

ENGEO INCORPORATED

GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS

In Reply
Please Refer to:
3174-F8

January 17, 1996

Mr. Will Macido
Livermore Valley Joint Unified School District
685 East Jack London Boulevard
Livermore, CA 94550

Subject: Maintenance Yard
2900 Ladd Avenue
Livermore, California

REPORT ON GROUND-WATER SAMPLING

Reference: ENGEO Inc., Report on Soil and Ground-Water Investigation, 2900 Ladd Avenue, Livermore, California, dated July 8, 1994.

Dear Mr. Macido:

This report presents the results of the quarterly ground-water sampling episode at the subject property (Figure 1). The scope of services included the following:

- Purging of the three ground-water monitoring wells with the recovery of a ground-water sample from each of the wells.
- Laboratory analysis of the ground-water samples for TPH as gasoline, benzene, toluene, ethyl benzene and xylene (BTEX).
- Preparation of this letter report

Ground-Water Sampling

Field work was conducted on December 29, 1995. The depth to the top of the ground-water was verified and the wells were checked for the presence of free product or petroleum sheen. No free product or sheen was observed. The water levels for MW2, MW3, and MW4 were measured at 20.91, 20.25 and 20.90 feet below the top of the well casing, respectively. The direction of ground-water movement in the wells seems to reverse from the northwest to southeast as the water level becomes shallower in the wells. The calculated reversal in gradient may reflect the measured ground-water level above the top of screen.

Prior to sampling, approximately four casing volumes of water were removed from the wells using a submersible electric pump. Water quality parameters including, temperature, pH, and conductivity

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were monitored to allow for adequate purging. The ground-water samples were collected for laboratory testing using a disposable polyethylene bailer. The samples were then decanted into precleaned laboratory glassware and cooled in an ice chest until delivery under a documented chain-of-custody to Chromalab, Inc. in Pleasanton, California. The well sampling information forms and the chain of custody are provided as attachments.

Laboratory Analysis

The ground-water samples were tested for total petroleum hydrocarbons as gasoline, (EPA 5030/8015) and benzene, toluene, ethylbenzene and xylenes (BTEX - EPA 602). A copy of the laboratory test report is provided as an attachment. Table I provides a summary of the laboratory test results.

TABLE I
 Laboratory Analysis Summary
 (Concentrations reported in parts per billion)

	TPHg	B	T	E	X
MW2					
4/20/93	4,500	340	110	8.0	630
5/12/94	7,000	520	220	35	410
2/8/95	170	8.9	4.5	2.1	17
5/23/95	<50	<0.5	<0.5	<0.5	<0.5
9/20/95	8,400	2,500	1,200	180	940
12/29/95	640	0.7	<0.5	1.9	4.7
MW3					
7/12/94	<50	<0.5	<0.5	<0.5	<0.5
2/8/95	<50	<0.5	<0.5	<0.5	<0.5
5/23/95	<50	<0.5	<0.5	<0.5	<0.5
9/20/95	<50	1.4	<0.5	<0.5	<0.5
12/29/95	50	1.8	<0.5	<0.5	<0.5
MW4					
7/12/94	<50	<0.5	<0.5	<0.5	<0.5
2/8/95	<50	<0.5	<0.5	<0.5	<0.5
5/23/95	60	<0.5	<0.5	<0.5	<0.5
9/20/95	<50	<0.5	<0.5	<0.5	<0.5
12/29/95	<50	<0.5	<0.5	<0.5	<0.5

Livermore Valley Joint Unified School District
Maintenance Yard, 2900 Ladd Avenue
REPORT ON GROUND-WATER SAMPLING

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Page 3

The next quarterly sampling episode for the three wells is scheduled for March 1996. With your authorization, a copy of this report has been provided to Ms. Eva Chu with the Alameda County Department of Environmental Health. We appreciate the opportunity to be of continued service to you on this project. If you have any questions, please contact our office.

