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LETTER OF TRANSMITTAL

DATE: July 22, 1993 ENGEO PROJECT NO.: 3174-F6

TO: Alameda County
 Department of Environmental Health
 80 Swan Way, Room 200
 Oakland, CA 94621

ATTENTION: Eva Chu

SUBJECT: 2900 Ladd Ave, Livermore

TRANSMITTED HEREWITH: A copy of the soil and ground-water
investigation at the Livermore Valley Joint Unified School
District site on Ladd Avenue.

REMARKS: Please give me a call if you have any questions
and we can discuss the scope of the next phase of work.

ENGEO INCORPORATED

BY: Brian Flaherty

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ENGEO INCORPORATED

GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS

In Reply
Please Refer to:
3174-F6

July 8, 1993

Livermore Valley Joint Unified School District
685 E. Jack London Boulevard
Livermore, CA 94550

Attention: Mr. Dick Alford

Subject: 2900 Ladd Avenue
Livermore, California

REPORT ON SOIL AND GROUND-WATER INVESTIGATION

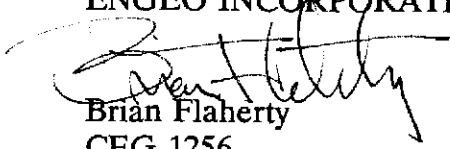
Gentlemen:

We are pleased to present the report on the soil and ground-water investigation undertaken to address the possible extent of contamination associated with a former leaking underground fuel storage tank at the Livermore Valley Joint Unified School District Transportation facility, 2900 Ladd Avenue in Livermore, California. This report describes the work performed and the findings of the study with conclusions and recommendations necessary to address the site soil and ground-water contamination. The investigation was prepared to satisfy the "Regional Board Staff Recommendations for Initial Evaluation and Investigation of Underground Tanks".

We are available at your convenience to discuss the findings and recommendations of our report. Please do not hesitate to contact our office if you have any questions.

Very truly yours,

ENGEO INCORPORATED



Brian Flaherty
CEG 1256

cc: 2 to Client
1 to Alameda County Department of Environmental Health

REPORT ON SOIL AND GROUND-WATER INVESTIGATION

for

2900 LADD AVENUE
LIVERMORE, CALIFORNIA

Submitted

to

Livermore Valley Unified School District
Livermore, California

Prepared

by

ENGEO Incorporated

Project 3174-F6

July 8, 1993

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INTRODUCTION

This soil and ground-water investigation was undertaken to study the possible extent of petroleum hydrocarbon contamination from a former leaking underground gasoline storage tank at 2900 Ladd Avenue in Livermore, California. The purpose of our study was to evaluate the vertical and lateral extent of petroleum hydrocarbons in the vadose zone soils, at the top of the ground-water table and in the ground water below the tank complex.

Scope of Work

The scope of work included:

1. Drilling and logging of six exploratory test borings to monitor the extent of the hydrocarbon contamination in the soil. An Organic Vapor Meter (PID) was used during drilling to screen for volatile vapors.
2. Collection of soil samples from each of the boreholes for submittal to an analytical laboratory for testing. Samples were analyzed for total petroleum hydrocarbons (TPH) as gasoline/diesel and volatile aromatic compounds (BTXE).
3. Analyses of the soil vapor readings and the laboratory test results. The test results and exploratory test boring information were studied to provide a preliminary evaluation of the areal and vertical extent of the contaminant plume.
4. Installation of a ground-water monitoring well with the collection of a ground-water sample from the monitoring well. The water sample was submitted to a testing laboratory and analyzed for TPH as gasoline/diesel and BTXE.
5. Preparation of a report documenting the findings with recommendations for further study.

BACKGROUND

Site Description

The facility at 2900 Ladd Avenue included an operations building, a maintenance yard, fuel dispensing pumps, associated underground piping and vents, and three fiberglass underground fuel storage tanks (Figure 1). The underground tank complex consisted of 6,000-gallon regular gasoline, 6,000-gallon unleaded gasoline and 10,000-gallon diesel fuel storage tanks. The tanks were located within a common excavation and were attached to a concrete hold-down pad.

Previous Investigations

The regular gasoline tank failed a precision test in 1990. In order to prepare a preliminary assessment of possible soil contamination, a limited subsurface investigation was undertaken (Reference 1). Soil samples were collected adjacent to the 6,000-gallon regular gasoline tank. Laboratory testing of the soil exposed total petroleum hydrocarbons (TPH) as gasoline at concentrations of 2,300 parts per million (ppm) at 14 feet and 1,500 ppm at 17 feet. These gasoline concentrations exceeded the Regional Water Quality Control Board (RWQCB) guideline level of 100 ppm for TPH in soil. We understand that an *Underground Storage Tank Unauthorized Release Report* was prepared at that time.

ENGEO Incorporated conducted a soil and ground-water study of the area around the tank complex in December 1990 (Reference 2). A ground-water monitoring well placed adjacent to the underground tanks exposed soil and ground-water contamination. Laboratory testing of soil samples found significant petroleum hydrocarbon contamination from 15 to 40 feet beneath the ground surface in the area of the tanks. A ground-water sample contained concentrations of benzene at 63 parts per billion (ppb).

Ground-water sampling of the monitoring well was conducted in September 1991 and July 1992 and is documented in References 3 and 4, respectively. Gasoline and BTXE were not detected in a ground-water sample obtained in September 1991. Laboratory analysis of the ground-water sample recovered in July 1992 detected 50 ppb gasoline and 17 ppb benzene. The measured ground-water surface had fallen 15.2 feet to 59.0 feet below the ground surface between the December 1990 and September 1991. The ground-water level rose 6.4 feet to a depth of 52.6 feet beneath the ground surface between September 1991 and July 1992. A schematic drawing of the tank complex with the location of the well is shown on Figure 1.

The three underground fuel storage tanks were removed from the site in August 1992. Laboratory testing of soil samples recovered adjacent to the northern end of the 6000-gallon leaded gasoline storage tank detected gasoline at 1200 ppm (Reference 5).

Decommissioning of the monitoring well was undertaken on July 9, 1992, since the well location was within the limits of the proposed tank excavation. A permit to decommission the well was obtained from Alameda County Zone 7 Flood Control District.

Work Plan

Review and analysis of the information collected from the previous studies of the tank complex found that a release or leak occurred from the gasoline storage tank or piping system. The petroleum hydrocarbon contamination in the soil is approximately 17 feet below the ground surface with the local ground-water level about 50 feet below the ground surface as of July 1992.

The November 3, 1992, work plan recommended exploratory soil borings drilled adjacent to the northern side of the tank complex in the approximate locations shown on Figure 1. An exploratory test boring was also located in the back fill above the location of the former

underground fuel storage tanks (Addendum to Work Plan, January 6, 1993). Drilling in this area required the coring of the concrete slab which was left in place at the time of the removal of the underground tanks.

Earlier laboratory testing of ground water in a monitoring well varied with regard to hydrocarbon concentrations and the ground-water table was at least 20 feet below the known hydrocarbon contamination in the soil. Therefore, it was decided that as a first phase of study, the installation of a ground-water monitoring well adjacent to the leaking underground fuel tank was appropriate. Analysis of the soil data could also aid in determining the locations for additional ground-water monitoring well(s) with regard to the migration of the contamination.

SOIL AND GROUND-WATER INVESTIGATION

Soil Borings

Six exploratory soil borings were drilled on April 9, 1993, in the approximate locations shown on Figure 1. The purpose of the exploratory borings was to evaluate the extent of petroleum hydrocarbons down to the top of the ground-water table. Once the depth to the local ground-water table was established, the design and construction of the ground-water monitoring well was determined.

