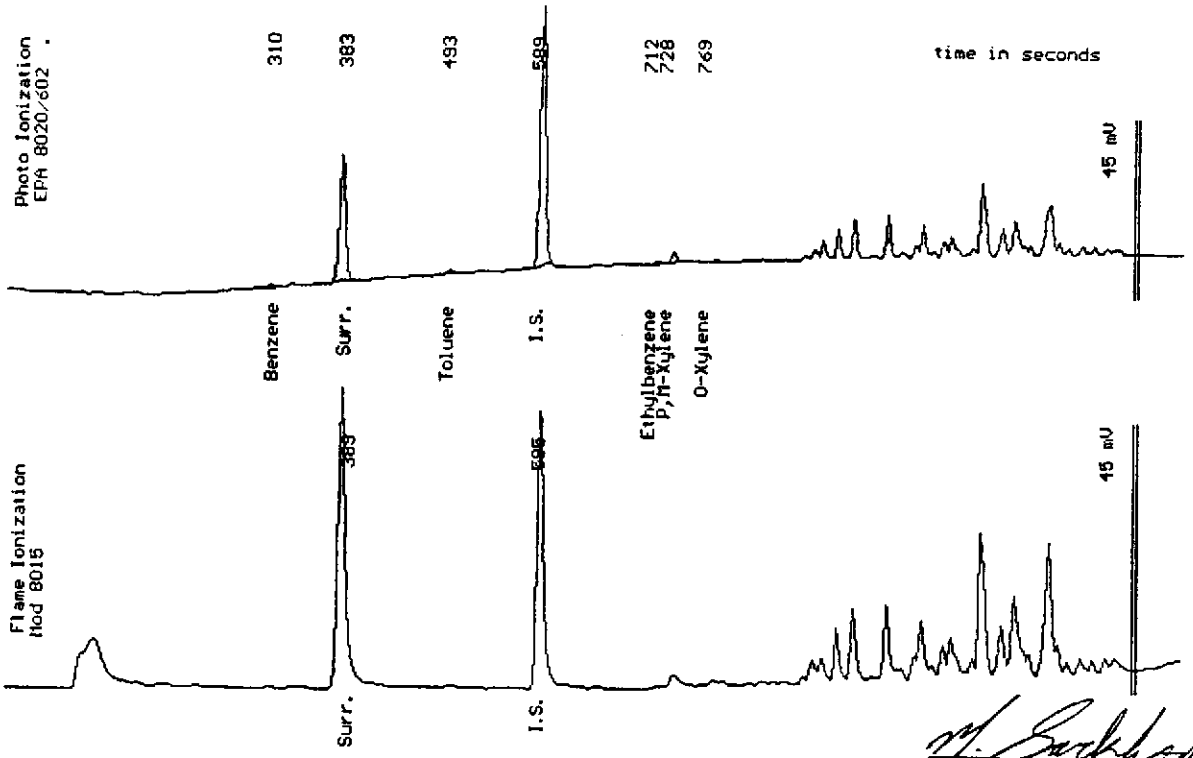
Sample Log 9043
9043-20

Sample: **MW7-4**

From : Project # 19024.03 (Beacon 604)
Sampled : 03/29/94
Dilution : 1:1 QC Batch : 6099B
Matrix : Soil

Parameter	(MRL) ug/kg	Measured Value ug/kg
Benzene	(.0050)	<.0050
Toluene	(.0050)	<.0050
Ethylbenzene	(.0050)	<.0050
Total Xylenes	(.0050)	<.0050
TPH as Gasoline	(1.0)	<1.0
Surrogate Recovery		101 %



Date Analyzed: 04-11-94
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

Mitra Sarkhosh
Senior Chemist

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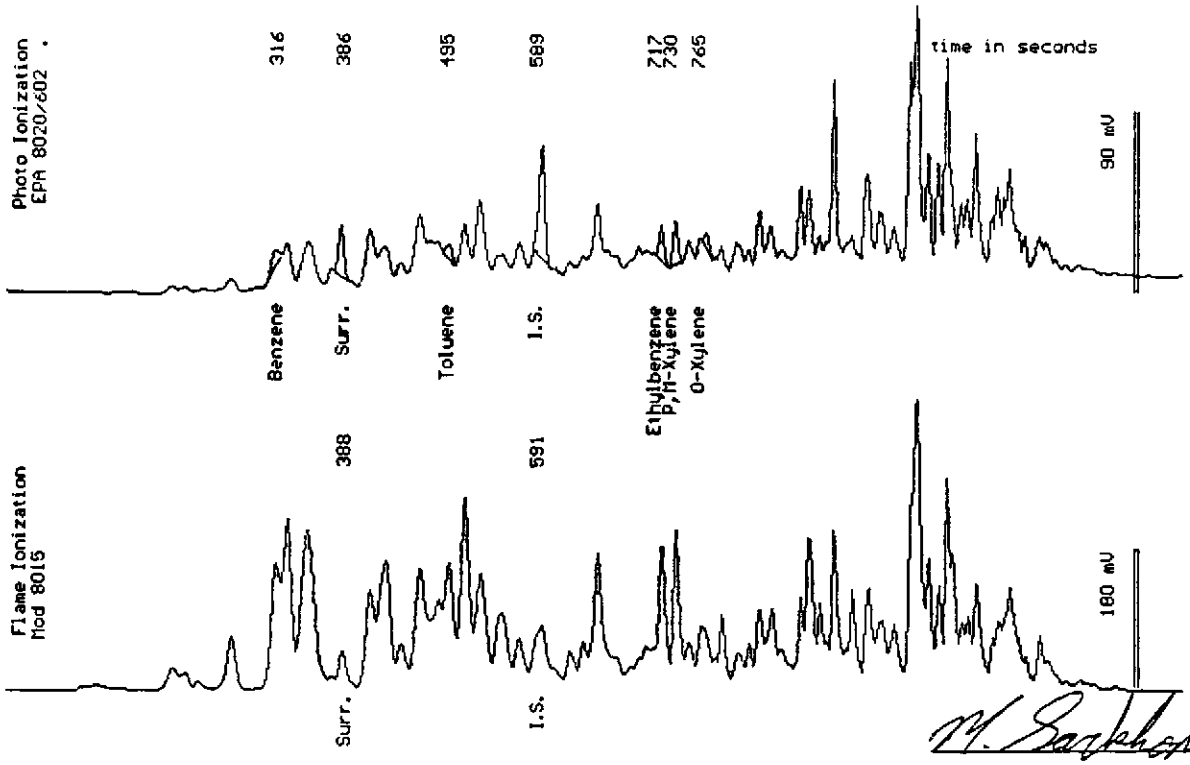
Sample Log 9043
9043-23

Sample: **MW7-7**

From : Project # 19024.03 (Beacon 604)
Sampled : 03/29/94
Dilution : 1:1 QC Batch : 6099B
Matrix : Soil

Parameter	(MRL) ug/kg	Measured Value ug/kg
Benzene	(.0050)	.016
Toluene	(.0050)	.013
Ethylbenzene	(.0050)	.025
Total Xylenes	(.0050)	.048
TPH as Gasoline	(1.0)	4.9
Surrogate Recovery		88 %



Date Analyzed: 04-11-94
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

Mitra Sarkhosh
Senior Chemist

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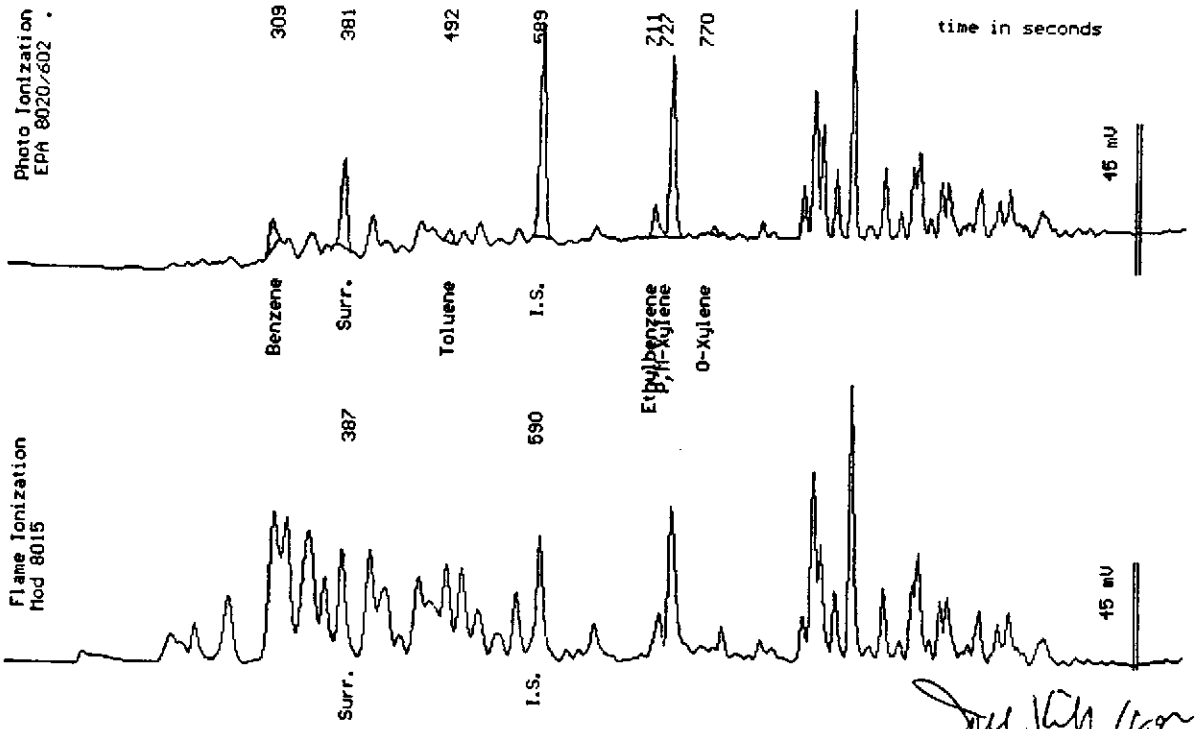
Sample Log 9043
9043-24

Sample: **MW7-8**

From : Project # 19024.03 (Beacon 604)
Sampled : 03/29/94
Dilution : 1:1 QC Batch : 6099D
Matrix : Soil

Parameter	(MRL) mg/kg	Measured Value mg/kg
Benzene	(.0050)	.064
Toluene	(.0050)	.029
Ethylbenzene	(.0050)	.065
Total Xylenes	(.0050)	.39
TPH as Gasoline	(1.0)	8.8
Surrogate Recovery		93 %



Date Analyzed: 04-12-94
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

Mitra Sarkhosh
Senior Chemist

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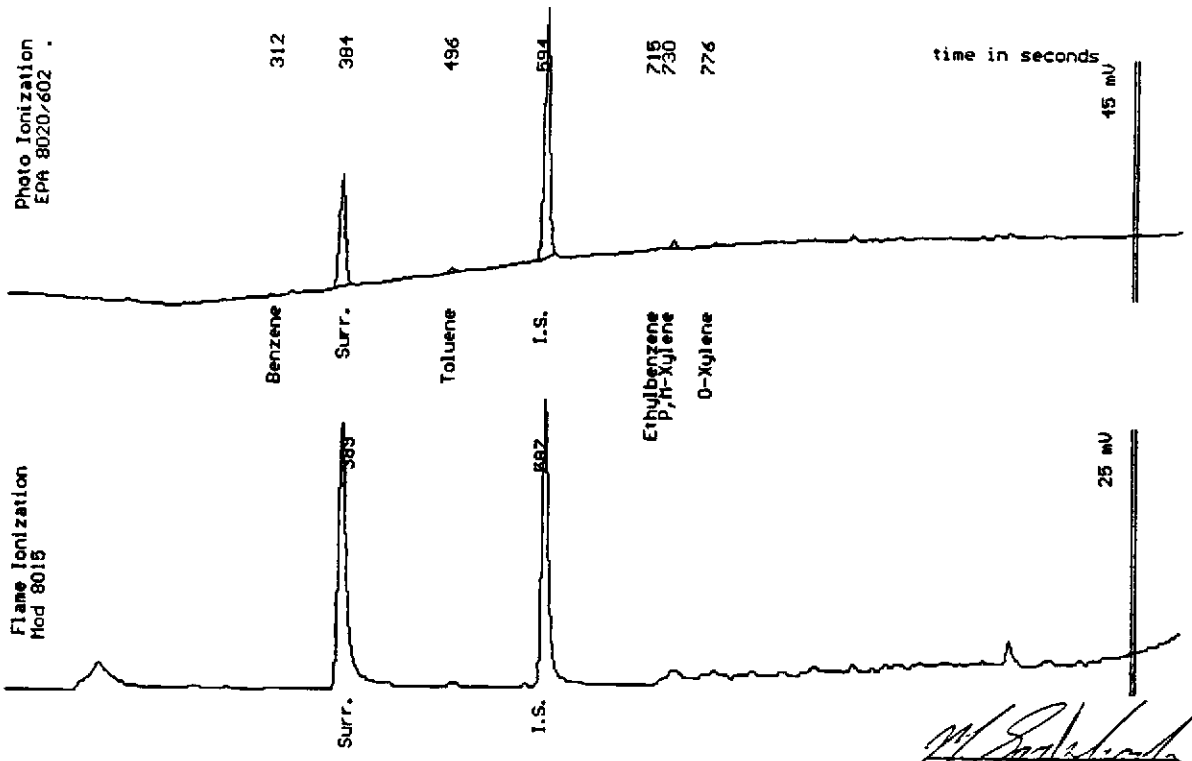
Sample Log 9043
9043-37

Sample: LV-(1->4)

From : Project # 19024.03 (Beacon 604)
Sampled : 03/30/94
Dilution : 1:1 QC Batch : 6098A
Matrix : Soil

Parameter	(MRL) ug/kg	Measured Value ug/kg
Benzene	(.0050)	<.0050
Toluene	(.0050)	<.0050
Ethylbenzene	(.0050)	<.0050
Total Xylenes	(.0050)	<.0050
TPH as Gasoline	(1.0)	<1.0
Surrogate Recovery		100 %



Date Analyzed: 04-05-94
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

Mitra Sarkhosh
Senior Chemist

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April 13, 1994
Sample Log 9043

Sample: LV-(1->4)

From : Project # 19024.03 (Beacon 604)
Sampled : 03/30/94
Received : 04/01/94
Matrix : Soil

Parameter	(MRL) mg/kg	Measured Value mg/kg
Total Lead	(10)	<10

Stewart Podolsky
Senior Chemist

Western Environmental Science & Technology · 45133 County Road 32B · Davis, CA 95616 · 916 753-9500 · FAX: 916 757-465

Ultramar Inc.
CHAIN OF CUSTODY REPORT

BEACON

Beacon Station No.	Sampler (Print Name)			ANALYSES				Date	Form No.
604	Steve Lichty							3-31-94	1 of
Project No.	Sampler (Signature)								
19024.03									
Project Location	Affiliation								
Livermore	AMV Geo								
Sample No./Identification	Date	Time	Lab No.	BTEX	TPH (gasoline)	TPH (diesel)	No. of Containers	REMARKS	
MW5-1	3-29-94			X	X		1	Hold all	
MW5-2								discreet soil	
MW5-3								samples until	
MW5-4								further notice	
MW5-5									
MW5-6									
MW5-7									
MW5-8									

Standard TAT

RECEIVED by W.E.S.T. date 4/1/94

Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
	4-1-94	1305		4/1/94	1305
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
	4/1/94	1430			
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
				4/1/94	1432

Report To:
Steve Lichty
A.M.V.

Bill to: ULTRAMAR INC.
525 West Third Street
Hanford, CA 93230
Attention: Terry Fox

Ultramar Inc.
CHAIN OF CUSTODY REPORT

BEACON

Beacon Station No.	Sampler (Print Name)			ANALYSES				Date	Form No.
604	Steve Lichty							3-31-94	2 of
Project No.	Sampler (Signature)								
19024.03								Standard TAT	
Project Location	Affiliation								
Livermore	AMU Geo								
Sample No./Identification	Date	Time	Lab No.	BTEX	TPH (gasoline)	TPH (diesel)	No. of Containers	REMARKS	
MW6-1	3-27-94			X	X		1	Hold all discreet samples on ice for further notice	
MW6-2									
MW6-3									
MW6-4									
MW6-5									
MW6-6									
MW6-7									
MW6-8									

RECEIVED by W.E.S.T. date 4/1/94

Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
	4-1-94	1305		4/1/94	1305
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
	4/1/94	1414			
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
				4/1/94	1423

Report To:

Steve Lichty
AMU.

Bill to: ULTRAMAR INC.
525 West Third Street
Hanford, CA 93230
Attention: Terry Cox

WHITE - Returned to Client with Report YELLOW - Laboratory Copy PINK - Originator Copy

Ultramar Inc.
CHAIN OF CUSTODY REPORT

BEACON

Beacon Station No.	Sampler (Print Name)			ANALYSES				Date	Form No.
604	Steve Lacy							4-1-94	3 of
Project No.	Sampler (Signature)								
19024.03	Steve Lacy							Standard TAT	
Project Location	Affiliation								
Livermore	AMV Geo								
Sample No./Identification	Date	Time	Lab No.	BTEX	TPH (gasoline)	TPH (diesel)	No. of Containers	REMARKS	
MW7-1	3.30-94			X	X		1	Hold until	
MW7-2								for new	
~~MW7-3~~ MW7-3								notice	
MW7-4									
MW7-5									
MW7-6									
MW7-7									
MW7-8									

RECEIVED by W.E.S.T. date 4/1/94

Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Steve Lacy	4-1-94	1305		4/1/94	1305
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
	4/1/94	1405			
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
			D. Cantrell	4/1/94	1431

Report To:
Steve Lacy AMV

Bill to: ULTRAMAR INC.
525 West Third Street
Hanford, CA 93230
Attention: Terry Fox

WHITE: Laboratory Copy YELLOW: Laboratory Copy PINK: Originator Copy

32 6003 1/90

Ultramar Inc.
CHAIN OF CUSTODY REPORT

BEACON

Beacon Station No.	Sampler (Print Name)			ANALYSES				Date	Form No.
604	Steve Liaty							4-1-94	4 of
Project No.	Sampler (Signature)								
19024.03	Steve Liaty								
Project Location	Affiliation								
Livermore	AMV Geo								
Sample No./Identification	Date	Time	Lab No.	BTEX	TPH (gasoline)	TPH (diesel)	No. of Containers	REMARKS	
MW4-1	3-30-94			X	X		1	Hold until	Standard TAT
MW4-2								further notice	
MW4-3									
MW4-4									
MW4-5									
MW4-6									
MW4-7									
MW4-8									

RECEIVED by W.E.S.T. date 4/1/94

Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Steve Liaty	4-1-94	1305		4/1/94	1305
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
	4/1/94	1420			
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
				4/1/94	1430

Report To:
Steve Liaty
AMV

Bill to: ULTRAMAR INC.
525 West Third Street
Hanford, CA 93230
Attention: Terry Fox

WHITE: Return to Client with Report YELLOW: Laboratory Copy PINK: Originator Copy

32-8003 1/90

DAILY FIELD REPORT

ACTON • MICKELSON • van DAM, INC.

Project No. 19024.03	Date: 3/29 & 3/30/94
Project Name: Beacon #604	Project Location: ~~Forest~~ First Street & P Street Livermore, CA
Weather: Clear to Partly Cloudy	Field Crew: SAL / V&W Drilling

Today's Work Activities:

3/29/94

0800 Arrive at site and meet with Flash Safety - Discuss procedure and begin setup of safety supply / Lane Closure
0830 V&W crew arrives - transfer supplies from Envirotech to V&W Truck.
0900 Waiting on Concrete cutter
1000 Begin drilling MW-5 - Concrete cutter did not show up on time (1½ hour late)
1130 Finish drilling MW-5 - beginning installation
1310 Begin drilling MW-6 - Vicker's concrete cutter on site
1445 Finish drilling MW-6 - beginning installation
1600 Concrete cutter has left site - presently V&W grouting wells and setting boxes
1730 Leave site.

3/30/94

0730 Arrive at site and meet with Flash Safety/V&W.
0815 Begin drilling MW-7
0935 Finish drilling MW-7 - beginning installation
1115 Setup and begin drilling MW-4
1330 Finish drilling MW-4 - beginning installation
1400 Travis Bond Blacktop on site to blacktop MW-7
1400 - 1500 V&W installing MW-4 / Survey MW-4 through MW-7
1500 Begin grouting MW-7 & MW-4 and setting boxes
1600 Beginning purging and sampling of MW-4 through MW-7
1730 V&W leaves site
1830 Finish sampling, clean and secure site, collect stockpile samples, leave site.

Signature: Steve Ly

Date: 3/30/94

ACTON • MICKELSON • van DAM, INC.

GROUND WATER LEVEL DATA

Project Name Beacon #604

Project Number 19024.05

Date 3-30-94 Field Crew SAL

Measuring Device and Number Interface Probe

Well No.	Time	Depth to Product (feet)	Depth to Ground Water (feet)	Product Thickness (feet)	Reference Elevation (feet)	Ground Water Elevation (feet)	Physical Observations/Comments
MW-1	1534		31.93		100.00	68.07	No Product
MW-2	1526		32.82		98.68	65.86	
MW-3	1514		30.97		97.08	66.11	
MW-4	1545		31.56		99.35	67.79	
MW-5	1535		32.07		98.37	66.30	
MW-6	1521		33.38		97.62	64.24	
MW-7	1519		31.98		98.03	66.05	

Signature Steve Lay

ACTON • MICKELSON • van DAM, INC.

SURVEY FIELD NOTES

Project Name	Project No.	Date
Beacon #604	19024.03	3-30-94
Surveyor SAL	Bench Mark MW-2	Bench Mark Description Monitoring Well Riser
	Rod Man Eric (F.S.)	

Station	(+) B.S.	H.I.	(-) F.S.	Elevation	Stadia Readings	Distance	Horizontal Angle	Remarks
MW-2	5.45			98.68				
		104.13						
MW-6			6.52	97.62				
MW-7			6.10	98.03				
MW-5			5.76	98.37				
MW-2	5.57			98.68				
		104.25						
MW-6			6.63	97.62	☆			
MW-7			6.22	98.03	☆			
MW-5			5.88	98.37	☆			
MW-4			4.90	99.35				

SITE SKETCH

Signature Steve Lee

ENCLOSURE F

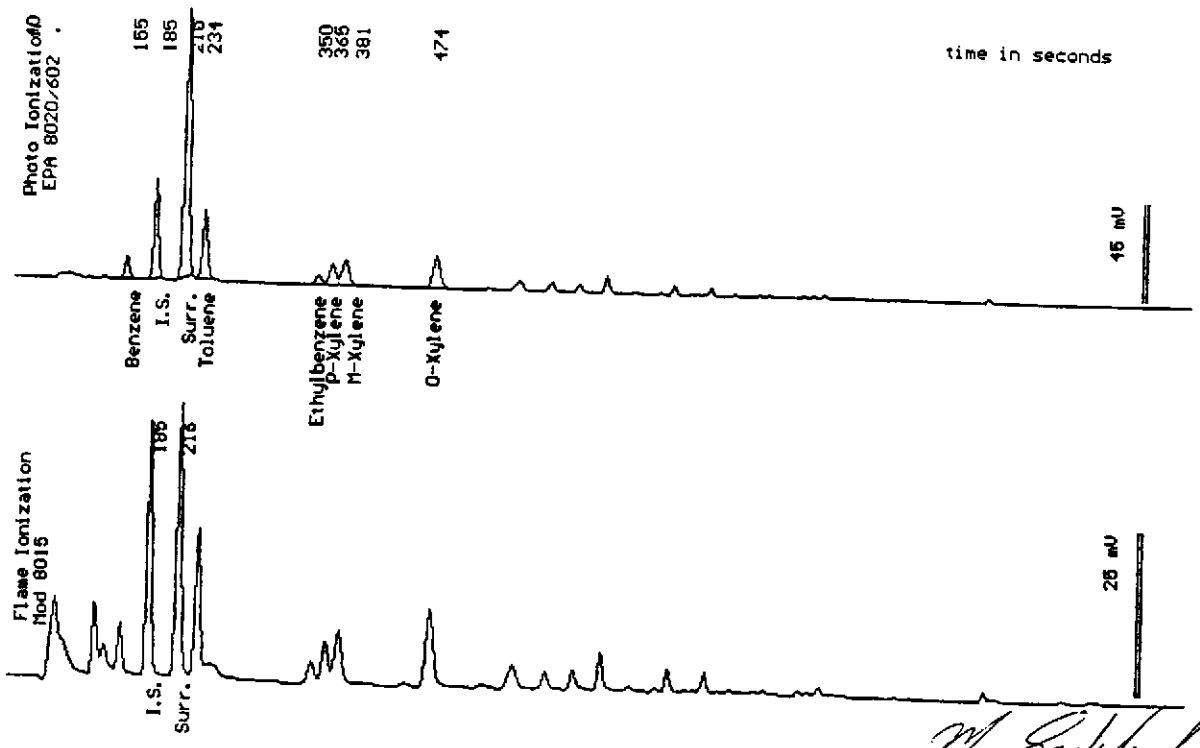
GROUND WATER SAMPLE ANALYTICAL REPORTS

Sample Log 9043
9043-33

Sample: **MW-4**

From : Project # 19024.03 (Beacon 604)
Sampled : 03/30/94
Dilution : 1:1
Matrix : Water
QC Batch : 4077A

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(.50)	4.2
Toluene	(.50)	15
Ethylbenzene	(.50)	2.5
Total Xylenes	(.50)	26
TPH as Gasoline	(50)	120
Surrogate Recovery		98 %



Date Analyzed: 04-05-94
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

Mitra Sarkhosh
Senior Chemist

Western Environmental Science & Technology · 45133 County Road 32B · Davis, CA 95616 · 916 753-9500 · FAX: 916 757-4653

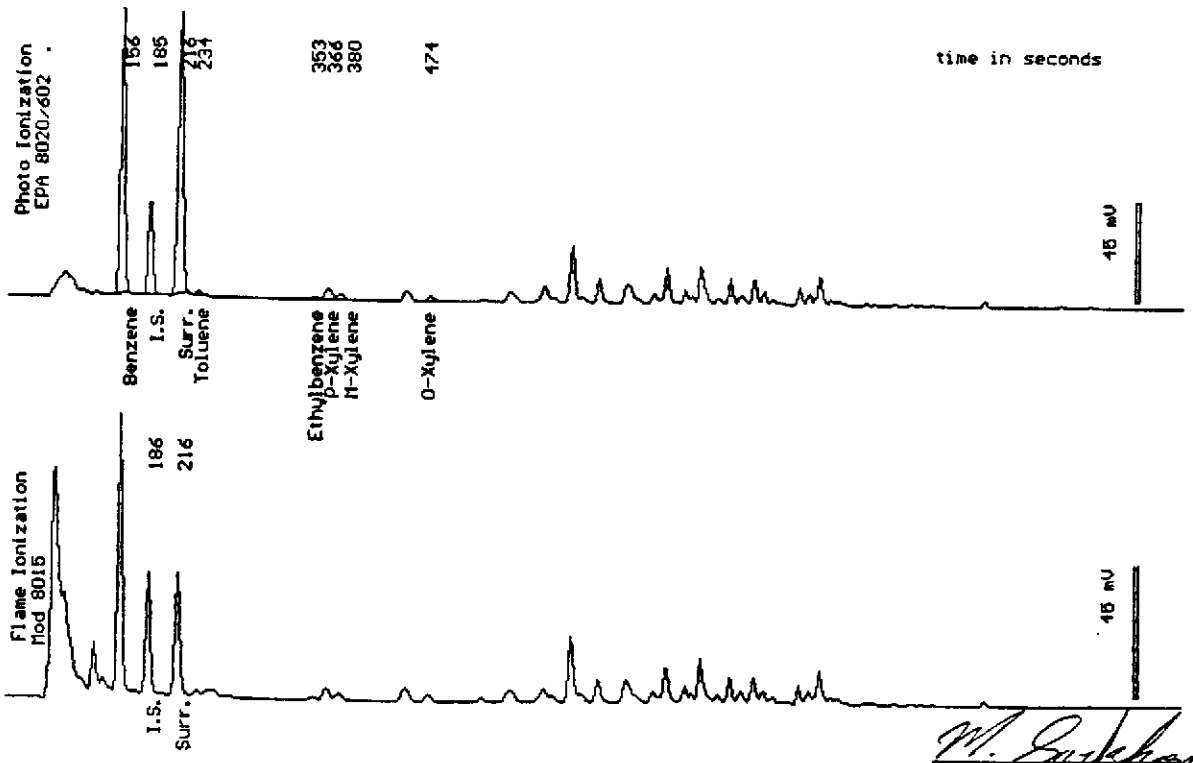
Sample Log 9043

9043-34

Sample: **MW-5**

From : Project # 19024.03 (Beacon 604)
Sampled : 03/30/94
Dilution : 1:25 QC Batch : 4077b
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(13)	1300
Toluene	(13)	20
Ethylbenzene	(13)	<13
Total Xylenes	(13)	160
TPH as Gasoline	(1300)	7500
Surrogate Recovery		96 %



Date Analyzed: 04-06-94
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

Mitra Sarkhosh
Senior Chemist

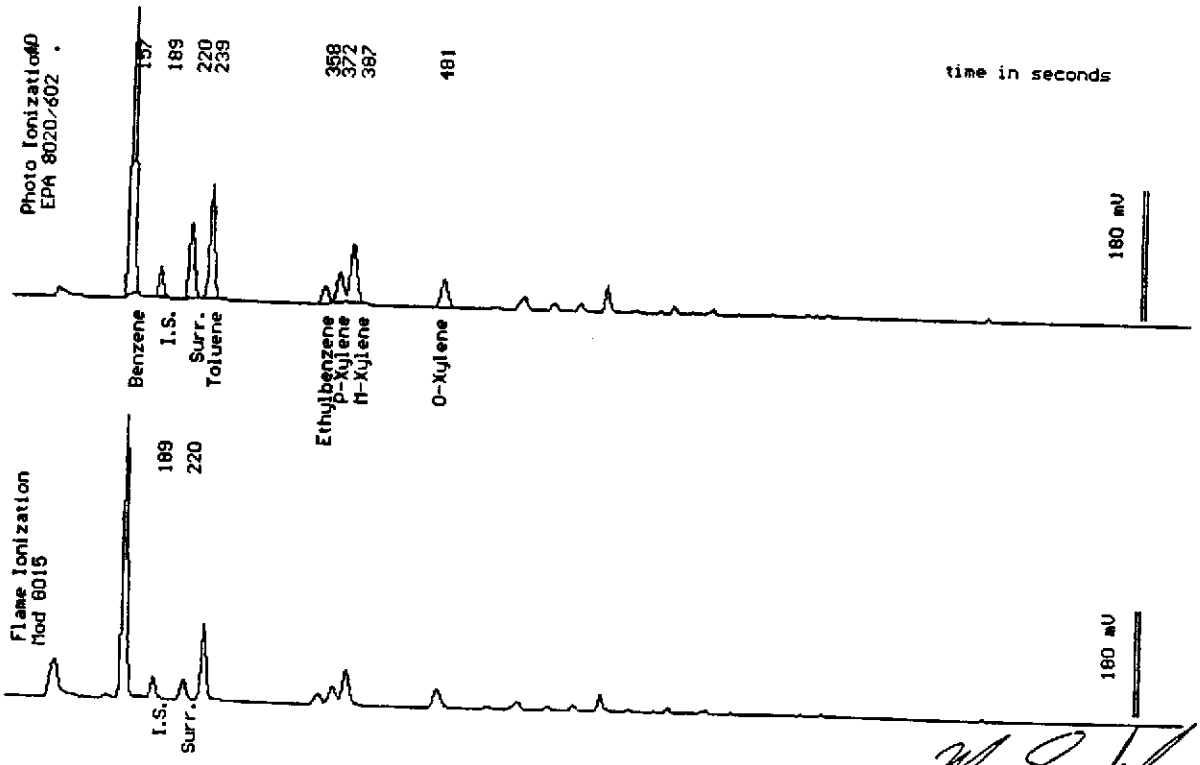
Western Environmental Science & Technology · 45133 County Road 32B · Davis, CA 95616 · 916 753-9500 · FAX: 916 757-463

