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

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION (LOP)
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

REMEDIAL ACTION COMPLETION CERTIFICATION

April 14, 1997

Mr. Steve Chrissanthos
1702 Lincoln Ave.
Alameda, CA 94501

Re: The three petroleum underground storage tanks formerly located at Alameda Cellars West, located at 901 Lincoln Avenue, Alameda, CA 94502

STID: 3872

Dear Mr. Chrissanthos,

This letter confirms the completion of a site investigation and remedial action for the underground storage tanks formerly located at the above described location. Thank you for your cooperation throughout this investigation. Your willingness and promptness in responding to our inquiries concerning the former underground storage tanks are greatly appreciated.

Based on information in the above-referenced file and with the provision that the information provided to this agency was accurate and representative of site conditions, no further action related to the underground tank release is required.

This notice is issued pursuant to a regulation contained in Section 2721(e) of Title 23 of the California Code of Regulations.

Please contact our office if you have any questions regarding this matter.

Sincerely,

Mee Ling Tung
Director of Environmental Health Services

c: Acting Chief, Hazardous Materials Division - files
Juliet Shin, ACDEH
Kevin Graves, RWQCB
Lori Casias, SWRCB (w/ enclosure)
Cheryl Gordon, SWRCB Cleanup Fund

01-0040

CASE CLOSURE SUMMARY
Leaking Underground Fuel Storage Tank Program

I. AGENCY INFORMATION Date: 10/28/96

Agency name: Alameda County-HazMat Address: 1131 Harbor Bay Pkwy.
City/State/Zip: Alameda, CA 94502 Phone: (510) 567-6700
Responsible staff person: Juliet Shin Title: Senior HMS

II. CASE INFORMATION

Site facility name: Alameda Cellars West
Site facility address: 901 Lincoln Ave., Alameda, CA 94501
RB LUSTIS Case No: N/A Local Case No./LOP Case No.: 3872
URF filing date: 11/01/95 SWEEPS No: N/A

Responsible Parties:	Addresses:	Phone Numbers:
Mr. Steve Chrissanthos	1702 Lincoln Ave. Alameda, CA 94501	(510) 521-3100

Tank No:	Size in gal.:	Contents:	Closed in-place or removed?:	Date:
1	10,000	gasoline	removed	3/1/90
2	10,000	gasoline	removed	3/1/90
3	2,000	diesel	removed	3/1/90

III. RELEASE AND SITE CHARACTERIZATION INFORMATION

Cause and type of release: Unknown

Site characterization complete? YES

Date approved by oversight agency: October 28, 1996

Monitoring Wells installed? YES Number: Four

Proper screened interval? YES. MW-1 screened from 5- to 15-feet bgs. MW-2 and MW-3 screened from 8- to 18-feet bgs. MW-4 screened from 5- to 20-feet bgs.

Highest GW depth below ground surface: 6.32'bgs Lowest depth: 12.12'bgs

Flow direction: Predominantly to the northwest. Towards the southwest during one quarter of monitoring.

Leaking Underground Fuel Storage Tank Program

Most sensitive current use: Unknown

Are drinking water wells affected? NO Aquifer name: Unknown

Is surface water affected? NO Nearest affected SW name: None

Off-site beneficial use impacts (addresses/locations): None

Report(s) on file? YES Where is report(s) filed? Alameda County
1131 Harbor Bay Pkwy.
Alameda, CA 94502

Treatment and Disposal of Affected Material:

Material	Amount (include units)	Action (Treatment of Disposal w/destination)	Date
Tanks	(Two 10,000-gallon & one 2,000-gallon)	Erickson, Inc. 255 Parr Blvd. Richmond, CA 94801	3/01/90
Rinsate	950 gallons	Refineries Services 13331 North Hwy. 33 Patterson, CA 95363	2/28/90

III. RELEASE AND SITE CHARACTERIZATION INFORMATION (Continued)
Maximum Documented Contaminant Concentrations - - Before and After Cleanup

Contaminant	Soil (ppm) Before[1]	Soil (ppm) After[2]	Water (ppb) Before	Water (ppb) After
TPH (Gas)	710	56	15,000	980
TPH (Diesel)	ND		NA	
Benzene	6.3	1.7	4,400	7.2
Toluene	36	2.0	620	1.1
Xylene	100	6.5	630	5
Ethylbenzene	13	6.4	850	47
Oil & Grease	960		NA	

[1]- These soil concentrations were identified in the tank pit during the tank removal, and were left in place.
[2]- Results of sample collected from Boring B-2, located adjacent to the former tank pit, at 11-feet bgs.

IV. CLOSURE

Does completed corrective action protect existing beneficial uses per the Regional Board Basin Plan? **Undetermined**

Does completed corrective action protect potential beneficial uses per the Regional Board Basin Plan? **Undetermined**

Does corrective action protect public health for current land use? **YES**

Site management requirements: **If land use changes or construction activities, involving excavation, take place at the site in the future, the site owner will be required to notify the local regulatory agency, prepare a Health & Safety plan, and assess any potential risks to human health or the environment based on any new potential exposure pathways.**

Should corrective action be reviewed if land use changes? **YES**

Monitoring wells Decommisioned: **NO Will be decommisioned upon receipt of case closure.**

Number Decommisioned: Number Retained:

List enforcement actions taken: **None**

List enforcement actions rescinded:

V. LOCAL AGENCY REPRESENTATIVE DATA

Name: **Juliet Shin** Title: **Senior HMS**
Signature: Date: 12/4/96

Reviewed by
Name: **Eva Chu** Title: **Hazardous Materials Specialist**
Signature: Date: 12/4/96

Name: **Thomas Peacock** Title: **Supervising HMS**
Signature: Date: 12/4/96

VI. RWQCB NOTIFICATION

Date Submitted to RB: RB Response: Approved
RWQCB Staff Name: **Kevin Graves** Title: Sen. Engineering Asso. Date: 12/6/96

VII. ADDITIONAL COMMENTS, DATA, ETC.

On March 1, 1990, two 10,000-gallon gasoline underground storage tanks (USTs) (Tanks B & C) and one 2,000-gallon diesel UST (Tank A) were removed from the above site. No holes were noted in any of the USTs. Two soil

samples were collected from beneath each end of each of the USTs. Soil samples collected from Tank pits B and C were collected from a depth of approximately 10 feet below ground surface (bgs). Soil samples collected from Tank pit A were collected from approximately 8.5 feet bgs (refer to attached figure with sample locations and results).