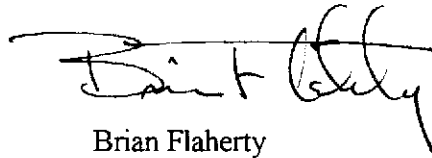
Very truly yours,

ENGEO INCORPORATED

Reviewed by:



Shawn Munger
RG 5810

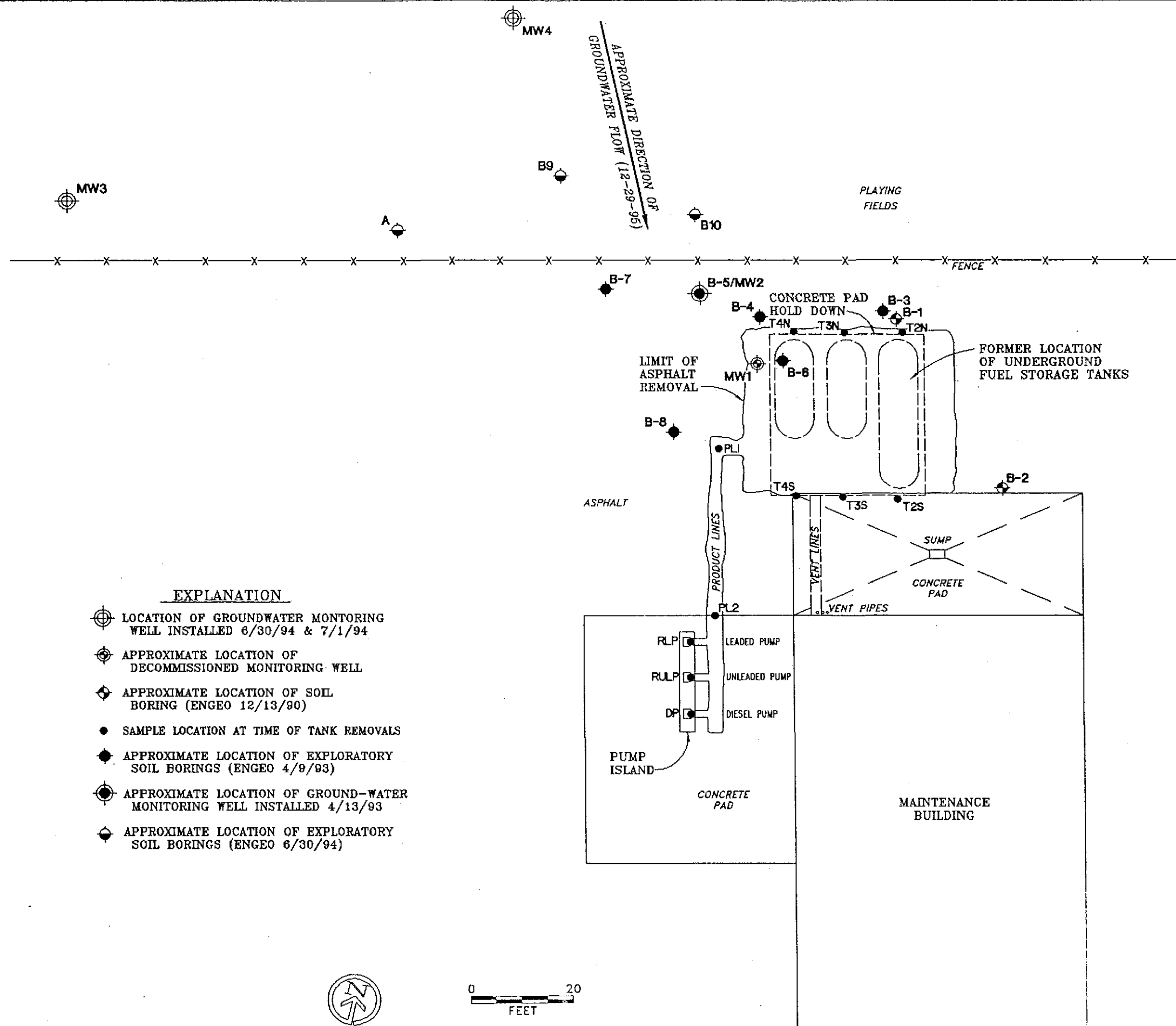


Brian Flaherty
Vice President
Director, Environmental Services

sm/ree:jan2.gwm

cc: 1 - Alameda County Department of Environmental Health

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EXPLANATION

- ⊕ LOCATION OF GROUNDWATER MONITORING WELL INSTALLED 6/30/94 & 7/1/94
- ⊙ APPROXIMATE LOCATION OF DECOMMISSIONED MONITORING WELL
- ◆ APPROXIMATE LOCATION OF SOIL BORING (ENGEO 12/13/90)
- SAMPLE LOCATION AT TIME OF TANK REMOVALS
- ◆ APPROXIMATE LOCATION OF EXPLORATORY SOIL BORINGS (ENGEO 4/9/93)
- ⊕ APPROXIMATE LOCATION OF GROUND-WATER MONITORING WELL INSTALLED 4/13/93
- ⊙ APPROXIMATE LOCATION OF EXPLORATORY SOIL BORINGS (ENGEO 6/30/94)