The exploratory borings were advanced using a truck-mounted, 6-inch diameter hollow stem auger. The soil samples were collected using a 3 inch diameter split spoon barrel sampler retaining 6-inch long stainless steel tubes. Sampling equipment was washed with a trisodium phosphate (TSP) and water solution then rinsed with clean water between each sampling event. The drilling equipment was steam cleaned before and after each boring.

Drilling was performed under the direction of an ENGEEO Environmental Geologist who logged the borings in accordance with the Unified Soil Classification System. Soil samples were collected from five foot depth intervals through the vadose zone down to the top of the ground-water table. These samples were screened in the field using a photoionization detector (PID), a device that provides a field determination of the presence of certain volatile organic compounds.

The soil samples were preserved for laboratory testing by sealing the sample tubes with teflon sheets, plastic end caps and tape. The soil samples were selected for laboratory testing on the basis of the PID screening and visual observations. The samples were placed in a cooled ice chest and transported under documented chain-of-custody to a certified analytical testing laboratory.

The drill cuttings were stored and covered with plastic in a separate stockpile. These soils could be scheduled for aeration or bioremediation after a review of the laboratory test results. The boreholes were back filled in accordance with the Alameda County Flood Control and Water Conservation District, Zone 7 guidelines.

Ground-Water Monitoring Well

A ground-water monitoring well was installed northwest of the former underground storage tank complex (Figure 1). The purpose of this replacement well was to establish to what extent the ground water is contaminated. If we found that the ground-water contamination concentrations exceed the state action levels then at least two additional wells would be recommended to determine the direction of the ground-water gradient and the possibility for off-site migration of the contaminants.

Prior to drilling, a monitoring well permit was obtained from the Alameda County Flood Control and Water Conservation District, Zone 7. The ground-water monitoring well borehole was drilled to a depth of approximately 57 feet using a hollow stem auger. Soil samples were collected at regular intervals and preserved for laboratory testing as previously described.

The monitoring well consists of 2-inch-diameter PVC casing with flush joints, installed down through the hollow stem auger. The well was constructed with 25 feet of screened casing (0.02-inch slot width) and an appropriate length of solid PVC well casing (2-inch-diameter Schedule 40 PVC). The screen length was determined after reviewing the significant vertical variation in the depth to ground water over time. The bottom of the PVC screen and boring was back filled with No. 3 Monterey sand to 2 feet above the screened section. A 24 inch layer of bentonite pellets was placed on top of the sand. A cement/bentonite seal was installed above the filter material up to the ground surface with the well completed in

a locking, traffic-resistant box. The top of the well casing was secured with a locking waterproof cap.

After the cement/bentonite grout had set, the well was developed using a surge block and bailer in an attempt to produce less turbid water prior to sampling. Approximately twenty well volumes of water were removed from the well during the development process. The purged water was stored on the site in Department of Transportation approved drums.

Prior to the collection of the ground-water samples for laboratory testing, we measured the depth to the top of the ground-water table and checked for free product. No floating product or evidence of a sheen on the water surface was noted.

Approximately five well volumes of water was removed from the well prior to the collection of the ground-water samples. The samples were collected using a clean polyethylene dedicated bailer. Samples were decanted into clean laboratory glassware and cooled in an ice chest until delivery under a documented chain-of-custody to Chromalab, Inc. a state certified analytical testing laboratory.

Sample collection, preservation, chain-of-custody procedures and equipment decontamination were performed in accordance with ENGEO's standard quality assurance/quality control procedures.

Laboratory Testing

The soil and ground-water samples were submitted to the analytical laboratory with a request that the testing be performed in accordance with test methods specified in the Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites (August 1990).

The selected soil samples were submitted for laboratory testing and analyzed for total petroleum hydrocarbons (TPH) as gasoline/diesel and for benzene, toluene, xylene and ethyl benzene (BTXE) (EPA Test Method 8015/5030 and 8020). The ground-water sample collected from the monitoring well was analyzed for TPH as gasoline/diesel and for BTXE.

ANALYSIS OF DATA

Review of the boring logs, PID readings and the laboratory test results for both the soil and ground-water samples shows that the subject site has been significantly impacted by petroleum hydrocarbons. It appears that the soil and ground water has been affected primarily in the area northwest of the former underground storage tanks complex. Soil samples collected from the east and southwest of the tanks were not significantly impacted.

Review of the laboratory test data found that the soil from a depth of approximately 15 feet below the ground surface down to the top of the ground-water table has been affected. From a review of the previous soil and ground-water studies on the site, the ground-water level is ten to fifteen feet higher than measured in July 1992.

It appears that the soil from depths of about 18 feet to 35 feet are the most affected. The concentrations of petroleum hydrocarbons detected by laboratory testing of the soil beneath 35 feet appear to be lower. However, the PID readings with depth are indicative of possibly higher concentrations of hydrocarbons than have been detected.

The reported concentrations of total petroleum hydrocarbons and BTXE in the ground water in April 1993, are greater than the levels recorded in the previous monitoring well reports. As the ground-water level rises it appears that the water comes in contact with the impacted soil. Laboratory testing of ground-water samples collected from the former monitoring well found that the hydrocarbons were non detectable when the ground-water level was at depths of 50 feet or greater. However, with the increase in the level of the ground water coming in contact with the hydrocarbons we would expect that the ground water will remain significantly impacted with a potential for off site dispersion of the hydrocarbons.

From the data collected to date it appears that the petroleum hydrocarbon contamination in the soil is dispersing toward the northwest within a sandy gravel. The gravel extends from beneath the tank excavation down to depths of at least 30 to 35 feet below the ground surface. A clayey to sandy silt was found in the bore holes beneath the some of the gravel. It appears that the gravel layers may be interstratified with the clayey silt such that the stratification could be influencing the vertical and lateral spreading of the hydrocarbons as they migrate downward.

We anticipate that the northwestward dispersion of the hydrocarbons is most likely affecting the ground water in this direction. Consequently one to two ground-water monitoring wells should be placed northwest of the excavation to monitor these impacts.

RECOMMENDATIONS

Based on the information collected the ground water beneath the underground storage tanks has been significantly affected. We recommend that a minimum of three ground-water monitoring wells be installed. The proposed locations of the wells are shown on Figure 3. Two of the wells would be placed in the presumed down gradient direction from the underground tank release with one well placed up gradient.

After evaluating the field and laboratory data we recommend that additional soil and ground-water characterization studies be undertaken. The study should establish both the vertical and lateral extent of the hydrocarbon contamination in the soil and the lateral migration of the ground-water plume. The characterization should include a detailed evaluation of site hydrogeology including the soil stratification, soil/permeabilities, ground-water gradient and aquifer characteristics. This further characterization should be undertaken such that it provides the necessary data for the development of a corrective action plan while providing information on the areal extent of the petroleum hydrocarbon contamination.

The scope of the proposed soil and ground-water characterization could include the following tasks:

1. Exploratory soil borings with a qualitative ground-water evaluation (Hydropunch method)
2. A passive soil gas survey
3. Installation of two to three ground-water monitoring wells
4. Collection of soil and ground-water samples for submittal to an testing laboratory for chemical analyses.
5. Evaluation of hydrogeologic characteristics of the aquifer to apply to potential soil and ground-water remediation technologies.