Soil samples collected from Tank pits B and C were analyzed for Total Petroleum Hydrocarbons as gasoline (TPHg) and benzene, toluene, ethylbenzene, and xylenes (BTEX). Soil samples collected from Tank pit A were analyzed for TPHg, TPHd, and BTEX. Stockpiled soil sample analysis included Oil & Grease. Analysis of soil samples collected from beneath the USTs identified TPHg at 540 parts per million (ppm) and 6.3 ppm benzene from the west end of Tank C, and 710 ppm TPHg and 1.8 ppm benzene from the west end of Tank B. Oil & Grease was identified in a stockpile soil sample at 960 ppm.

Four borings were drilled at the site on December 4, 1992 (B-1 through B-4). A minimum of two soil samples were collected from each boring for analysis. Samples were analyzed for TPHg and BTEX. Only 55.96 ppm TPHg, 1.7 ppm benzene, 2.0 ppm toluene, 6.5 ppm ethylbenzene, and 6.4 ppm xylenes were identified from a soil sample collected from boring B-2 at 11 feet below ground surface (bgs)(refer to attached figure for sample locations and corresponding table for sample results).

Borings B-1, B-2, and B-3 were converted into monitoring wells MW-3, MW-1, and MW-2. Well MW-1 is screened from 5- to 15-feet bgs, and Wells MW-2 and MW-3 are screened from 8- to 18-feet bgs. According to the boring logs, fine grain sand, Merritt Sand formation, was identified down to the bottom of the borings in all three wells.

On February 24, 1993, three borings were emplaced in the vicinity of Well MW-1 (S-1 through S-3) to determine the extent of soil contamination observed on the west end of the former tank excavation (refer to attached figure for sample locations). Two soil samples were collected from each boring at 5- and 10-feet bgs, and four soil samples were also collected from the stockpiled soil resulting from the tank removal. These samples were analyzed for TPHg and BTEX. No contaminants were identified above detection limits (refer to attached table for sample results).

An additional well, MW-4, was installed downgradient of MW-1 on October 6, 1993 (refer to attached figure). Two soil samples were collected during the drilling of this well at 11-feet bgs (capillary fringe) and 13-feet bgs (saturated zone). These samples were analyzed for TPHg and BTEX and no contaminants were identified above detection limits. Merritt Sand was observed throughout the whole length of this boring as well.

Wells MW-1 through MW-3 were sampled for 14 consecutive quarters, and Well MW-4 was sampled for 10 consecutive quarters. During this period,

contaminants were only identified in Well MW-1, which is located closest to the former UST. The highest contaminant concentrations appear to be correlated with the quarters where the water table is deeper (i.e., between 10- and 12-feet bgs). Although elevated levels of contaminants have been identified in Well MW-1, the concentrations of TPHg and benzene have significantly attenuated since groundwater sampling was initiated in December 1992. Additionally, the analysis for bio-indicator parameters (i.e., DO, nitrates, sulfates, etc.) in September 1996 indicate that active anaerobic degradation is taking place within the contaminant plume.

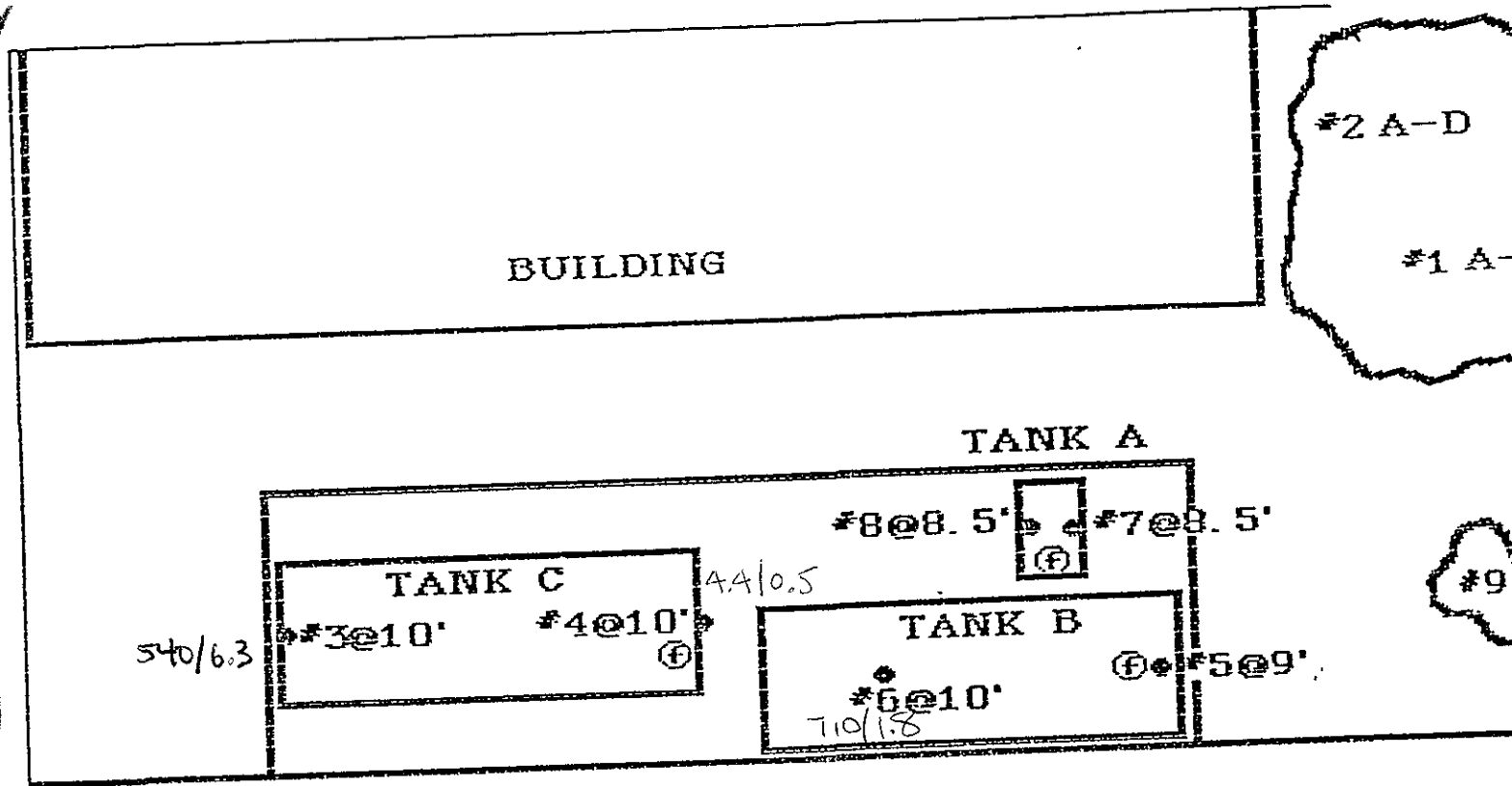
In summary, this office is recommending this site for closure based on the following:

- The groundwater contaminant plume does not appear to be migrating based on the fact that no contaminants have ever been identified in Well MW-4, which is located ~50 to 60 feet downgradient of the former underground storage tank;

- The contaminant concentrations in the plume have significantly attenuated throughout 14 consecutive groundwater monitoring events, and the bio-indicator parameter concentrations indicate that there is active anaerobic degradation taking place, based on the Non Detect levels of nitrates and low sulfate levels within the contaminant plume, and higher nitrate and sulfate levels outside of the plume.

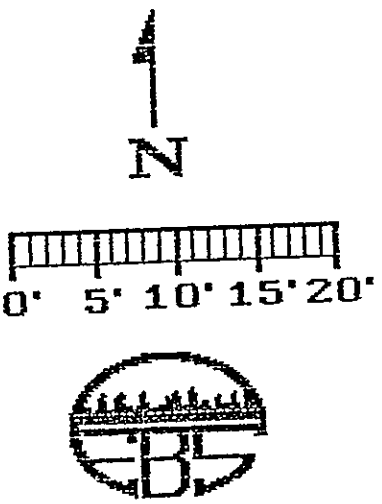
- During the tank removal, soil samples collected from the excavation identified 6.3ppm and 1.8ppm benzene along the south and west end of the tank pit. Additionally, during the installation of Well MW-1, 1.6ppm benzene was identified at 11-feet bgs. Although these levels exceed the 10-5 risk threshold values given for a commercial site in the Tier 1 table of the American Society for Testing and Materials' Risk Based Corrective Action guidelines (ASTM RBCA) for the Soil to Vapor Intrusion into Buildings pathway, these samples were collected over 20-feet away from the site's building and this soil contamination appears to be very limited in extent based on the Non Detect results of soil samples collected from borings S-1 and S-2.

- The site is currently used for commercial purposes. Based on the current groundwater contaminant concentrations and the Tier 1 table of ASTM RBCA, the groundwater contamination does not appear to be posing a risk to human health or the environment for a 10^{-5} risk.



ppm TPH-G / benzene

ZACCOR CORP. @
ALAMEDA
CELLARS
901 LINCOLN AVE
ALAMEDA, CA
3/1/90



MOBILE CHEM LABS INC.

1678 Reliez Valley Road
Lafayette, CA 94549 • (415) 945-1266

Environmental Bio-Systems
30028 Industrial Pkway. S.W.
Hayward, CA 94544-6904
Attn: Timothy Babcock
Environmental Scientist

Date Sampled: 03-01-90
Date Received:03-01-90
Date Reported:03-01-90

Sample Number	Sample Description
V003001	Alemeda Cellars - Alemeda 901 Lincoln Ave. Comp # 1 A-D SOIL

ANALYSIS

	Detection Limit	Sample Results
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	63
Benzene	0.1	0.2
Toluene	0.1	0.2
Xylenes	0.1	2.8
Ethylbenzene	0.1	0.3

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 8020 used for BTX distinction.

MOBILE CHEM LABS

Joyce A VanDebogart

for Ronald G. Evans
Lab Director

MOBILE CHEM LABS INC.

1678 Reliez Valley Road
Lafayette, CA 94549 • (415) 945-1266

Environmental Bio-Systems
30028 Industrial Pkway. S.W.
Hayward, CA 94544-6904
Attn: Timothy Babcock
Environmental Scientist

Date Sampled: 03-01-90
Date Received:03-01-90
Date Reported:03-01-90

Sample Number	Sample Description
V003002	Alemeda Cellars - Alemeda 901 Lincoln Ave. Comp # 2 A-D SOIL

ANALYSIS

	Detection Limit	Sample Results
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	12
Benzene	0.1	0.2
Toluene	0.1	0.3
Xylenes	0.1	1.0
Ethylbenzene	0.1	0.1

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 8020 used for BTX distinction.

MOBILE CHEM LABS

Ronald G. Evans
Lab Director

MOBILE CHEM LABS INC.

1678 Reliez Valley Road
Lafayette, CA 94549 • (415) 945-1266

Environmental Bio-Systems
30028 Industrial Pkway. S.W.
Hayward, CA 94544-6904
Attn: Timothy Babcock
Environmental Scientist

Date Sampled: 03-01-90
Date Received:03-01-90
Date Reported:03-01-90

Sample Number	Sample Description
V003003	Alemeda Cellars - Alemeda 901 Lincoln Ave. # 3 SOIL

ANALYSIS

	Detection Limit	Sample Results
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	540
Benzene	0.1	6.3
Toluene	0.1	0.4
Xylenes	0.1	42
Ethylbenzene	0.1	5.1

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 8020 used for BTX distinction.

MOBILE CHEM LABS

Joyce A V Dishaneau

Ronald G. Evans
Lab Director

MOBILE CHEM LABS INC.