Sample Log 9043
9043-35

Sample: **MW-6**

From : Project # 19024.03 (Beacon 604)
Sampled : 03/30/94
Dilution : 1:100
Matrix : Water
QC Batch : 4077b

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(50)	21000
Toluene	(50)	8600
Ethylbenzene	(50)	1700
Total Xylenes	(50)	12000
TPH as Gasoline	(5000)	63000
Surrogate Recovery		99 %



Date Analyzed: 04-06-94
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

Mitra Sarkhosh
Senior Chemist

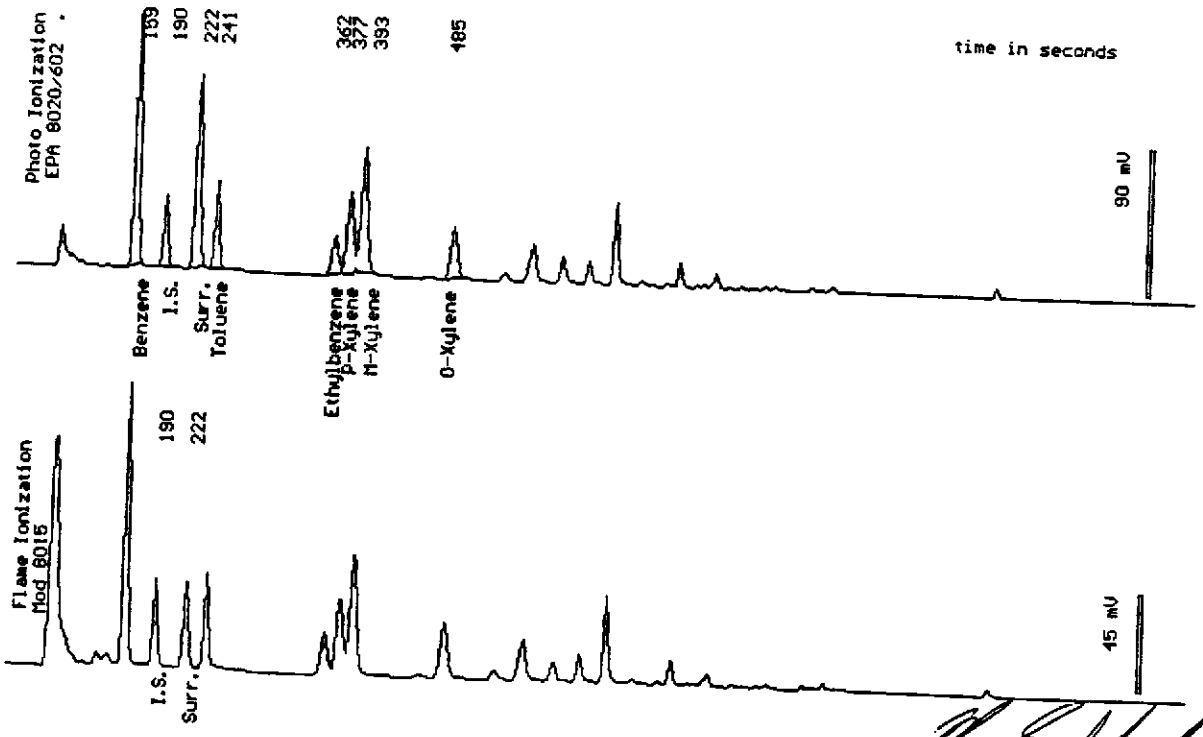
Western Environmental Science & Technology · 45133 County Road 32B · Davis, CA 95616 · 916 753-9500 · FAX: 916 757-465

Sample Log 9043
9043-36

Sample: **MW-7**

From : Project # 19024.03 (Beacon 604)
Sampled : 03/30/94
Dilution : 1:100
Matrix : Water
QC Batch : 4077b

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(50)	7200
Toluene	(50)	2400
Ethylbenzene	(50)	1600
Total Xylenes	(50)	11000
TPH as Gasoline	(5000)	43000
Surrogate Recovery		98 %



Date Analyzed: 04-06-94
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

Mitra Sarkhosh
Senior Chemist

Western Environmental Science & Technology • 45133 County Road 32B • Davis, CA 95616 • 916 753-9500 • FAX: 916 757-4652

Ultramar Inc.

CHAIN OF CUSTODY REPORT

BEACON

Beacon Station No.	Sampler (Print Name)			ANALYSES				Date	Form No.
604	Steve Liaty							4-1-94	5 of
Project No.	Sampler (Signature)								
19024.03	Steve Liaty							Standard TAT	
Project Location	Affiliation								
Livermore	AMV Geo								
Sample No./Identification	Date	Time	Lab No.	BTEX	TPH (gasoline)	TPH (diesel)	No. of Containers	REMARKS	
MW-4	3-30-94	1640		X	X		3	Water sample	
MW-5		1715					3		
MW-6		1745					3		
MW-7		1630					3		
LV-(1 through 4)	3-30-94	1645					4	Composite to one sample	

RECEIVED by W.E.S.T. date 4/1/94

Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Steve Liaty	4-1-94	1305		4/1/94	1305
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
	4/1/94	1800			
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
				4/1/94	1430

Report To: Steve Liaty AMV

Bill to: ULTRAMAR INC.
525 West Third Street
Hanford, CA 93230
Attention: Terry Fox

WHITE: Return to Client with Report YELLOW: Laboratory Copy PINK: Originator Copy

32-8003 1/90

Ultramar

93 AUG 12 PM 2:22

Ultramar Inc.
P.O. Box 466
525 W. Third Street
Hanford, CA 93232-0466
(209) 582-0241

Telecopy: 209-584-6113 Credit & Wholesale
209-583-3330 Administrative
209-583-3302 Information Services
209-583-3358 Accounting

August 10, 1993

Ms. Eva Chu
Department of Environmental Health
Alameda County Health Care Services
80 Swan Way, Room 200
Oakland, CA 94612

SUBJECT: BEACON STATION NO. 604, 1619 FIRST STREET, LIVERMORE, CALIFORNIA

Dear Ms. Chu:

Enclosed is a copy of the report on the assessment at the above-referenced Ultramar facility.

A workplan detailing further assessment will be sent to your office when it has been completed.

Please call if you have any questions regarding this site.

Sincerely,

ULTRAMAR INC.

Terrence A. Fox
Senior Project Manager
Marketing Environmental Department

cc: Alameda County Local Coordinator, San Francisco Bay Region, RWQCB

ACTON • MICKELSON • van DAM, INC.
Consulting Scientists, Engineers, and Geologists

5090 Robert J. Mathews Parkway, #4
El Dorado Hills, California 95762

(916) 939-7550
Fax (916) 939-7570

August 6, 1993

Mr. Terrence A. Fox
Ultramar, Inc.
525 West Third Street
Hanford, California 93232

19024.01

Subject: Soil and Ground Water Investigation--Beacon Station No. 604
1619 West First Street, Livermore, California

Dear Mr. Fox:

Acton • Mickelson • van Dam, Inc. (AMV), has been authorized to conduct an investigation of soil and ground water conditions at Beacon Station No. 604 located at 1619 West First Street, Livermore, Alameda County, California (Figure 1). This letter summarizes the results of soil boring, ground water monitoring well and vapor extraction well installation, and soil and ground water sampling performed at the site on May 27, 28, June 1, and June 22, 1993.

Scope of Work

The work included advancing three 10-inch-diameter soil borings to a depth of approximately 54 feet below grade and completing each of these borings as monitoring wells (MW-1, MW-2, and MW-3) and advancing four 8-inch-diameter soil borings to approximate depths of 50, 37, 36, and 35 feet below grade (VW-1, VW-2, VW-3, and B-4, respectively). Soil borings VW-1, VW-2, and VW-3 were completed as vapor extraction wells. Soil boring B-4 was grouted to the surface shortly after drilling. Monitoring and vapor extraction well and soil boring locations are illustrated on Figure 2. Methods used to drill and sample the soil borings are described in Enclosure A. Soil boring logs containing detailed descriptions of soil characteristics are included in Enclosure B.

Selected soil samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX) and total petroleum hydrocarbons as gasoline (TPHg). Analytical procedures conformed to U.S. Environmental Protection Agency (EPA) and California Environmental Protection Agency (CAL-EPA) approved methods.

Ground water monitoring wells MW-1, MW-2, and MW-3 were constructed of 4-inch-diameter, Schedule 40 PVC casing. Vapor extraction wells VW-1, VW-2, and VW-3 were constructed of 2-inch-diameter Schedule 40 PVC casing. Details of monitoring well and vapor extraction well construction are contained in Enclosure C. The monitoring wells were developed, purged, and sampled in accordance with methods outlined in Enclosure A. A ground water sample from each monitoring well was submitted for laboratory analysis of BTEX and TPHg in accordance with the requirements of the Department of Environmental Health, County of Alameda.

Soil Borings

Soil samples collected from the borings consisted of silty clay and clayey gravel. For example, samples collected from the boring of monitoring well MW-3 indicated the following vertical soil sequence: from below the concrete to 18.5 feet below grade, the soil encountered consisted of clayey gravel; from 18.5 to 35 feet, a silty clay unit was encountered; from 35 feet to a total depth of 53 feet below grade, a clayey gravel unit was present. Contacts between the soil types were gradational. Soil boring logs containing detailed descriptions of soil conditions encountered in each boring are included in Enclosure B.

Soil Sample Analytical Results

A portion of each soil sample collected from the soil borings was sealed in a plastic bag and allowed to reach ambient air temperature. The headspace of the bag was then screened in the field for the presence of organic vapors with a photoionization detector (PID). The highest PID reading for each sample was recorded on the right-hand side of the boring logs (Enclosure B.)

Soil samples were selected for chemical analysis on the basis of PID screening results and the location of the soil samples in relation to the most likely source of petroleum constituents. Twenty-four soil samples were submitted for analysis of concentrations of BTEX and TPHg. Analytical results of soil samples submitted by AMV are summarized in Table 1. Copies of certified analytical reports are contained in Enclosure D.

Ground Water Level Measurements

Ground water level measurements were collected from each monitoring well on June 1 and June 22, 1993 (Table 2). Ground water was present at depths ranging from 37.11 to 39.07 feet below the top of the monitoring well casings on June 22, 1993. Water level measurements from the June 22, 1993, indicate an inferred direction of ground water flow toward the northwest as illustrated on Figure 3. On June 22, 1993, the ground water gradient was approximately 0.03 foot per foot.

Ground Water Analytical Results

On June 1 and June 22, 1993, ground water samples were collected from the three on-site monitoring wells (MW-1, MW-2, and MW-3). Samples were collected as described in Enclosure A. Copies of field notes for sampling activities conducted on June 22, 1993, are contained in Enclosure E. Each ground water sample was analyzed for BTEX and TPHg by state and federal EPA approved methods. Analytical results are compiled in Table 3. Copies of certified analytical reports are contained in Enclosure F.

Discussion

Soil samples containing TPHg concentrations exceeding 100 parts per million (ppm) were collected from 40 feet below grade in soil boring VW-1 and 20 feet below grade in soil boring VW-2. The area of soil containing TPHg at concentrations exceeding 100 ppm has been defined. A soil sample collected at 40 feet below grade from soil boring VW-1 contained benzene at a concentration of 1.8 ppm.

The most recent ground water samples collected on June 22, 1993, contained TPHg concentrations ranging from 160,000 micrograms per Liter (μg/L) in monitoring well MW-2, to 160 μg/L monitoring well MW-3. The ground water sample collected from monitoring well MW-2 on June 22, 1993, contained the highest concentration of benzene at 19,000 μg/L.

It is recommended that a copy of this report be forwarded to the following agencies:

Ms. Eva Chu
Department of Environmental Health
Alameda County Health Care Services
80 Swan Way, Room 200
Oakland, California 94612

Mr. Cecil Felix
California Regional Water Quality Control Board,
San Francisco Bay Region
2101 Webster Street, Room 500
Oakland, California 94612

If you have any questions, please contact either of the undersigned at (916) 939-7550.

Sincerely,

ACTON • MICKELSON • van DAM, INC.

Steven A. Liaty
Geologist

Dale A. van Dam, R.G.
California Registered Geologist #4632

SAL:DAvD:ecd
Enclosures

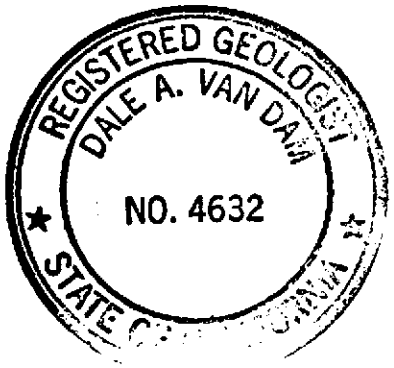


TABLE 1

SOIL SAMPLE ANALYTICAL RESULTS
Concentrations in milligrams per kilogram (mg/kg)

Boring No.	Sample No.	Depth (feet below grade)	Date Sampled	Benzene	Toluene	Ethylbenzene	Total Xylenes	TPHg[a]
VW-1	6	30	05-27-93	<0.50	4.3	2.6	17	280
	7	35	05-27-93	0.20	0.45	0.11	0.56	11
	8	40	05-27-93	1.8	16	5.3	32	340
VW-2	4	20	05-28-93	<0.50	4.0	4.0	25	200
	6	30	05-28-93	0.018	0.15	0.044	0.23	3.5
	7	35	05-28-93	0.021	0.024	0.0086	0.056	<1.0
VW-3	4	20	06-01-93	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
	5	25	06-01-93	0.017	<0.0050	<0.0050	<0.0050	<1.0
	6	30	06-01-93	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
	7	35	06-01-93	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
MW-1	5	25	05-27-93	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
	6	30	05-27-93	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
	7	35	05-27-93	0.029	0.015	0.0051	0.031	<1.0
MW-2	4	20	05-27-93	<0.0050	<0.0050	<0.0050	0.037	6.4
	5	25	05-27-93	0.057	0.099	0.026	0.22	1.5
	6	30	05-27-93	0.040	0.065	0.0070	0.051	<1.0
	7	35	05-27-93	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
MW-3	5	25	05-28-93	<0.0050	<0.0050	<0.0050	<0.0050	<1.0
	6	30	05-28-93	<0.0050	<0.0050	<0.005	<0.0050	<1.0
	7	35	05-28-93	<0.0050	<0.0050	<0.005	<0.0050	<1.0
B-4	4	20	06-01-93	<0.0050	<0.0050	<0.0050	0.020	<1.0
	5	25	06-01-93	<0.050	0.27	0.18	1.7	16
	6	30	06-01-93	0.17	0.044	0.013	0.057	<1.0
	7	35	06-01-93	0.073	0.11	0.30	0.65	55

TABLE 2

WATER ELEVATION DATA

Monitoring Well	Date	Top of Riser	Depth to Water (feet)	Ground Water Elevation (feet)	Physical Observation
MW-1	06-01-93 06-22-93	100.00	37.50 38.46	62.50 61.54	No Product No Product
MW-2	06-01-93 06-22-93	98.68	38.02 39.07	60.66 59.61	No Product No Product
MW-3	06-01-93 06-22-93	97.08	36.18 37.11	61.90 61.97	No Product No Product

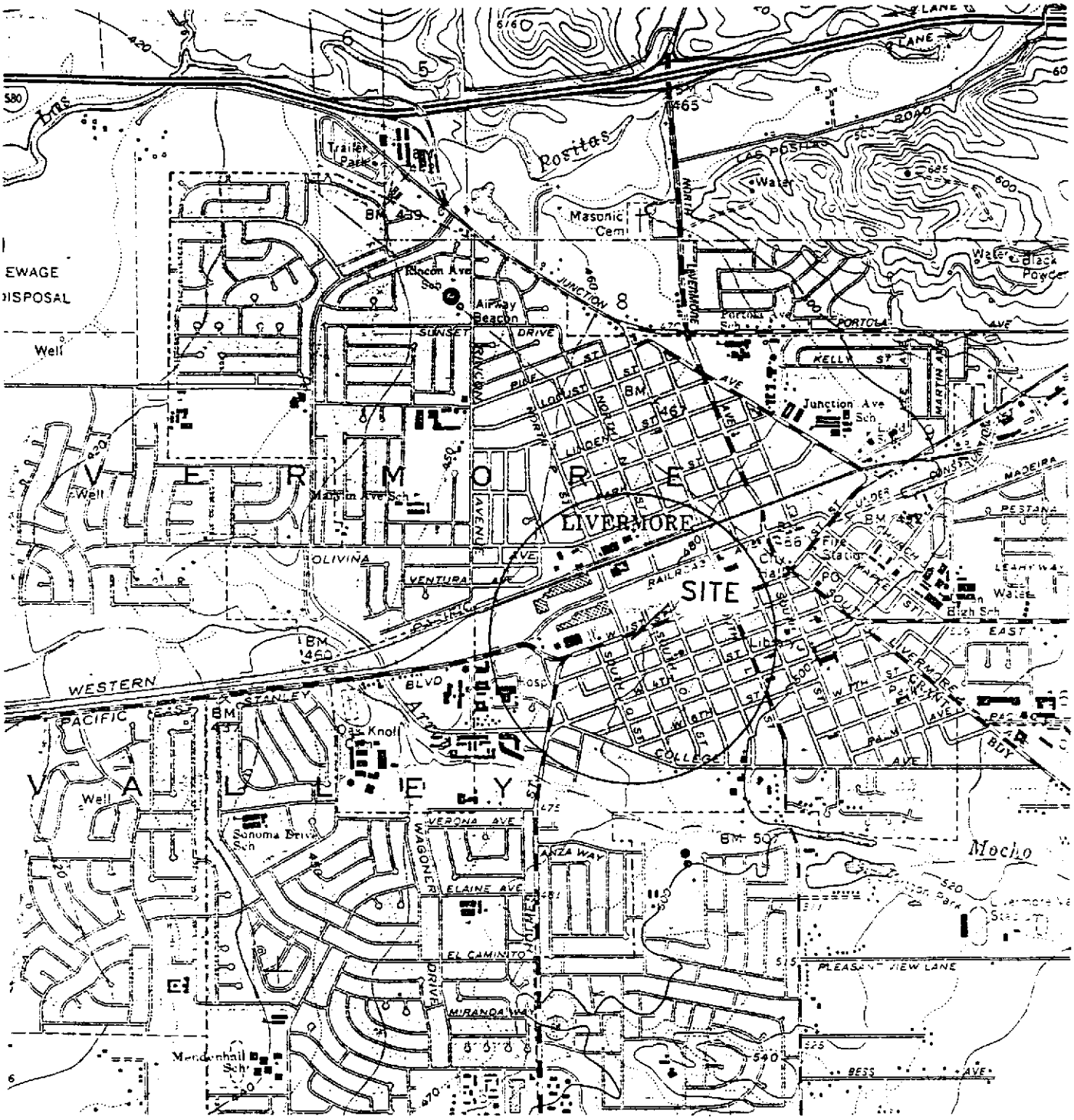
NOTE: Monitoring well elevations were surveyed relative to an arbitrary bench mark at the top of the casing of monitoring well MW-1 with an assumed elevation of 100.00 feet.

TABLE 3

GROUND WATER SAMPLE ANALYTICAL RESULTS
Concentrations in micrograms per Liter (μg/L)

Monitoring Well	Date Sampled	Benzene	Toluene	Ethylbenzene	Total Xylenes	TPHg*
MW-1	06-01-93 06-22-93	2,200 8,000	400 10,000	<50 260	4,900 10,000	27,000 87,000
MW-2	06-01-93 06-22-93	20,000 19,000	21,000 22,000	3,300 3,500	18,000 18,000	170,000 160,000
MW-3	06-01-93 06-22-93	4.6 8.2	<0.50 <0.50	<0.50 <0.50	1.9 0.72	270 160

*Total Petroleum Hydrocarbons as gasoline.



General Notes

Base Map from U.S.G.S.
Livermore, California
7.5 Minute Topographic
Photorevised 1980

QUADRANGLE LOCATION

N

0 2000

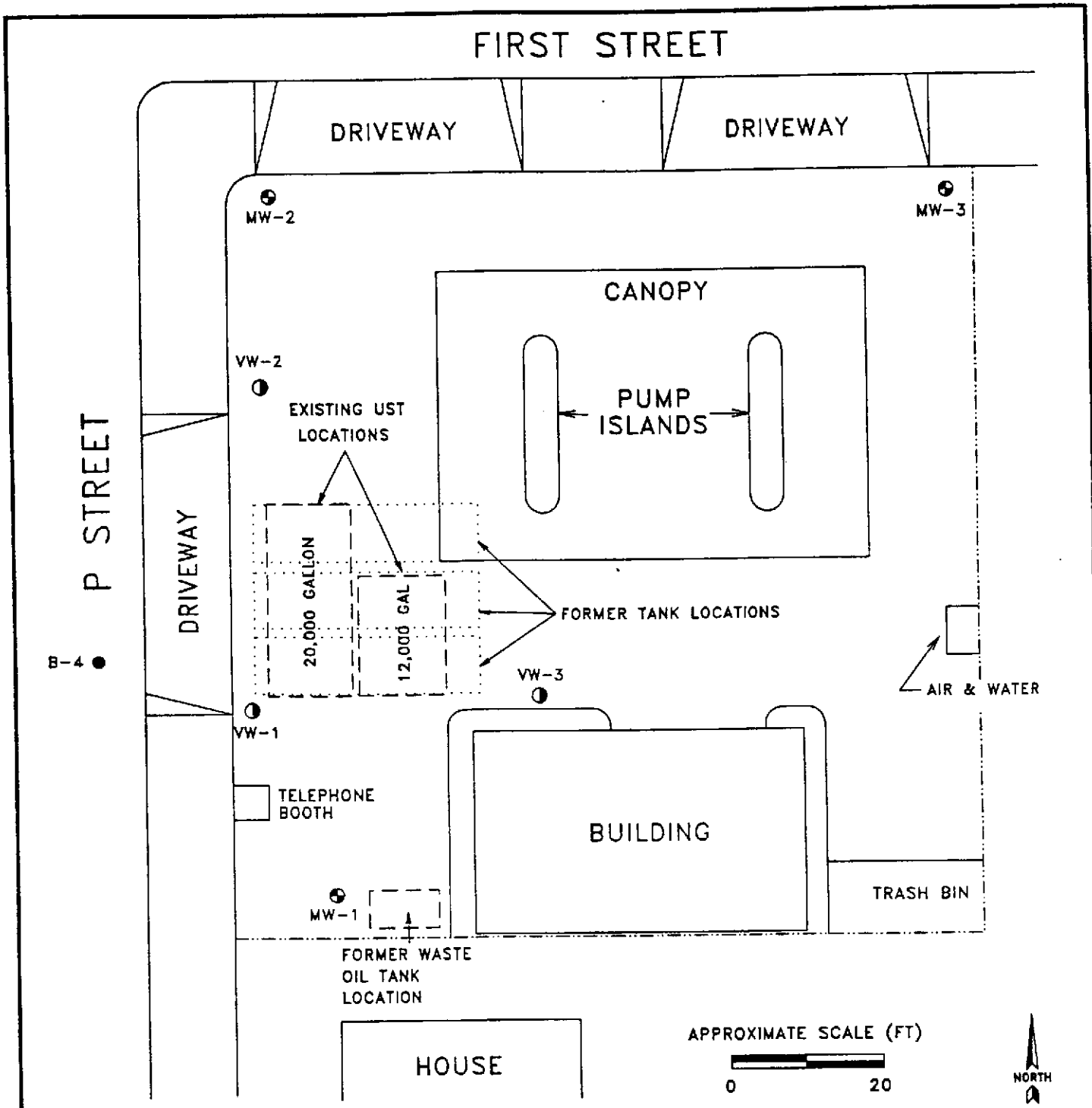
Scale
1" = 2000'

FIGURE 1

SITE LOCATION MAP
BEACON STATION #604
1619 WEST FIRST STREET
LIVERMORE, CALIFORNIA

Project No.	Drawn by:
19021.01	EAF
File No.	Prepared by:
19021015	HEH
Revision No.	Reviewed by:

Acton • Mickelson • van Dam, Inc.
Consulting Scientists, Engineers, and Geologists
5090 Robert J. Mathews Parkway, #4
El Dorado Hills, California 95762
(916) 939-7550



LEGEND

- VW-3 — VADOSE WELL LOCATION AND NUMBER
- MW-2 — MONITORING WELL LOCATION AND NUMBER
- B-4 — SOIL BORING LOCATION
- PROPERTY BOUNDARY

FIGURE 2
SITE MAP
BEACON STATION #604
1619 WEST FIRST STREET
LIVERMORE, CA

Project No. 19024.01	Drawn SAL
File No. 19024SM	Prepared SAL
Revision	Reviewed

Acton • Mickelson • van Dam, Inc.
Consulting Scientists, Engineers, and Geologists
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El Dorado Hills, California 95762
(916) 939-7550

ENCLOSURE A

SOIL AND GROUND WATER SAMPLING TECHNIQUES

Proper sampling techniques were followed to assure that samples represented actual field conditions and that samples were labeled, preserved, and transported properly to retain sample integrity. This exhibit describes procedures followed by Acton • Mickelson • van Dam, Inc. (AMV), during collection of samples of subsurface soil and ground water. Sampling guidance documents from the American Society of Testing and Materials (ASTM), U.S. Environmental Protection Agency (EPA), and California Department of Health Services (DHS) were followed for all sampling procedures. Actual sampling procedures employed were based on field conditions and may differ from those described here.

1.0 EXPLORATION BORING/SOIL SAMPLING PROCEDURES

Soil borings and soil sampling were performed under the direction of an AMV geologist. The soil borings were advanced using a truck-mounted, hollow-stem auger drill rig.

Soil samples were collected at 5-foot vertical intervals. Soil sampling was done in accordance with ASTM 1586-84. Using this procedure, three 2-inch-diameter, 6-inch-length, brass tubes were placed in a California-type split-barrel sampler. The sampler was driven into the soil by a 140-pound weight falling 30 inches. After an initial set of 6 inches, the number of blows required to drive the sampler an additional 12 inches is known as penetration resistance, or the "N" value. The "N" value was used as an empirical measure of the relative density of cohensionless soils and the consistency of cohesive soils.

Upon recovery of the split-barrel sampler, the brass tubes containing the soil were removed. The ends of one of the three brass tubes were sealed with Teflon tape and plastic end caps. The sample was labeled with an identification number, time, date, location, and requested laboratory analysis. The sample was placed in a plastic bag and stored at approximately 4° Celsius (C) in an ice chest for transport to the laboratory. Sample custody procedures outlined in Section 5.0 of this exhibit were followed. This was performed for each sample collection.

Soil in one of the brass tubes was extracted upon recovery, placed in a plastic bag, and sealed for later screening for organic vapors using a photoionization detector (PID) or a flame ionization detector (FID). The remaining portion of the soil sample was examined and a complete log of soil conditions was recorded on a soil boring log (Enclosure A) using the Unified Soil Classification System (Enclosure B). The soil was examined for grain size, color, and moisture content.

The split-barrel sampler was cleaned to prevent cross-contamination for each sampling interval using procedures described in Section 3.0.

Soil borings were normally advanced with 8- or 10-inch-diameter, hollow-stem augers. The soil generated from the soil borings was stored on visqueen.

2.0 WATER LEVEL AND LIQUID-PHASE HYDROCARBON (LPH) THICKNESS MEASUREMENTS AND GROUND WATER SAMPLING

2.1 Water Level and LPH Thickness Measurements

The static water level and/or LPH thickness in each well was measured prior to purging or sampling.

The depth to water/product was measured using an electronic interface probe. The wire of the interface probe is marked at 0.01 foot intervals. One tone is emitted from the interface probe if LPH is encountered; another tone for water. The wire of the interface probe was lowered slowly until LPH or water was encountered. At this point, the mark on the interface wire opposite the permanent reference point on the top of the well casing was read to the nearest 0.01 foot and recorded. If the first encountered substance was LPH, the probe was lowered until the tone corresponding to water was emitted. This depth was also recorded. The difference between the two depths corresponds to the LPH thickness. The interface probe was rinsed in deionized water between measurements in different wells.

A permanent reference point was marked on the well casings. The permanent reference point on the well casings was surveyed to a common reference point. All well casing riser elevations are known to within 0.01 foot.

Prior to well development, a disposable bailer was used to collect a sample of LPH, if present in a well, for subjective analysis. The sample was collected by gently lowering the bailer approximately one-half the bailer length past the air/LPH interface. The appearance (color, opacity, "freshness") was described and noted on field notes.

2.2 Well Evacuation and Development

After the static water level in a well was determined and prior to collection of a ground water sample, stagnant water was removed from the well casing and the surrounding gravel pack by bailing, pumping, or with a vacuum truck. At least three casing volumes of water were removed from each well from which a sample was collected. The volume of water in the casing was determined from the known elevation of the water surface, the well bottom elevation (as measured when the well is installed), and the well diameter.

If the well was bailed or pumped during purging, samples were collected and field analyzed for pH, temperature, and specific conductance. The well was considered stabilized when repeated readings of the following parameters were within the ranges indicated as follows:

- Specific conductance ±10 percent of the reading range
- pH ±0.1 pH unit
- Temperature ±0.5° C.

After stabilization, and after at least three well volumes were evacuated, a sample was collected for analysis. The field container used for well stabilization measurements, and the pH, temperature, and conductivity probes were rinsed between wells with deionized water.

All purge water was containerized and properly handled and documented for disposal. If the containers was stored on site, a label specifying the date of purging, source, and the known or suspected nature of the contents was affixed to each container.

2.3 Sample Collection, Preservation, and Handling

After purging, a new polyethylene disposable bailer was used to collect samples for analysis. The bailer was attached to a new disposable rope and lowered slowly into the water to avoid agitation of the collected sample. Containers for volatile organics analyses were filled completely so no airspace remained in the vial after sealing.

All sample containers were prewashed and prepared at the analyzing laboratory in accordance with quality assurance/quality control protocols of the laboratory. Only sample containers appropriate for the intended analyses were used.

3.0 DECONTAMINATION AND DISPOSAL PROCEDURES

3.1 Equipment Decontamination

All equipment that came in contact with potentially contaminated soil, drilling fluid, air, or water was decontaminated before each use. Decontamination consisted of steam-cleaning, a high-pressure, hot-water rinse, or trisodium phosphate (TSP) wash and freshwater rinse, as appropriate.

Drilling and sampling equipment were decontaminated as follows:

1. Drill rig augers, drill rods, and drill bits were steam-cleaned prior to use and between borings. Visible soil, grease, and other impurities were removed.

2. Soil sampling equipment was steam-cleaned prior to use and between each boring. Prior to individual sample collection, any sampling device was cleaned in a TSP solution and rinsed twice in clean water. Any visible soil residue was removed.