6. Review of the available soil and ground-water remediation technologies with preliminary estimates for the costs and possible time frame for soil and ground-water contamination mitigation.

LIMITATIONS

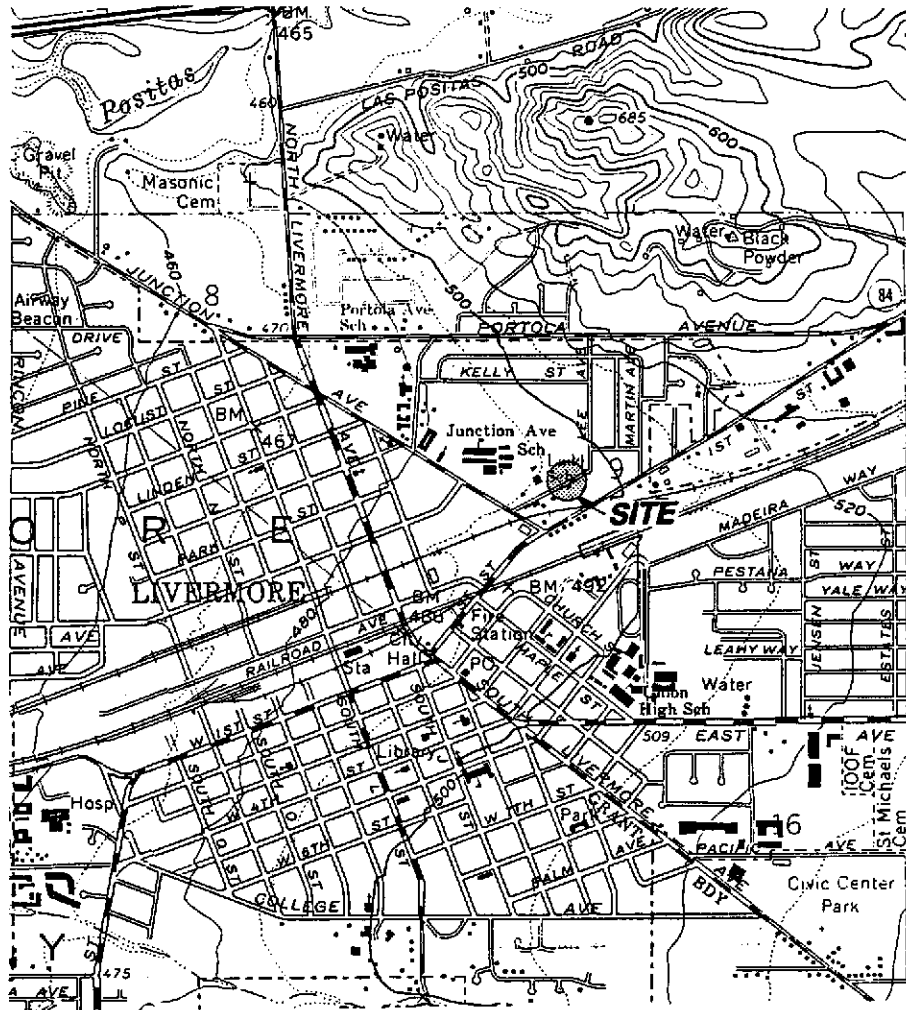
It should be recognized that the recommendations and conclusions presented in this report were based on specific soil and ground-water conditions at the points of collection. The scope of work was limited to observation and logging of the ground-water monitoring well installation, well purging and the collection of a ground-water sample from each well, submittal of the ground-water samples to an analytical laboratory, review of the laboratory test results and preparation of a report documenting the work performed and the findings of the laboratory testing.

The professional staff of ENGEO Incorporated strives to perform its services in a proper and professional manner with reasonable care and competence but are not infallible. Conclusions regarding quality of site soils, ground water, and contaminated concentrations were based on the reported laboratory analyses. We are unable to eliminate all risks or provide insurance; therefore, we are unable to guarantee or warrant the results of our work.

Visual observations referenced in this report are intended only to represent site conditions on the date of the individual sampling events. It is recognized and agreed that ENGEO has assumed responsibility for conducting the study and providing the report and conclusions to the Client. The responsibility for disclosures or reports to third parties and for remedial action, shall be solely that of the Client. ENGEO agrees not to provide a report to any third party not legally required, unless authorized by the Client.

REFERENCES

1. BSK and Associates; Soil Boring/Sampling and Chemical Testing, Existing Underground Gasoline Tank, Bus Maintenance Yard, 2900 Ladd Avenue, Livermore, California; August 10, 1990.
2. ENGEO Inc.; Soil and Ground-Water Study, Transportation Facility, 2900 Ladd Avenue, Livermore, California; September 3, 1991.
3. ENGEO Inc.; Report on Ground-Water Sampling, 2900 Ladd Avenue, Livermore, California; September 13, 1991.
4. ENGEO Inc.; Report on Ground-Water Sampling and Well Destruction, 2900 Ladd Avenue, Livermore, California; July 28, 1992.
5. ENGEO Inc.; Underground Storage Tank Site Closure Report, Transportation Facility Maintenance Yard, 2801 and 2900 Ladd Avenue, Livermore, California; August 31, 1992.
6. ENGEO Inc.; Work Plan to Address Subsurface Contamination, Livermore Valley Joint Unified School District, Transportation Facility, 2900 Ladd Avenue, Livermore, California. November 3, 1992.
7. ENGEO Inc.; Addendum to Work Plan, 2900 Ladd Avenue, Livermore, California. January 6, 1993.



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SITE LOCATION MAP
L.V.J.U.S.D. MAINTENANCE YARD
2900 LADD AVENUE
LIVERMORE, CALIFORNIA