1678 Reliez Valley Road
Lafayette, CA 94549 • (415) 945-1266

Environmental Bio-Systems
30028 Industrial Pkway. S.W.
Hayward, CA 94544-6904
Attn: Timothy Babcock
Environmental Scientist

Date Sampled: 03-01-90
Date Received:03-01-90
Date Reported:03-01-90

Sample Number	Sample Description
V003004	Alemeda Cellars - Alemeda 901 Lincoln Ave. # 4 SOIL

ANALYSIS

	Detection Limit	Sample Results
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	4.4
Benzene	0.1	0.5
Toluene	0.1	0.8
Xylenes	0.1	0.6
Ethylbenzene	0.1	0.1

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 8020 used for BTX distinction.

MOBILE CHEM LABS

Joyce M Diskerud

Ronald G. Evans
Lab Director

MOBILE CHEM LABS INC.

1678 Reliez Valley Road
Lafayette, CA 94549 • (415) 945-1266

Environmental Bio-Systems
30028 Industrial Pkway. S.W.
Hayward, CA 94544-6904
Attn: Timothy Babcock
Environmental Scientist

Date Sampled: 03-01-90
Date Received: 03-01-90
Date Reported: 03-01-90

Sample Number	Sample Description
V003005	Alemeda Cellars - Alemeda 901 Lincoln Ave. # 5 SOIL

ANALYSIS

	Detection Limit	Sample Results
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.1	0.2
Toluene	0.1	<0.1
Xylenes	0.1	0.2
Ethylbenzene	0.1	<0.1

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 8020 used for BTX distinction.

MOBILE CHEM LABS

Joyce A V Dishmeau

for Ronald G. Evans
Lab Director

MOBILE CHEM LABS INC.

1678 Reliez Valley Road
Lafayette, CA 94549 • (415) 945-1266

Environmental Bio-Systems
30028 Industrial Pkway. S.W.
Hayward. CA 94544-6904
Attn: Timothy Babcock
Environmental Scientist

Date Sampled: 03-01-90
Date Received:03-01-90
Date Reported:03-02-90

Sample Number	Sample Description
V003006	Alemeda Cellars - Alemeda 901 Lincoln Ave. # 6 SOIL

ANALYSIS

	Detection Limit	Sample Results
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	710
Benzene	0.1	1.8
Toluene	0.1	36
Xylenes	0.1	100
Ethylbenzene	0.1	13

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 8020 used for BTX distinction.

MOBILE CHEM LABS

Ronald G. Evans
Lab Director

MOBILE CHEM LABS INC.

1678 Reliez Valley Road
Lafayette, CA 94549 • (415) 945-1266

Environmental Bio-Systems
30028 Industrial Pkway. S.W.
Hayward, CA 94544-6904
Attn: Timothy Babcock
Environmental Scientist

Date Sampled:03-01-90
Date Received:03-01-90
Date Reported:03-02-90

Sample Number	Sample Description	Detection Limit	SOIL Total Petroleum Hydrocarbons as Diesel
		ppm	ppm
	Alemeda Cellars - Alemeda 901 Lincoln Ave.		
V030007	# 7	5	<5
V030008	# 8	5	<5

Note: Analysis was performed using EPA methods 3550 and TPH LUFT

MOBILE CHEM LABS

Ronald G. Evans
Lab Director

MOBILE CHEM LABS INC.

1678 Reliez Valley Road
Lafayette, CA 94549 • (415) 945-1266

Environmental Bio-Systems
30028 Industrial Pkway. S.W.
Hayward, CA 94544-6904
Attn: Timothy Babcock
Environmental Scientist

Date Sampled: 03-01-90
Date Received: 03-01-90
Date Reported: 03-02-90

Sample Number	Sample Description
V003008	Alemeda Cellars - Alemeda 901 Lincoln Ave. # 8 SOIL

ANALYSIS

	Detection Limit	Sample Results
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.1	0.2
Toluene	0.1	<0.1
Xylenes	0.1	0.1
Ethylbenzene	0.1	<0.1

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 8020 used for BTX distinction.

MOBILE CHEM LABS

Joyce A Dishman

Ronald G. Evans
Lab Director

MOBILE CHEM LABS INC.

1678 Reliez Valley Road
Lafayette, CA 94549 • (415) 945-1266

Environmental Bio-Systems
30028 Industrial Pkway. S.W.
Hayward, CA 94544-6904
Attn: Timothy Babcock
Environmental Scientist

Date Sampled:03-01-90
Date Received:03-01-90
Date Reported:03-02-90

SOIL → Stockpiled

Sample Number	Sample Description	Detection Limit	Total Recoverable Hydrocarbons as Oil & Grease by I.R.
		ppm	ppm
	Alemeda Cellars - Alemeda 901 Lincoln Ave.		
V030013	# 9	50	960

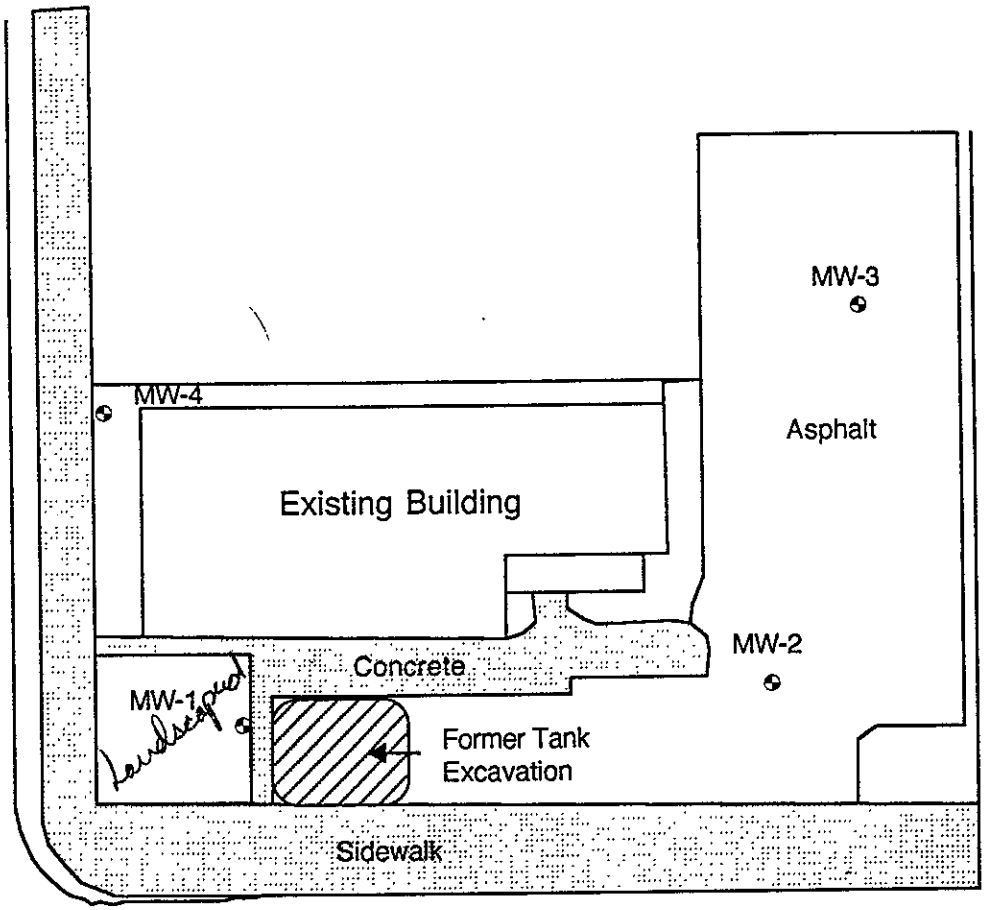
Note: EPA 3550 / 418.1 Total Petroleum Hydrocarbons by Infrared Spectrophotometry. Sonication extraction in Trichlorotrifluoroethane with Silica Gel Clean-Up followed by determination using infrared spectrophotometry