FIGURE NO. **1**
 JOB NO.: 3174-F8
 DATE: JANUARY 1996
 DRAWN BY: [Signature] CHECKED BY: [Signature]

MONITORING WELL LOCATIONS
 L.V.J.U.S.D. MAINTENANCE YARD
 2900 LADD AVENUE
 LIVERMORE, CALIFORNIA

ENGEO
 INCORPORATED

LIST OF ATTACHMENTS

Chromalab, Inc. Report

Chain-of-Custody

Three Ground-Water Sampling Information Forms

ENGEO Incorporated Ground-Water Monitoring Well Data

CHROMALAB, INC.

Environmental Services (SDB)

January 8, 1996

Submission #: 9512381

ENGEO, INC.

Atten: Shawn Munger

Project: 2900 LADD AVE.
Received: December 29, 1995

Project#: 3174-F8

re: 3 samples for Gasoline and BTEX analysis.
Method: EPA 5030/8015M/602/8020

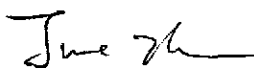
Sampled: December 29, 1995 Matrix: WATER
Run: 9948-2 Analyzed: December 29, 1995

Spl #	Sample ID	Gasoline (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl Benzene (ug/L)	Total Xylenes (ug/L)
115292	MW-2	0.64	0.7	N.D.	1.9	4.7

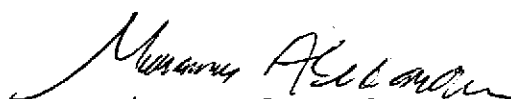
Sampled: December 29, 1995 Matrix: WATER
Run: 9952-4 Analyzed: December 29, 1995

Spl #	Sample ID	Gasoline (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl Benzene (ug/L)	Total Xylenes (ug/L)
115293	MW-3	0.05	1.8	N.D.	N.D.	N.D.
115294	MW-4	N.D.	N.D.	N.D.	N.D.	N.D.

Reporting Limits	0.05	0.5	0.5	0.5	0.5
Blank Result	N.D.	N.D.	N.D.	N.D.	N.D.
Blank Spike Result (%)	110	110	108	108	107



June Zhao
Chemist



Marianne Alexander
Gas/BTEX Supervisor

381/115292-294

CHROMALAB, INC.

Environmental Services (SDB) (DOHS 1094)