JOB NO.: 3174-F6

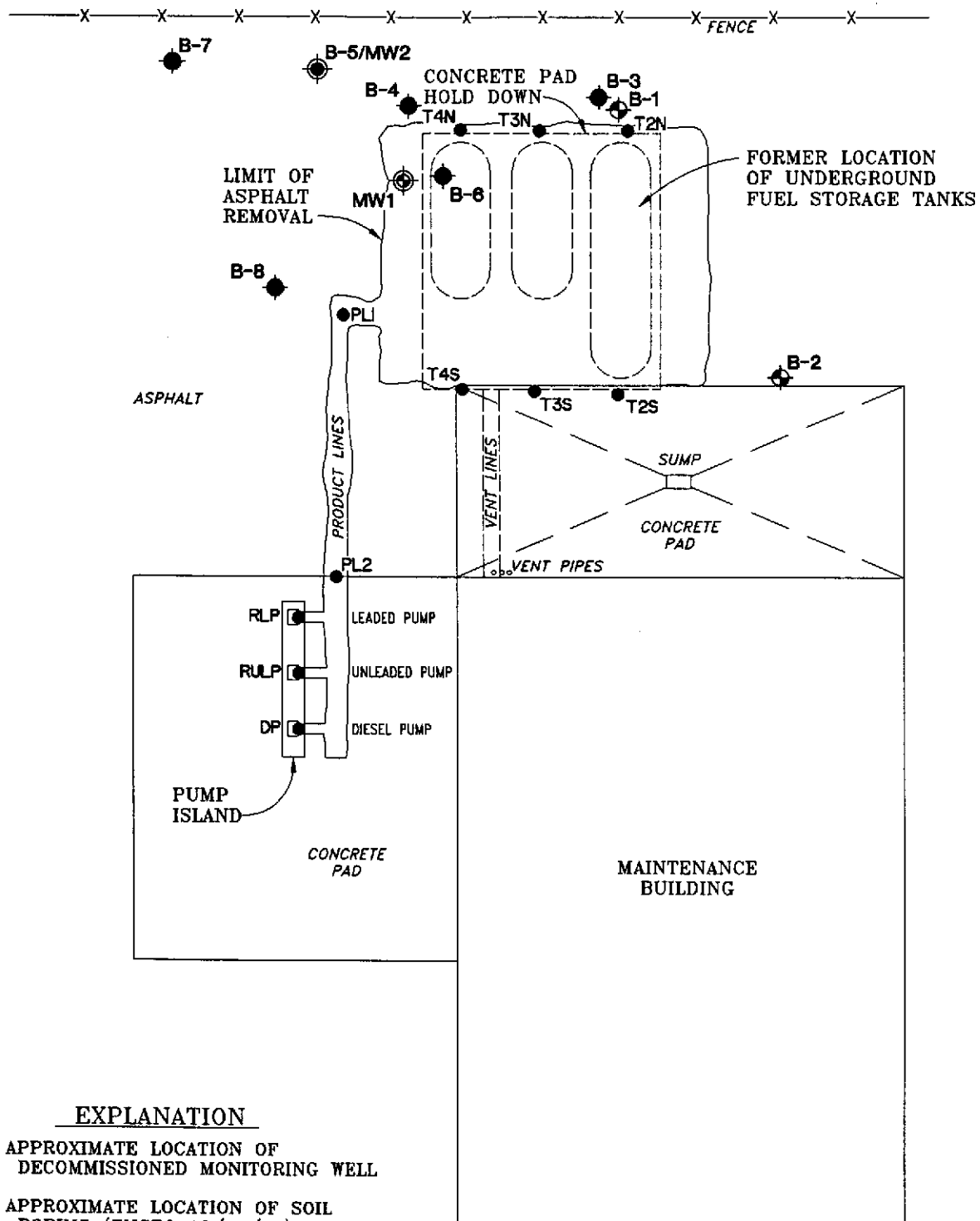
DATE: JULY 1993

DRAWN BY: *DB*

CHECKED BY: *ST*

FIGURE NO.

1



EXPLANATION

- ⊙ APPROXIMATE LOCATION OF DECOMMISSIONED MONITORING WELL
- ⊙ APPROXIMATE LOCATION OF SOIL BORING (ENGE0 12/13/90)
- SAMPLE LOCATION AT TIME OF TANK REMOVALS
- ◆ APPROXIMATE LOCATION OF EXPLORATORY SOIL BORINGS (ENGE0 4/9/93)
- ⊙ APPROXIMATE LOCATION OF GROUND-WATER MONITORING WELL INSTALLED 4/13/93

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SITE PLAN WITH SAMPLING LOCATIONS
L.V.J.U.S.D. MAINTENANCE YARD
2900 LADD AVENUE
LIVERMORE, CALIFORNIA

JOB NO.: 3174-F8

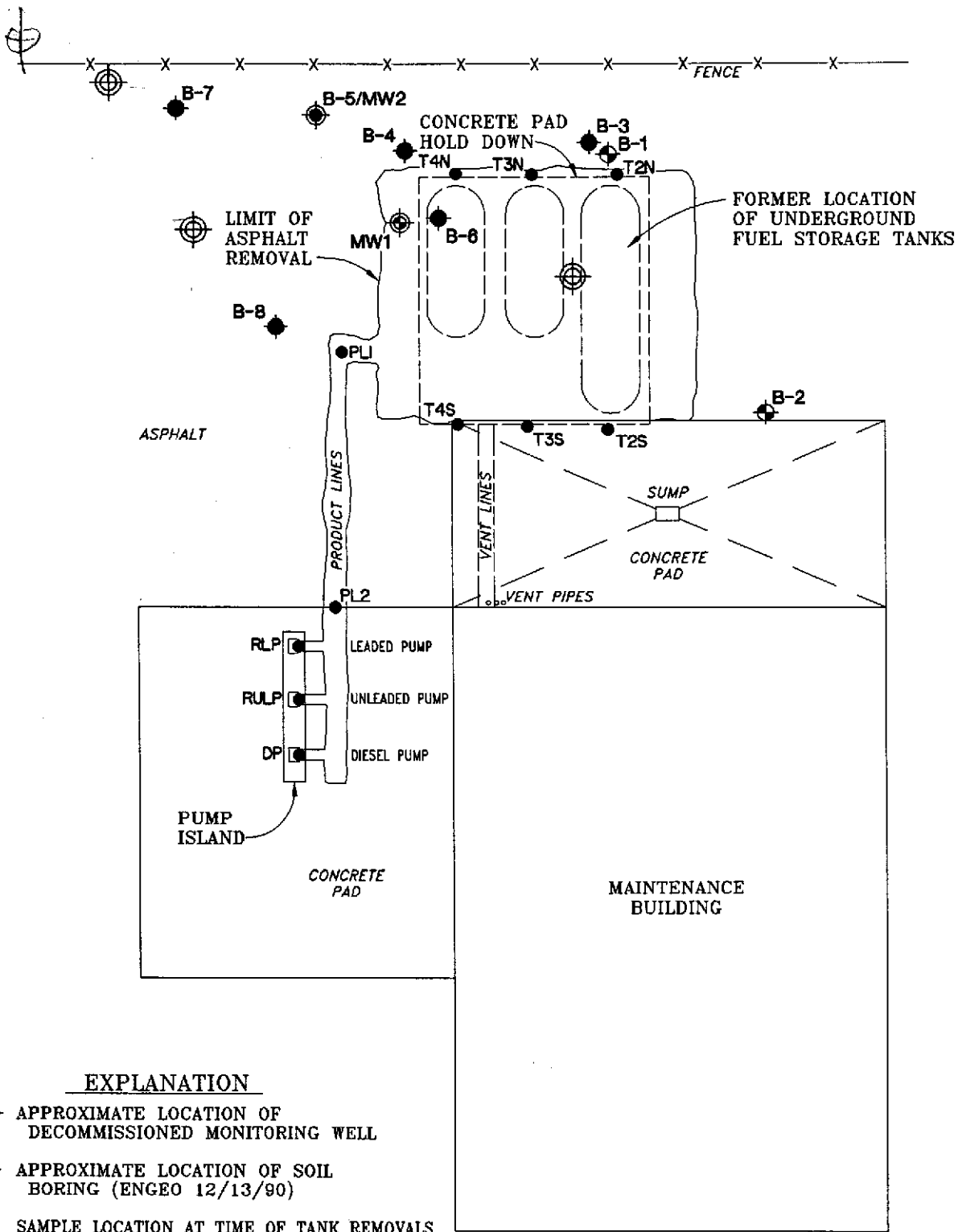
DATE: JULY 1993

DRAWN BY: *DB*

CHECKED BY: *PF*

FIGURE NO.

2



EXPLANATION

- ⊕ APPROXIMATE LOCATION OF DECOMMISSIONED MONITORING WELL
- ⊕ APPROXIMATE LOCATION OF SOIL BORING (ENGE0 12/13/90)
- SAMPLE LOCATION AT TIME OF TANK REMOVALS
- ◆ APPROXIMATE LOCATION OF EXPLORATORY SOIL BORINGS (ENGE0 4/9/93)
- ⊕ APPROXIMATE LOCATION OF GROUND-WATER MONITORING WELL INSTALLED 4/13/93
- ⊕ PROPOSED LOCATION FOR ADDITIONAL GROUND-WATER MONITORING WELL



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INCORPORATED

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

JOB NO.: 3174-F6

DATE: JULY 1993

DRAWN BY: *DS* CHECKED BY: *BF*

FIGURE NO.