3. Water sampling containers were cleaned and prepared by the respective analytical laboratories.

4. Stainless steel or brass soil sampling tubes were steam-cleaned or washed in TSP solution and rinsed with clean water.

5. Field monitoring equipment (pH, conductivity, or temperature probes) was rinsed with clean water prior to use and between samples.

4.0 FIELD MEASUREMENTS

Field data were collected during various sampling and monitoring activities; this section describes routine procedures followed by personnel performing field measurements. The methods presented below are intended to ensure that field measurements are consistent and reproducible when performed by various individuals.

4.1 Buried Utility Locations

Prior to commencement of work on site, AMV contacted appropriate utility companies to have underground utility lines located. AMV also researched the location of all underground utilities using past site construction and surveying plans and by conducting a ground reconnaissance of the area. All work associated with the borings was preceded by hand augering to a minimum depth of 5 feet below grade to avoid contact with underground utilities.

4.2 Lithologic Logging

A log of soil conditions encountered during the drilling and sample collection (Enclosure A) was maintained using the Unified Soil Classification System (Enclosure B) by an AMV geologist. All boring logs were reviewed by a California registered geologist.

The collected soil samples were examined and the following information recorded: boring location, sample interval and depth, blow counts, color, soil type, moisture content (qualitative), and depth at which ground water (if present) is first encountered. Also recorded on the soil boring logs were the field screening results derived from the use of a portable PID or FID.

4.3 Disposal Procedures

Soils and fluids that were produced and/or used during the installation and sampling of borings, and that are known or suspected to contain potentially hazardous materials, were contained during the above operations. These substances were retained on site until chemical testing had been completed to determine the proper means of disposal. Handling and disposal of substances known or suspected to contain potentially hazardous materials complied with the applicable regulations of DHS, the California Department of Water Resources, and any other applicable regulations. Soils and fluids produced and/or used during the above-described operations that appeared to contain potentially hazardous materials were disposed of appropriately.

Residual substances generated during cleaning procedures that are known or suspected to pose a threat to human health or the environment were placed in appropriate containers until chemical testing had been completed to determine the proper means for their disposal.

4.4 Conductivity, Temperature, and pH

Specific conductance, water temperature, and pH measurements were made when a water sample was collected. Regardless of the sample collection method, a representative water sample was placed in a transfer bottle used solely for field parameter determinations. A conventional pH meter with a combination electrode or equivalent was used for field-specific conductance measurements. Temperature measurements were performed using standard thermometers or equivalent temperature meters. Combination instruments capable of measuring two or all three of the parameters may have also been used.

All instruments were calibrated in accordance with manufacturer methods. The values for conductivity standards and pH buffers used in calibration were recorded daily in a field notebook. All probes were thoroughly cleaned and rinsed with fresh water prior to any measurements, in accordance with Section 3.1.

5.0 SAMPLE CUSTODY

This section describes standard operating procedures for sample custody and custody documentation. Sample custody procedures were followed through sample collection, transfer, analysis, and ultimate disposal. The purpose of these procedures is to assure that (1) the integrity of samples was maintained during their collection, transportation, and storage prior to analysis and (2) post-analysis sample material was properly disposed of. Sample custody is divided into field procedures and laboratory procedures, as described below.

5.1 Field Custody Procedures

Sample quantities, types, and locations were determined before the actual fieldwork commenced. As few people as possible handled samples. The field sampler was personally responsible for the care and custody of the collected samples until they were properly transferred.

5.1.1 Field Documentation

Each sample was labeled and sealed properly immediately after collection. Sample identification documents was carefully prepared so that identification and chain-of-custody records could be maintained and sample disposition could be controlled. Forms were filled out with waterproof ink. The following sample identification documents were utilized.

- Sample labels
- Field notebook
- Chain-of-custody forms

5.1.2 Sample Labels

Sample labels provide identification of samples. Preprinted sample labels were provided. Where necessary, the label was protected from water and solvents with clean label-protection tape. Each label contained the following information:

- Name of collector
- Date and time of collection
- Place of collection
- AMV project number
- Sample number
- Preservative (if any)

5.1.3 Field Notebook

Information pertinent to a field survey, measurements, and/or sampling were recorded in a bound notebook. Entries in the notebook may have included the following:

- Name and title of author, date and time of entry, and physical/environmental conditions during field activity.
- Location of sampling or measurement activity.
- Name(s) and title(s) of field crew.
- Type of sampled or measured media (e.g., soil, ground water, air, etc.)
- Sample collection or measurement method(s).
- Number and volume of sample(s) taken.
- Description of sampling point(s).
- Description of measuring reference points.
- Date and time of collection or measurement.
- Sample identification number(s).
- Sample preservative (if any).
- Sample distribution (e.g., laboratory).
- Field observations/comments.
- Field measurements data (pH, etc.).

5.1.4 Chain-of-Custody Record

A chain-of-custody record was filled out for and accompanied every sample and every shipment of samples to the analytical laboratories in order to establish the documentation necessary to trace sample possession from the time of collection. The record contained the following information:

- Sample or station number or sample I.D.
- Signature of collector, sampler, or recorder.
- Date and time of collection.
- Place of collection.
- Sample type.
- Signatures of persons involved in the chain of possession.
- Inclusive dates of possession.

The laboratory portion of the form was completed by laboratory personnel and contains the following information:

- Name of person receiving the sample.
- Laboratory sample number.
- Date and time of sample receipt.
- Analyses requested.
- Sample condition and temperature.

5.1.5 Sample Transfer and Shipment

Samples were always accompanied by a chain-of-custody record. When transferring samples, the individuals relinquishing and receiving the samples signed, dated, and noted the time on the chain-of-custody record. Samples were packaged properly for shipment and dispatched to the appropriate laboratory for analysis. The chain-of-custody record accompanied each shipment. The method of shipment, courier name(s), and other pertinent information was entered in the chain-of-custody record.

5.2 Laboratory Custody Procedures

A designated sample custodian accepted custody of the shipped samples and verified that the information on the sample label matched that on the chain-of-custody record. Information regarding method of delivery and sample conditions was also checked on the chain-of-custody record. The custodian then entered the appropriate data into the laboratory sample tracking system. The laboratory custodian may have used the sample number on the sample label or may have assigned a unique laboratory number to each sample. The custodian then transferred the sample(s) to the proper analyst(s) or stored the sample(s) in the appropriate secure area.

Laboratory personnel are responsible for the care and custody of samples from the time they are received until the sample is exhausted. Once at the laboratory, the samples are handled in accordance with U.S. Environmental Protection Agency SW-846, Test Methods for Evaluating Solid Waste Physical/Chemical Methods, Third Edition, for the intended analyses. All data sheets, chromatographs, and laboratory records were filed as part of the permanent documentation.

5.3 Corrections to Documentation

Original data recorded in field notebooks, chain-of-custody records, and other forms were written in ink. These documents were not altered, destroyed, or discarded, even if they were illegible or contained inaccuracies that required a replacement document.

If an error was made or found on a document, the individual making the corrections did so by crossing a single line through the error, entering the correct information, and initialing and dating the change. The erroneous information was obliterated. Any subsequent error(s) discovered on a document were corrected. All corrections were initialed and dated.

5.4 Sample Storage and Disposal

Samples and extracts were retained by the analytical laboratory for 60 days after a written report was issued by the laboratory. Unless notified by the program manager, excess or unused samples were disposed of by the laboratory in an appropriate manner consistent with applicable government regulations.

ENCLOSURE B

SOIL BORING LOGS

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Log of Soil Boring MW-1

Casing Elevation: 100.00 feet

Completion Depth: 54 feet

Project No.	Location:
19024.01	Beacon 504 1619 W. First Street Livermore, CA.

Drilling Company: Turner Exploration

Driller: Mike Barr

Drilling and Sampling Methods:

BK-81 HSA California Modified split-spoon sampler

OVM/OVA: HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-27-93	13:10
Finish	05-27-93	15:15
Water Depth	Initial	Completion 38.46 feet

Logged by: H. Hansen

Checked by: DvD

Depth (feet)	Sample Int.	Description	Graphic Log	BORING/WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
0		12 inch bore concrete								
1		CLAYEY GRAVEL Olive brown, 1/2 to 2 inch gravel, fine to coarse-grained sand, common plastic fines, dry (GC)								
2										
3										
4										
5					17 12 35	18	14		MW1-1	0
6										
7										
8										
9										
10			GC		40 45 50/4	18	12		MW1-2	0
11										
12										
13										
14										
15										
16					35 50/3	9	9		MW1-3	0
17										
18										
19										
20		moist at 20.5 feet			18 27 28	18	18		MW1-4	0

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Log of Soil Boring MW-1 (cont)

Casing Elevation: 100.00 feet

Completion Depth: 54 feet

Project No.	Location:
19024.01	Beacon 604 1519 W. First Street Livermore, CA.

Drilling Company: Turner Exploration

Driller: Mike Barr

Drilling and Sampling Methods:

BK-81 HSA California Modified
split-spoon sampler

OVM/OVA HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-27-93	
Finish	05-27-93	15:15
Water Depth	Initial	Completion 38.46 feet

Logged by: H. Hansen

Checked by: D.D

Depth (feet)	Sample Int.	Description	Graphic Log	BORING/WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
20		(continued from above) CLAYEY GRAVEL, olive brown, 1/2 to 3 inch gravel, fine- to coarse-grained sand, common plastic fines, moist (GC)	GC							
21										
22										
23		SILTY CLAY brown, slighty plastic, moist, (CL)	CL							
24										
25					6 27 28	18	18		MW1-5	0
26										
27										
28		CLAYEY GRAVEL Olive brown, 1/2 to 2 inch gravel fine to coarse-grained sand common plastic fines, moist (GC)								
29										
30					14 17 33	18	18		MW1-6	4
31										
32										
33										
34			GC							
35					18 27 33	18	18		MW1-7	110
36										
37										
38										
39										
40		saturated at 40 feet			19 27 37	18	16		MW1-8	40
41										

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Log of Soil Boring MW-1 (cont)

Casing Elevation: 100.00 feet

Completion Depth: 54 feet

Project No.	Location:
19024.01	Beacon 604 1619 W. First Street Livermore, CA.

Drilling Company: Turner Exploration

Driller: Mike Barr

Drilling and Sampling Methods:

BK-81 HSA California Modified split-spoon sampler

OVM/OVA Hnu PID with 10.2 eV Probe

Drilling	Time	Date
Start	05-27-93	13:10
Finish	05-27-93	15:15
Water Depth	Initial	Completion 38.46 feet

Logged by: H. Hansen

Checked by: DvD

Depth (feet)	Sample Int.	Description	Graphic Log	BORING/WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
40		(continued from above) CLAYEY GRAVEL, olive brown, 1/2 to 2 inch gravel, fine- to coarse-grained sand, common plastic fines, saturated (GC)								
41										
42										
43										
44										
45					28 29 42	18	18		MW1-9	15
46										
47			GC							
48										
49										
50					16 14 33	18"	15		MW1-10	150
51										
52										
53										
54					16 17 24	18	9		MW1-11	60
55		Boring terminated at 55 feet								
56										
57										
58										
59										
60										
61										

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Log of Soil Boring MW-2

Casing Elevation: 98.68 feet

Completion Depth: 54 feet

Project No.	Location:
19024.01	Beacon 604 1619 W. First Street Livermore, CA.

Drilling Company: Turner Exploration

Driller: Mike Barr

Drilling and Sampling Methods:

BK-81 HSA California Modified
split-spoon sampler

OVM/OVA HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-27-93	07:00
Finish	05-27-93	09:00
Water Depth	Initial	Completion 39.07 feet

Logged by: H. Hansen

Checked by: DP

Depth (feet)	Sample Int.	Description	Graphic Log	BORING/WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
0		Concrete								
1		CLAYEY GRAVEL Olive brown, 1/2 to 2 inch gravel, fine to coarse-grained sand, common plastic fines, slighty moist, (GC)								
2										
3										
4										
5					2 3 -	12	12		MW2-1	0
6										
7										
8			GC							
9										
10					9 7 10	18	14		MW2-2	0
11										
12										
13										
14										
15					11 17 37	18	12		MW2-3	0
16										
17										
18		SILTY CLAY brown, moderately plastic, moist, (CL)								
19										
20			CL		14 22 24	18	16		MW2-4	12

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Log of Soil Boring MW-2 (cont)

Casing Elevation: 98.68 feet

Completion Depth: 54 feet

Project No.	Location:
19024.01	Beacon 604 1619 W. First Street Livermore, CA.

Drilling Company: Turner Exploration

Driller: Mike Barr

Drilling and Sampling Methods:

BK-81 HSA California Modified split-spoon sampler

OVM/OVA HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-27-93	07:00
Finish	05-27-93	09:00
¹Water Depth	Initial	Completion 39.07 feet

Logged by: H. Hansen

Checked by: DvD

Depth (feet)	Sample Int.	Description	Graphic Log	BORING/WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
20		(continued from above) SILTY CLAY, brown, moderately plastic, moist (CL)								
21										
22										
23										
24										
25		CLAYEY GRAVEL olive brown, 1/2 to 1 inch gravel fine to coarse-grained sand common plastic fines, very moist, (GC)			7 19 24	18	15		MW2-5	30
26										
27										
28										
29										
30					28 32 41	18	18		MW2-6	150
31										
32										
33										
34										
35					26 78	12	12		MW2-7	4
36										
37										
38										
39		saturated at 39.5 feet								
40					24 38 32	18	14		MW2-8	400
41										

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Log of Soil Boring MW-2 (cont)

Casing Elevation: 98.68 feet

Completion Depth: 54 feet

Project No.	Location:
19024.01	Beacon 604 1619 W. First Street Livermore, CA.

Drilling Company: Turner Exploration

Driller: Mike Barr

Drilling and Sampling Methods:

BK-81 HSA California Modified split-spoon sampler

OVM/OVA HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-27-93	07:00
Finish	05-27-93	09:00
Water Depth	Initial	Completion 39.07 feet

Logged by: H. Hansen

Checked by: DvD

Depth (feet)	Sample Int.	Description	Graphic Log	BORING/WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
40		(continued from above) CLAYEY GRAVEL, olive brown, 1/2 to 1 inch gravel, fine- to coarse-grained sand, common plastic fines, saturated (GC)	GC							
41										
42										
43										
44										
45		SILTY CLAY brown, moderately plastic saturated, (CL)	CL		16 17 22	18	18		MW2-9	300
46										
47										
48										
49										
50					19 24 22	18	17		MW2-10	250
51										
52										
53										
54					8 9 12	18	12		MW2-11	15
55		Total depth 55 feet.								
56										
57										
58										
59										
60										
61										

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Log of Soil Boring MW-3

Casing Elevation: 99.08 feet

Completion Depth: 54 feet

Project No.	Location:
19024.01	Beacon 604 1619 W. First Street Livermore, CA.

Drilling Company: Turner Exploration

Driller: Mike Barr

Drilling and Sampling Methods:

BK-81 HSA California Modified
split-spoon sampler

OVM/OVA: HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-28-93	12:30
Finish	05-28-93	15:30
Water Depth	Initial	Completion 37.11 feet

Logged by: H. Hansen

Checked by: DvD

Depth (feet)	Sample Int.	Description	Graphic Log	BORING/ WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
0		Concrete/roadbase								
1		CLAYEY GRAVEL Olive brown, 1/2 to 2 inch gravel, fine to coarse-grained sand, common plastic fines, moist, (GC)	GC		6 17 42	18	17		MW3-1	0
2										
3										
4										
5										
6										
7										
8										
9					9					
10					24 32	18	18		MW3-2	0
11										
12										
13										
14										
15					10 5 12	18	0		MW3-3	NO RECOVERY
16										
17										
18										
19		SILTY CLAY brown, moderately plastic, moist, (CL)	CL							
20					18 24 22	18	9		MW3-4	0

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Log of Soil Boring MW-3 (cont)

Casing Elevation: 99.08 feet

Completion Depth: 54 feet

Project No.	Location:
19024.01	Beacon 604 1619 W. First Street Livermore, CA.

Drilling Company: Turner Exploration
Driller: Mike Barr
Drilling and Sampling Methods:
BK-81 HSA California Modified split-spoon sampler

OVM/OVA HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-28-93	12:30
Finish	05-28-93	15:30
Water Depth	Initial	Completion 37.11 feet

Logged by: H. Hansen
Checked by: D.D.

Depth (feet)	Sample Int.	Description	Graphic Log	BORING/WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
20		(continued from above) SILTY CLAY, brown, moderately plastic, moist (CL)								
21										
22										
23										
24										
25			CL		22 28 29	18	11		MW3-5	0
26										
27										
28										
29										
30					17 19 21	18	16		MW3-6	0
31										
32										
33										
34										
35					9 37 42	18	11		MW3-7	0
36		CLAYEY GRAVEL 1/2 to 2 inch gravel, fine to coarse-grained sand, common plastic fines, saturated (GC)								
37										
38			GC							
39										
40					14 22 25	18	18		MW3-8	0
41										

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Log of Soil Boring MW-3 (cont)

Casing Elevation: 99.08 feet

Completion Depth: 54 feet

Project No.	Location:
19024.01	Beacon 604 1619 W. First Street Livermore, CA.

Drilling Company: Turner Exploration
Driller: Mike Barr
Drilling and Sampling Methods:
BK-81 HSA California Modified
split-spoon sampler

OVM/OVA: HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-28-93	12:30
Finish	05-28-93	15:30
Water Depth	Initial	Completion 37.11 feet

Logged by: H. Hansen
Checked by: DvD

Depth (feet)	Sample Int.	Description	Graphic Log	BORING/WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
40		(continued from above) CLAYEY GRAVEL, 1/2 to 2 inch gravel, fine- to coarse-grained sand, common plastic fines, saturated (GC)	GC							
41										
42										
43										
44										
45					9 37 42	18	18		MW3-9	0
46										
47										
48										
49					7 9 24	18	12		MW3-10	0
50										
51										
52										
53		Boring terminated at 53 feet								
54										
55										
56										
57										
58										
59										
60										
61										

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Log of Soil Boring VW-1

Casing Elevation:

Completion Depth: 37 feet

Project No.	Location:
19024.01	Beacon 604 1619 W. First Street Livermore, CA.

Drilling Company: Turner Exploration

Driller: Mike Barr

Drilling and Sampling Methods:

BK-81 HSA California Modified split-spoon sampler

OVM/OVA HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-27-93	08:30
Finish	05-27-93	10:30
Water Depth	Initial	Completion N/A

Logged by: H. Hansen

Checked by: DvD

Depth (feet)	Sample Int.	Description	Graphic Log	BORING/WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
0		Concrete								
1		0 to 27 feet; conductor casing, no samples collected								
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

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Log of Soil Boring VW-1 (cont)

Project No. 19024.01

Location: Beacon 604, 1619 W. First Street, Livermore, CA.

Drilling Company: Turner Exploration

Driller: Mike Barr

Drilling and Sampling Methods: BK-81 HSA California Modified split-spoon sampler

Casing Elevation:

OVM/OVA: HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-27-93	08:30
Finish	05-27-93	10:30
Water Depth	Initial	Completion N/A

Completion Depth: 37 feet

Logged by: H. Hansen

Checked by: DvP

Depth (feet)	Sample Int.	Description	Graphic Log	BORING/WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
20		(continued from above) 0 to 27 feet; conductor casing, no samples collected								
21										
22										
23										
24										
25										
26										
27		CLAYEY GRAVEL olive brown, 1/2 to 1 inch gravel, fine to coarse-grained sand, common plastic fines, very moist, (GC)	GC		23 13 11	18	9		VW1-6	225
28										
29										
30										
31										
32										
33										
34					21					
35					31	18	16		VW1-7	325
36					33					
37										
38										
39		Saturated at 39.5 feet			37					
40					14	18	18		VW1-8	500
41					13					

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Log of Soil Boring VW-1 (cont)

Casing Elevation:

Completion Depth: 37 feet

Project No.	Location:
19024.01	Beacon 604 1619 W. First Street Livermore, CA.

Drilling Company: Turner Exploration

Driller: Mike Barr

Drilling and Sampling Methods:
BK-81 HSA California Modified
split-spoon sampler

OVM/OVA: HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-27-93	08:30
Finish	05-27-93	10:30
Water Depth	Initial	Completion N/A

Logged by: H. Hansen

Checked by: DJP

Depth (feet)	Sample Int.	Description	Graphic Log	BORING/ WELL DETAIL	Blows/6 In	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
40		(continued from above) CLAYEY GRAVEL, olive brown, 1/2 to 1 inch gravel, fine- to coarse-grained sand, common plastic fines, saturated (GC)	GC		19 22 18	18	18		VW1-9	300
41										
42										
43										
44										
45										
46										
47										
48										
49										
50		Boring terminated at 50 feet			26 36 24	18	18		VW1-10	450
51										
52										
53										
54										
55										
56										
57										
58										
59										
60										
61										

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Log of Soil Boring VW-2

Casing Elevation:

Completion Depth: 37 feet

Project No.	Location:
19024.01	Beacon 604 1619 W. First Street Livermore, CA.

Drilling Company: Turner Exploration
Driller: Mike Barr
Drilling and Sampling Methods:
BK-81 HSA California Modified
split-spoon sampler

OVM/OVA HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-28-93	08:45
Finish	05-27-93	09:45
Water Depth	Initial	Completion N/A

Logged by: H. Hansen
Checked by: DJD

Depth (feet)	Sample Int.	Description	Graphic Log	BORING/ WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
0		Concrete								
1		CLAYEY GRAVEL olive brown, 1/2 to 2 inch gravel, fine to coarse-grained sand common plastic fines, slightyly moist, (GC)								
2										
3										
4										
5					17 19 24	18	17		VW2-1	0
6										
7										
8										
9										
10					25 35	12	9		VW2-2	0
11										
12										
13										
14										
15					49 38	12	8		VW2-3	0
16										
17										
18										
19										
20					11 9 22	18	10		VW2-4	0

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Log of Soil Boring VW-2 (cont)

Casing Elevation:

Completion Depth: 37 feet

Project No.	Location:
19024.01	Beacon 604, 1619 W. First Street, Livermore, CA.

Drilling Company: Turner Exploration

Driller: Mike Barr

Drilling and Sampling Methods: BK-81 HSA California Modified split-spoon sampler

OVM/OVA: HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	05-28-93	08:45
Finish	05-27-93	09:45
Water Depth	Initial	Completion N/A

Logged by: H. Hansen

Checked by: DvD

Depth (feet)	Sample Int.	Description	Graphic Log	BORING/WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
20		(continued from above) CLAYEY GRAVEL, olive brown, 1/2 to 2 inch gravel, fine- to coarse-grained sand, common plastic fines, slightly moist (GC)	GC							
21										
22		SILTY CLAY brown, moderately plastic moist, (CL)	CL							
23										
24										
25		CLAYEY GRAVEL 1/2 to 2 inch gravel, fine to coarse-grained sand, common plastic fines, (GC)			15 17 19	18	2		VW2-5	225
26										
27										
28										
29										
30			GC		12 19 27	18	6	Retained for chemical analysis.	VW2-6	—
31										
32										
33										
34										
35					42 50/0				VW2-7	475
36										
37		boring terminated at 37 feet								
38										
39										
40										
41										

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Log of Soil Boring VW-3 (cont)

Project No. 19024.01

Location: Beacon 604, 1519 W. First Street, Livermore, CA.

Drilling Company: Turner Exploration

Driller: Mike Barr

Drilling and Sampling Methods: BK-81 HSA California Modified split-spoon sampler

Casing Elevation:

OVM/OVA: HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	06-01-93	08:40
Finish	06-01-93	09:30
Water Depth	Initial	Completion N/A

Completion Depth: 36 feet

Logged by: H. Hansen

Checked by: DvD

Depth (feet)	Sample Int.	Description	Graphic Log	BORING/WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
20		(continued from above)								
21										
22										
23			CL							
24										
25					19 24 32	18	17		VW3-5	2
26										
27										
28		CLAYEY GRAVEL brown, fine to coarse-grained, common plastic fines, very moist, (GC)								
29										
30					27 25 42	18	18		VW3-6	1
31			GC							
32										
33										
34					20 25 31	18	18		VW3-7	1
35										
36		boring terminated at 36.0 feet								
37										
38										
39										
40										
41										

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Consulting Scientists, Engineers, and Geologists

Log of Soil Boring B-4

Casing Elevation:

Completion Depth: 35.0 feet

Project No.	Location:
19024.01	Beacon 604 1619 W. First Street Livermore, CA.

Drilling Company: Turner Exploration

Driller: Mike Barr

Drilling and Sampling Methods:

BK-81 HSA California Modified
split-spoon sampler

OVM/OVA HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	06-01-93	11:20
Finish	06-01-93	12:20
Water Depth	Initial	Completion N/A

Logged by: H. Hansen

Checked by: D.D

Depth (feet)	Sample Int.	Description	Graphic Log	BORING/ WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
0		Asphalt								
1		CLAYEY GRAVEL olive brown, 1/2 to 2 inch gravel, fine to coarse-grained sand, common plastic fines, (GC)								
2										
3										
4					16					
5					18 22	18	12		B4-1	0
6										
7										
8										
9			GC							
10					10					
11					28 23	18	17		B4-2	0
12										
13										
14										
15					12					
16					14 42	18	12		B4-3	0
17										
18										
19										
20					15 43 50/6	18	16		B4-4	25

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Consulting Scientists, Engineers, and Geologists

Log of Soil Boring B-4 (cont)

Casing Elevation:

Completion Depth: 35.0 feet

Project No.	Location: Beacon 604, 1619 W. First Street, Livermore, CA.
19024.01	

Drilling Company: Turner Exploration
Driller: Mike Barr
Drilling and Sampling Methods:
BK-81 HSA California Modified
split-spoon sampler

OVM/OVA HNu PID with 10.2 eV probe

Drilling	Time	Date
Start	06-01-93	11:20
Finish	06-01-93	12:20
Water Depth	Initial	Completion N/A

Logged by: H. Hansen
Checked by: DD

Depth (feet)	Sample Int.	Description	Graphic Log	BORING/WELL DETAIL	Blows/6 in	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
20		(continued from above) CLAYEY GRAVEL, 1/2 to 2 inch gravel, fine- to coarse-grained sand, common plastic fines (GC)	GC							
21										
22										
23		SILTY CLAY brown, moderately plastic, very moist, some gravel, (CL)	CL							
24										
25					15 43 50/6	18	18		B4-5	100
26										
27										
28										
29										
30					23 28 41	18	18		B4-6	40
31		CLAYEY GRAVEL olive brown, 1/2 to 3 inch gravel, fine to coarse-grained sand, common plastic fines, (GC)	GC							
32										
33										
34		saturated at 35.0 feet			19 27 42	18	18		B4-7	65
35		boring terminated at 35.0 feet								
36										
37										
38										
39										
40										
41										

ENCLOSURE C

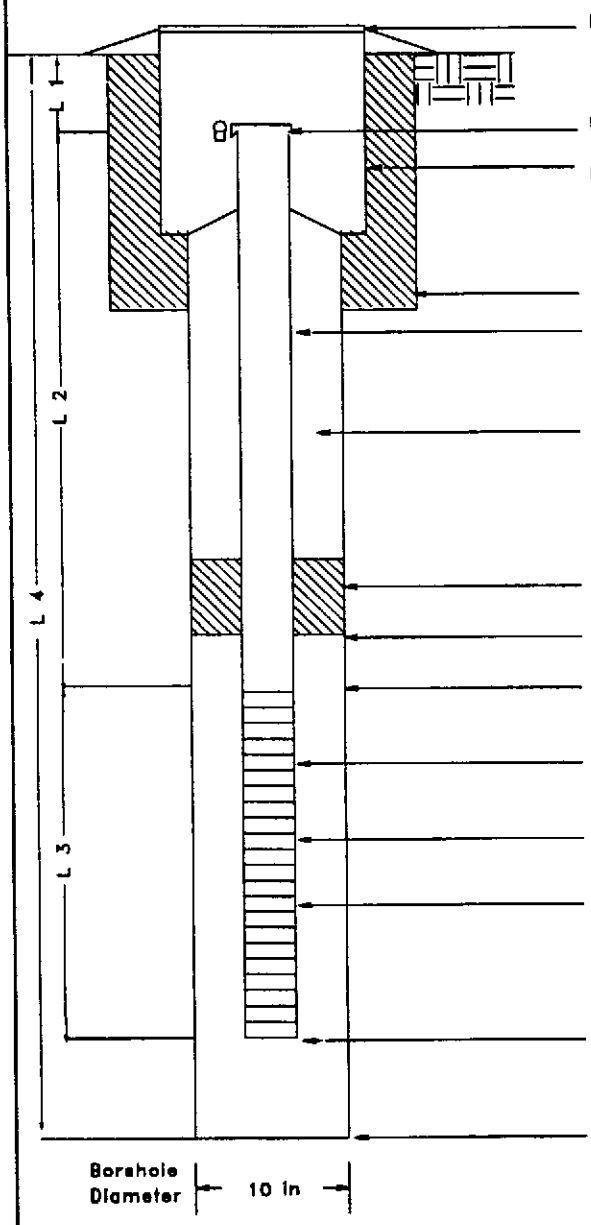
MONITORING WELL AND VAPOR EXTRACTION WELL CONSTRUCTION SPECIFICATIONS

MONITORING WELL CONSTRUCTION DETAILS

MONITORING WELL NO. MW-1

PROJECT: Beacon #604
1619 W. First Street
Livermore, CA

ELEVATION: 100.00



Protective Casing	
Locking Water Tight Cap	
Flush Grade Well Construction	
Diameter and Mat'l	12-inch steel
Total length	12 inches
Length Above Ground	1/4 inch
Thickness and Type of Seal	2 feet, concrete
Diameter, Mat'l and Joint Type of Riser Pipe	4 inch, SCH 40 PVC, flush thread
Type of Backfill Around Riser	cement/ 5% bentonite grout
Thickness and Type of Seal	2 feet bentonite chips
Distance of Filter Sand Above Top of Screen	2 feet
Type of Filter Around Screen	#3 Lonestar
Monitoring Well Mat'l	SCH 40 PVC
Screen Gauge/Slot Size	0.020 inch
Diameter and Length of Screen	4 inch, 20 feet
Depth to Bottom of Monitoring Well	54 feet
Depth to the Bottom of Filter Sand	55 feet