MOBILE CHEM LABS

Joyce A W Dickman

Ronald G. Evans
Lab Director

NINTH STREET



LINCOLN AVENUE

Title: Site Plan 901 Lincoln Avenue Alameda, California	
Figure Number: 2.0	Scale: 1"=30'
Drawn By: JVC	Date: 8/23/95
Project Number: 6039-2b	N / W / E / S
ACC Environmental Consultants 7977 Capwell Drive, Suite 100 Oakland, CA 94621 (510) 638-8400 Fax: (510) 638-8404	

A report by the Alameda County Flood Control and Water Conservation District Geohydrology and Groundwater - Quality Overview, East Bay Plain Area, Alameda County, California, 205 (J) Report, June 1988, describes the Merritt Sand as consisting of loose well-sorted, fine to medium grained sand and silt, with lenses of sandy clay and clay. The sand was a wind and water deposited beach and near-shore deposit and is exposed only in the Alameda and Oakland areas.

Groundwater was encountered at approximately 14 feet bgs during drilling. Borings B-1 and B-3 were drilled to approximately 18 feet bgs. Borings B-2 and B-4 were drilled to approximately 15 feet bgs. Monitoring wells MW-3, MW-1 and MW-3 were completed at the drilled depths within borings B-1, B-2 and B-3, respectively.

An HNu photoionization detector (PID) was used during drilling and sampling procedures to detect field evidence of volatile hydrocarbons in the soil. Up to 300 ppm of volatile hydrocarbons was detected in the soil from 8 to 13 feet bgs in the boring B-2. This layer was also observed to be discolored. No field evidence of volatile organics was detected from the other borings.