3

KEY TO BORING LOGS

MAJOR TYPES		DESCRIPTION		
COARSE-GRAINED SOILS MORE THAN HALF OF MAT'L LARGER THAN #200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	Well graded gravels, little or no fines	
		GRAVELS WITH OVER 12 % FINES	Poorly graded gravels or gravel-sand mixture	
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES		Silty gravels, gravel and silt mixtures
				Clayey gravels, gravel and clay mixtures
		SANDS WITH OVER 12 % FINES		Clayey sandy gravel, gravel-sand-clay mixtures
				Well graded sands, little or no fines
FINE-GRAINED SOILS MORE THAN HALF OF MAT'L SMALLER THAN #200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		Silty sand, sand-silt mixtures	
			Clayey sand, sand-clay mixtures	
			Silt	
			Clay	
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		Clayey silt, silt-clay mixtures	
			Silty clay, clay-silt mixtures	
			Gravelly clay, clay-gravel mixtures	
			Sandy silty clay, clay-silt-sand mixtures	
	HIGHLY ORGANIC SOILS		Gravelly silt, silt-gravel mixtures	
			Peat and other highly organic soils	
BEDROCK	SEDIMENTARY BEDROCK		Sandstone	
	OTHER BEDROCK TYPES		Siltstone	
	DESCRIBED ON LOGS		Claystone	

RELATIVE DENSITY

SANDS AND GRAVELS	BLOWS/FOOT (S.P.T.)
VERY LOOSE	0-4
LOOSE	4-10
MEDIUM DENSE	10-30
DENSE	30-50
VERY DENSE	OVER 50

CONSISTENCY

SILTS AND CLAYS	STRENGTH*	BLOWS/FOOT (S.P.T.)
VERY SOFT	0-1/4	0-2
SOFT	1/4-1/2	2-4
MEDIUM STIFF	1/2-1	4-8
STIFF	1-2	8-15
VERY STIFF	2-4	15-30
HARD	OVER 4	OVER 30

SAMPLER SYMBOLS

- Modified California (3" O.D.) sampler
- S.P.T. - Split Spoon sampler
- Bulk - Bag sample
- Lost - Sample attempted, no recovery
- Shelby tube








LINE TYPES

- Solid - Layer Break
- Angled - Approximate Layer Break
- Dashed - Gradational Layer Break

(S.P.T.) Number of blows of 140 lb. hammer falling 30" to drive a 2-inch O.D. (1-3/8 inch I.D.) Sampler.

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* Unconfined compressive strength in tons/sq. ft., asterisk on log means determined by Pocket Penetrometer.

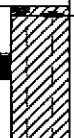
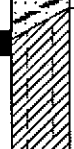


DEPTH (FEET)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: April 9, 1993		N S.P.T. BLOW/FT	OVM READING P.I.D. (10.0eV) (parts per million)	IN PLACE	
			SURFACE ELEVATION: Approx. feet msl				DRY UNIT WEIGHT	MOIST. CONTENT
			DESCRIPTION				(PCF)	% DRY WEIGHT
0			ASPHALT/BASE ROCK					
			10YR 4/4 Dark yellowish-brown gravelly CLAY, moist. (CL)					
5			10YR 4/4 Dark yellowish brown clayey GRAVEL. (GC)			2.3		
10	3-1		10YR 5/4 Yellowish brown clayey sandy GRAVEL. Gravel to 4 inches.			3.0		
15	3-2		10YR 5/4 Yellowish brown silty SAND with some clay, slightly to medium plasticity. (SM/SC) Increasing gravel.			3.0		
20	3-3		10YR 6/5 Pale brown clayey sandy GRAVEL, very moist. (GC)			20.5		
25	3-4					3.8		
30						4.6		









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Livermore Valley Joint
Unified School District
Livermore, California

BORING NO.: B-3
DATE: July 1993
JOB NO.: 3174-F6

FIGURE NO.
3

DEPTH (FEET)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: April 9, 1993	N S.P.T. BLOW/FT	OVM READING P.I.D. (10.0ev)	IN PLACE	
			SURFACE ELEVATION: Approx. feet msl			DRY UNIT WEIGHT	MOIST. CONTENT
DESCRIPTION			*MODIFIED FOR 3" O.D. SAMPLER	(parts per million)	(PCF)	% DRY WEIGHT	
30	3-5		10YR 5/4 Yellowish brown silty CLAY, moist, medium plasticity. (CL)		2.7		
			▼ Water level 4/13/93.				
35	3-6		Mottled 10YR 5/8 yellowish brown and 10YR 5/3 brown clayey SAND, wet, moisture on grains. (CL)		3.8		
40	3-7		10YR 5/4 Yellowish brown clayey SILT, wet, trace rounded gravel, moisture on grains. ▼ Water level three hours after drilling.		4.0		
45	3-8		▽ Water level at time of drilling. 10YR 5/6 Yellowish brown clayey sandy GRAVEL, wet. (CG)		1.1		
50			Bottom of boring at approximately 46.5 feet.				
55							
60							
ENGEO INCORPORATED			Livermore Valley Joint Unified School District Livermore, California		BORING NO.: B-3		FIGURE NO. 3
					DATE: July 1993		
					JOB NO.: 3174-F6		

DEPTH (FEET)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: April 9, 1994	N S.P.T. BLOW/FT	OVM READING P.I.D. (10.0ev) (parts per million)	IN PLACE	
			SURFACE ELEVATION: Approx. feet msl			DRY UNIT WEIGHT (PCF)	MOIST. CONTENT % DRY WEIGHT
			DESCRIPTION	*MODIFIED FOR 3" O.D. SAMPLER			
0			ASPHALT/BASE ROCK				
			10YR 4/4 Dark yellowish brown gravelly CLAY with some sand moist. (CL) Increasing gravel.		10.8		
5			10Y 5/4 Yellowish brown sandy GRAVEL with some clay, slightly moist. (GC)		5.6		
10			Increasing moisture				
15	4-1		Very moist.		478		
20	4-2				478		
25	4-3		Harder drilling.		401		
30			10YR 5/4 Yellowish brown sandy GRAVEL, damp. (GW)				
ENGEO INCORPORATED			Livermore Valley Joint Unified School District Livermore, California		BORING NO.: S-4 DATE: July 1993 JOB NO.: 3174-F6		FIGURE NO. 4

DEPTH (FEET)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: April 9, 1994	N S.P.T. BLOW/FT	OVM READING P.I.D. (10.0ev)	IN PLACE	
			SURFACE ELEVATION: Approx. feet msl			*MODIFIED FOR 3" O.D. SAMPLER	(parts per million)
			DESCRIPTION				
30	4-4		Easier drilling. Mottled 10YR 5/8 Yellowish brown and 10YR 6/3 pale brown clayey SILT, trace fine sand, very moist, slight plasticity. (SM) Water level on 4/12/93.		579		
35	4-5		Increasing sand. 10YR 5/6 Yellowish brown clayey silty SAND with rounded gravels, very moist. (SC)		181		
40	4-6				40		
45	4-7		Water level at time of drilling.		23		
50							
55							
60							

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Livermore Valley Joint
Unified School District
Livermore, California

BORING NO.: B-4


DATE: July 1993








JOB NO.: 3174-F6

FIGURE
NO.