L1 = 0.25

L2 = 33.75

L3 = 20

L4 = 54

MONITORING WELL WATER LEVEL MEASUREMENTS

DATE	TIME	WATER LEVEL*
06-22-93	13:26	38.46 ft

* MEASURING POINT TOP OF CASING

COMPLETION DATE AND TIME 15:30 05-27-93

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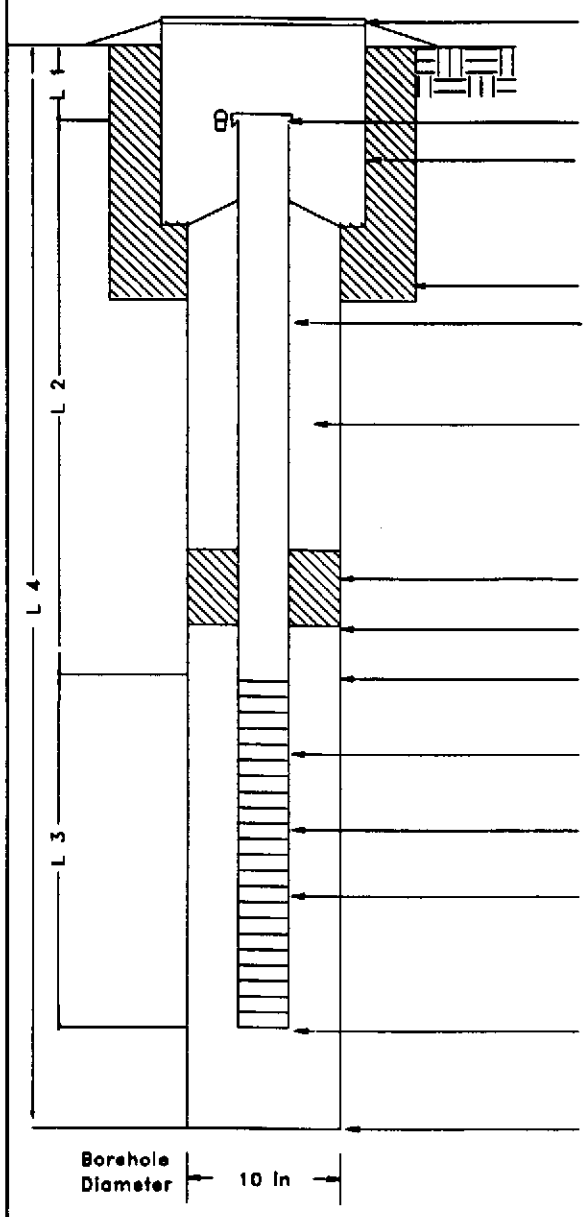
MONITORING WELL CONSTRUCTION DETAILS

MONITORING WELL NO. MW-2

PROJECT: Beacon #604
1619 W. First Street
Livermore, CA

ELEVATION: 98.68



Protective Casing	
Locking Water Tight Cap	
Flush Grade Well Construction	
Diameter and Mat'l	12-inch steel
Total length	12 inches
Length Above Ground	1/4 inch
Thickness and Type of Seal	2 feet, concrete
Diameter, Mat'l and Joint Type of Riser Pipe	4 inch, SCH 40 PVC, flush thread
Type of Backfill Around Riser	cement/ 5% bentonite grout
Thickness and Type of Seal	2 feet bentonite chips
Distance of Filter Sand Above Top of Screen	2 feet
Type of Filter Around Screen	#3 Lonestar
Monitoring Well Mat'l	SCH 40 PVC
Screen Gauge/Slot Size	0.020 inch
Diameter and Length of Screen	4 inch, 20 feet
Depth to Bottom of Monitoring Well	54 feet
Depth to the Bottom of Filter Sand	54 feet

Borehole Diameter ← 10 in →

L1 = 0.25

L2 = 33.75

L3 = 20

L4 = 54

COMPLETION DATE AND TIME 10:00 05-27-93

MONITORING WELL WATER LEVEL MEASUREMENTS

DATE	TIME	WATER LEVEL*
06-22-93	13:30	39.07 ft

* MEASURING POINT TOP OF CASING

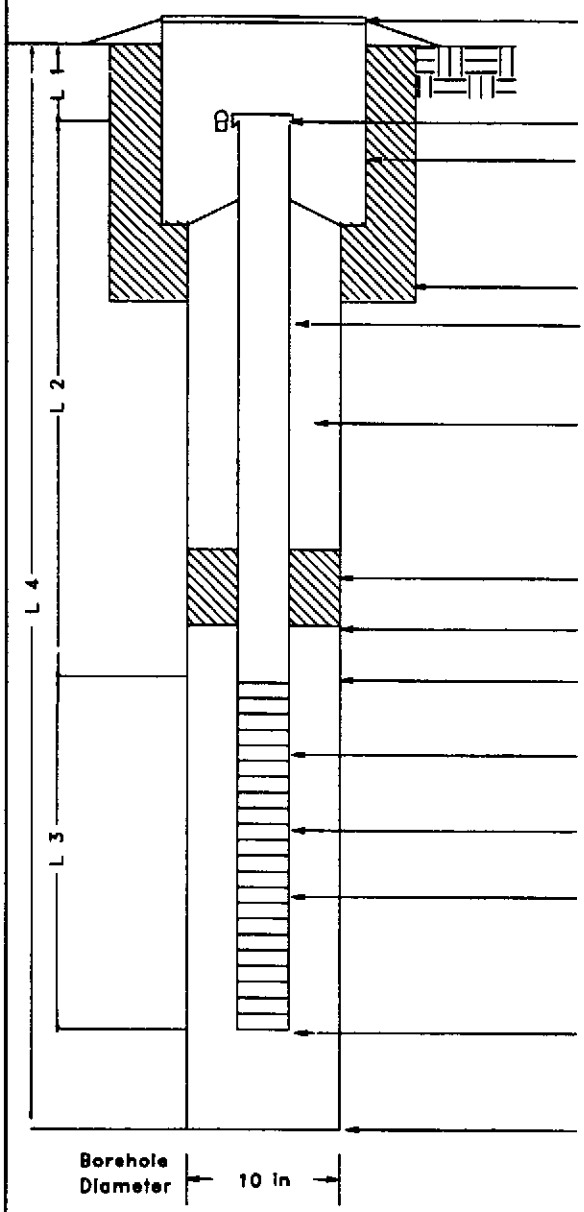
ACTON • MICKELSON • VAN DAM, INC.

MONITORING WELL CONSTRUCTION DETAILS

MONITORING WELL NO. MW-3

PROJECT: Beacon #604
1619 W. First Street
Livermore, CA

ELEVATION: 99.08



Protective Casing	
Locking Water Tight Cap	
Flush Grade Well Construction	
Diameter and Mat'l	12-inch steel
Total length	12 inches
Length Above Ground	1/4 inch
Thickness and Type of Seal	2 feet, concrete
Diameter, Mat'l and Joint Type of Riser Pipe	4 inch, SCH 40 PVC, flush thread
Type of Backfill Around Riser	cement/ 5% bentonite grout
Thickness and Type of Seal	2 feet bentonite chips
Distance of Filter Sand Above Top of Screen	2 feet
Type of Filter Around Screen	#3 Lonestar
Monitoring Well Mat'l	SCH 40 PVC
Screen Gauge/Slot Size	0.020 inch
Diameter and Length of Screen	4 inch, 20 feet
Depth to Bottom of Monitoring Well	53 feet
Depth to the Bottom of Filter Sand	53 feet

L1 = 0.25

L2 = 32.75

L3 = 20

L4 = 53

COMPLETION DATE AND TIME 15:45 05-28-93

MONITORING WELL WATER LEVEL MEASUREMENTS

DATE	TIME	WATER LEVEL*
06-22-93	13:22	37.11 ft

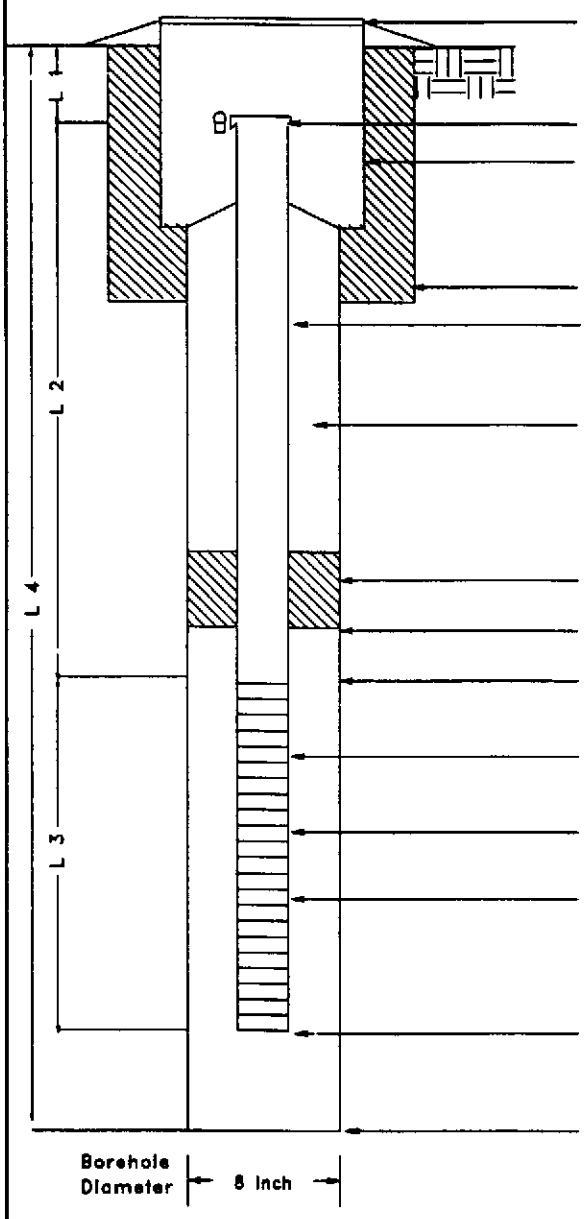
* MEASURING POINT TOP OF CASING

ACTON • MICKELSON • VAN DAM, INC.

VADOSE WELL CONSTRUCTION DETAILS

VADOSE WELL NO. VW-1

PROJECT: Beacon #604
1619 W. First Street
Livermore, CA



Protective Casing	
Locking Water Tight Cap	
Flush Grade Well Construction	
Diameter and Mat'l	12-inch steel
Total length	12 inches
Length Above Ground	1/4 inch
Thickness and Type of Seal	2 feet, concrete
Diameter, Mat'l and Joint Type of Riser Pipe	2 inch, SCH 40 PVC, flush thread
Type of Backfill Around Riser	cement/ 5% bentonite grout
Thickness and Type of Seal	2 feet bentonite chips
Distance of Filter Sand Above Top of Screen	2 feet
Type of Filter Around Screen	#3 Lonestar
Monitoring Well Mat'l	SCH 40 PVC
Screen Gauge/Slot Size	0.020 inch
Diameter and Length of Screen	2 inch, 10 feet
Depth to Bottom of Monitoring Well	37 feet
Depth to the Bottom of Filter Sand	37 feet

L1 = 0.25

L2 = 26.75

L3 = 10

L4 = 37

COMPLETION DATE AND TIME 18:45 05-28-93

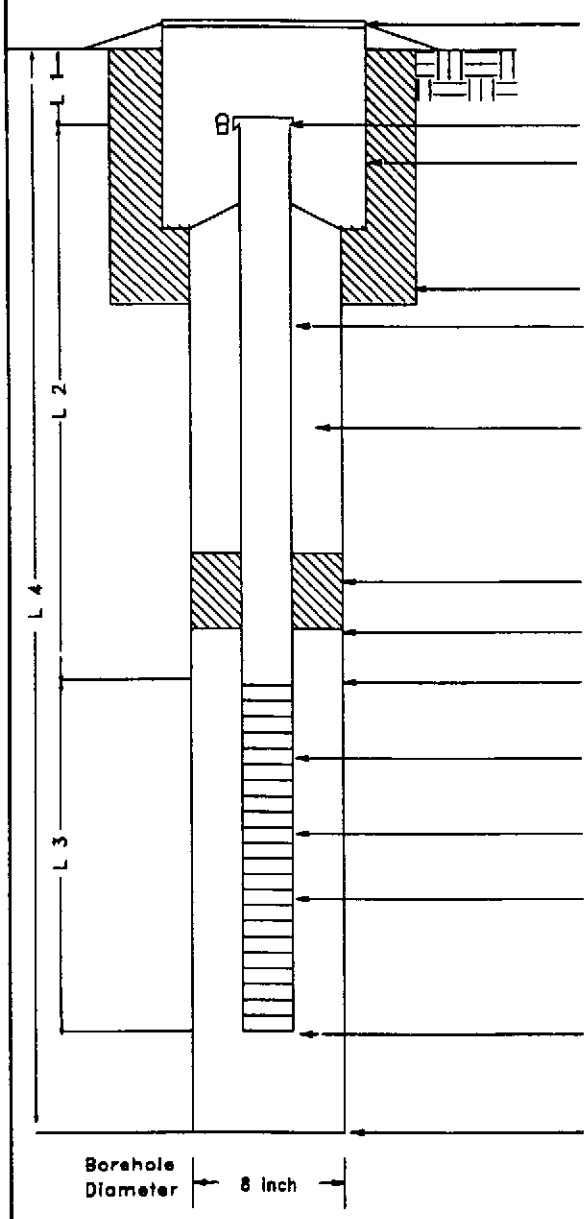
Note: hole backfilled with bentonite chips 37 to 50 feet

ACTON • MICKELSON • VAN DAM, INC.

VADOSE WELL CONSTRUCTION DETAILS

VADOSE WELL NO. VW-2

PROJECT: Beacon #604
1619 W. First Street
Livermore, CA



Protective Casing	
Locking Water Tight Cap	
Flush Grade Well Construction	
Diameter and Mat'l	12-inch steel
Total length	12 inches
Length Above Ground	1/4 inch
Thickness and Type of Seal	2 feet, concrete
Diameter, Mat'l and Joint Type of Riser Pipe	2 inch, SCH 40 PVC, flush thread
Type of Backfill Around Riser	cement/ 5% bentonite grout
Thickness and Type of Seal	2 feet bentonite chips
Distance of Filter Sand Above Top of Screen	2 feet
Type of Filter Around Screen	#3 Lonestar
Monitoring Well Mat'l	SCH 40 PVC
Screen Gauge/Slot Size	0.020 inch
Diameter and Length of Screen	2 inch, 15 feet
Depth to Bottom of Monitoring Well	37 feet
Depth to the Bottom of Filter Sand	37 feet

L1 = 0.25

L2 = 21.75

L3 = 15

L4 = 37

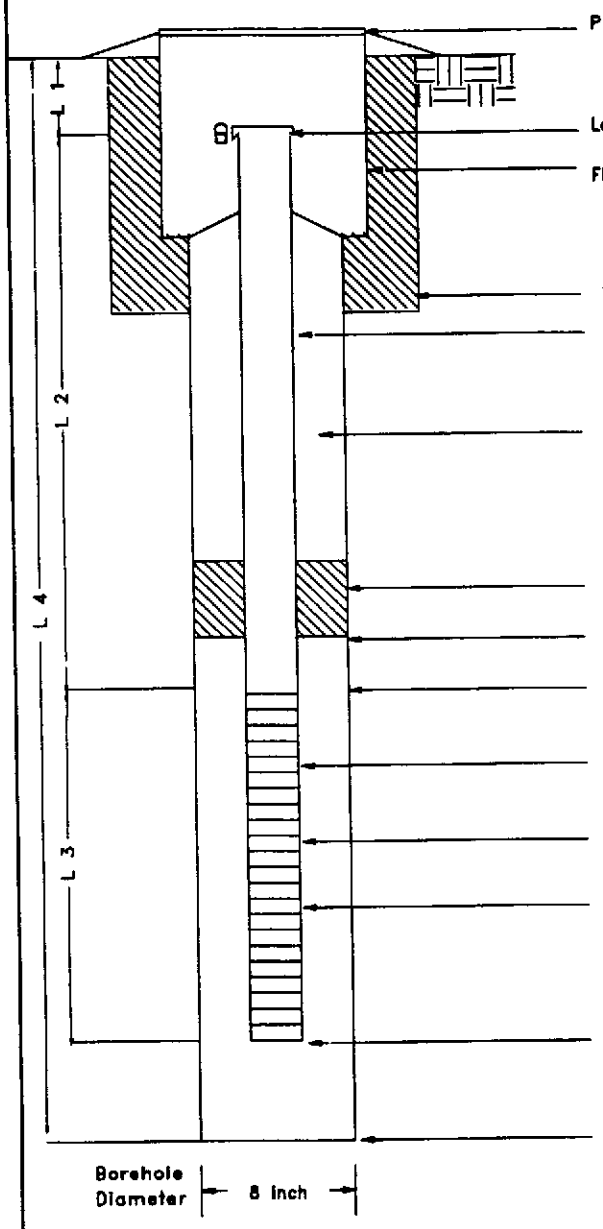
COMPLETION DATE AND TIME 10:45 05-28-93

ACTON • MICKELSON • VAN DAM, INC.

VADOSE WELL CONSTRUCTION DETAILS

VADOSE WELL NO. VW-3

PROJECT: Beacon #604
1619 W. First Street
Livermore, CA



Protective Casing	
Locking Water Tight Cap	
Flush Grade Well Construction	
Diameter and Mat'l	8-inch steel
Total length	12 inches
Length Above Ground	1/4 inch
Thickness and Type of Seal	2 feet, concrete
Diameter, Mat'l and Joint Type of Riser Pipe	2 inch, SCH 40 PVC, flush thread
Type of Backfill Around Riser	cement/ 5% bentonite grout
Thickness and Type of Seal	2 feet bentonite chips
Distance of Filter Sand Above Top of Screen	2 feet
Type of Filter Around Screen	#3 Lonestar
Monitoring Well Mat'l	SCH 40 PVC
Screen Gauge/Slot Size	0.020 inch
Diameter and Length of Screen	2 inch, 10 feet
Depth to Bottom of Monitoring Well	36 feet
Depth to the Bottom of Filter Sand	36 feet

L1 = 0.25

L2 = 20.75

L3 = 15

L4 = 36

COMPLETION DATE AND TIME 10:40 06-01-93

ACTON • MICKELSON • VAN DAM, INC.

ENCLOSURE D

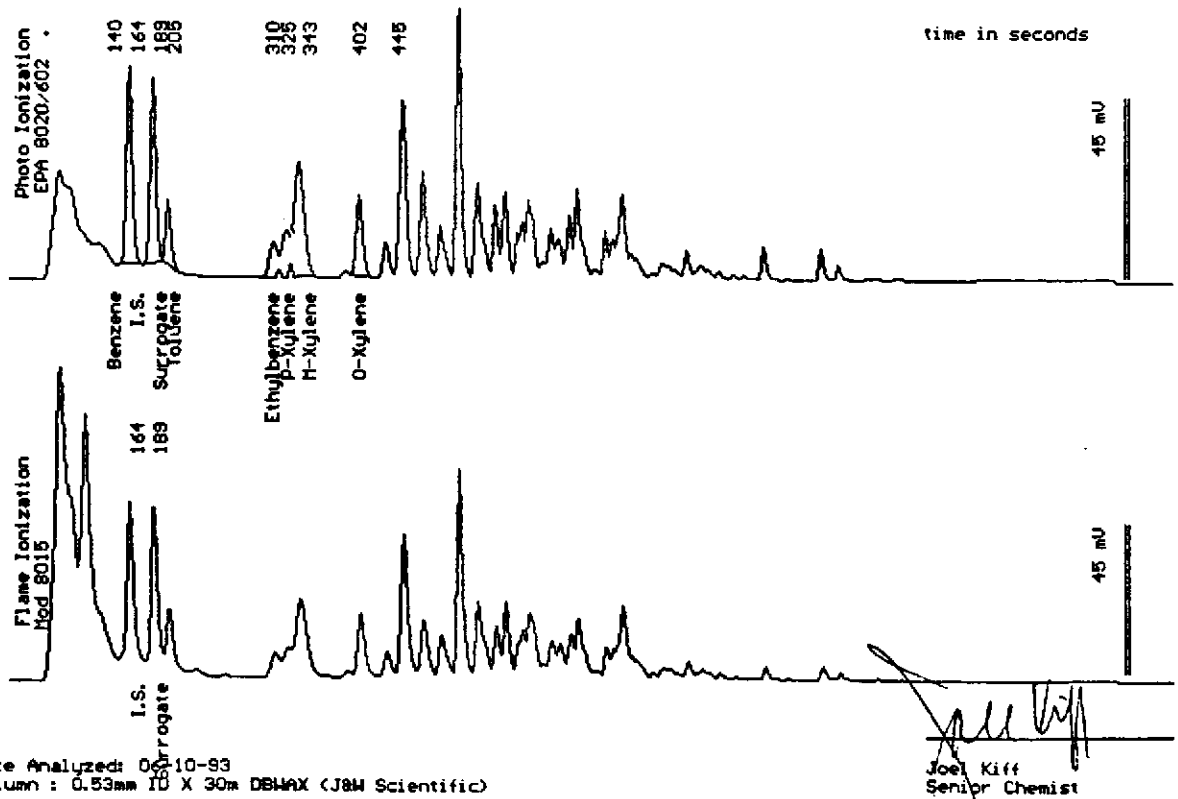
SOIL SAMPLE ANALYTICAL RESULTS

Sample Log 6555
6555-1

Sample: **VW-1-6 30'**

From : Project # 19024.01 (Beacon 604)
Sampled : 05/27/93
Dilution : 1:100 QC Batch : 4011m
Matrix : Soil

Parameter	(MDL) ug/kg	Measured Value ug/kg
Benzene	(.50)	<.50
Toluene	(.50)	4.3
Ethylbenzene	(.50)	2.6
Total Xylenes	(.50)	17
TPH as Gasoline	(100)	280
Surrogate Recovery		92 %



Date Analyzed: 06-10-93
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

Joel Kiff
Senior Chemist

Western Environmental Science & Technology • 45133 County Road 32B • Davis, CA 95616 • 916 753-9500 • FAX: 916 757-4652

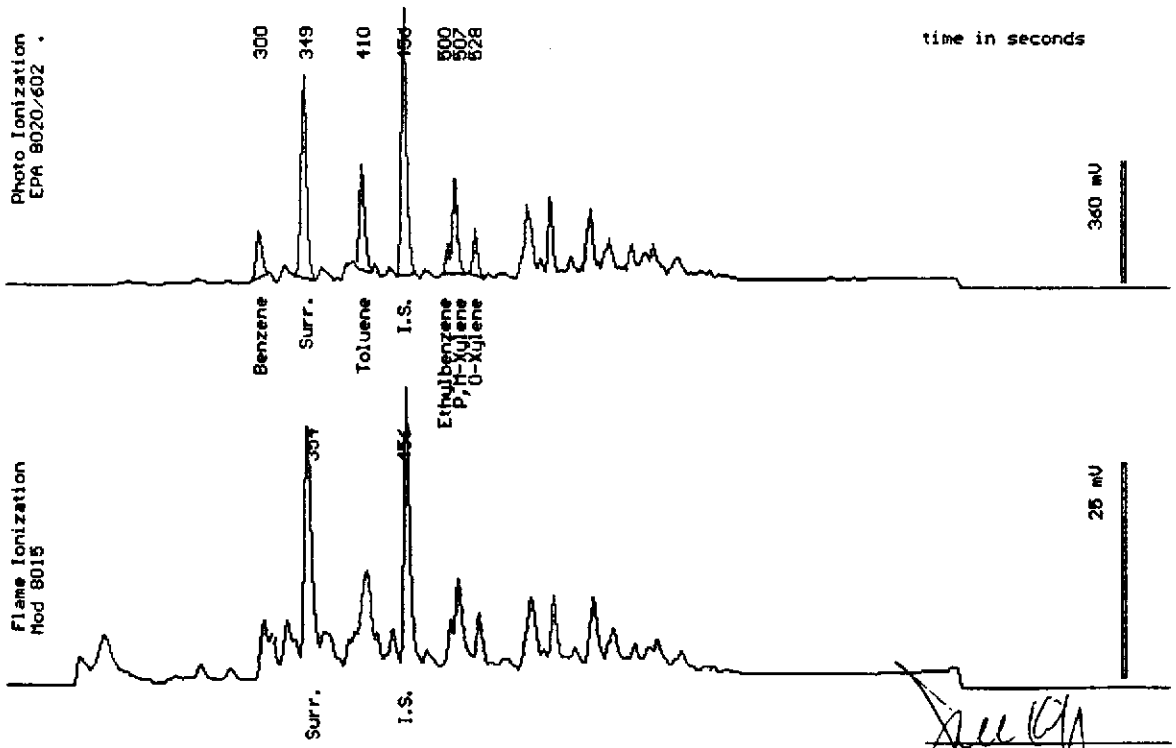
Sample Log 6555

6555-2

Sample: **VW-1-7 35'**

From : Project # 19024.01 (Beacon 604)
Sampled : 05/27/93
Dilution : 1:10 QC Batch : 6026b
Matrix : Soil

Parameter	(MDL) mg/kg	Measured Value mg/kg
Benzene	(.050)	.20
Toluene	(.050)	.45
Ethylbenzene	(.050)	.11
Total Xylenes	(.050)	.56
TPH as Gasoline	(10)	11
Surrogate Recovery		89 %



Date Analyzed: 06-10-93
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

Joel Kiff
Senior Chemist

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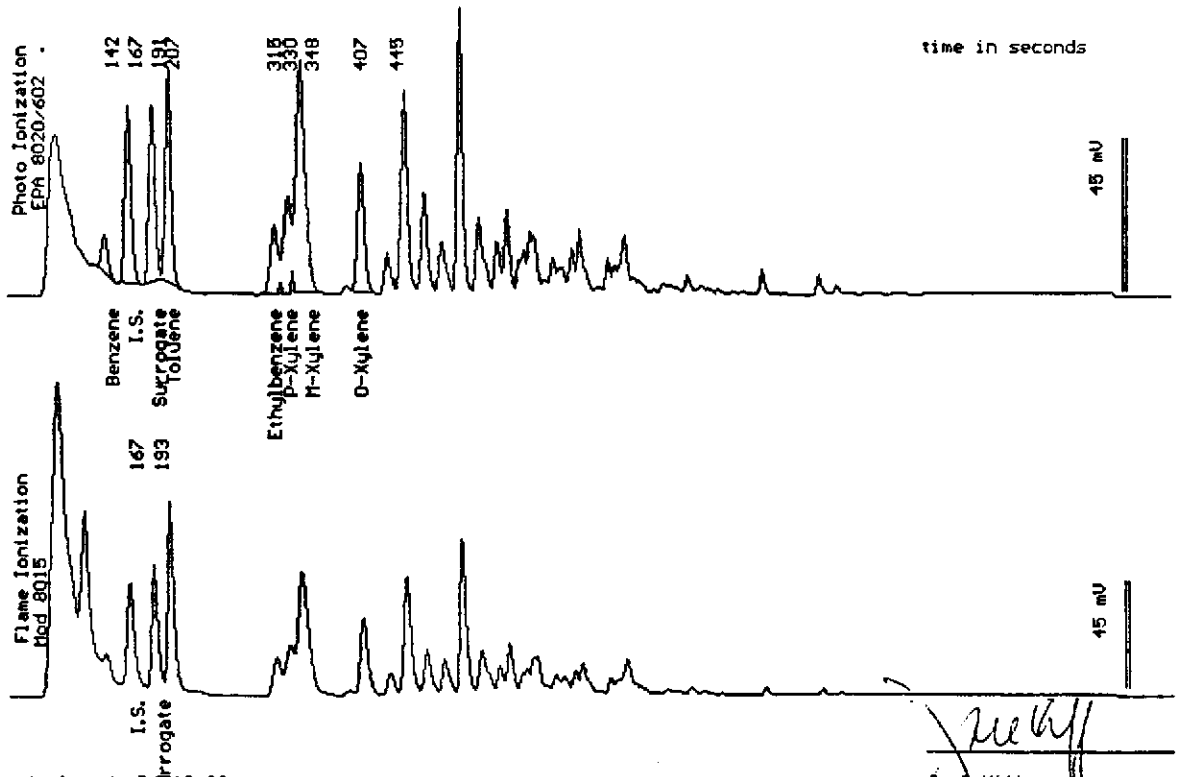
Sample Log 6555

6555-3

Sample: **VW-1-8 40'**

From : Project # 19024.01 (Beacon 604)
Sampled : 05/27/93
Dilution : 1:100 QC Batch : 4012d
Matrix : Soil

Parameter	(MDL) mg/kg	Measured Value mg/kg
Benzene	(.50)	1.8
Toluene	(.50)	16
Ethylbenzene	(.50)	5.3
Total Xylenes	(.50)	32
TPH as Gasoline	(100)	340
Surrogate Recovery		98 %



Date Analyzed: 06-10-93
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

Joel Kiff
Senior Chemist

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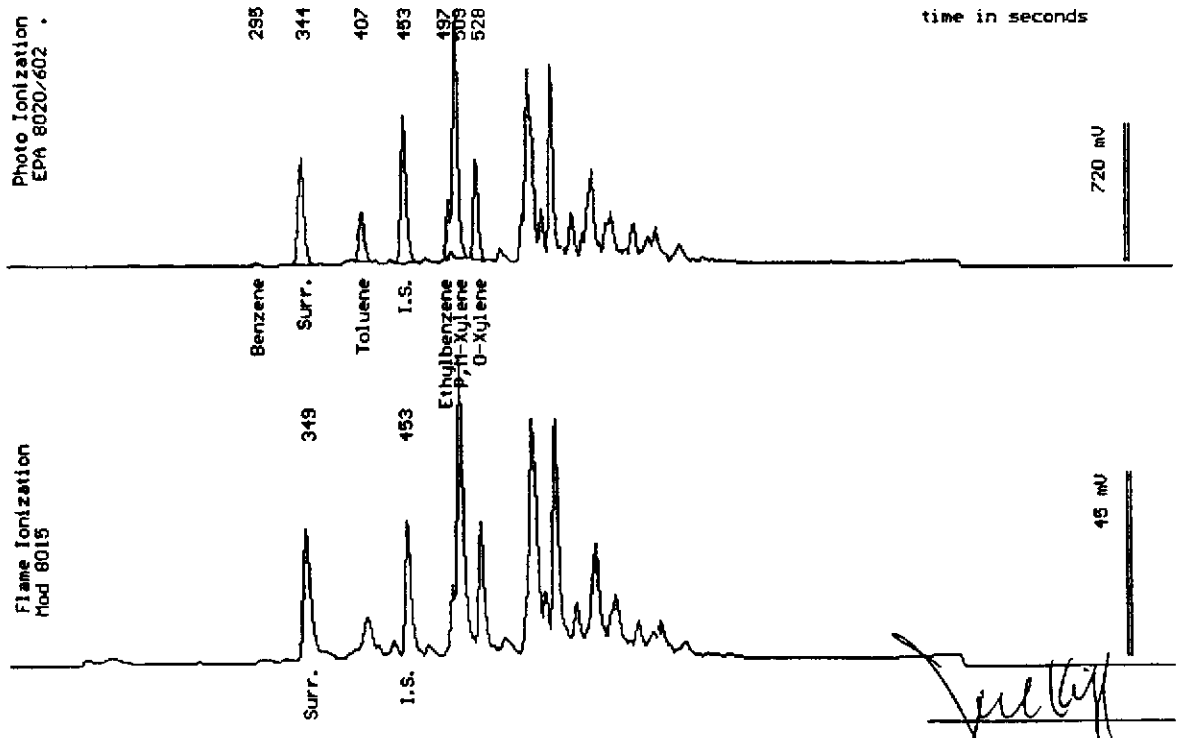
Sample Log 6555

6555-11

Sample: **VW-2-4 20**

From : Project # 19024.01 (Beacon 604)
Sampled : 05/28/93
Dilution : 1:100 QC Batch : 6026c
Matrix : Soil

Parameter	(MDL) mg/kg	Measured Value mg/kg
Benzene	(.50)	<.50
Toluene	(.50)	4.0
Ethylbenzene	(.50)	4.0
Total Xylenes	(.50)	25
TPH as Gasoline	(100)	200
Surrogate Recovery		88 %