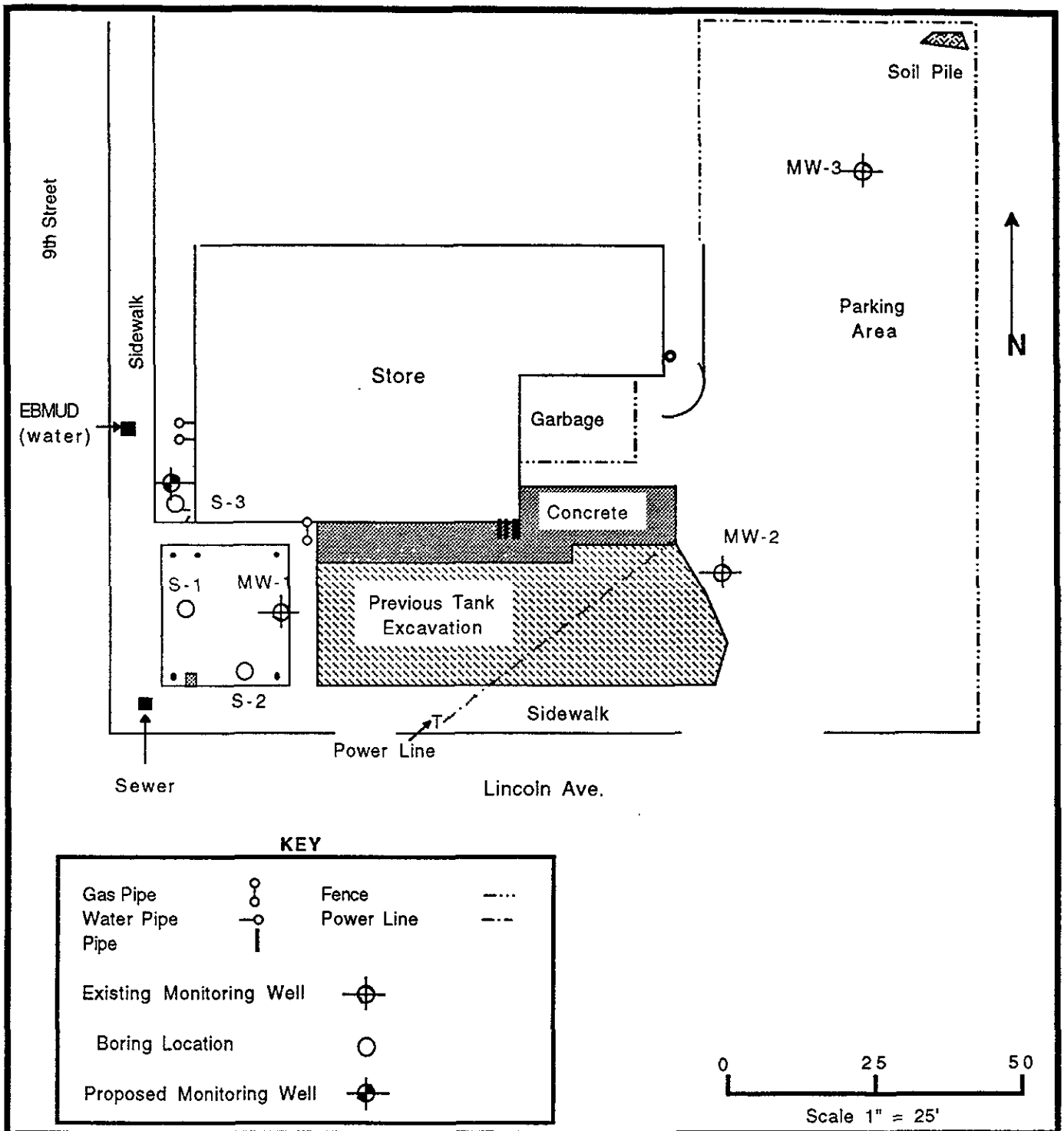
4.2 Analytical Results - Soil

Analysis of soil collected from eleven feet bgs from boring B-2 indicated elevated levels of Total Petroleum Hydrocarbons (TPH) as gasoline with BTEX. Analysis of soil from borings B-1, B-3 and B-4 indicated below detectable levels of TPH as gasoline with BTEX. Levels of TPH as gasoline with BTEX found from each sample are illustrated below.

TABLE 2
Analytical Results - Soil

Boring	Sample Number	Depth (feet)	TPH-gasoline (mg/Kg)	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethylbenzene (mg/Kg)	Xylenes (mg/Kg)
B-1	B1-11	11	<0.05	<0.0005	<0.0005	<0.0005	<0.0005
(MW-3)	B1-16	16	<0.05	<0.0005	<0.0005	<0.0005	<0.0005
B-2	B2-6	6	<0.05	<0.0005	<0.0005	<0.0005	<0.0005
(MW-1)	B2-11	11	55.96	1.6529	2.0016	6.5195	6.4000
	B2-16	16	<0.05	<0.0005	<0.0005	<0.0005	<0.0005
B-3	B3-6	6	<0.05	<0.0005	<0.0005	<0.0005	<0.0005
(MW-2)	B3-11	11	<0.05	<0.0005	<0.0005	<0.0005	<0.0005
B-4	B4-6	6	<0.05	<0.0005	<0.0005	<0.0005	<0.0005
	B4-11	11	<0.05	<0.0005	<0.0005	<0.0005	<0.0005

Notes: mg/Kg = parts per million (ppm)



ACC Environmental Consultants, Inc. 1000 Atlantic Avenue, Suite 110 Alameda, California 94501		Site Map 901 Lincoln Ave. Alameda, California	
Project No. 6039-2b	Date: 9/8/93	Dn by: MCK	Figure 2

CHROMALAB, INC.

Environmental Laboratory (1094)

5 DAYS TURNAROUND

March 2, 1993

ChromaLab File No.: 0293238

ACC ENVIRONMENTAL CONSULTANTS

Attn: Misty Kaltreider

RE: Seven soil samples for Gasoline and BTEX analysis

Project Name: 901 LINCOLN
Project Number: 6039-2a
Date Sampled: Feb. 24, 1993
Date Submitted: Feb. 25, 1993
Date Analyzed: Feb. 26, 1993

RESULTS:

Sample I.D.	Gasoline (mg/Kg)	Benzene (µg/Kg)	Toluene (µg/Kg)	Ethyl Benzene (µg/Kg)	Total Xylenes (µg/Kg)
S1-5	N.D.	N.D.	N.D.	N.D.	N.D.
S1-10	N.D.	N.D.	N.D.	N.D.	N.D.
S2-5	N.D.	N.D.	N.D.	N.D.	N.D.
S2-10	N.D.	N.D.	N.D.	N.D.	N.D.
S3-5	N.D.	N.D.	N.D.	N.D.	N.D.
S3-10	N.D.	N.D.	N.D.	N.D.	N.D.
C-1,C-2,C-3,C-4	N.D.	N.D.	N.D.	N.D.	N.D.
BLANK	N.D.	N.D.	N.D.	N.D.	N.D.
SPIKE RECOVERY	106%	106%	108%	95%	98%
DUP SPIKE RECOVERY	---	106%	113%	99%	98%
DETECTION LIMIT	1.0	5.0	5.0	5.0	5.0
METHOD OF ANALYSIS	5030/8015	8020	8020	8020	8020

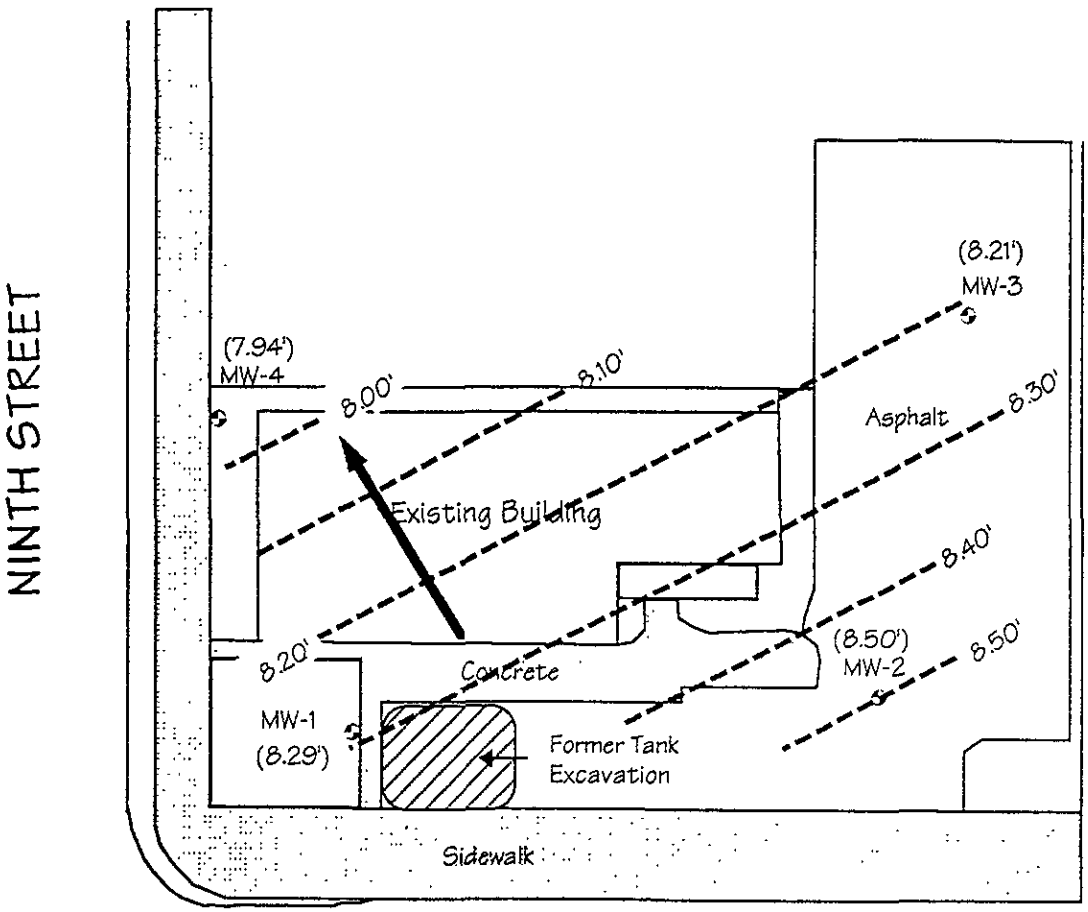
ChromaLab, Inc.