SUBM #: 9512381 REP: PM
 CLIENT: ENGEO
 DUE: 01/08/96
 REF #: 25764

25764

Chain of Custody

DATE 12/29/95 PAGE 1 OF 1

					ANALYSIS REPORT																													
PROJ. MGR. <u>Shawn Munger</u> COMPANY <u>ENGEO, Inc</u> ADDRESS <u>2401 Crow Canyon Rd Suite 200</u> <u>San Ramon, CA</u>					TPH - Gasoline (EPA 5030, 8015)	TPH - Gasoline (5030, 8015) w/BTEX (EPA 602, 8020)	TPH - Diesel, TEPH (EPA 3510/3550, 8015)	PURGEABLE AROMATICS BTEX (EPA 602, 8020)	PURGEABLE HALOCARBONS (EPA 601, 8010)	VOLATILE ORGANICS (EPA 624, 8240, 524.2)	BASE/NEUTRALS, ACIDS (EPA 625/627, 8270, 525)	TOTAL OIL & GREASE (EPA 5520, B+F, E+F)	PCB (EPA 608, 8080)	PESTICIDES (EPA 608, 8080)	TOTAL RECOVERABLE HYDROCARBONS (EPA 418.1)	LUFT METALS: Cd, Cr, Pb, Zn, Ni	CAM METALS (17)	PRIORITY POLLUTANT METALS (13)	TOTAL LEAD	EXTRACTION (TCLP, STLC)							NUMBER OF CONTAINERS							
SAMPLE ID	DATE	TIME	MATRIX	PRESERV.	TPH - Gasoline (EPA 5030, 8015)	TPH - Gasoline (5030, 8015) w/BTEX (EPA 602, 8020)	TPH - Diesel, TEPH (EPA 3510/3550, 8015)	PURGEABLE AROMATICS BTEX (EPA 602, 8020)	PURGEABLE HALOCARBONS (EPA 601, 8010)	VOLATILE ORGANICS (EPA 624, 8240, 524.2)	BASE/NEUTRALS, ACIDS (EPA 625/627, 8270, 525)	TOTAL OIL & GREASE (EPA 5520, B+F, E+F)	PCB (EPA 608, 8080)	PESTICIDES (EPA 608, 8080)	TOTAL RECOVERABLE HYDROCARBONS (EPA 418.1)	LUFT METALS: Cd, Cr, Pb, Zn, Ni	CAM METALS (17)	PRIORITY POLLUTANT METALS (13)	TOTAL LEAD	EXTRACTION (TCLP, STLC)						NUMBER OF CONTAINERS								
MW-2	12/29/95	12:30	Aqueous	Ice	X																					3								
MW-3	12/29/95	11:15	Aqueous	Ice	X																					3								
MW-4	12/29/95	10:05	Aqueous	Ice	X																					3								
PROJECT INFORMATION					SAMPLE RECEIPT					RELINQUISHED BY 1					RELINQUISHED BY 2					RELINQUISHED BY 3														
PROJECT NAME: 2900 Ladd Ave.					TOTAL NO. OF CONTAINERS					Signature: Keith E. Nowell 1345					Signature					Signature														
PROJECT NUMBER: 3174-FB					HEAD SPACE					(DATE)										(TIME)					(DATE)									
P.O. #					REC'D GOOD CONDITION/COLD					(PRINTED NAME)										(DATE)					(TIME)					(DATE)				
TAT					CONFORMS TO RECORD					(COMPANY)										(DATE)					(TIME)					(DATE)				
SPECIAL INSTRUCTIONS/COMMENTS:					24 48 72 OTHER					RECEIVED BY 1					RECEIVED BY 2					RECEIVED BY (LABORATORY) 3														
										Signature					Signature: Keith E. Nowell 1345					Signature					Signature									
										(DATE)					Signature					Signature					Signature									
										(COMPANY)					Signature					Signature					Signature									

LIMITATIONS OF LIABILITY

ChromaLab, Inc. performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of ChromaLab, Inc. shall be the re-perform work at its own expense, and ChromaLab, Inc. shall have no other liability whatsoever, and in no event shall ChromaLab, Inc. be liable, whether in contract or tort, or otherwise for any incidental consequential or special damages, including but not limited to, damages in any way connected with the use or interpretation of information or analysis provided by ChromaLab, Inc.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding times and splitting of samples in the field.

**ENGEO INCORPORATED
GROUND-WATER SAMPLING INFORMATION**

Job Name: 2900 Ladd Avenue

Job Number: 3174-F8

Location: Livermore, California

Date: December 29, 1995

Client: L.V.J.U.S.D.

By: Keith Nowell

WELL INFORMATION

Well Number: MW-2

Diameter (in): 2

Total Depth (ft): 56.78 (toc)

Screen Length: 25'

Depth to Water (ft): 20.91 (toc)

Casing Volume (gal): 6.0

PURGING INFORMATION

Bailer: Pump: X (rate): 1.3 gpm

Time: (init./fin) 11:55/12:18

Volume Removed (gal): 30

No. of Casing Vol: 5.0

Time	Volume Removed (Gal.)	Total Casing Volumes	Temp °F	Cond (µS)	pH	Comments
11:55	--	--	--	--	--	Initial. no odor. no sheen
11:58	6	1.0	64.7	796	7.5	Turbid
12:02	12	2.0	65.4	810	7.3	Slightly turbid
12:08	18	3.0	65.3	825	7.2	Slightly turbid
12:14	24	4.0	64.0	806	7.2	Slightly turbid
12:18	30	5.0	64.3	808	7.3	Slightly turbid

SAMPLE INFORMATION

Bailer: X Pump: (gpm):

Decon Procedure: TSP

Dist. H₂O

Disposable X

Other

Sample	Time	Size	Presv.	Test	Comments
MW-2	12:30	40ml (3)	ICE	TPHg/BTEX	Slightly turbid