Date Analyzed: 06-10-93
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

Joel Kiff
Senior Chemist

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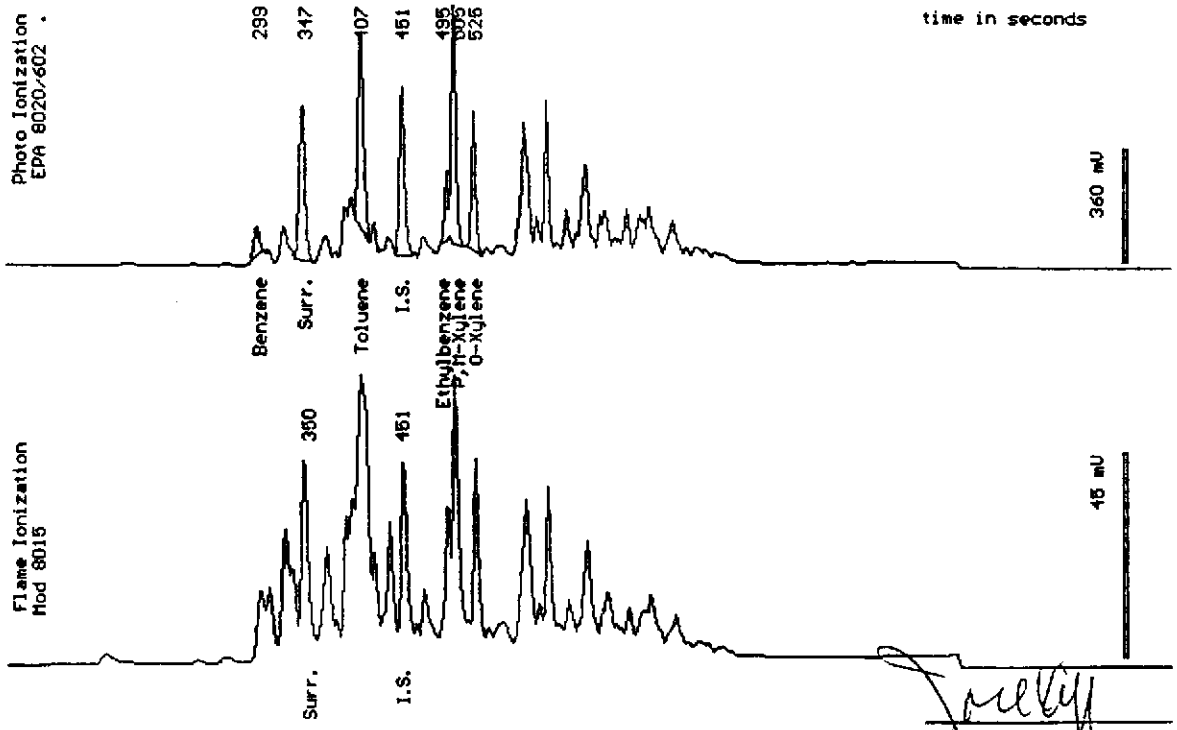
Sample Log 6555

6555-12

Sample: **VW-2-6 30'**

From : Project # 19024.01 (Beacon 604)
Sampled : 05/28/93
Dilution : 1:1 QC Batch : 6026c
Matrix : Soil

Parameter	(MDL) mg/kg	Measured Value mg/kg
Benzene	(.0050)	.018
Toluene	(.0050)	.15
Ethylbenzene	(.0050)	.044
Total Xylenes	(.0050)	.23
TPH as Gasoline	(1.0)	3.5
Surrogate Recovery		111 %



Date Analyzed: 06-10-93
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

Joel Kiff
Senior Chemist

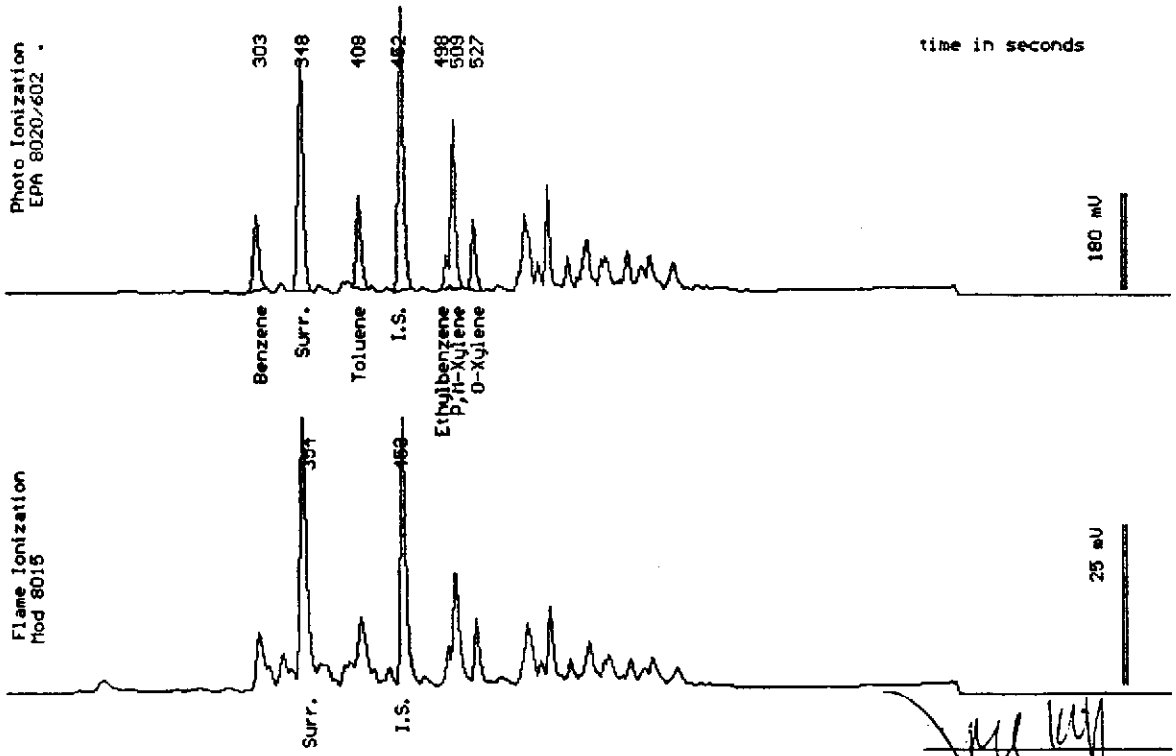
Sample Log 6555

6555-13

Sample: VW-2-7 35'

From : Project # 19024.01 (Beacon 604)
Sampled : 05/28/93
Dilution : 1:1 QC Batch : 6026d
Matrix : Soil

Parameter	(MDL) ug/kg	Measured Value ug/kg
Benzene	(.0050)	.021
Toluene	(.0050)	.024
Ethylbenzene	(.0050)	.0086
Total Xylenes	(.0050)	.056
TPH as Gasoline	(1.0)	<1.0
Surrogate Recovery		100 %



Date Analyzed: 06-11-93
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

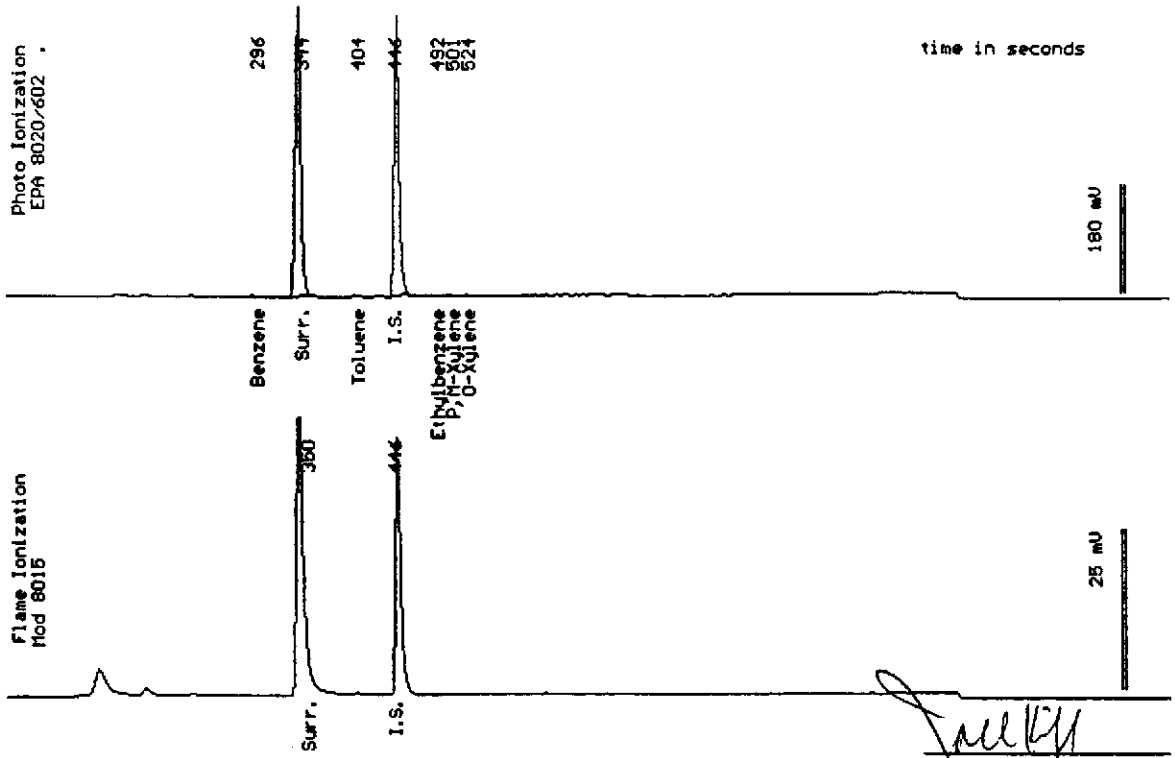
Joel Kiff
Senior Chemist

Sample Log 6568
6568-1

Sample: **VW-3-4**

From : Project # 19024.01
Sampled : 06/01/93
Dilution : 1:1 QC Batch : 6026d
Matrix : Soil

Parameter	(MDL) mg/kg	Measured Value mg/kg
Benzene	(.0050)	<.0050
Toluene	(.0050)	<.0050
Ethylbenzene	(.0050)	<.0050
Total Xylenes	(.0050)	<.0050
TPH as Gasoline	(1.0)	<1.0
Surrogate Recovery		122 %



Date Analyzed: 06-11-93
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

Joel Kiff
Senior Chemist

Western Environmental Science & Technology · 45133 County Road 32B · Davis, CA 95616 · 916 753-9500 · FAX: 916 757-4652

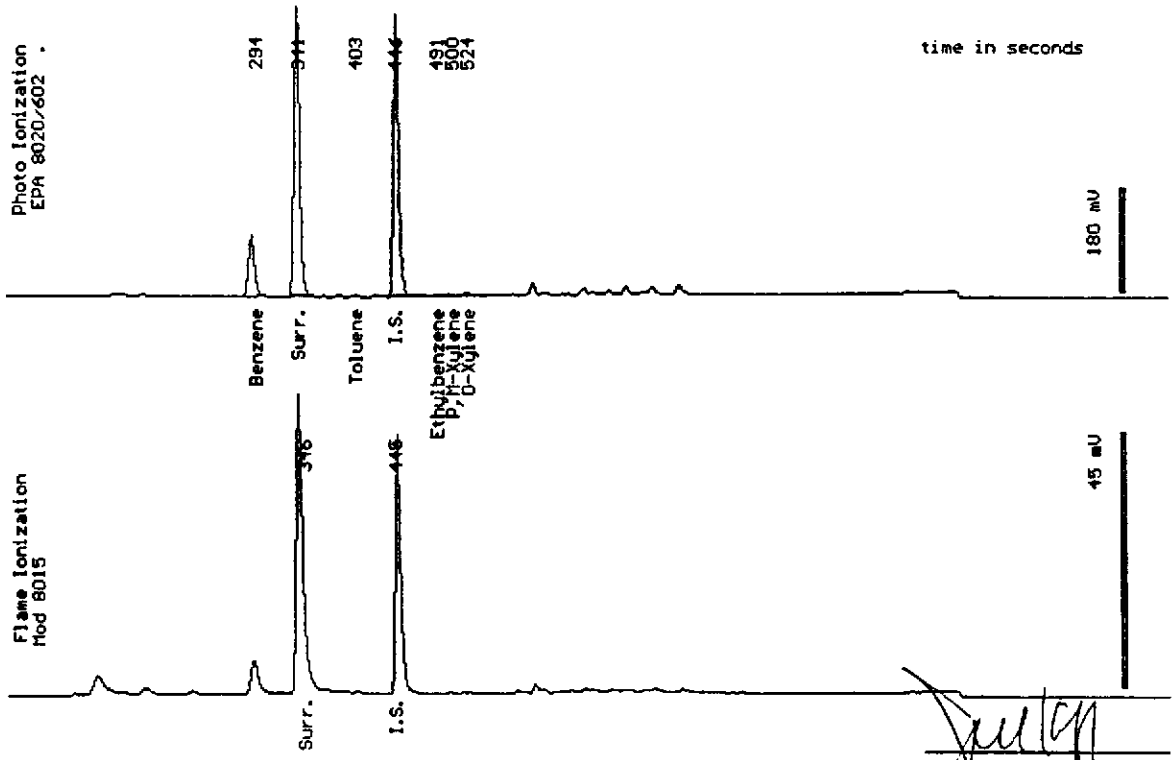
Sample Log 6568

6568-2

Sample: VW-3-5

From : Project # 19024.01
Sampled : 06/01/93
Dilution : 1:1 QC Batch : 6026d
Matrix : Soil

Parameter	(MDL) ug/kg	Measured Value ug/kg
Benzene	(.0050)	.017
Toluene	(.0050)	<.0050
Ethylbenzene	(.0050)	<.0050
Total Xylenes	(.0050)	<.0050
TPH as Gasoline	(1.0)	<1.0
Surrogate Recovery		127 %



Date Analyzed: 06-11-93
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

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Senior Chemist

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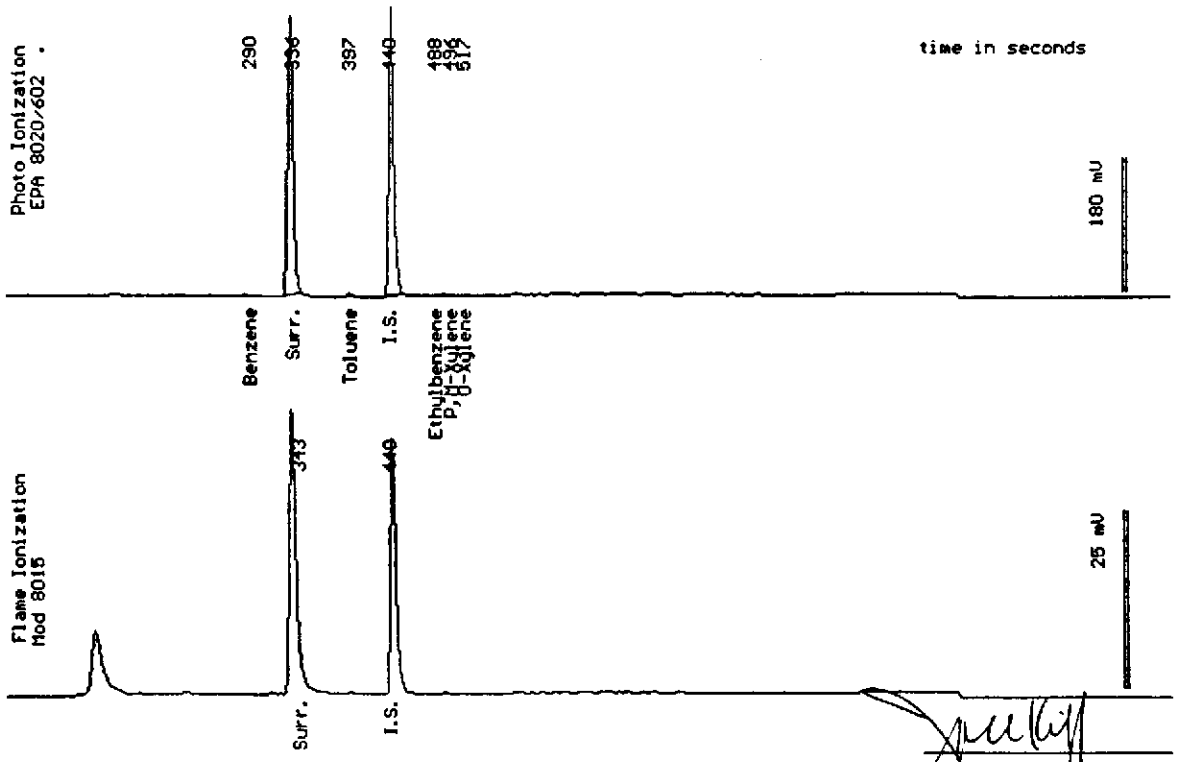
Sample Log 6568
6568-11

Sample: **VW-3-6**

From : Project # 19024.01
Sampled : 06/01/93
Dilution : 1:1 QC Batch : 6026d
Matrix : Soil

Parameter	(MDL) ug/kg	Measured Value ug/kg
Benzene	(.0050)	<.0050
Toluene	(.0050)	<.0050
Ethylbenzene	(.0050)	<.0050
Total Xylenes	(.0050)	<.0050
TPH as Gasoline	(1.0)	<1.0
Surrogate Recovery		115 %



Date Analyzed: 06-11-93
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

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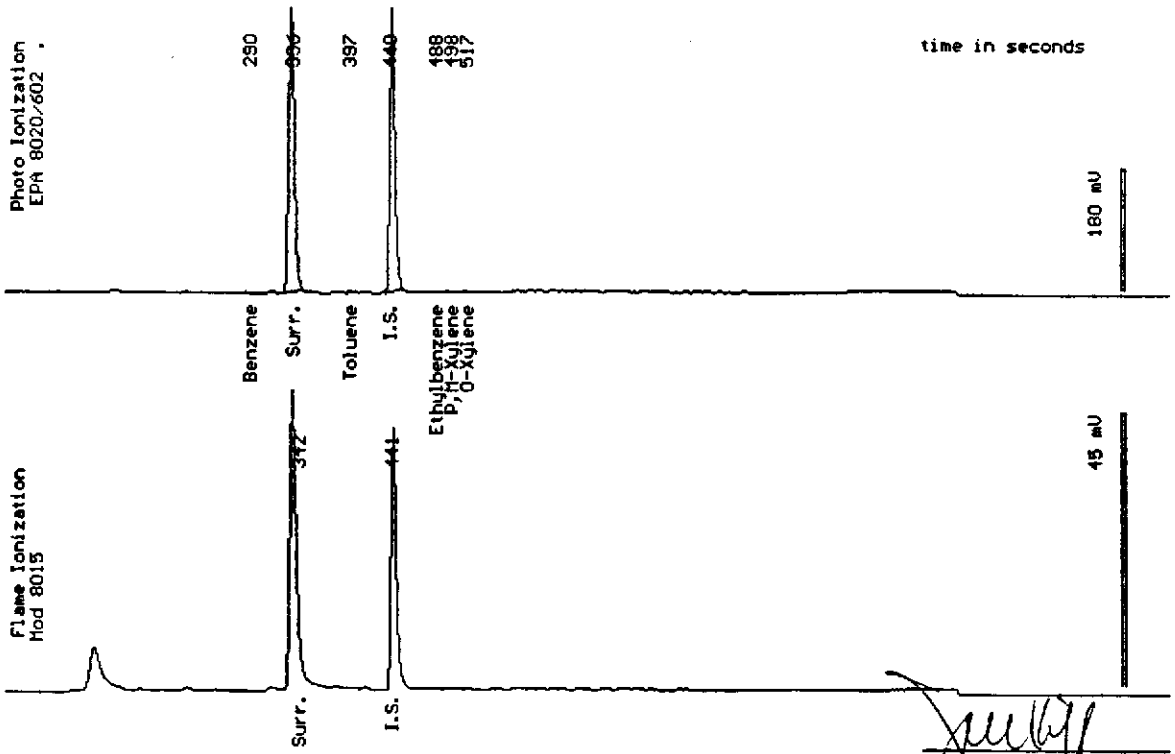
Sample Log 6568

6568-3

Sample: **VW-3-7**

From : Project # 19024.01
Sampled : 06/01/93
Dilution : 1:1 QC Batch : 6026d
Matrix : Soil

Parameter	(MDL) mg/kg	Measured Value mg/kg
Benzene	(.0050)	<.0050
Toluene	(.0050)	<.0050
Ethylbenzene	(.0050)	<.0050
Total Xylenes	(.0050)	<.0050
TPH as Gasoline	(1.0)	<1.0
Surrogate Recovery		124 %



Date Analyzed: 06-11-93
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

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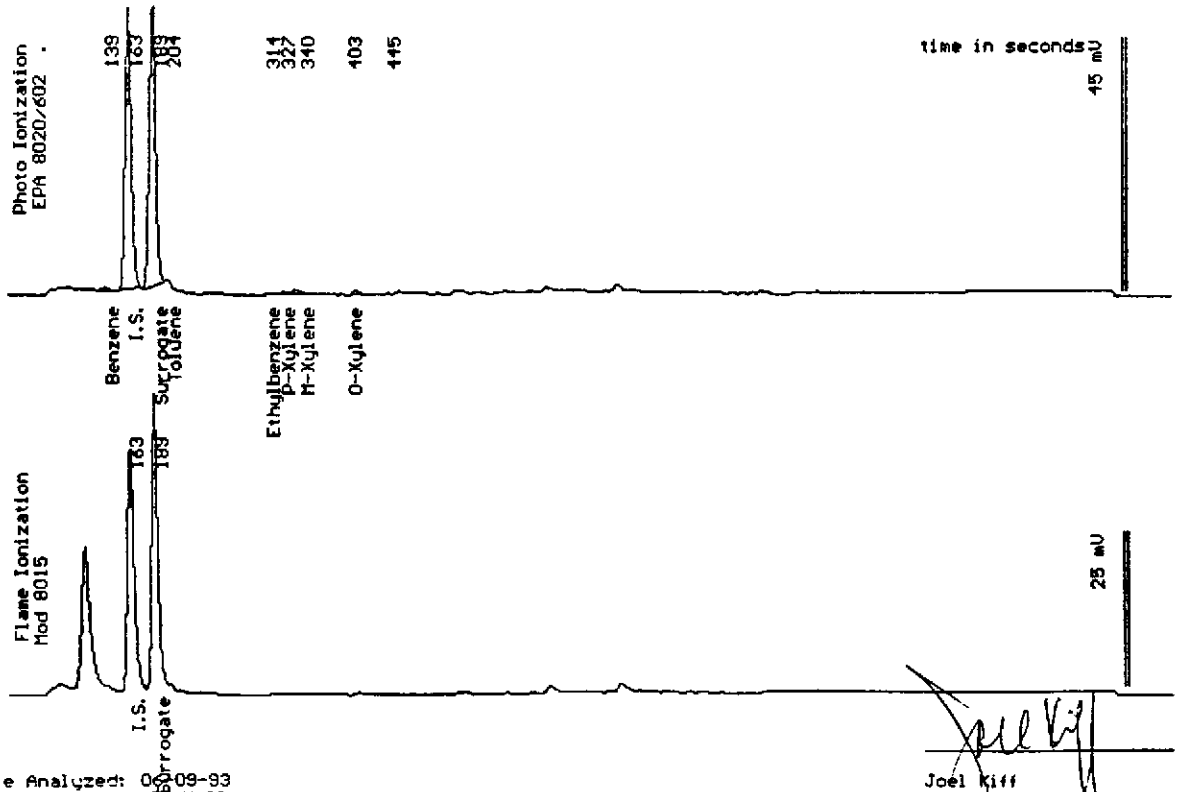
Sample Log 6555

6555-4

Sample: **MW-1-5 25'**

From : Project # 19024.01 (Beacon 604)
Sampled : 05/27/93
Dilution : 1:1 QC Batch : 4011m
Matrix : Soil

Parameter	(MDL) mg/kg	Measured Value mg/kg
Benzene	(.0050)	<.0050
Toluene	(.0050)	<.0050
Ethylbenzene	(.0050)	<.0050
Total Xylenes	(.0050)	<.0050
TPH as Gasoline	(1.0)	<1.0
Surrogate Recovery		108 %



Date Analyzed: 06/09-93
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

Joel Kiff
Senior Chemist

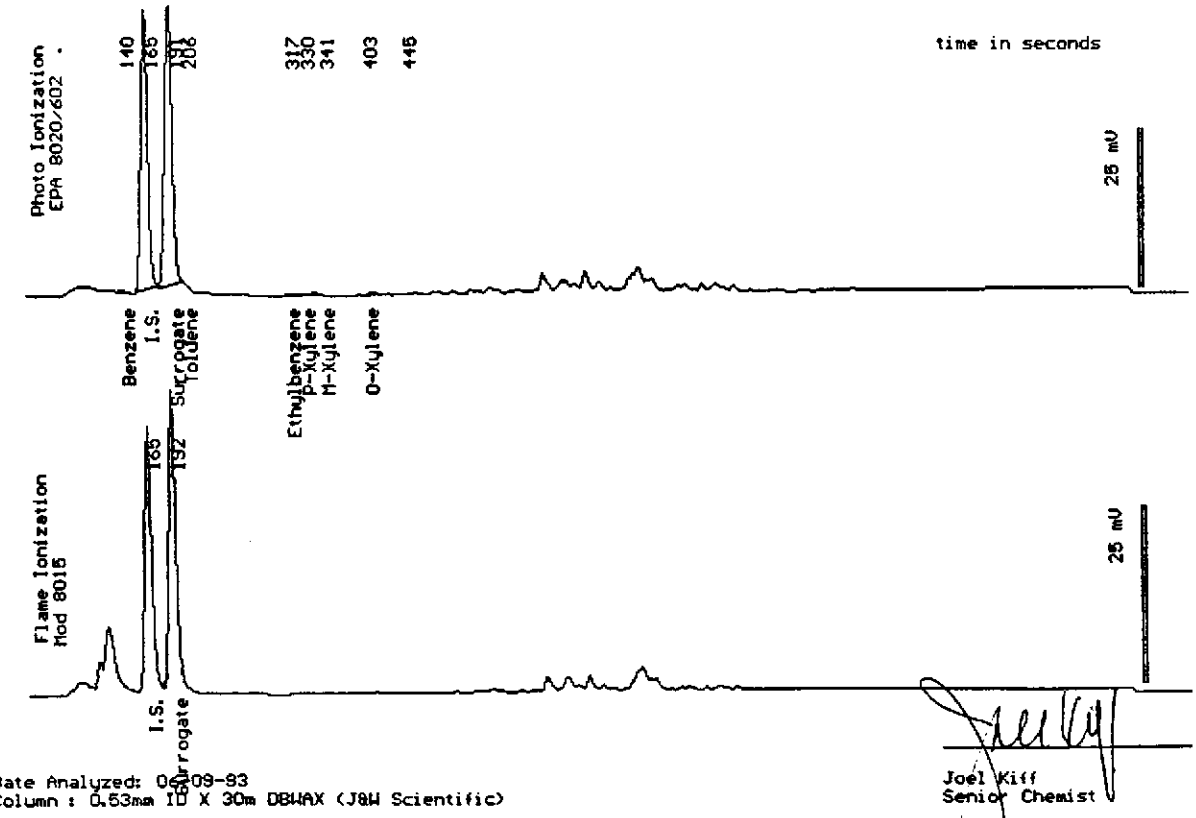
Sample Log 6555

6555-5

Sample: **MW-1-6 30'**

From : Project # 19024.01 (Beacon 604)
Sampled : 05/27/93
Dilution : 1:1 QC Batch : 4011m
Matrix : Soil

Parameter	(MDL) mg/kg	Measured Value mg/kg
Benzene	(.0050)	<.0050
Toluene	(.0050)	<.0050
Ethylbenzene	(.0050)	<.0050
Total Xylenes	(.0050)	<.0050
TPH as Gasoline	(1.0)	<1.0
Surrogate Recovery		117 %



Date Analyzed: 06/09-93
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

Joel Kiff
Senior Chemist

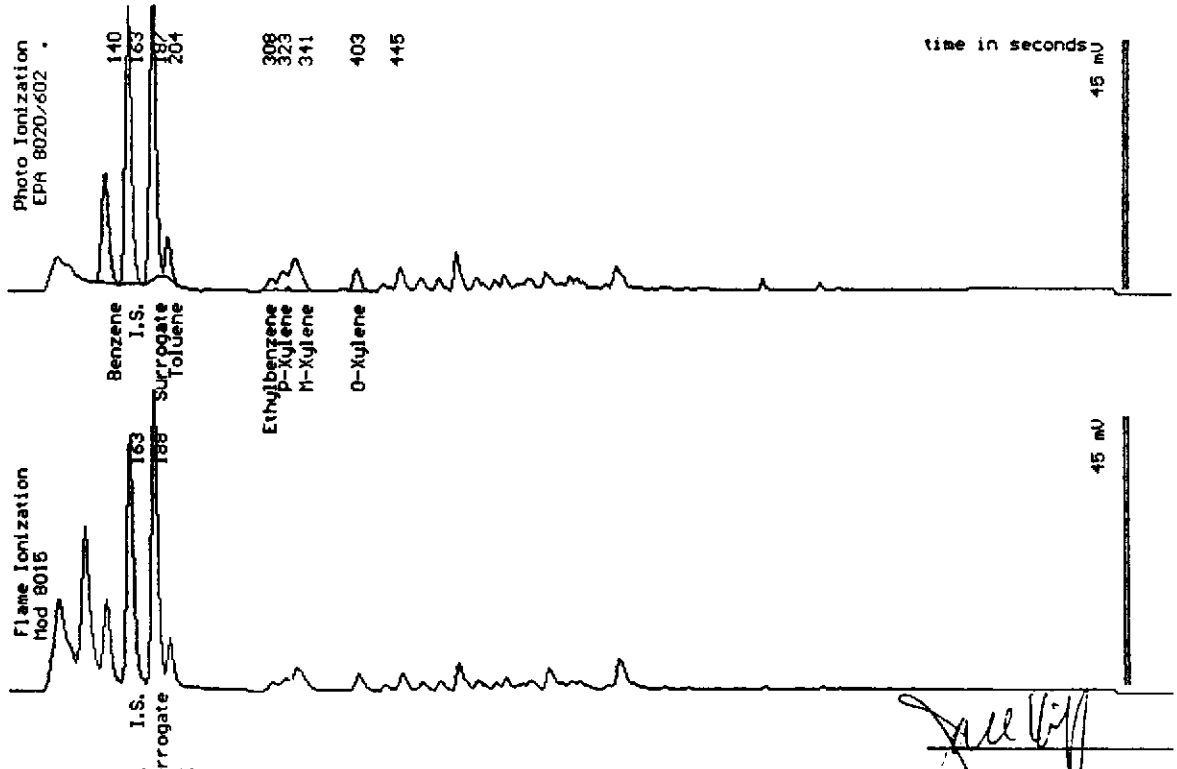
Sample Log 6555

6555-6

Sample: **MW-1-7 35'**

From : Project # 19024.01 (Beacon 604)
Sampled : 05/27/93
Dilution : 1:1 QC Batch : 4011m
Matrix : Soil

Parameter	(MDL) ug/kg	Measured Value ug/kg
Benzene	(.0050)	.029
Toluene	(.0050)	.015
Ethylbenzene	(.0050)	.0051
Total Xylenes	(.0050)	.031
TPH as Gasoline	(1.0)	<1.0
Surrogate Recovery		107 %