Billy Thach
Analytical Chemist

Eric Tam
Laboratory Director

do

2239 Omega Road,#1 • San Ramon, California 94583
(510) 831-1788 • Facsimile (510) 831-0700



LEGEND

--- 8.30' Groundwater Elevation Contour

Groundwater Flow Direction

Elevations in Feet Above Mean Sea Level
Water Levels Measured on September 6, 1996

Title: Groundwater Gradient 901 Lincoln Avenue Alameda, California	
Figure Number: 3	Scale: 1"=30'
Drawn By: EFC	Date: 4/1//96
Project Number: 6039-1.6	N / W E / S

ACC Environmental Consultants
7977 Capwell Drive, Suite 100
Oakland, CA 94621
(510) 638-8400 Fax: (510) 638-8404

Well No. Well Elevation	Sample Date	Depth to Groundwater (feet)	Groundwater Elevation (MSL)
MW-3 19.35	12/15/92	10.44	8.91
	01/06/93	8.91	10.44
	02/09/93	7.26	12.09
	03/20/93	7.16	12.19
	04/08/93	7.49	11.86
	05/17/93	9.01	10.34
	06/23/93	10.22	9.13
	07/13/93	10.58	8.77
	08/10/93	11.12	8.23
	09/10/93	11.68	7.67
	10/25/93	11.98	7.37
	11/12/93	12.12	7.23
	02/16/94	9.18	10.17
	03/10/94	8.32	10.83
	05/16/94	10.28	9.07
	08/29/94	11.77	7.58
	02/15/95	6.87	12.50
	08/28/95	10.27	9.08
	02/23/96	6.93	12.42
	09/06/96	11.14	8.21
MW-4 18.51	08/23/93	10.27	9.08
	10/25/93	11.43	7.08
	11/12/93	11.59	6.92
	02/16/94	7.80	10.71
	03/10/94	8.36	10.15
	05/16/94	9.66	8.85
	08/29/94	11.11	7.40
	02/15/95	6.75	11.76
	08/28/95	9.95	8.56
	02/23/96	6.75	11.76
	09/06/96	10.57	7.94

Notes: All measurements in feet
MSL = Mean sea level

In addition, groundwater monitoring was performed before, during, and after purging to evaluate the groundwater for intrinsic parameters of biodegradation. Monitoring included measuring for temperature and DO with the use of a Horiba® U-10 meter and continuous flow cell and conductivity and pH with the use of a Hydac® meter. In addition, samples were collected for analysis of nitrate, sulfate, total iron, soluble iron, and TDS. The parameter results are summarized in Table 2. Only wells MW-1, MW-2, and MW-4 were measured. Well MW-3 has historically been clean, and was not monitored for this study.

TABLE 1 - GROUNDWATER DEPTH INFORMATION

Well No. Well Elevation	Sample Date	Depth to Groundwater (feet)	Groundwater Elevation (MSL)
MW-1	12/15/92	10.27	8.72
18.99	01/06/93	8.67	10.32
	02/09/93	6.67	12.01
	03/20/93	6.94	12.05
	04/08/93	7.25	11.74
	05/17/93	8.67	10.32
	06/23/93	9.58	9.41
	07/13/93	10.21	8.78
	08/10/93	10.78	8.21
	09/10/93	11.21	7.78
	10/25/93	11.58	7.41
	11/12/93	11.74	7.25
	02/16/94	8.94	10.05
	03/10/94	8.71	10.32
	05/16/94	9.76	9.23
	08/29/94	11.28	7.71
	02/15/95	6.76	12.23
	08/28/95	10.03	8.96
	02/23/96	6.81	12.18
	09/06/96	10.70	8.29
MW-2	12/15/92	10.14	8.89
19.03	01/06/93	8.50	10.53
	02/09/93	6.66	12.37
	03/20/93	6.53	12.50
	04/08/93	6.83	12.20
	05/17/93	8.34	10.69
	06/23/93	9.36	9.67
	07/13/93	9.99	9.04
	08/10/93	10.54	8.49
	09/10/93	11.08	7.95
	10/25/93	11.41	7.62
	11/12/93	11.58	7.45
	02/16/94	8.71	10.32
	03/10/94	7.93	11.10
	05/16/94	9.58	9.45
	08/29/94	11.16	7.87
	02/15/95	6.32	12.71
	08/28/95	9.75	9.28
	02/23/96	6.37	12.66
	09/06/96	10.53	8.50