**ENGEO INCORPORATED
GROUND-WATER SAMPLING INFORMATION**

Job Name: 2900 Ladd Avenue	Job Number: 3174-F8
Location: Livermore, California	Date: Keith Nowell
Client: L.V.J.U.S.D.	By: Shawn Munger

WELL INFORMATION

Well Number: MW-3	Diameter (in): 2
Total Depth (ft): 52.52 (toc)	Screen Length: 25'
Depth to Water (ft): 20.25 (toc)	Casing Volume (gal): 4.1

PURGING INFORMATION

Bailer: Pump: X (rate): 1.8 gpm	Time: (init./fin) 10:44/10:56
Volume Removed (gal): 22	No. of Casing Vol: 4.1

Time	Volume Removed (Gal.)	Total Casing Volumes	Temp °F	Cond (µS)	pH	Comments
10:44	--	--	--	--	--	Initial, no odor, no sheen
10:47	5.5	1.0	66.5	872	7.3	Turbid
10:50	11	2.0	64.7	827	7.3	Slightly turbid
10:53	16.5	3.1	64.4	826	7.1	Slightly turbid
10:56	22	4.1	63.1	798	7.5	Slightly turbid

SAMPLE INFORMATION

Bailer: X Pump: (gpm):	Dist. H ₂ O
Decon Procedure: TSP	Other
Disposable X	

Sample	Time	Size	Presv.	Test	Comments
MW-3	11:15	40ml (3)	ICE	TPHg/BTEX	Clear

**ENGEO INCORPORATED
GROUND-WATER SAMPLING INFORMATION**

Job Name: 2900 Ladd Avenue

Job Number: 3174-F8

Location: Livermore, California

Date: December 29, 1995

Client: L.V.J.U.S.D.

By: Keith Nowell

WELL INFORMATION

Well Number: MW-4

Diameter (in): 2

Total Depth (ft): 53.55 (toc)

Screen Length: 25'

Depth to Water (ft): 20.90 (toc)

Casing Volume (gal): 5.5

PURGING INFORMATION

Bailer: Pump: X (rate): 0.90 gpm

Time: (init./fin) 9:31/9:47

Volume Removed (gal): 22

No. of Casing Vol: 4.0

Time	Volume Removed (Gal.)	Total Casing Volumes	Temp °F	Cond (µS)	pH	Comments
9:31	--	--	--	--	--	Initial, no odor, no sheen
9:35	5.5	1.0	67.9	1220	7.0	Turbid
9:38	11	2.0	65.6	1216	7.2	Slightly turbid
9:42	16.5	3.0	65.2	1080	7.4	Slightly turbid
9:47	22	4.0	65.4	996	7.6	Slightly turbid

SAMPLE INFORMATION

Bailer: X Pump: (gpm):

Decon Procedure: TSP

Dist. H₂O

Disposable X

Other

Sample	Time	Size	Presv.	Test	Comments
MW-4	10:05	40ml (3)	ICE	TPHg/BTEX	Clear

**ENGENE INCORPORATED
GROUND-WATER MONITORING WELL DATA**

Project: LVJUSD Project No: 3895-F2

Location: 2900 Ladd Avenue. Date: 12/29/95
 Livermore, California

GROUND-WATER GRADIENT CALCULATION

Maximum Elevation (ft-msl): 79.10
Minimum Elevation (ft-msl): 78.32
Mid Elevation (ft-msl): 78.55
Distance Max - Min (ft): 65.00

Equipotential Point: 19.17 Feet From Min Point.

WATER ELEVATION DATA

WELL#	Elevation (msl)	Casing Elevation (rel)	Casing Height (ft)	Depth to Water (tc/ft)	Water Elev (msl)	Water Depth (ft)
MW2	100.4	100.00	0.40	20.9	79.10	21.30
MW3	99.03	98.85	0.18	20.3	78.55	20.48
MW4	99.48	99.22	0.26	20.9	78.32	21.16

WELL CONSTRUCTION DETAILS

WELL#	Installation Date	Boring Diameter (in)	Total Depth (ft)	Diameter (in)	Top of Screen (bgl)	Top of Filter Pack (bgl)
MW2	4/13/93	7.25	57.00	2.00	32.00	30.00
MW3	1/23/95	7.25	53.00	2.00	28.00	26.00
MW4	6/30/94	7.25	53.00	2.00	28.00	26.00