Date Analyzed: 06-09-93
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

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Senior Chemist

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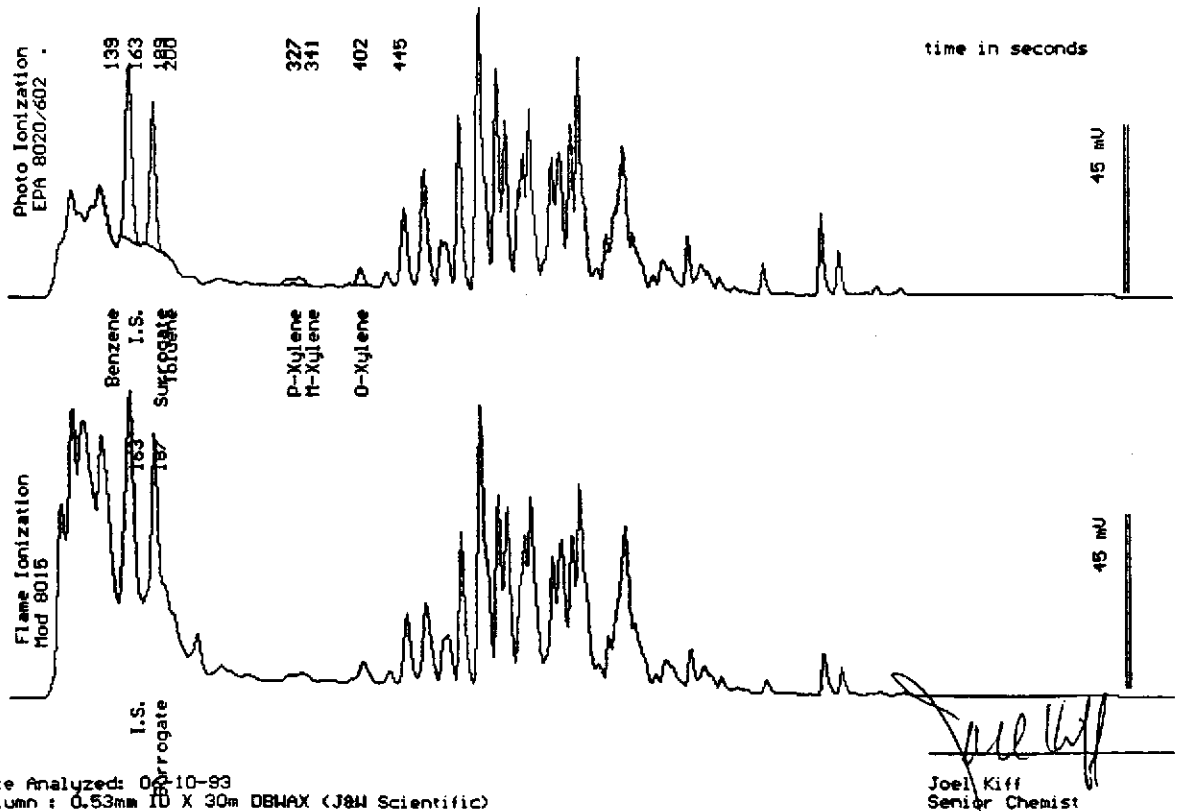
Sample Log 6555

6555-7

Sample: **MW-2-4 20'**

From : Project # 19024.01 (Beacon 604)
Sampled : 05/27/93
Dilution : 1:1 QC Batch : 4011m
Matrix : Soil

Parameter	(MDL) mg/kg	Measured Value mg/kg
Benzene	(.0050)	<.0050
Toluene	(.0050)	<.0050
Ethylbenzene	(.0050)	<.0050
Total Xylenes	(.0050)	.037
TPH as Gasoline	(1.0)	6.4
Surrogate Recovery		70 %



Date Analyzed: 06-10-93
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

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Senior Chemist

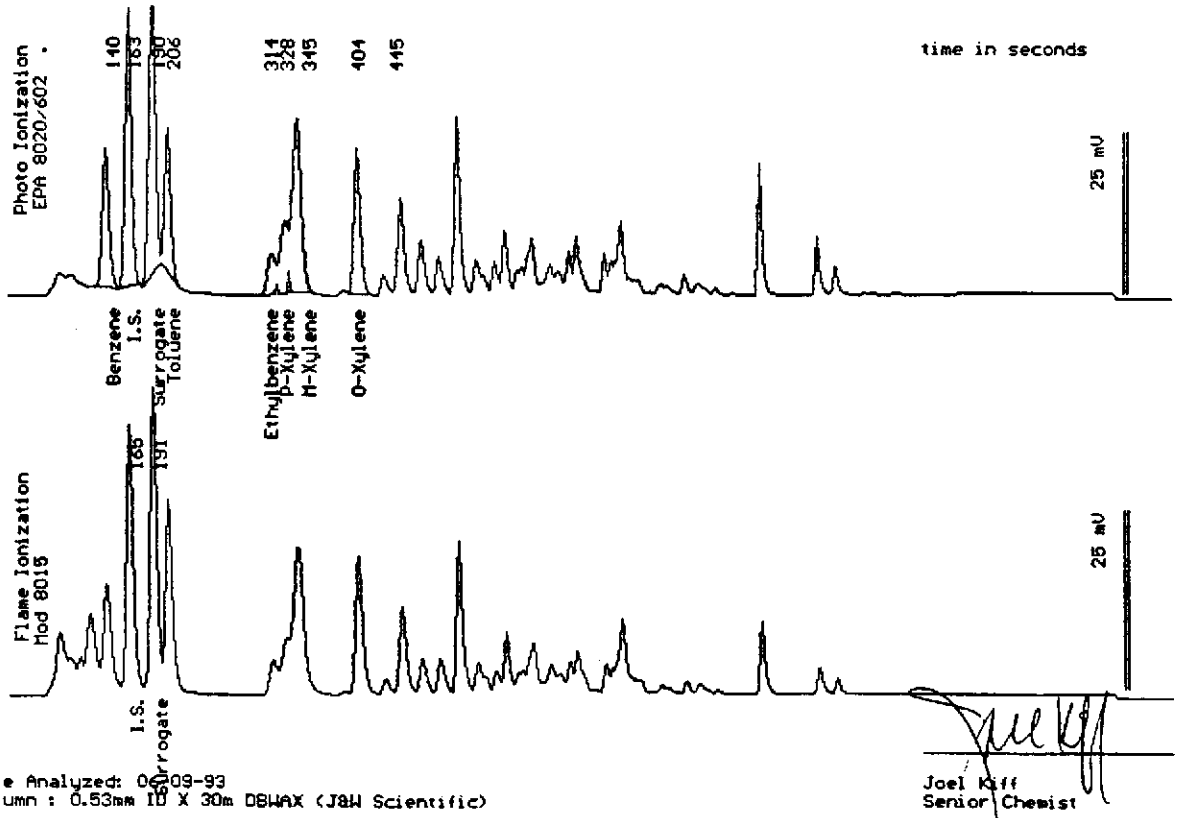
Sample Log 6555

6555-8

Sample: **MW-2-5 25'**

From : Project # 19024.01 (Beacon 604)
Sampled : 05/27/93
Dilution : 1:1 QC Batch : 4011m
Matrix : Soil

Parameter	(MDL) mg/kg	Measured Value mg/kg
Benzene	(.0050)	.057
Toluene	(.0050)	.099
Ethylbenzene	(.0050)	.026
Total Xylenes	(.0050)	.22
TPH as Gasoline	(1.0)	1.5
Surrogate Recovery		114 %



Date Analyzed: 06/09-93
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

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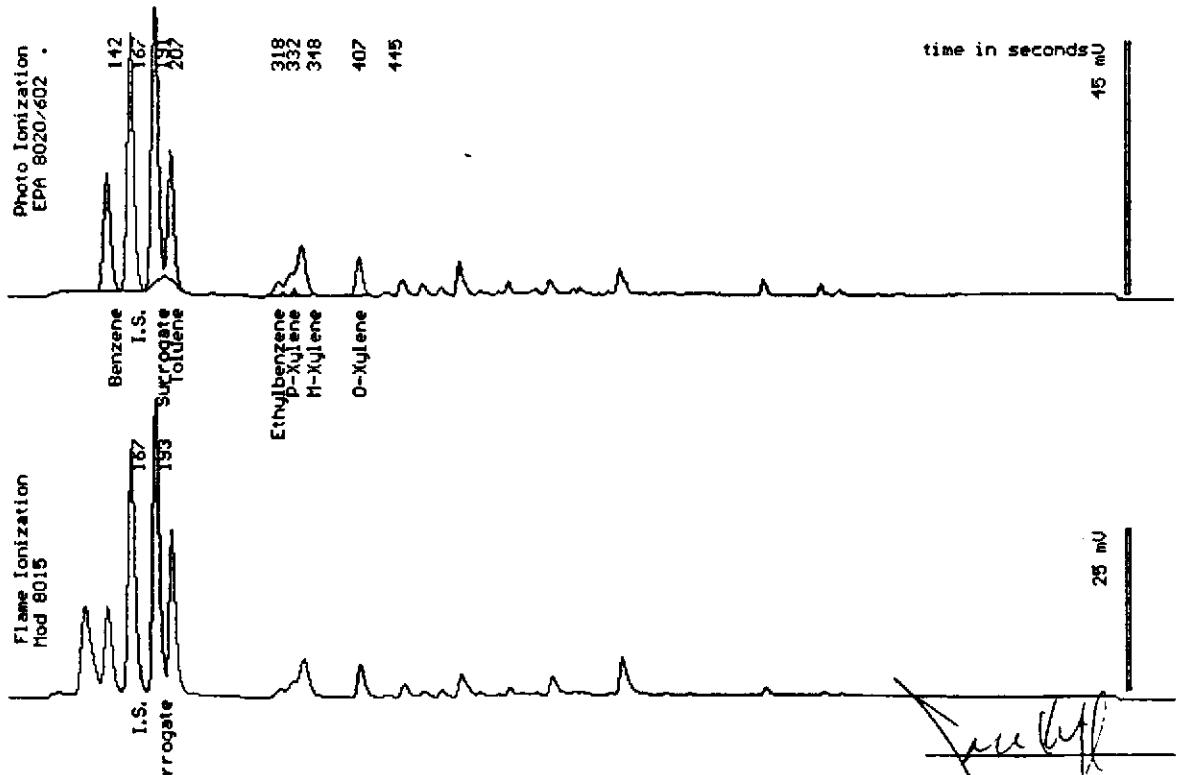
Sample Log 6555

6555-9

Sample: **MW-2-6 30'**

From : Project # 19024.01 (Beacon 604)
Sampled : 05/27/93
Dilution : 1:1 QC Batch : 4012d
Matrix : Soil

Parameter	(MDL) ug/kg	Measured Value ug/kg
Benzene	(.0050)	.040
Toluene	(.0050)	.065
Ethylbenzene	(.0050)	.0070
Total Xylenes	(.0050)	.051
TPH as Gasoline	(1.0)	<1.0
Surrogate Recovery		112 %



Date Analyzed: 06-10-93
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

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Senior Chemist

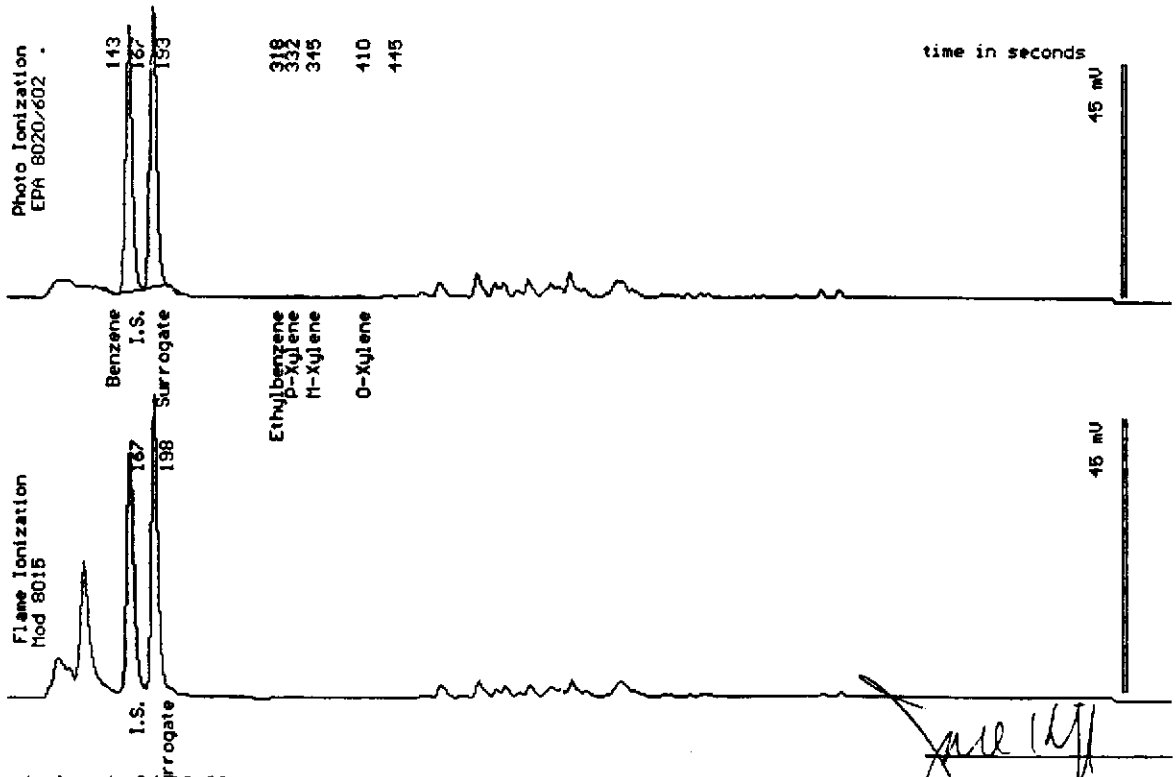
Sample Log 6555

6555-10

Sample: **MW-2-7 35'**

From : Project # 19024.01 (Beacon 604)
Sampled : 05/27/93
Dilution : 1:1 QC Batch : 4012c
Matrix : Soil

Parameter	(MDL) ug/kg	Measured Value ug/kg
Benzene	(.0050)	<.0050
Toluene	(.0050)	<.0050
Ethylbenzene	(.0050)	<.0050
Total Xylenes	(.0050)	<.0050
TPH as Gasoline	(1.0)	<1.0
Surrogate Recovery		110 %



Date Analyzed: 06/10-93
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

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Senior Chemist

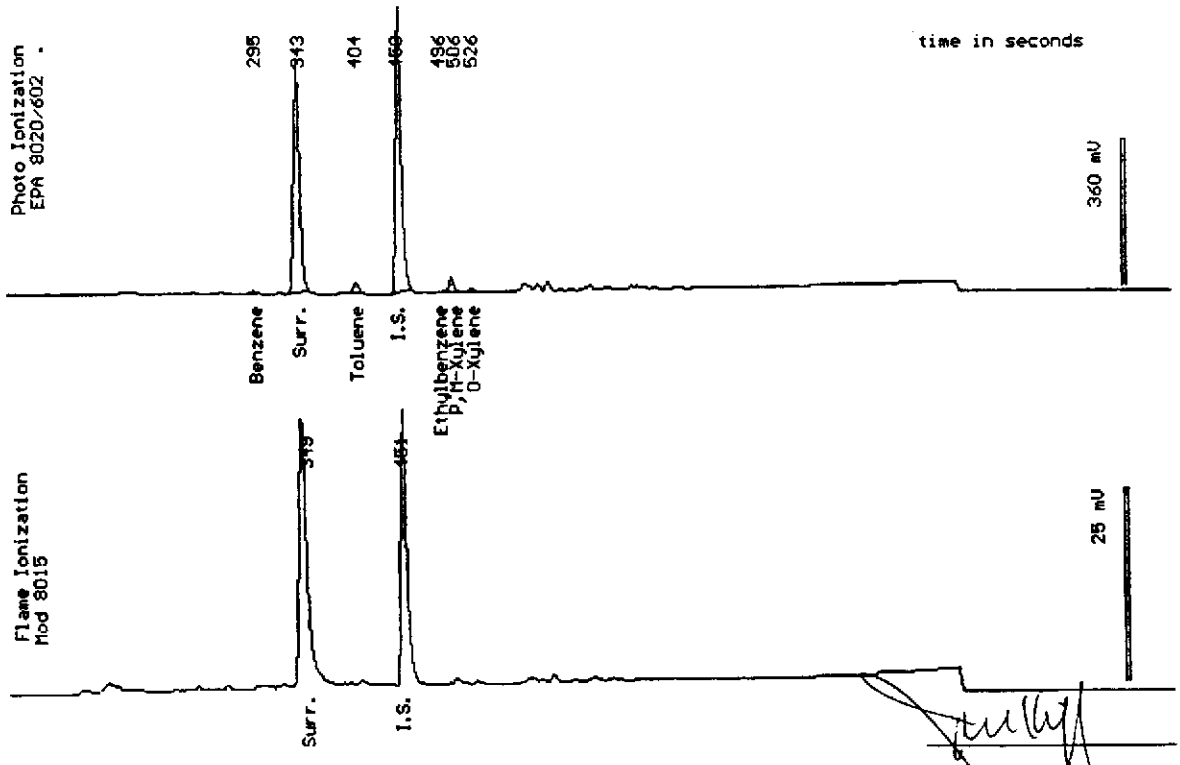
Sample Log 6555

6555-14

Sample: **MW-3-5 25'**

From : Project # 19024.01 (Beacon 604)
Sampled : 05/28/93
Dilution : 1:1 QC Batch : 6026c
Matrix : Soil

Parameter	(MDL) ug/kg	Measured Value ug/kg
Benzene	(.0050)	<.0050
Toluene	(.0050)	<.0050
Ethylbenzene	(.0050)	<.0050
Total Xylenes	(.0050)	<.0050
TPH as Gasoline	(1.0)	<1.0
Surrogate Recovery		95 %



Date Analyzed: 06-10-93
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

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Senior Chemist

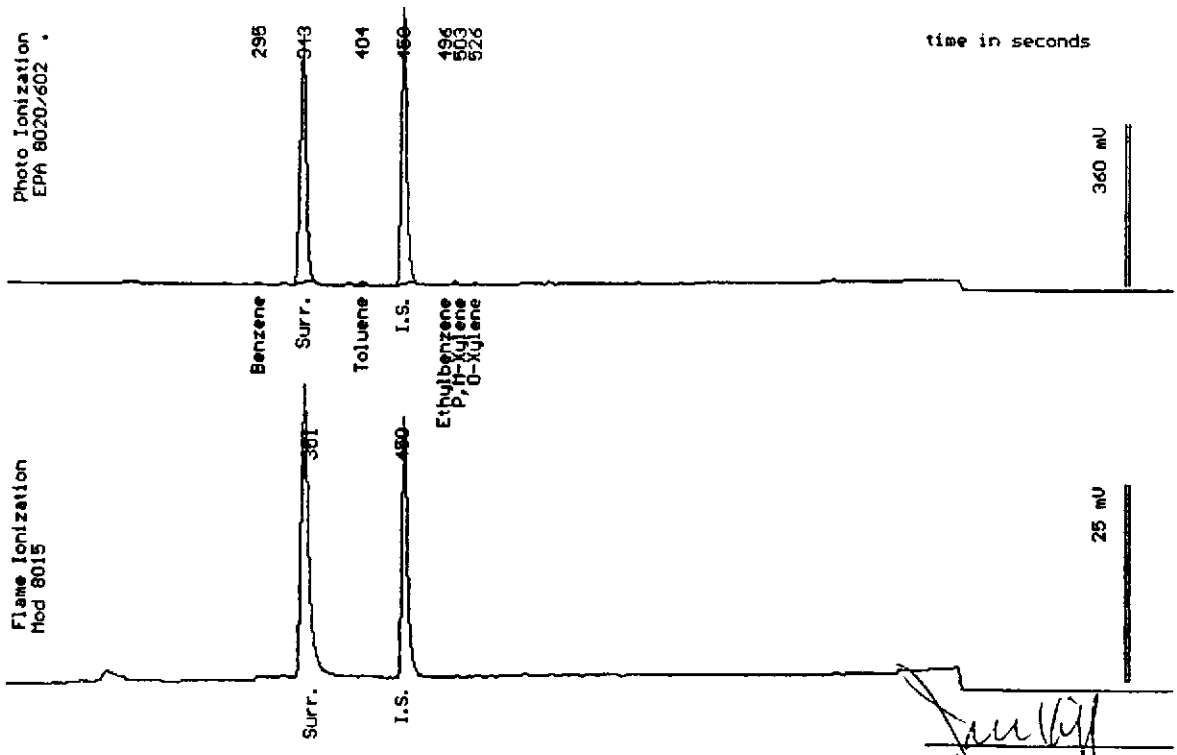
Sample Log 6555

6555-15

Sample: **MW-3-6 30'**

From : Project # 19024.01 (Beacon 604)
Sampled : 05/28/93
Dilution : 1:1 QC Batch : 6026c
Matrix : Soil

Parameter	(MDL) mg/kg	Measured Value mg/kg
Benzene	(.0050)	<.0050
Toluene	(.0050)	<.0050
Ethylbenzene	(.0050)	<.0050
Total Xylenes	(.0050)	<.0050
TPH as Gasoline	(1.0)	<1.0
Surrogate Recovery		102 %



Date Analyzed: 06-10-93
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

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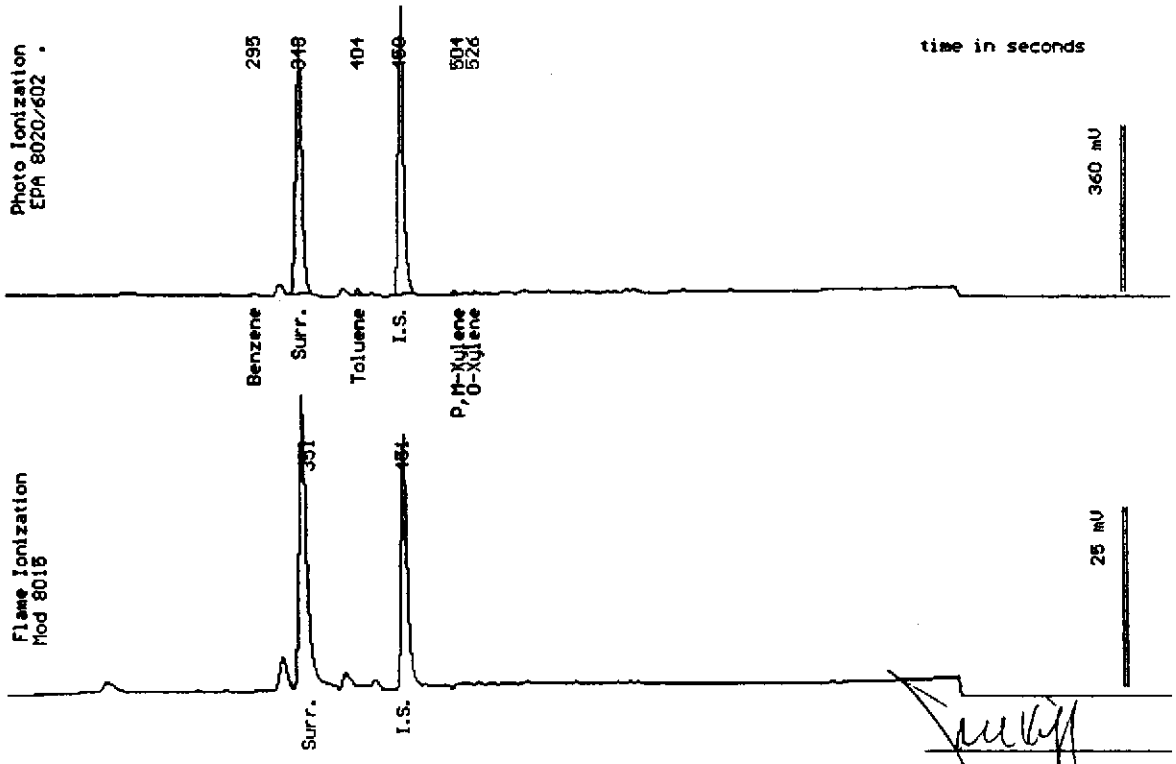
Sample Log 6555

6555-16

Sample: **MW-3-7 35'**

From : Project # 19024.01 (Beacon 604)
Sampled : 05/28/93
Dilution : 1:1 QC Batch : 6026c
Matrix : Soil

Parameter	(MDL) mg/kg	Measured Value mg/kg
Benzene	(.0050)	<.0050
Toluene	(.0050)	<.0050
Ethylbenzene	(.0050)	<.0050
Total Xylenes	(.0050)	<.0050
TPH as Gasoline	(1.0)	<1.0
Surrogate Recovery		103 %



Date Analyzed: 06-10-93
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

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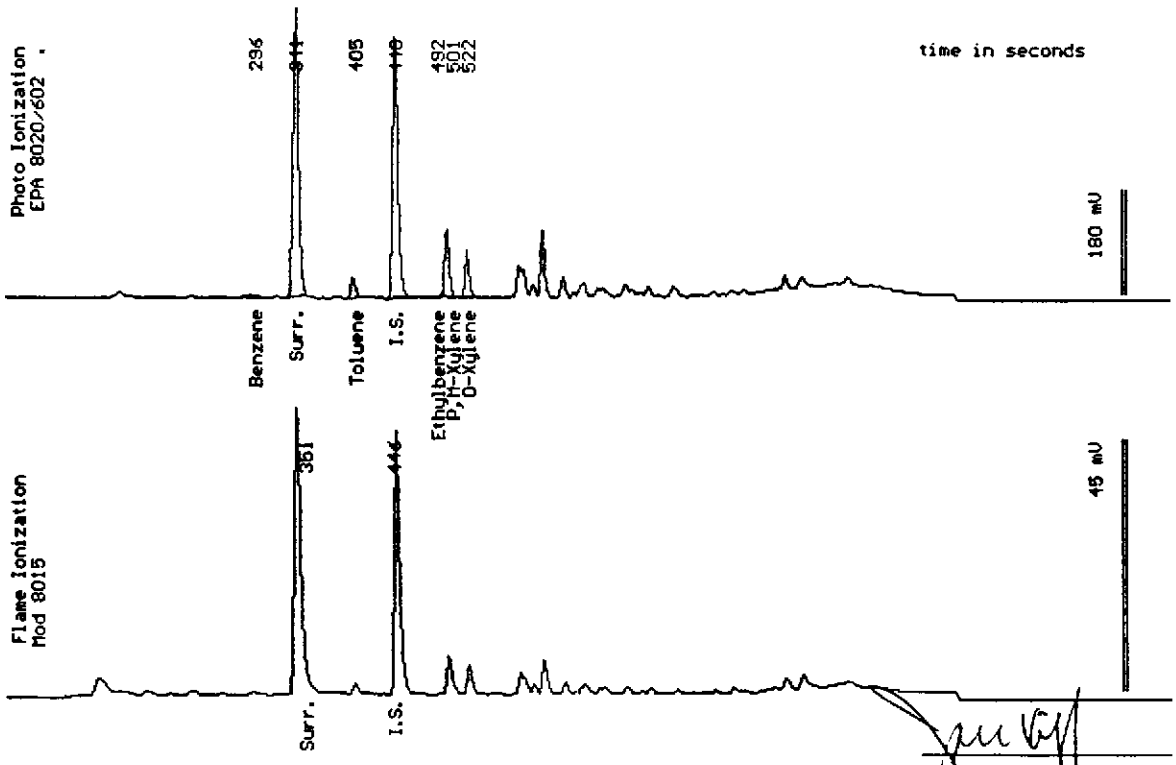
Sample Log 6568

6568-4

Sample: B-4-4 20'

From : Project # 19024.01
Sampled : 06/01/93
Dilution : 1:1 QC Batch : 6027a
Matrix : Soil

Parameter	(MDL) mg/kg	Measured Value mg/kg
Benzene	(.0050)	<.0050
Toluene	(.0050)	<.0050
Ethylbenzene	(.0050)	<.0050
Total Xylenes	(.0050)	.020
TPH as Gasoline	(1.0)	<1.0
Surrogate Recovery		122 %



Date Analyzed: 06-14-93
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

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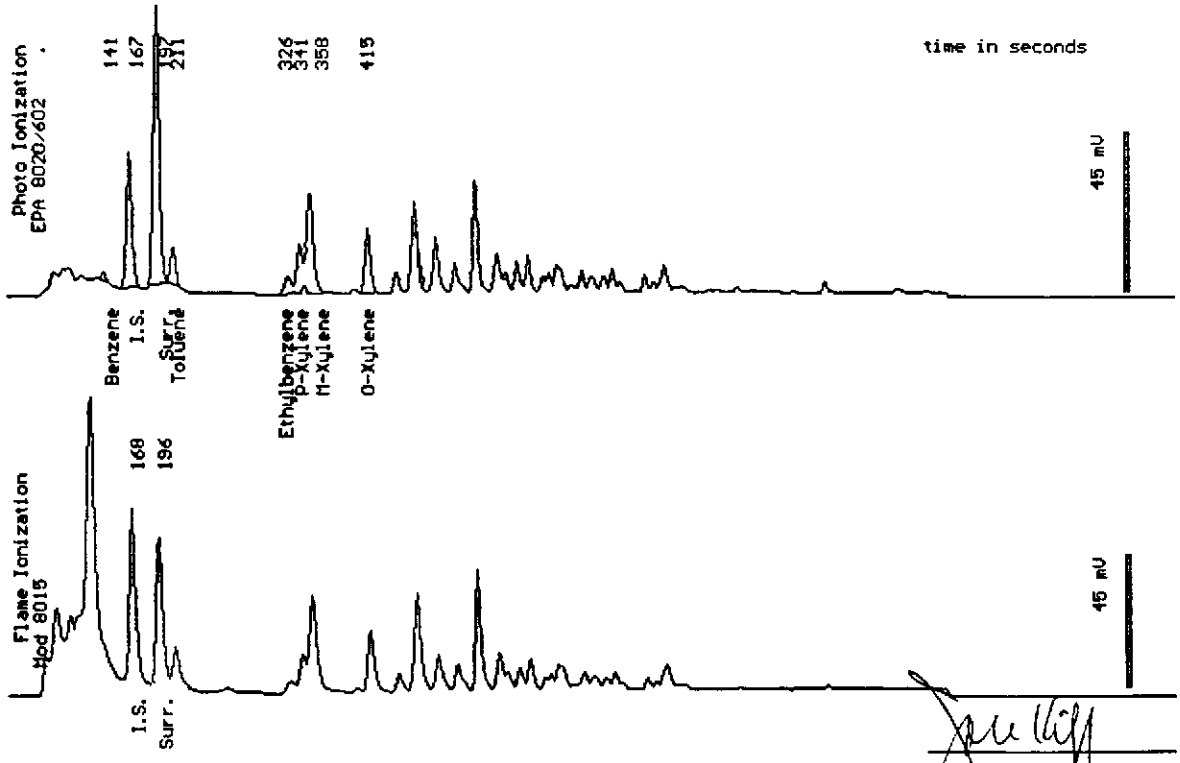
Sample Log 6568

6568-5

Sample: B-4-5 25'

From : Project # 19024.01
Sampled : 06/01/93
Dilution : 1:10 QC Batch : 2001b
Matrix : Soil

Parameter	(MDL) mg/kg	Measured Value mg/kg
Benzene	(.050)	<.050
Toluene	(.050)	.27
Ethylbenzene	(.050)	.18
Total Xylenes	(.050)	1.7
TPH as Gasoline	(10)	16
Surrogate Recovery		86 %