4

DEPTH (FEET)	MONITORING WELL CONSTRUCTION DETAIL	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: April 9, 1993	N S.P.T. BLOWS/FT	OUM READING P.I.D. (10.0eU)	IN PLACE	
			SURFACE ELEVATION: Approx. feet MSL			DRY UNIT WEIGHT (PCF)	MOIST. CONTENT % DRY WEIGHT
DESCRIPTION			*MODIFIED FOR 3" O.D. SAMPLER	(parts per million)			
0			ASPHALT/BASE ROCK.				
			10YR 4/6 Dark yellowish brown silty CLAY with some gravel, moist, medium plasticity. (CL) Increasing gravel.				
5			10YR 3/3 Dark brown clayey GRAVEL with gravels to 4 inches, moist. (GC) Very coarse gravel.		1.5		
10			Water level at time of drilling.		2.7		
16			10YR 6/4 Light yellowish brown sandy GRAVEL with trace fines, wet. (GP) 5-1		584		
20			10YR 5/4 Dark yellowish brown clayey sandy GRAVEL, wet. (CG) 5-2		693		
25			10YR 5/4 Dark yellowish brown gravelly SAND with little silt and clay, very moist. (SC) 5-3		659		
			Increasing clay.				
30			No sample recovery.				
ENGEO INCORPORATED			Livermore Valley Joint Livermore, California		WELL NO.: B-5 DATE: July 1993 JOB NO.: 3174-F6		FIGURE NO. 5

DEPTH (FEET)	MONITORING WELL CONSTRUCTION DETAIL	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: April 9, 1993	N S.P.T. BLOWS/FT	QUM READING P.I.D. (10.0eV)	IN PLACE	
			SURFACE ELEVATION: Approx. feet MSL			DRY UNIT WEIGHT	MOIST. CONTENT
DESCRIPTION			*MODIFIED FOR 3" O.D. SAMPLER	(parts per million)	(PCF)	% DRY WEIGHT	
30			Mottled 10YR 5/8 yellowish brown and 10YR 6/3 pale brown silty CLAY, moist. (CL) Increasing silt. ▼ Water level on 4/12/93		297		
35			5-4 Mottled 10YR 5/8 yellowish brown and 10YR 6/3 pale brown clayey SILT. (SM) Increasing sand; trace gravel.		119		
40			2.5Y 5/4 Light olive-brown clayey sandy GRAVEL, moist. (FG) 5-5		125		
45			10YR 5/4 Yellowish brown clayey sandy GRAVEL, wet. 5-6				
50			5-7		11		
55			5-8				
60			Bottom of boring at approximately 57 feet.				
			Livermore Valley Joint Livermore, California	WELL NO.: B-5 DATE: July 1993 JOB NO.: 3174-F6	FIGURE NO. 5		

DEPTH (FEET)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: April 9, 1993	N S.P.T. BLOW/FT	OVM READING P.I.D. (10.0ev)	IN PLACE	
			SURFACE ELEVATION: Approx. feet msl			DRY UNIT WEIGHT (PCF)	MOIST. CONTENT % DRY WEIGHT
DESCRIPTION			*MODIFIED FOR 3" O.D. SAMPLER	(parts per million)			
0			ASPHALT/BASE ROCK				
			PEA GRAVEL. (FILL)				
5							
10			CONCRETE.				
15	6-1		10YR 4/6 Dark yellowish brown clayey GRAVEL, moist. (GC)		603		
20	6-2		10YR 5/4 Yellowish-brown clayey GRAVEL, wet. (GC)		598		
25	6-3		10YR yellowish brown silty CLAY, very moist, medium plasticity. (CL)		478		
30			10YR 5/6 Yellowish brown silty SAND and GRAVEL, moist. (GM)				

ENGEO
INCORPORATED

Livermore Valley Joint
Unified School District
Livermore, California



BORING NO.: B-6

DATE: July 1993

JOB NO.: 3174-F6

FIGURE
NO.

6

DEPTH (FEET)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: April 9, 1993	N S.P.T. BLOW/FT	OVM READING P.I.D. (10.0ev)	IN PLACE	
			SURFACE ELEVATION: Approx. feet msl			DRY UNIT WEIGHT (PCF)	MOIST. CONTENT % DRY WEIGHT
			DESCRIPTION	*MODIFIED FOR 3" O.D. SAMPLER	(parts per million)		
30	6-4				522		
35	6-5		Mottled 10YR 5/8 yellowish brown and 10YR 6/3 pale brown clayey SILT with fine sand, very moist. (SM)		151		
40			Bottom of boring at approximately 36.5 feet.				
45							
50							
55							
60							

ENGEO
INCORPORATED

Livermore Valley Joint
Unified School District
Livermore, California









BORING NO.: B-6

DATE: July 1993

JOB NO.: 3174-F6

FIGURE
NO.

6

DEPTH (FEET)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: April 9, 1993	N S.P.T. BLOW/FT	OVM READING P.I.D. (10.0eV)	IN PLACE	
			SURFACE ELEVATION: Approx. feet msl			DRY UNIT WEIGHT (PCF)	MOIST. CONTENT % DRY WEIGHT
			DESCRIPTION	*MODIFIED FOR 3" O.D. SAMPLER	(parts per million)		
0			ASPHALT/BASE ROCK				
			10YR 4/2 Very dark grayish-brown sandy gravelly CLAY, slightly moist, medium plasticity. (CL)		5.4		
5			10YR 4/3 Brown clayey SAND, damp. (CL)				
			10YR 4/4 Dark yellowish brown sandy clayey GRAVEL, moist. (CG)		2.3		
10			10YR 5/3 Brown silty SAND with gravel, trace clay, wet. (SM)		2.3		
15	7-1		Mottled 10YR 5/4 yellowish brown and 10YR 6/3 pale brown clayey SILT, very moist, wet. (SM)		733		
20	7-2		10YR 5/6 Yellowish brown clayey sandy GRAVEL, very moist. (CG)		742		
25	7-3				623		
30							

ENGEO
INCORPORATED

Livermore Valley Joint
Unified School District
Livermore, California



BORING NO.: 8-7










DATE: July 1993

JOB NO.: 3174-F6

FIGURE
NO.

7

DEPTH (FEET)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: April 9, 1993	N S.P.T. BLOW/FT	OVM READING P.I.D. (10.0eV)	IN PLACE	
			SURFACE ELEVATION: Approx. feet msl			*MODIFIED FOR 3" O.D. SAMPLER	(parts per million)
			DESCRIPTION				
30	7-4				707		
35	7-5		Mottled 10YR 5/8 yellowish brown silty CLAY/clayey SILT, very moist, medium plasticity. (CL)		280		
			Bottom of boring at approximately 36.5 feet.				
40							
45							
50							
55							
60							
ENGEO INCORPORATED			Livermore Valley Joint Unified School District Livermore, California		BORING NO.: B-7 DATE: July 1993 JOB NO.: 3174-F6		FIGURE NO. 7

DEPTH (FEET)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: April 9, 1993	N S.P.T. BLOW/FT	OVM READING P.I.D. (10.0ev)	IN PLACE	
			SURFACE ELEVATION: Approx. feet msl			DRY UNIT WEIGHT (PCF)	MOIST. CONTENT % DRY WEIGHT
DESCRIPTION			*MODIFIED FOR 3" O.D. SAMPLER	(parts per million)			
0			ASPHALT/BASE ROCK				
			10YR 4/4 Dark yellowish-brown gravelly CLAY, moist. (CL)				
5			10YR 5/4 Dark yellowish brown clayey GRAVEL, slightly moist. (GC)		10.0		
					7.0		
10					5.4		
15	8-1		Wet.		14.1		
20	8-2		Mottled 10YR 6/6 brownish yellow and 10YR 6/3 pale brown clayey SILT, moist, low plasticity. (ML)		534		
25	8-3		10YR 5/4 Yellowish brown clayey GRAVEL, wet. (GC)		137		
30							

ENGEO
INCORPORATED

Livermore Valley Joint
Unified School District
Livermore, California


BORING NO.: B-8

DATE: July 1993

JOB NO.: 3174-F6

FIGURE
NO.