TABLE 4 - GROUNDWATER SAMPLE ANALYTICAL RESULTS

Well No.	Date Sampled	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
MW-1	12/15/92	<50	<0.5	<0.5	<0.5	<0.5
	03/10/93	100	0.86	<0.5	<0.5	6.3
	06/23/93	6,800	2,500	1,100	100	560
	09/10/93	15,000	4.400	620	850	630
	10/25/93	----	----	----	----	----
	11/12/93	5,400	1,900	1.1	700	20
	02/16/94	69	1.5	<0.5	<0.5	3.1
	03/10/94	----	----	----	----	----
	05/16/94	520	14	1.1	9.0	8.9
	08/29/94	500	12	1.3	2.2	4.6
	02/15/95	80	1.9	<0.5	<0.5	3.6
	08/28/95	2,400	650	7.4	68	19
	02/23/96	100	7.4	<0.5	<0.5	4.3
	09/06/96	980	7.2	1.1	47	~~<0.5~~ 5
MW-2	12/15/92	<50	<0.5	<0.5	<0.5	<0.5
	03/10/93	<50	<0.5	<0.5	<0.5	<0.5
	06/23/93	<50	<0.5	<0.5	<0.5	<0.5
	09/10/93	<50	<0.5	<0.5	<0.5	<0.5
	10/25/93	----	----	----	----	----
	11/12/93	<50	<0.5	<0.5	<0.5	<0.5
	02/16/94	----	----	----	----	----
	03/10/94	----	----	----	----	----
	05/16/94	----	----	----	----	----
	08/29/94	----	----	----	----	----
	02/15/95	----	----	----	----	----
	08/28/95	----	----	----	----	----
	02/23/96	----	----	----	----	----
	09/06/96	----	----	----	----	----

Well No.	Date Sampled	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
MW-3	12/15/92	<50	<0.5	<0.5	<0.5	<0.5
	03/10/93	<50	<0.5	<0.5	<0.5	<0.5
	06/23/93	<50	<0.5	<0.5	<0.5	<0.5
	09/10/93	<50	<0.5	<0.5	<0.5	<0.5
	10/25/93	----	----	----	----	----
	11/12/93	<50	<0.5	<0.5	<0.5	<0.5
	02/16/94	----	----	----	----	----
	03/10/94	----	----	----	----	----
	05/16/94	----	----	----	----	----
	08/29/94	----	----	----	----	----
	02/15/95	----	----	----	----	----
	08/28/95	----	----	----	----	----
	02/23/96	----	----	----	----	----
	09/06/96	----	----	----	----	----
MW-4	10/25/93	<50	<0.5	<0.5	<0.5	<0.5
	11/12/93	<50	<0.5	<0.5	<0.5	<0.5
	02/16/94	<50	<0.5	<0.5	<0.5	<0.5
	03/10/94	<50	<0.5	<0.5	<0.5	<0.5
	05/16/94	<50	<0.5	<0.5	<0.5	<0.5
	08/29/94	<50	<0.5	<0.5	<0.5	<0.5
	02/15/95	<50	<0.5	<0.5	<0.5	<0.5
	08/28/95	<50	<0.5	<0.5	<0.5	<0.5
	02/23/96	<50	<0.5	<0.5	<0.5	<0.5
	09/06/96	<50	<0.5	<0.5	<0.5	<0.5

Notes: µg/L = micrograms per liter (ppb)

5.0 DISCUSSION

Laboratory analysis of groundwater samples collected from monitoring well MW-1 indicated detectable concentrations of TPHg, benzene, toluene, and ethylbenzene. No concentrations above reporting limits were detected in the groundwater sample collected from monitoring well MW-4, indicating a downgradient extent of petroleum hydrocarbons. Concentrations of TPHg reported in monitoring well MW-1 rose with respect to TPHg concentrations detected in April 1996. This possibly indicates that remnant impact in soil is deeper than groundwater (the tank bottom was between 10 and 12 feet below ground surface [bgs]); therefore, when groundwater is deeper (i.e., between 10 and 12 feet bgs) constituents migrate through the groundwater whereas at higher levels, more groundwater is present and more dilution is occurring.

makes sense when comparing depth to water w/ historic concentrations

historic

TABLE 2 - MONITORING PARAMETERS

Well No.- Gallons Removed	pH	Temp (°C)	Conductivity (µn/cm)	DO (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Total Iron (mg/L)	Soluble Iron (mg/L)	TDS (mg/L)
MW-1 - 0	6.36	23.3	0.750	1.57	---	---	---	---	---
1	6.38	22.7	0.750	1.87	---	---	---	---	---
1.5	6.40	22.5	0.762	1.87	---	---	---	---	---
2.5	6.38	22.2	0.761	1.84	<0.05	13	14	0.22	430
MW-2- 0	6.40	24.0	0.254	---	---	---	---	---	---
1.8	6.33	23.2	0.263	---	---	---	---	---	---
2.7	6.31	23.1	0.257	---	---	---	---	---	---
4.5	6.36	22.9	0.248	---	4.7	25	15	0.19	140
MW-4 - 0	7.22	21.6	0.818	1.87	---	---	---	---	---
2.8	6.55	20.7	0.831	1.83	---	---	---	---	---
4.2	6.52	20.5	0.805	1.68	---	---	---	---	---
5.6	6.48	20.4	0.801	1.73	~~<0.05~~ 1.1	26	94	0.15	390

Notes: mg/L = milligrams per liter, equivalent to parts per million

3.2 Groundwater Gradient

Groundwater levels were measured from the four existing monitoring wells on September 6, 1996, and were used to calculate groundwater elevation (Figure 3). The gradient was evaluated by triangulation using the elevation of the potentiometric surface measured with respect to MSL data. Based on groundwater elevation calculations, groundwater flow direction is toward the northwest at an average gradient of 0.006 foot/foot. The groundwater flow direction is consistent with previous sampling events since 1993. Table 3 summarizes the current and historic groundwater gradient and direction of groundwater flow on site.

TABLE 3 - HISTORICAL GROUNDWATER GRADIENT

Date Monitored	Gradient (foot/foot)	Direction
12/15/92	0.002	west-southwest
01/06/93	0.004	northwest
02/09/93	0.008	northwest
03/10/93	0.009	northwest
04/08/93	0.011	northwest
05/17/93	0.008	northwest
06/23/93	0.008	north-northwest
07/13/93	0.006	northwest
08/10/93	0.006	northwest
09/10/93	0.006	northwest
10/25/93	0.007	northwest