Date Analyzed: 06-14-93
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

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Sample Log 6568

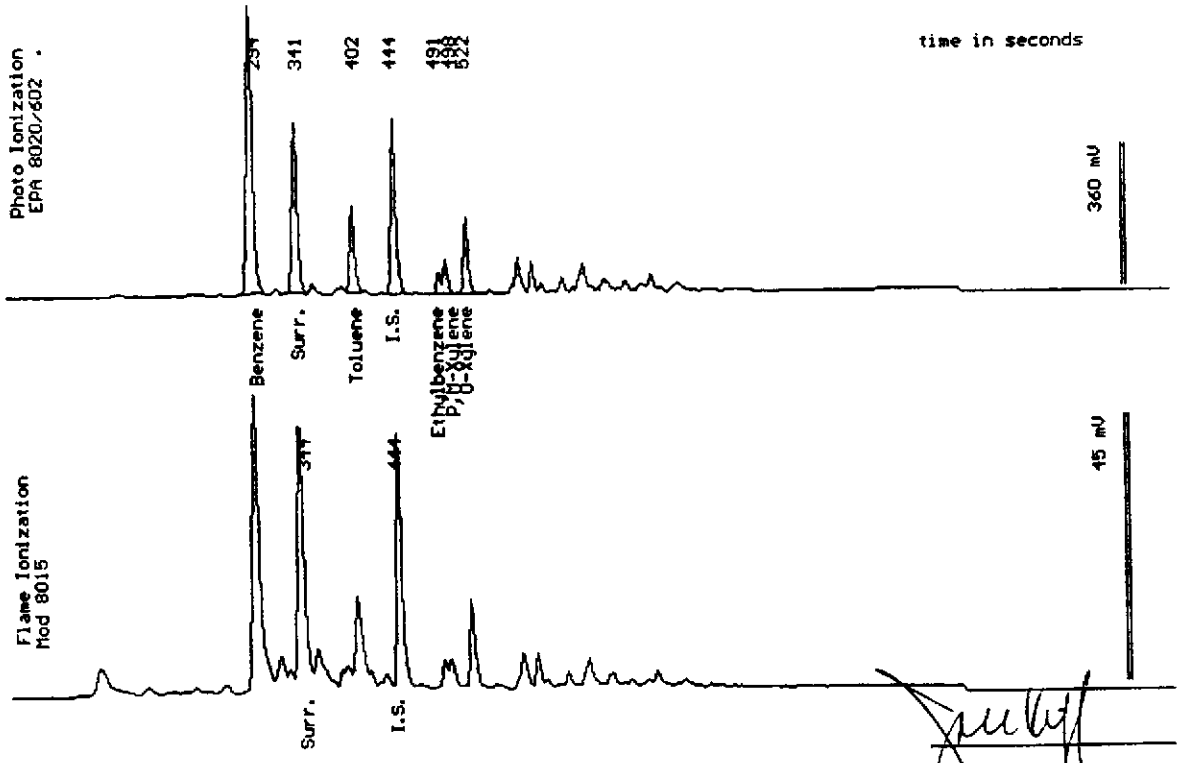
6568-6

Sample: B-4-6 30'

From : Project # 19024.01
Sampled : 06/01/93
Dilution : 1:1
Matrix : Soil

QC Batch : 6026d

Parameter	(MDL) mg/kg	Measured Value mg/kg
Benzene	(.0050)	.17
Toluene	(.0050)	.044
Ethylbenzene	(.0050)	.013
Total Xylenes	(.0050)	.057
TPH as Gasoline	(1.0)	<1.0
Surrogate Recovery		118 %



Date Analyzed: 06-11-93
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

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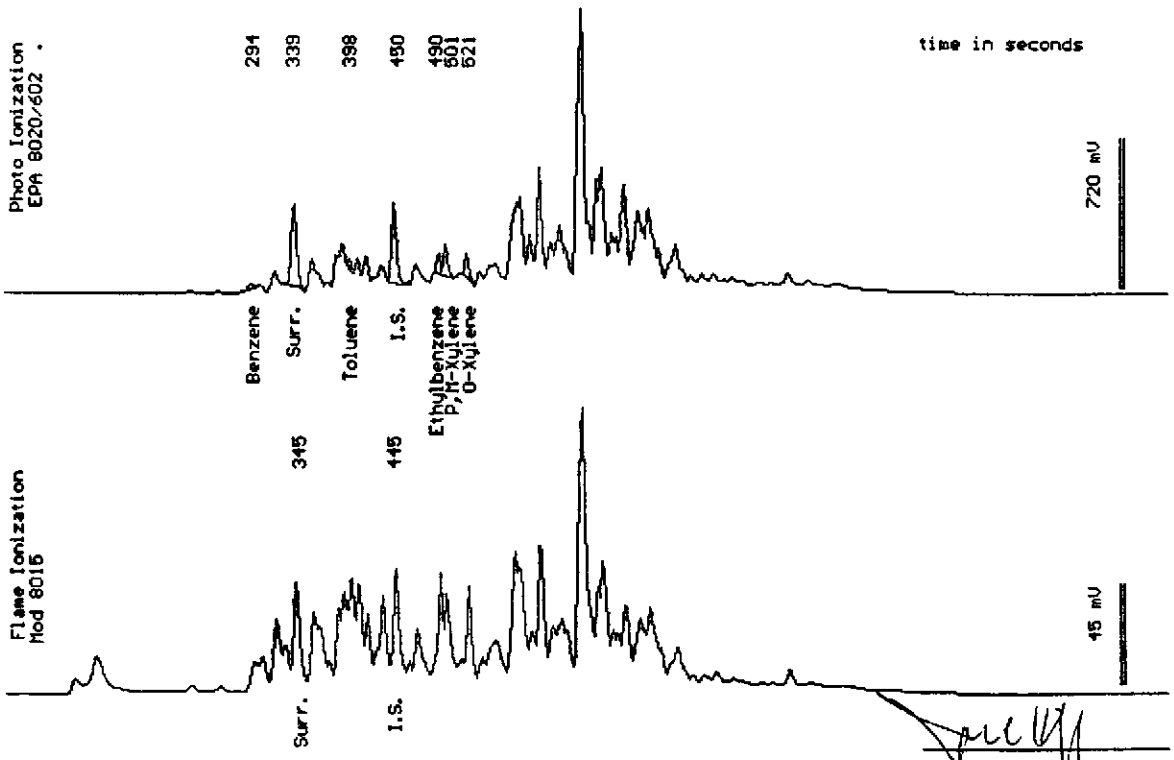
Sample Log 6568

6568-7

Sample: B-4-7 35'

From : Project # 19024.01
Sampled : 06/01/93
Dilution : 1:10 QC Batch : 6027e
Matrix : Soil

Parameter	(MDL) mg/kg	Measured Value mg/kg
Benzene	(.050)	.073
Toluene	(.050)	.11
Ethylbenzene	(.050)	.30
Total Xylenes	(.050)	.65
TPH as Gasoline	(10)	55
Surrogate Recovery		123 %



Date Analyzed: 06-15-93
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

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CHAIN OF CUSTODY REPORT

BEACON

Beacon Station No.	Sampler (Print Name)			ANALYSES												Date	Form No.
604	Hal Hansen															5-28-93	1 of 4
Project No.	Sampler (Signature)																
19024.01	Hal Hansen																
Project Location 1619 W. First St Livermore Ca	Affiliation AMV																
Sample No./Identification	Date	Time	Lab No.	BTEX	TPH (gasoline)	TPH (diesel)									No. of Containers	REMARKS	
VW-1-6 30'	5-27-93			X	X										1		
VW-1-7 35'				X	X												
VW-1-8 40'				X	X											[redacted]	
MW-1-1 5'																hold	
MW-1-2 10'																hold	
MW-1-3 15'																hold	
MW-1-4 20'																hold	
MW-1-5 25'				X	X												

RECEIVED by W.E.S.T. date 0°c

Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Hal Hansen AMV	5-28-93	907			
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
				5/28/93	15:12

Report To: Hal Hansen AMV

Bill to: ULTRAMAR INC.
525 West Third Street
Hanford, CA 93230
Attention: Rory Fox

WHITE: Return to Client with Report YELLOW: Laboratory Copy PINK: Originator Copy

32-8003 1/90

Ultramar Inc.
CHAIN OF CUSTODY REPORT

BEACON

Beacon Station No.	Sampler (Print Name)	Date	Form No.
604	Hal Hansen	5-28-93	2 of 4
Project No. 1902L101	Sampler (Signature) Hal Hansen		
Project Location 1619 W. Jensen Ave Livermore	Affiliation AMV		

Sample No./Identification	Date	Time	Lab No.	BTEX	TPH (gasoline)	TPH (diesel)	No. of Containers	REMARKS
MW-1-6 30'	5-27-93			X	X		1	
MW-1-7 35'				X	X			
MW-1-8 40'								hold
MW-2-1 5'								hold
MW-2-2 10'								hold
MW-2-3 15'								hold
MW-2-4 20'				X	X			~~hold~~
MW-2-5 25'				X	X			

Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Hal Hansen AMV	5/28/93	3:07			
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
				5/28/93	15:12

Report To: Hal Hansen AMV

Bill to: ULTRAMAR INC.
525 West Third Street
Hanford, CA 93230
Attention: Terry Fox

WHITE: Return to Client with Report YELLOW: Laboratory Copy PINK: Originator Copy

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Ultramar Inc.

CHAIN OF CUSTODY REPORT

BEACON

Beacon Station No.	Sampler (Print Name)			ANALYSES									Date	Form No.
604	Hal Hansen												5-28-93	3 of 4
Project No.	Sampler (Signature)													
19024.01	Hal Hansen													
Project Location 1619 ~~Stillman~~ W. First	Affiliation													
Ft Lupton Co	AMV Inc													
Sample No./Identification	Date	Time	Lab No.	BTEX	TPH (gasoline)	TPH (diesel)						No. of Containers	REMARKS	
MW-2-6 30'	5-27-93			X	X							1		
MW-2-7 25'	↓			X	X							↓		
MW-2-8 40'	↓												hold	
MW-2-1 5'	5-28-93												hold	
VW-2-2 10'	↓												hold	
VW-2-3 15'	↓												hold	
VW-2-4 20'	↓			X	X							↓		
VW-2-6 30'	↓			X	X							↓		

Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Hal Hansen AMV	5-28-93	307			
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
				5/28/93	15:12

Report To: Hal Hansen AMV

Bill to: ULTRAMAR INC.
525 West Third Street
Hanford, CA 93230
Attention: Terry Fox

WHITE: Return to Client with Report YELLOW: Laboratory Copy PINK: Originator Copy

32-8003 1/90

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CHAIN OF CUSTODY REPORT

BEACON

Beacon Station No.	Sampler (Print Name)			ANALYSES									Date	Form No.
604	Hal Hansen												5-28-93	4 of 4
Project No.	Sampler (Signature)													
19024.01	Hal Hansen													
Project Location 1619 W. Jinet St Livermore Ca	Affiliation AMV inc													
Sample No./Identification	Date	Time	Lab No.	BTEX	TPH (gasoline)	TPH (diesel)						No. of Containers	REMARKS	
VW-2-7 35	5-28-93			X	X							1		
MW-3-1 5'													Hold	
MW-3-2 10'													Hold	
MW-3-4 15'													Hold	
MW-3-5 25'				X	X									
MW-3-6 30'				X	X									
MW-3-7 35'				X	X									
MW-3-8 40'													Hold	

Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Hal Hansen AMV	5-28-93	3:01			
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
				5/28/93	15:12

Report To: Hal Hansen AMV

Bill to: ULTRAMAR INC.
525 West Third Street
Hanford, CA 93230
Attention: Tony Fox

WHITE: Return to Client with Report YELLOW: Laboratory Copy PINK: Originator Copy

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CHAIN OF CUSTODY REPORT

BEACON

Beacon Station No.	Sampler (Print Name)			ANALYSES								Date	Form No.
604	Hal Hansen											6/1/93	1 of 1
Project No. 190240.01	Sampler (Signature)												
Project Location 1611 W. First St. Suisun	Affiliation AMV												
Sample No./Identification	Date	Time	Lab No.	BTEX	TPH (gasoline)	TPH (diesel)					No. of Containers	REMARKS	
VW-3-1	6-1-93			X	X						1	Hold	
VW-3-2	"										1	Hold	
VW-3-3											1	Hold	
VW-3-4											1		
VW-3-5											1		
VW-3-6											1		
VW-3-7											1		

Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Hal Hansen AMV	6/1/93	2:40			
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
				6/2/93	7:15

Report To: Hal Hansen
AMV

Bill to: ULTRAMAR INC.
525 West Third Street
Hanford, CA 93230
Attention: Tom Tao

WHITE: Return to Client with Report YELLOW: Laboratory Copy PINK: Originator Copy

32-8003 (/90

Ultramar Inc.

CHAIN OF CUSTODY REPORT

BEACON

Beacon Station No.	Sampler (Print Name)	ANALYSES	Date	Form No.
604	Hal Hansen		6-1-93	2 of 3
Project No. 19024.01	Sampler (Signature) Hal Hansen			
Project Location 1619 W. [illegible] Sacramento Ca	Affiliation AMV			

Sample No./Identification	Date	Time	Lab No.	BTEX	TPH (gasoline)	TPH (diesel)						No. of Containers	REMARKS
B-4-1 5'	6-1-93			X	X							1	hold
B-4-2 10'	↓			↓	↓							1	hold
B-4-3 15	↓			↓	↓							1	hold
B-4-4 20	↓			↓	↓							1	
B-4-5 25	↓			↓	↓							1	
B-4-6 30'	↓			↓	↓							1	
B-4-7 35'	↓			↓	↓							1	

Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Hal Hansen	6-1-93	2:49			
			[signature]	6/1/93	14:56

Report To: Hal Hansen
AMV

Bill to: ULTRAMAR INC.
525 West Third Street
Hanford, CA 93230
Attention: Terry Trent

WHITE: Return to Client with Report YELLOW: Laboratory Copy PINK: Originator Copy

32-0003 1/90

ENCLOSURE E

FIELD NOTES

ACTON • MICKELSON • van DAM, INC.

GROUND WATER LEVEL DATA

Project Name Beacon 604 Project Number 19024.01

Date 6-22-93 Field Crew Hal Hansen + Steve Scaty Measuring Device and Number ind.

Well No.	Time	Depth to Product (feet)	Depth to Ground Water (feet)	Product Thickness (feet)	Reference Elevation (feet)	Ground Water Elevation (feet)	Physical Observations/Comments
MW3	1:22		37.11		99.08	61.97	TD 54
MW-1	1:26		38.46		100.00	61.54	TD 53
MW-2	1:30		39.07		98.68	59.61	TD 54

Signature

ACTON • MICKELSON • van DAM, INC.

GROUND WATER LEVEL DATA

Project Name Beacon "604 Livermore Project Number 1902L.01

Date 6-1-93 Field Crew Hal Hansen Measuring Device and Number Interface probe

Well No.	Time	Depth to Product (feet)	Depth to Ground Water (feet)	Product Thickness (feet)	Reference Elevation (feet)	Ground Water Elevation (feet)	Physical Observations/Comments
MW-1	636		37.50		100.00	62.50	TDS4
MW-2	627		38.02		98.68	6066	TDS4
MW-3	618		36.16		99.08	61.90	TDS3

Signature

DAILY FIELD REPORT

ACTON • MICKELSON • van DAM, INC.

Project No. 19024.01	Date: 6-24-93 work performed 6-22-93
Project Name: Former Beacon 604	Project Location: 1619 First St Livermore, CA
Weather: Clear, warm	Field Crew: HEH, SAL

Today's Work Activities:

- Arrived at site approximately 12:45.
- Took water level measurements
- Hand bailed three well volumes from MW1, MW2, & MW-3
- Collected samples from each well after 80% recharge.
- Left site @ approximately 5:30 pm.

Signature Steve Kratz Date 6/24/93

ACTON • MICKELSON • van DAM, INC.

SAMPLING/DEVELOPMENT INFORMATION

Sampling/Development Point MW-1
Sample I.D. —
Describe Sampling/Development Point SW corner of site

Project Name Beacon 604
Project No. 19024
Work Order #
Date 6/22/93
Field Crew HEH / SAL

Well Depth 53' feet below MP
Depth to Water (below MP) 38.46 feet
Discharge Rate gpm
Number of borehole volumes evacuated before sampling: 3

Casing Diameter 4 inches
Time 3:11 AM/PM
No product observed

Sampling/Development Method:
_____ Tap
_____ Submersible
X Bailer
_____ Other
_____ Centrifugal Pump

Pump intake or bailer set at 53 feet below MP.

Sample Appearance: Cloudy
Note any Sampling Problems:
Note any Equipment Washing:
Samples Collected/Time: 350 Cloudy, 3 VOA's

EVACUATION/STABILIZATION TEST DATA

Time	pH (units)	Temperature Corrected Conductance (umhos/cm)	Temperature (°C)	Water Level (nearest 0.01 foot)	Cumulative Volume of Water Removed from Well (gallons)	Pumping Rate (gpm)

Bailing Start Time 3:00 WL 38.46'
Bailing Stop Time 3:45 pm WL 40.40'

Comments:

Signature Steve Kratz
Date 6/22/93

ACTON • MICKELSON • van DAM, INC.

SAMPLING/DEVELOPMENT INFORMATION

Sampling/Development Point MW-2
Sample I.D.
Describe Sampling/Development Point NW corner of site

Project Name Beacon 604
Project No. 19024
Work Order #
Date 6-22-93
Field Crew SAL

Well Depth 54' feet below MP
Depth to Water (below MP) 39.07 feet
Discharge Rate gpm
Number of borehole volumes evacuated before sampling: 3

Casing Diameter 4 inches
Time 415 AM/PM

Sampling/Development Method:
_____ Tap
_____ Submersible
X Bailer
_____ Other
_____ Centrifugal Pump

Pump intake or bailer set at 50.00 feet below MP.

Sample Appearance: Cloudy
Note any Sampling Problems:
Note any Equipment Washing:
Samples Collected/Time: 450 pm 3 VOA's

EVACUATION/STABILIZATION TEST DATA

Time	pH (units)	Temperature Corrected Conductance (umhos/cm)	Temperature (°C)	Water Level (nearest 0.01 foot)	Cumulative Volume of Water Removed from Well (gallons)	Pumping Rate (gpm)

Bailing Start Time 4:00 WL 39.07
Bailing Stop Time 4:45 pm WL 41.3

Comments:

Signature Steve Latt
Date 6/22/93

ACTON • MICKELSON • van DAM, INC.

SAMPLING/DEVELOPMENT INFORMATION

Sampling/Development Point MW-3
Sample I.D. —
Describe Sampling/Development Point NE corner of MW

Project Name Beck 604
Project No. 19024
Work Order # —
Date 6-22-93
Field Crew HH & SL

Well Depth 54' feet below MP
Depth to Water (below MP) 37.11 feet
Discharge Rate _____ gpm
Number of borehole volumes evacuated before sampling: 3

Casing Diameter 4 inches
Time 1:20 AM/PM

Sampling/Development Method:

—	Tap	X	Bailer	—	Centrifugal Pump
X	Submersible	—	Other		

Pump intake or bailer set at 52 feet below MP.

Sample Appearance: Cloudy
Note any Sampling Problems: _____
Note any Equipment Washing: _____
Samples Collected/Time: 2:45 3 VOA's

EVACUATION/STABILIZATION TEST DATA

Time	pH (units)	Temperature Corrected Conductance (umhos/cm)	Temperature (°C)	Water Level (nearest 0.01 foot)	Cumulative Volume of Water Removed from Well (gallons)	Pumping Rate (gpm)
					34	

Bailing Start Time 2:15 WL 37.41
Bailing Stop Time 2:40 WL 40.50

Comments: _____

Signature Steve Lutz
Date 6-22-93

ACTON • MICKELSON • van DAM, INC.

SURVEY FIELD NOTES

Project Name	Project No. 19024.01	Date 6-1-93
	Bench Mark MW-1	Bench Mark Description
Surveyor Hal Hansen	Rod Man	

Station	(+) B.S.	H.I.	(-) F.S.	Elevation	Stadia Readings	Distance	Horizontal Angle	Remarks
MW-1	5.07	105.07		100.00				
MW-2			6.39	98.68				
MW-3			5.99	99.08				
MW-1	5.31	105.31		100.00				
MW-2			6.67	98.64				
MW-3			6.23	99.08				

SITE SKETCH

Signature

ENCLOSURE F

GROUND WATER SAMPLE ANALYTICAL RESULTS

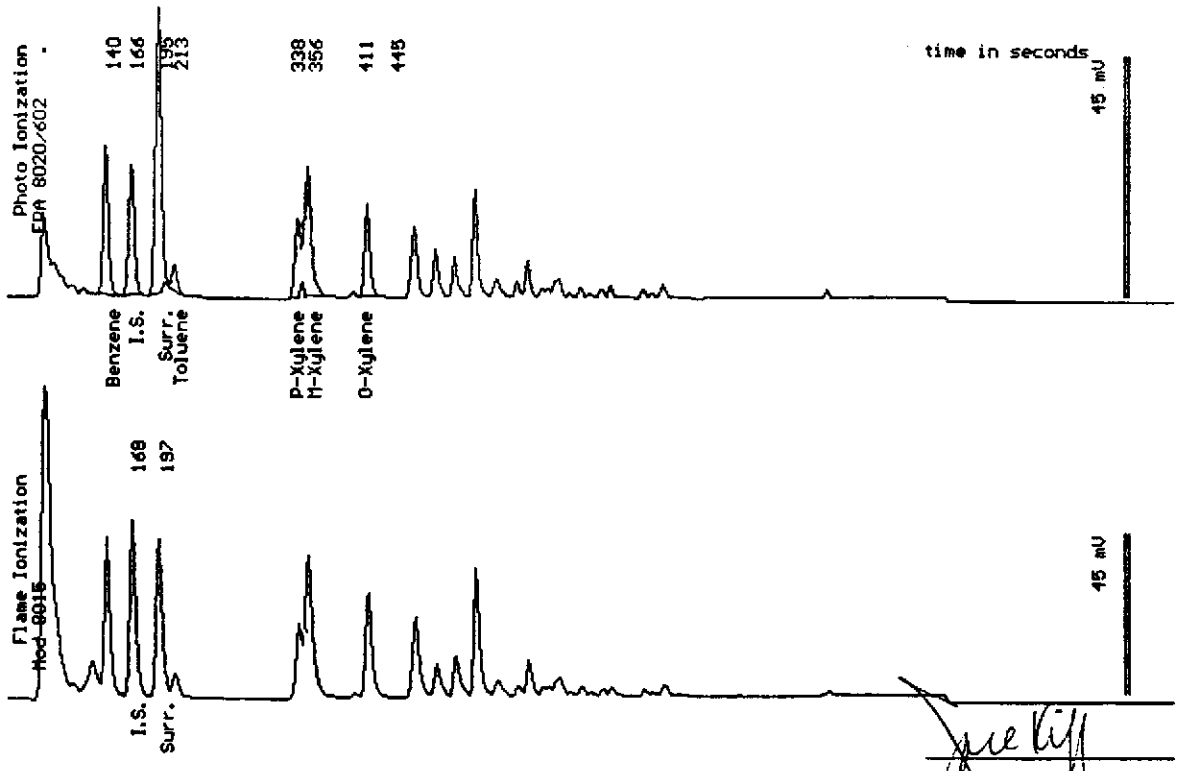
Sample Log 6568

6568-8

Sample: **MW-1**

From : Project # 19024.01
Sampled : 06/01/93
Dilution : 1:100 QC Batch : 2000h
Matrix : Water

Parameter	(MDL) ug/L	Measured Value ug/L
Benzene	(50)	2200
Toluene	(50)	400
Ethylbenzene	(50)	<50
Total Xylenes	(50)	4900
TPH as Gasoline	(5000)	27000
Surrogate Recovery		89 %



Date Analyzed: 06-12-93
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

Joel Kiff
Senior Chemist

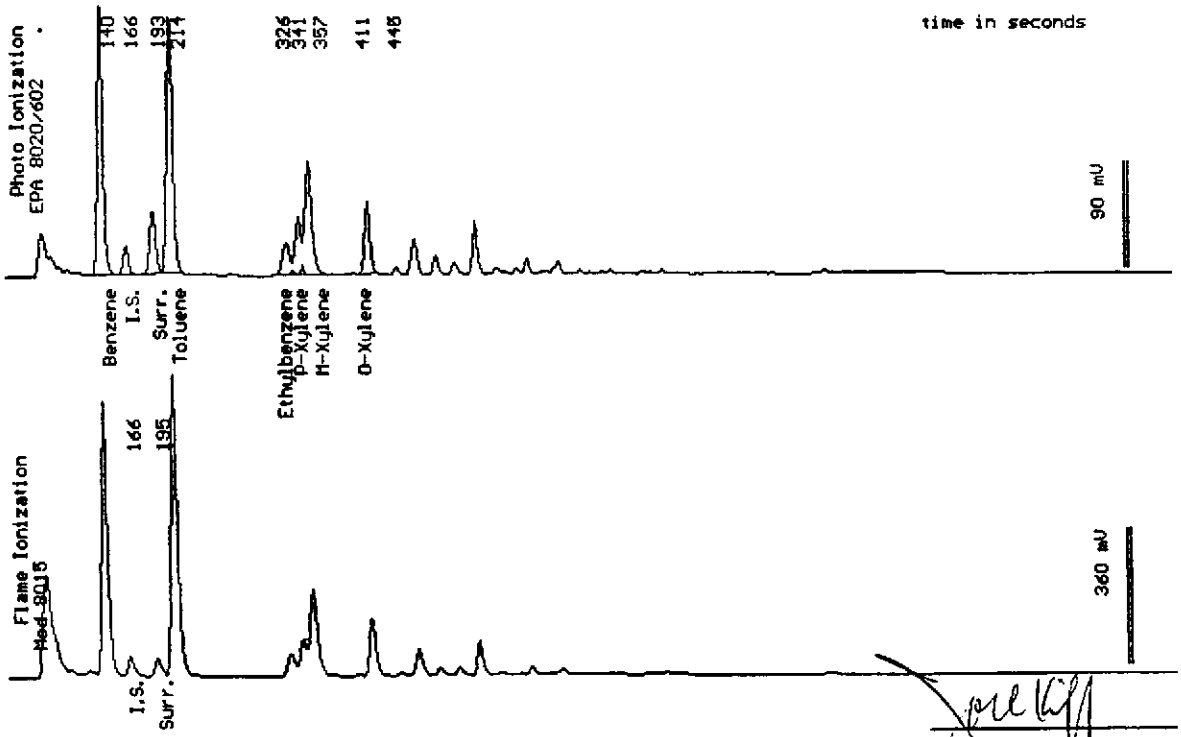
Sample Log 6568

6568-9

Sample: **MW-2**

From : Project # 19024.01
Sampled : 06/01/93
Dilution : 1:100 QC Batch : 2000h
Matrix : Water

Parameter	(MDL) ug/L	Measured Value ug/L
Benzene	(50)	20000
Toluene	(50)	21000
Ethylbenzene	(50)	3300
Total Xylenes	(50)	18000
TPH as Gasoline	(5000)	170000
Surrogate Recovery		90 %



Date Analyzed: 06-12-93
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

Joel Kiff
Senior Chemist

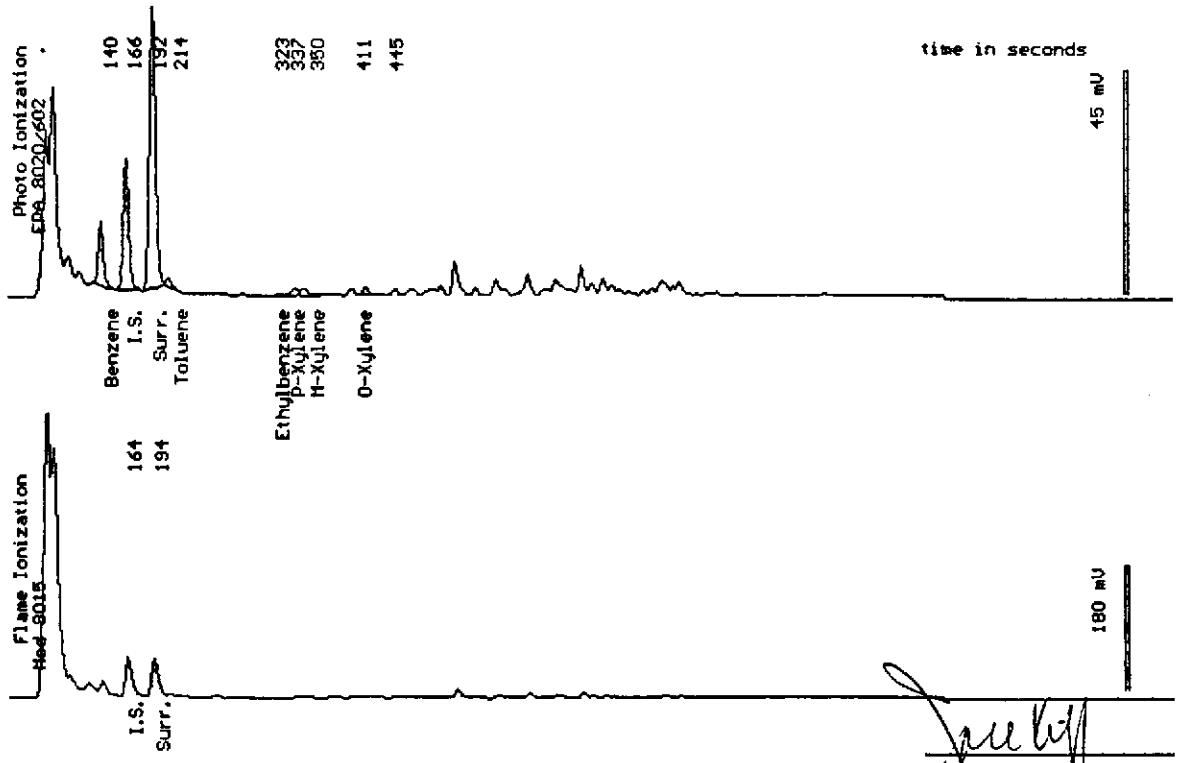
Sample Log 6568

6568-10

Sample: **MW-3**

From : Project # 19024.01
Sampled : 06/01/93
Dilution : 1:1 QC Batch : 2000h
Matrix : Water

Parameter	(MDL) ug/L	Measured Value ug/L
Benzene	(.50)	4.6
Toluene	(.50)	<.50
Ethylbenzene	(.50)	<.50
Total Xylenes	(.50)	1.9
TPH as Gasoline	(50)	270
Surrogate Recovery		92 %



Date Analyzed: 06-12-93
Column : 0.53mm ID X 30m DBWAX (J&W Scientific)

Joel Kiff
Senior Chemist

Ultramar Inc.
CHAIN OF CUSTODY REPORT

BEACON

Beacon Station No.	Sampler (Print Name)			ANALYSES									Date	Form No.
604	Hal Hansen												6-1-93	3 of 3
Project No.	Sampler (Signature)													
1902-4.01	Hal Hansen													
Project Location 1619 W. First St Livermore Ca	Affiliation AMV inc													
Sample No./Identification	Date	Time	Lab No.	BTEX	TPH (gasoline)	TPH (diesel)						No. of Containers	REMARKS	
MW-1	6-1-93			X	X							3		
MW-2												3		
MW-3					V							3		

RECEIVED by W.E.S.T. date 6/2

Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Hal Hansen AMV	6-1-93				
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
				6/1/93	1455