8

DEPTH (FEET)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: April 9, 1993	N S.P.T. BLOW/FT	OVM READING P.I.D. (10.0eV) (parts per million)	IN PLACE	
			SURFACE ELEVATION: Approx. feet msl			DRY UNIT WEIGHT	MOIST. CONTENT
			DESCRIPTION			*MODIFIED FOR 3" O.D. SAMPLER	(PCF)
30	8-4				20		
35	8-5		Mottled 10YR 5/8 yellowish brown and 10YR 6/3 pale brown silty CLAY, moist. (CL)				
			Bottom of boring at approximately 35.5 feet.				
40							
45							
50							
55							
60							
ENGEO INCORPORATED			Livermore Valley Joint Unified School District Livermore, California	BORING NO.: B-8	DATE: July 1993	FIGURE NO. 8	
				JOB NO.: 3174-F6			

**ENGEO INCORPORATED
SOIL SAMPLING INFORMATION**

Date: April 9, 1993
 Job Number: 3174-F6
 Location: Livermore, California

By: Eric Harrell
 Job Name: LVJUSD Maintenance Yard
 Client: L.V.J.U.S.D.

DRILLING INFORMATION

Drilling Contractor: Kvilhaug
 Auger Type: Hollow Stem
 Hole Diameter: 7.75"

License # 482390
 Sampler Type: 2.5 inch diameter
 California Modified

SAMPLE INFORMATION

Decon Procedure: TSP X
 Solvent _____

Dist. H₂O X
 Acid _____

<u>Sample</u>	<u>Time</u>	<u>Size</u>	<u>Test</u>	<u>Comments</u>
B3-1	8:58	2.5X6"		11.0'
B3-2	9:05	2.5X6"		16.0'
B3-3	9:12	2.5X6"		21.0'
B3-4	9:23	2.5X6"		26.0'
B3-5	9:31	2.5X6"		31.0'
B3-6	9:40	2.5X6"		36.0'
B3-7	10:02	2.5X6"		41.0'
B3-8	10:30	2.5X6"		45.5'
B4-1	11:22	2.5X6"		16.0'
B4-2	11:30	2.5X6"	800/1900	21.0'
B4-3	11:41	2.5X6"	2300/7700	26.0'
B4-4	11:55	2.5X6"	31/51	30.5'
B4-5	12:03	2.5X6"		36.0'
B4-6	12:18	2.5X6"		40.5'
B4-7	12:32	2.5X6"		44.5'
B5-1	14:50	2.5X6"		15.5'
B5-2	15:02	2.5X6"	730/2800	20.5'
B5-3	15:13	2.5X6"	21/152	25.5'

**ENGEO INCORPORATED
SOIL SAMPLING INFORMATION**

Date: April 12, 1993
 Job Number: 3174-F6
 Location: Livermore, California

By: Eric Harrell
 Job Name: LVIJUSD Maintenance Yard
 Client: L.V.J.U.S.D.

DRILLING INFORMATION

Drilling Contractor: Kvilhaug
 Auger Type: Hollow Stem
 Hole Diameter: 7.75 inch

License # 482390
 Sampler Type: 2.5 inch diameter
 California Modified

SAMPLE INFORMATION

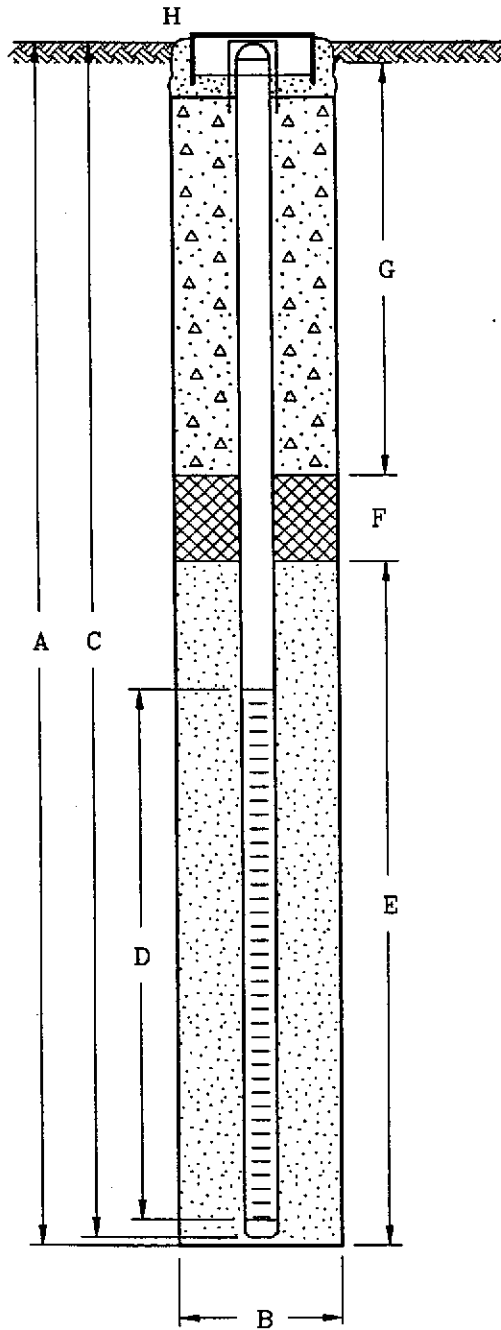
Decon Procedure: TSP X
 Solvent _____

Dist. H₂O X
 Acid _____

Sample	Time	Size	Test	Comments
B6-1	8:48	2.5X6"	76 ^D 810/ND	15.5'
B6-2	8:56	2.5X6"	120 ^D 550/1900	21.0'
B6-3	9:05	2.5X6"	ND 1200/4100	26.0'
B6-4	9:16	2.5X6"	410/ND	31.0'
B6-5	9:24	2.5X6"		36.0'
B7-1	10:45	2.5X6"	670/1200	16.0'
B7-2	10:50	2.5X6"	410/190	21.0'
B7-3	11:15	2.5X6"	450/ND	26.0'
B7-4	11:22	2.5X6"	65/84	31.0'
B7-5	11:35	2.5X6"		36.0'
B8-1	13:20	2.5X6"		14.5'
B8-2	13:29	2.5X6"	18/1600	21.0'
B8-3	13:37	2.5X6"	ND/ND	26.0'
B8-4	13:46	2.5X6"	ND/ND	30.5'
B8-5	14:02	2.5X6"		36.0'

MONITORING WELL DETAIL

PROJECT NUMBER 3174-F6 DATE OF INSTALLATION April 13, 1993
 PROJECT NAME L.V.J.U.S.D. Maintenance TOP OF CASING ELEV. _____
Yard
 COUNTY Alameda GROUND SURFACE ELEV. _____
 WELL PERMIT NO. #93167 DATUM _____