Report To: Hal Hansen
AMV

Bill to: ULTRAMAR INC.
525 West Third Street
Hanford, CA 93230
Attention: Terry Fox

WHITE: Return to Client with Report YELLOW: Laboratory Copy PINK: Originator Copy

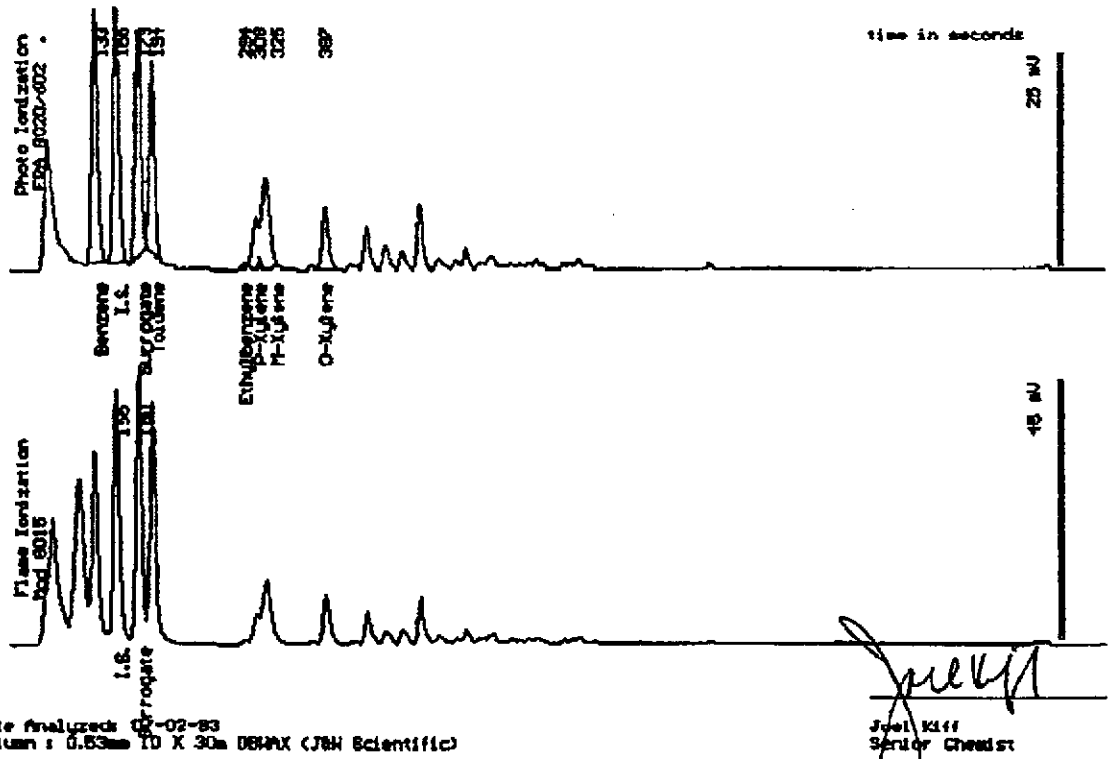
32-8003 1/90

Sample Log 6755
6755-1

Sample: MW1

From : Project # 19024.01 (Beacon 604)
Sampled : 06/22/93
Dilution : 1:500 QC Batch : 4017A
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(250)	8000
Toluene	(250)	10000
Ethylbenzene	(250)	260
Total Xylenes	(250)	10000
TPH as Gasoline	(25000)	87000
Surrogate Recovery		94 %



Date Analyzed: 06-02-93
Column : 0.53mm ID X 30m DBMAX (J&W Scientific)

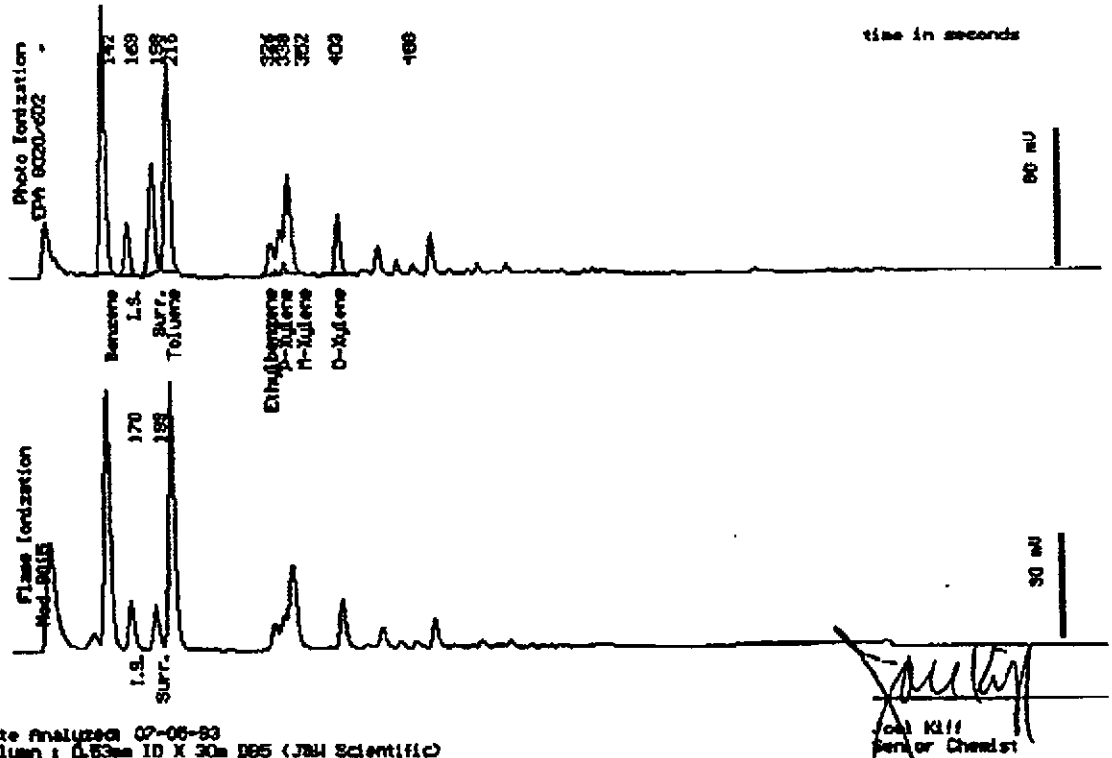
Joel Kiff
Senior Chemist

Sample Log 6755
6755-2

Sample: MW2

From : Project # 19024.01 (Beacon 604)
Sampled : 06/22/93
Dilution : 1:250 QC Batch : 2004C
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(130)	19000
Toluene	(130)	22000
Ethylbenzene	(130)	3500
Total Xylenes	(130)	18000
TPH as Gasoline	(13000)	160000
Surrogate Recovery		102 %



Date Analyzed 07-06-93
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

Joel Kiff
Senior Chemist

Western Environmental Science & Technology • 45133 County Road 32B • Davis, CA 95616 • 916 753-9500 • FAX: 916 757-4652

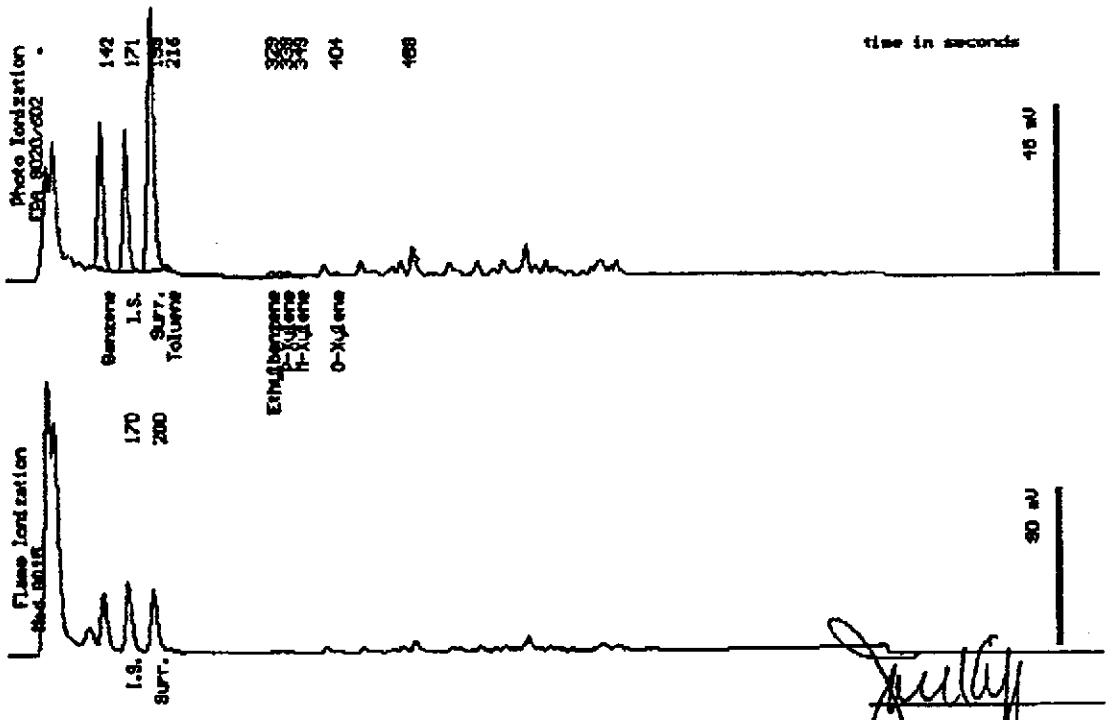
Sample Log 6755

6755-3

Sample: MW3

From : Project # 19024.01 (Beacon 604)
Sampled : 06/22/93
Dilution : 1:1 QC Batch : 2004C
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(.50)	8.2
Toluene	(.50)	<.50
Ethylbenzene	(.50)	<.50
Total Xylenes	(.50)	.72
TPH as Gasoline	(50)	160
Surrogate Recovery		106 %



Date Analyzed 07-06-93
Column : 0.53mm ID X 30m DB5 (J&W Scientific)

Joel Kiff
Senior Chemist

Ultramar Inc.
CHAIN OF CUSTODY REPORT

BEACON

Beacon Station No.	Sampler (Print Name)			ANALYSES				Date	Form No.
604	Steve Liaty							6-24-93	1 of 1
Project No.	Sampler (Signature)							3 40ml VOAs w/preserv	
19024.01	Steve Liaty								
Project Location 1619 First St Livermore CA	Affiliation Acton Mickelson van Dam			BTEX	TPH (gasoline)	TPH (diesel)	No. of Containers		
Sample No./Identification	Date	Time	Lab No.					REMARKS	
MW1	6-22-93	350p		X	X		3		
MW2	↓	450p		X	X		3		
MW3	↓	245p		X	X		3		

RECEIVED by W.E.S.T. date 6/24/93 SR

Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Steve Liaty	6-24-93	910a			
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
				6/24/93	9:50

Report To: Dale van Dam
Acton Mickelson van Dam

Bill to: ULTRAMAR INC.
525 West Third Street
Hanford, CA 93230
Attention: Terry Fox

WHITE: Return to Client with Report YELLOW: Laboratory Copy PINK: Originator Copy

33-0002 1/90

H+GCL
Environmental Scientists and Engineers

2200 Powell Street, Ste. 880 • Emeryville, CA 94608
(510) 547-3886 • FAX: (510) 547-3631

7/28/92

Eva Chu
Alameda County Health Agency
80 Swan Way, Room 200
Oakland, CA 94621

RE: Livermore Arcade/Beacon Oil Gasoline Contamination Plume

Dear Ms. Chu:

On behalf of Grubb & Ellis Realty, H+GCL has enclosed with this letter monitoring well sampling data to demonstrate that the Livermore Arcade Shopping Center (Arcade site) is not the source of the gasoline constituents which have been found in on and off site wells.

The gasoline plume has intermingled with a PCE plume originating at Mike's Cleaners of the Arcade site. This has seriously slowed the cleanup of the PCE contamination currently being performed by soil vapor extraction.

In addition, recent testing of California Water Service Wells 3 and 8 (CWS-3, CWS-8) found 0.3 ug/l of toluene in CWS-8. Though this is a low and legal concentration, it indicates that the gasoline plume may have spread to the deeper aquifer threatening water supplies.

Research obtained during the performance of a Phase I evironmental site assessment showed no current or historical sources of gasoline at the Arcade site. In addition, data obtained from a monitoring well upgradient of the Arcade site (MW-16) found significantly higher levels of gasoline components than a monitoring well (MW-1) which is located on the Arcade site. Both wells were sampled on the same day.

The gasoline plume appears to be originating from the Beacon Oil Station at the intersection of First Street and P Street. In a statement provided to H+GCL, Becker Engineering of Napa, CA said that they repaired badly leaking pipes at the Beacon Oil Station in the late 1980's. It is possible that a monitoring well has already been installed on their property and that groundwater analysis data is readily available.

H+GCL has found no evidence of on-site sources of gasoline contaminants at the Arcade site. We hope that Alameda County will vigorously pursue action from the up-gradient source of this plume.

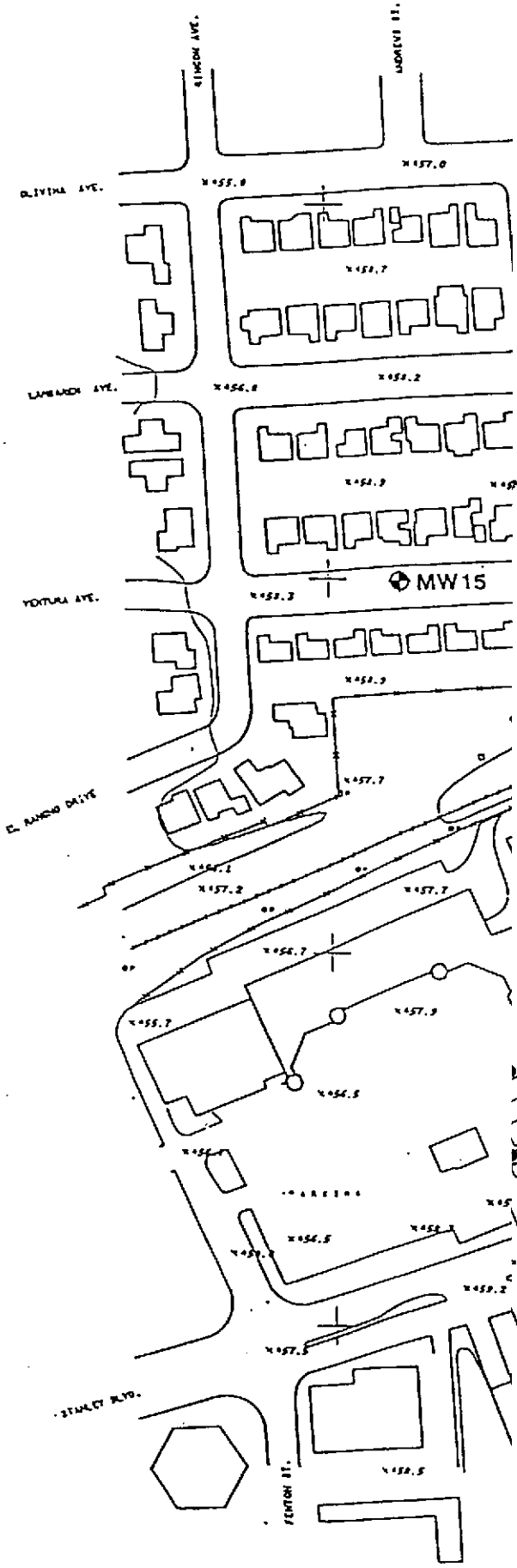
Sincerely

H+GCL

Karl Novak

Karl W. Novak, P.E., R.E.A.
Director, Engineering and Hydrogeology

Attachment: Well Data



Legend

- Location of Monitoring Well
- Location of Mike's Cleaners
- PCE PLUME
- GASOLINE PLUME
- INFERRED PLUME

Scale: 0 100 feet 200 feet

N

ARCADE SHOPPING CENTER

Livermore, Ca.

HGCL Environmental Scientists and Engineers

PROJECT NO. 48016.08

DATE March 1992

Plate I

2030 Addison Street #500, Berkeley, California 94704

October 17, 1995

Alameda County Health Agency
Department of Environmental Health
Hazardous Materials Division
1131 Harbor Bay Parkway, Room 250
Alameda, California 94502

687157.08
File: Correspondence

Attention: Ms. Eva Chu

Subject: **Amendment No. 1, Final LNAPL Assessment and Groundwater Characterization Investigation Report, Mill Springs Park Apartments, 1809 Railroad Avenue, Livermore, California**

Dear Eva:

Telephone
510.540.6954
Facsimile
510.540.7496

This letter presents an amendment to EARTH TECH's October 9, 1995 LNAPL Assessment and Groundwater Characterization Investigation for the Mill Springs Park Apartment (MSP) site in Livermore, California. This report characterized the extent and possible source(s) of a light nonaqueous phase liquid (LNAPL) encountered in monitoring well MW-1 at the MSP site. This amendment identifies additional boring locations and results of split samples performed by RSI on behalf of Desert Petroleum Inc. located off the MSP property boundaries. This additional subsurface investigation was performed as part of further characterization of the B&C Mini-mart located at 2008 First Street in Livermore, California.

EARTH TECH observed RSI's drilling of five soil borings and collection of grab groundwater samples at these locations between October 10 and October 12, 1995. The boring locations are identified as G-1, G-2, G-3, G-4 and MW-5. The boring locations are shown on the attached Boring Location Plan, Map 1. All boring locations are located offsite and in an upgradient direction to the MSP site. Four of the borings (G-1 through G-4) are located on property owned by the Groth Brothers Oldsmobile - GMC. MW-5 is located within the limits of "L" Street.

Grab groundwater sampling was performed by RSI personnel, and split samples were obtained from borings G-1, G-2, G-3, G-4 and MW-5 (prior to well development) and contained in sample containers provided by Curtis & Tompkin, Ltd.

The groundwater samples were analyzed for total volatile hydrocarbons (TVH) against a gasoline standard, using EPA Method 8015 (LUFT). In addition, the groundwater samples were analyzed for VOCs [benzene, toluene, ethylbenzene, xylenes and methyl tert-butyl ether] using EPA method 8020. These data were used to further characterize the extent of the dissolved petroleum hydrocarbons associated with previous LNAPL releases.

The results of the TVH, BTXE and MTBE analyses are presented on the attached Map and tabulated in Table 1, Groundwater Analyses Summary Table. Copies of the certified analytical reports are also presented as an attachment to this letter. The data indicate that groundwater has been impacted at all five locations sampled. High concentrations of gasoline (TVH) exceeding 1,000 μg/L were detected in borings G-3, G-4 and MW-5.

The TVH concentration at all the sample locations also exceeded the 50 μg/L action level presented in the Tri-Regional Guidelines for Investigating Leaking Underground Fuel Tanks by the Regional Water Quality Control Board (RWQCB). The highest TVH concentration was detected at boring MW-5 at a concentration of 250,000 μg/L. This boring is located east and upgradient of the former gasoline UST on the Groth Brothers Oldsmobile site.

The results of grab groundwater analyses clearly indicate that the LNAPL detected in MW-1 and dissolved petroleum hydrocarbons detected in the grab groundwater samples collected from the MSP site originated from an offsite source. These data also indicate that the Groth Brothers Oldsmobile site is not the source of the LNAPL and dissolved petroleum hydrocarbons.

In the October 9, 1995 report, EARTH TECH concluded, based on the field investigation and file research, that the potential sources of the LNAPL were the B & C Mini-mart (2008 First Street) and Groth Brothers Oldsmobile (78 L street). Since the Groth site has been determined not to be a source of the LNAPL, the B&C Mini-mart now appears to be the most likely source. Given the current groundwater data, the conclusion that the B & C Mini-mart is the most likely source of the LNAPL and dissolved petroleum hydrocarbon contamination in the groundwater at the MSP site is further supported by the following facts: the documented occurrence of at least two unauthorized releases of gasoline at this site within the last six months; the recent (September 1995) removal of a UST from service due to a structural failure of the tank and the marked similarities between the fingerprint of the LNAPL from monitoring well MW-1 with fingerprints of petroleum products (gasoline) dispensed at the B & C Mini-mart.

While other sources, yet unidentified, may exist, the facts and findings clearly demonstrate that the LNAPL and dissolved petroleum hydrocarbon contamination detected under the MSP site originated from an offsite source, and that it is reasonable to conclude that the B & C Mini-mart is the source of the contamination.

Since the LNAPL and groundwater contamination has been confirmed to originate from an offsite source, EARTH TECH recommends that the final site closure granted by the RWQCB remain in place and that the present and any future owner of the MSP site not be required to perform any further site characterization or periodic groundwater monitoring.

EARTH TECH further requests that the ACHA-DEH issue a letter to MSP stating that final site closure status has not changed and that MSP will not be held responsible for further monitoring or remediation of impacted groundwater underlying the site. EARTH TECH further requests that the ACHA-DEH also obtain similar written concurrence from the RWQCB regarding monitoring and remediation.

Soil and groundwater data utilized were used as reported. Chemical analyses were performed by others not under direct supervision by EARTH TECH. The conclusions and recommendations contained herein represent professional opinions prepared consistent with the standards of care and diligence normally practiced by environmental consultants of a similar nature in the same locale. No other warranty, expressed or implied, is made.

If you have any questions, please contact the undersigned.

Sincerely,

EARTH TECH

Mark Milani, P.E.
Managing Senior Engineer

REGISTERED PROFESSIONAL ENGINEER
MARK MILANI
No. 35120
Exp 9/30/97
CIVIL
STATE OF CALIFORNIA

MM:mm

cc: Mr. Jim Hardy, Wingfield Venture Fund

Attachments: Map 1 - Boring Location Plan
Table 1 - Groundwater Analyses Summary Table
Certified Analytical Report

687157/4/ACHALTR.NO8

TABLE 1

GROUNDWATER ANALYSES SUMMARY TABLE

Date: 10/17/95

SITE	DATE	Gasoline (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Ethyl benzene (ug/l)	Total xylenes (ug/l)	MTBE (ug/l)
GROTH	08/11/95	<50	<0.5	<0.5	<0.5	<0.5	<2.0
H-01	08/11/95	<50	<0.5	<0.5	<0.5	<0.5	<2.0
H-01	09/13/95	<50	<0.5	<0.5	<0.5	<0.5	<2.0
H-02	08/14/95	<50	<0.5	<0.5	<0.5	5.4	<2.0
H-03	08/11/95	<50	10	<0.5	<0.5	<0.5	26
H-04	08/14/95	210	9.2	<0.5	<0.5	4.8	29
H-04	09/13/95	<50	1.3	<0.5	<0.5	<0.5	<2.0
H-05	08/11/95	4000	1300	270	43	350	14000
H-05	08/16/95	970	340	<5.0	<5.0	80	4800
H-06	08/14/95	16000	7700	1100	120	800	67000
H-07	08/11/95	17000	3200	820	740	1900	14000
H-07	09/13/95	5800	2800	77	280	510	11000
H-08	08/11/95	7300	3000	89	140	230	15000
H-08	09/13/95	4000	2200	61	42	120	8000
H-09	08/14/95	<50	<0.5	<0.5	<0.5	0.8	<2.0
H-09	08/16/95	<50	<0.5	<0.5	<0.5	<0.5	<2.0
H-10	08/14/95	<50	<0.5	<0.5	<0.5	<0.5	<2.0
H-11	08/14/95	<50	<0.5	<0.5	<0.5	<0.5	<2.0
MW-1	08/14/95	11000	190	260	110	900	210

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL 8020C&T

TABLE 1 (CONT.)

GROUNDWATER ANALYSES SUMMARY TABLE

Date: 10/17/95

SITE	DATE	Gasoline (ug/l)	Benzene (ug/l)	Toluene (ug/l)	Ethyl benzene (ug/l)	Total xylenes (ug/l)	MTBE (ug/l)
G-01	10/11/95	280	60	<0.5	<0.5	1.5	<2.0
G-02	10/11/95	94	1.7	<0.5	<0.5	<0.5	<2.0
G-03	10/11/95	82000	12000	19000	2700	12000	18000
G-04	10/11/95	4300	33	<0.5	2.5	4.5	<2.0
MW-5	10/11/95	250000	42000	120000	23000	120000	110000

Values represent total concentrations unless noted < = Not detected at indicated reporting limit --- = Not analyzed

For RCL 8020C&T

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

A N A L Y T I C A L R E P O R T

Prepared for:

The Earth Technology Corporation
2030 Addison Street
Suite 500
Berkeley, CA 94704

Date: 16-OCT-95
Lab Job Number: 122991
Project ID: 687157.00
Location: Mill Springs

Reviewed by: _____

Reviewed by: _____

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 122991
CLIENT: THE EARTH TECHNOLOGY CORPORATION
PROJECT ID: 687157.00
LOCATION: MILL SPRINGS

DATE SAMPLED: 10/11/95
DATE RECEIVED: 10/11/95
DATE ANALYZED: 10/14/95
DATE REPORTED: 10/16/95
BATCH NO: 23846

Total Volatile Hydrocarbons with BTXE in Aqueous Solution
TVH by California DOHS Method/LUFT Manual October 1989
MTBE & BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)	MTBE (ug/L)
123001-003	MSP-GW3	82,000	12,000	19,000	2,700	12,000	18,000*
METHOD BLANK	N/A	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(2.0)

* Result obtained from a 1:100 dilution analyzed on 10/16/95
  QC BATCH: 23860

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY: BS/BSD

RPD, %	1
RECOVERY, %	91

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 122991
CLIENT: THE EARTH TECHNOLOGY CORPORATION
PROJECT ID: 687157.00
LOCATION: MILL SPRINGS

DATE SAMPLED: 10/11/95
DATE RECEIVED: 10/11/95
DATE ANALYZED: 10/13/95
DATE REPORTED: 10/16/95
BATCH NO: 23815

Total Volatile Hydrocarbons with BTXE in Aqueous Solution
TVH by California DOHS Method/LUFT Manual October 1989
MTBE & BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)	MTBE (ug/L)
123001-001	MSP-GW1	280	60	ND(0.5)	ND(0.5)	1.5	ND(2.0)
123001-002	MSP-GW2	94	1.7	ND(0.5)	ND(0.5)	ND(0.5)	ND(2.0)
123001-004	MSP-GW4	4,300*	33	ND(0.5)	2.5	4.5	ND(2.0)
METHOD BLANK	N/A	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(2.0)

* Result obtained from a 1:2 dilution analyzed on 10/14/95
QC BATCH: 23846.

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY: BS/BSD

RPD, %	3
RECOVERY, %	95

The Earth Technology Corporation

Chain of Custody Record

Lab job no.:

Date 10/11/95

Page 1 of 1

Laboratory Curtis & Tompkins
Address Berkeley, CA
Client Earth Tech
Address 2030 Addison St., #500
Berkeley, CA 94704
Project Name Mill Springs
Project Number 687157.02

Method of Shipment lab drop-off
Shipment No.
Airbill No.
Cooler No.
Project Manager Mark Milani
Telephone No. 510/540-6954
Fax. No. 510/540-7496
Samplers: (Signature)

Field Sample Number	Location/ Depth	Date	Time	Sample Type	Type/Size of Container	Preservation Temp.	Preservation Chemical	Filtered Y/	No. of Containers	TVH/BTEX/MTBE	Analysis Required	Remarks
MSP-GW1	35'	10/11/95	0900	water	40 ml VOA	4°C	HCl		3	X		
MSP-GW2	35'	"	1015	"	"	4°C	"		3	X		
MSP-GW3	35'	"	1145	"	"	4°C	"		3	X		
MSP-GW4	35'	"	1400	"	"	4°C	"		3	X		See comments below
						4°C						
						4°C						
						4°C						
						4°C						
						4°C						
						4°C						
						4°C						
						4°C						

Relinquished by:	Date	Received by:	Date	Relinquished by:	Date	Received by:	Date
Signature	10/11/95	Signature	10/11/95	Signature		Signature	
Printed Tan Dinh	Time 1520	Printed J. Williams	Time 3:20	Printed	Time	Printed	Time
Company EARTH TECH		Company CIT		Company		Company	
Reason lab drop-off				Reason			

Comments: 48-hr Turnaround time

Relinquished by:	Date	Received by:	Date
Signature		Signature	
Printed	Time	Printed	Time
Company		Company	
Reason			

DISTRIBUTION: White to Laboratory, Canary to Earth Technology Project File, Pink to Courier, Golden to Field File

F-1000
10/25/92

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

A N A L Y T I C A L R E P O R T

Prepared for:

The Earth Technology Corporation
2030 Addison Street
Suite 500
Berkeley, CA 94704

Date: 16-OCT-95
Lab Job Number: 123001
Project ID: 687157.08
Location: Mill Springs

Reviewed by: _____

Reviewed by: _____

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 123001
CLIENT: THE EARTH TECHNOLOGY CORPORATION
PROJECT ID: 687157.08
LOCATION: MILL SPRINGS

DATE SAMPLED: 10/12/95
DATE RECEIVED: 10/12/95
DATE ANALYZED: 10/16/95
DATE REPORTED: 10/16/95
BATCH NO: 23860

Total Volatile Hydrocarbons with BTXE in Aqueous Solution
TVH by California DOHS Method/LUFT Manual October 1989
MTBE & BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)	MTBE (ug/L)
123001-001	MSP-MW5-GRAB	250,000*	42,000	120,000	23,000	120,000	110,000
METHOD BLANK	N/A	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(2.0)

* Result obtained from a 1:600 dilution analyzed on 10/14/95
  QC BATCH: 23846.

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY: BS/BSD

RPD, %	3
RECOVERY, %	100

The Earth Technology Corporation

Chain of Custody Record

Lab job no.: _____
Date 10/12/95
Page 1 of 1

Laboratory Curtis & Tompkins
Address Berkeley, CA
Client Earth Tech
Address 2030 Addison St., #500
Berkeley, CA 94704
Project Name Mill Springs
Project Number 68715.08

Method of Shipment drop-off
Shipment No. _____
Airbill No. _____
Cooler No. _____
Project Manager Mark Milani
Telephone No. 510/540-6954
Fax. No. 510/540-7496
Samplers: (Signature) T. Dinh

Field Sample Number	Location/ Depth	Date	Time	Sample Type	Type/Size of Container	Preservation Temp.	Preservation Chemical	Filtered Y	No. of Containers	TVH/BTEX/MTBE	Analysis Required	Remarks
MSP-MW5-GRAB	35'	10/12/95	0915	water	40ml VOA	4°C	HCL	-	3	✓		see note below
						4°C						
						4°C						
						4°C						
						4°C						
						4°C						
						4°C						
						4°C						
						4°C						
						4°C						
						4°C						
						4°C						

Relinquished by: Signature T. Dinh; Printed Tan Dinh; Company Earth Tech; Reason lab drop off — Date 10/12/95; Time 1048

Received by: Signature J. Wilson; Printed J. Wilson; Company Cit — Date 10/12/95; Time 10:40

Relinquished by: Signature _____; Printed _____; Company _____; Reason _____ — Date _____; Time _____

Received by: Signature _____; Printed _____; Company _____ — Date _____; Time _____

Comments: note: 48 hr TaT

Relinquished by: Signature _____; Printed _____; Company _____; Reason _____ — Date _____; Time _____

Received by: Signature _____; Printed _____; Company _____ — Date _____; Time _____

DISTRIBUTION: White to Laboratory, Canary to Earth Technology Project File, Pink to Courier, Golden to Field File

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