**EXPLORATORY BORING**

A. TOTAL DEPTH 57 FT.
 B. DIAMETER 7.25 IN.
 DRILLING METHOD Hollow Stem Auger

WELL CONSTRUCTION

C. CASING LENGTH 57' FT.
 MATERIAL schedule 40 PVC
 DIAMETER 2.0 IN.
 D. SLOTTED INTERVAL LENGTH 25 FT.
 SLOTTED INTERVAL FROM 32 TO 57 FT.
 SLOT SIZE 0.020 IN.
 E. FILTER PACK INTERVAL 30 TO 57 FT.
 FILTER MATERIAL No. 3 Monterey Sand
 F. FILTER PACK SEAL 28 TO 30 FT.
 SEAL MATERIAL Bentonite Pellets
 G. GROUT INTERVAL 1.0 TO 28 FT.
 GROUT MATERIAL Type I/II Portland Cement
 H. Flush Mount Cristy Box

ENGEO INCORPORATED
WELL PURGING INFORMATION

Job Name: LVJUSD	Date: April 20, 1993
Job No.: 3174-F6	Client: LVJUSD
Location: 2900 Ladd, Livermore, CA	Personnel: Keith Nowell
Well No: MW-2	Total Depth (ft.): 56.89
Depth to Water (ft.): 30.81	Casing Volume (gal.):4.4

Time	Volume Removed (Gal.)	Total Casing Volumes	Temp. °C	Cond. (ppm)	pH	Comments
9:51	5	1.1	20.4	540	7.30	Turbid-incl. silt & sand
9:57	10	2.3	20.4	530	7.30	Turbid-incl. silt & sand
10:04	15	3.4	20.4	580	7.40	Turbid
10:15	20	4.5	20.6	490	7.38	Slightly turbid

3174-F6
July 8, 1993

**ENGEIO INCORPORATED
GROUND-WATER SAMPLING INFORMATION**

Date: April 20, 1993

By: Keith Nowell

Job Number: 3174-F6

Job Name: LVJUSD Trans. Yard

Location: 2900 Ladd Avenue
Livermore, California

Client: LVJUSD

WELL INFORMATION

Well Number: MW-2

Diameter (in): 2.0

Total Depth (ft): 56.89

Screen Length: 25 feet

Depth to Water (ft): 30.81

Casing Volume (gal): 4.4

PURGING INFORMATION

Bailer: Pump: X (rate): .8 gpm Time: (init./fin.) 9:45/10:10

Volume Removed (gal): 20 No. of Casing Vol: 4.5

pH Reading: 7.4 Temp (C): 20.6

TDS (ppm) 490

SAMPLE INFORMATION

Bailer: X Pump: (rate):

Decon Procedure: Solvent Acid
TSP X Dist. H₂O X
Disposable X Other

<u>Sample</u>	<u>Time</u>	<u>Size</u>	<u>Presv.</u>	<u>Test</u>	<u>Comments</u>
<u>MW-2A</u>	<u>11:00</u>	<u>3x40ml</u>	<u>ice</u>	<u>TPHG, BTEX</u>	<u>slightly turbid</u>
<u>MW-2B</u>	<u>11:05</u>	<u>2x1 l</u>	<u>ice</u>	<u>TPHD,</u>	<u>slightly turbid</u>
<u>TPHG:</u>	<u>Total</u>	<u>Petroleum</u>	<u>Hydrocarbons</u>	<u>as Gasoline</u>	<u> </u>
<u>TPHD:</u>	<u>Total</u>	<u>Petroleum</u>	<u>Hydrocarbons</u>	<u>as Diesel</u>	<u> </u>
<u>BTEX:</u>	<u>Benzene,</u>	<u>Toluene,</u>	<u>Ethyl Benzene</u>	<u>and Xylenes</u>	<u> </u>

CHROMALAB, INC.

Environmental Laboratory (1094)

ORIGINALS

5 DAYS TURNAROUND

April 23, 1993

Chr

93201

ENGE0, INC.

Att. ERIC Harrell

RE: Eighteen soil samples for Gasoline and BTEX analysis

Project Name: LVJUSD

Project Number: 3174-F6

Date Sampled: April 9-12, 1993

Date Submitted: April 19, 1993

Date Analyzed: April 21, 1993

RESULTS:

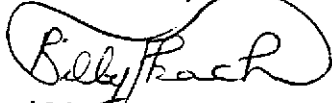
Sample I.D.	Gasoline (mg/Kg)	Benzene (µg/Kg)	Toluene (µg/Kg)	Ethyl Benzene (µg/Kg)	Total Xylenes (µg/Kg)
B4-2	800	1900	22000	8100	56000
B4-3	2300	7700	88000	35000	210000
B4-4	31	51	640	350	2400
B5-2	730	2800	21000	6700	4100
B5-3	24	52	620	330	2200
B5-4	1.1	230	8.3	N.D.	130
B5-5	N.D.	N.D.	N.D.	N.D.	N.D.
B6-1	860	N.D.*	13000	8300	55000
B6-2	530	1900	17000	7300	44000
B6-3	1200	4100	39000	15000	100000
B6-4	410	N.D.***	4500	3500	22000
B7-1	670	1200	16000	9700	58000
B7-2	46	190	1300	550	3600
B7-3	480	N.D.**	6700	4000	25000
B7-4	65	84	1300	750	4800
B8-2	18	1600	3100	330	2200
B8-3	N.D.	80	77	11	73
B8-4	N.D.	50	20	5.0	37
BLANK	N.D.	N.D.	N.D.	N.D.	N.D.
SPIKE RECOVERY	90%	100%	98%	97%	98%
DUP SPIKE RECOVERY	----	100%	108%	105%	104%
DETECTION LIMIT	1.0	5.0	5.0	5.0	5.0
METHOD OF ANALYSIS	5030/8015	8020	8020	8020	8020

* Detection Limit = 1000 µg/Kg due to dilution needed.

**Detection Limit = 500 µg/Kg due to dilution needed.

***Detection Limit = 250 ug/kg due to dilution needed.

ChromaLab, Inc.



Billy Thach
Analytical Chemist



Eric Tam
Laboratory Director

CHROMALAB, INC.

5 DAYS TURNAROUND

Analytical Laboratory (E694)

April 26, 1993

ChromaLab File No.: 0493201

ENGEQ, INC.

Attn: Eric Harrell

RE: Eighteen soil samples for Diesel analysis

Project Name: LVJUSD

Project Number: 3174-F6

Date Sampled: April 9-12, 1993

Date Submitted: April 19, 1993

Date Extracted: April 22, 1993

Date Analyzed: April 23, 1993

RESULTS:

<u>Sample I.D.</u>	<u>Diesel (mg/Kg)</u>
B4-2	9.1
B4-3	N.D.
B4-4	N.D.
B5-2	N.D.
B5-3	N.D.
B5-4	N.D.
B5-5	N.D.
B6-1	46
B6-2	120
B6-3	N.D.
B6-4	N.D.
B7-1	N.D.
B7-2	N.D.
B7-3	N.D.
B7-4	N.D.
B8-2	N.D.
B8-3	N.D.
B8-4	N.D.
BLANK	N.D.
SPIKE RECOVERY	119%
DUP SPIKE RECOVERY	115%
DETECTION LIMIT	1.0
METHOD OF ANALYSIS	3550/8015

ChromaLab, Inc.



Yiu Tam
Analytical Chemist



Eric Tam
Laboratory Director

cc

CHAIN OF CUSTODY RECORD

PROJECT NUMBER		PROJECT NAME					TPH - GASOLINE (EPA 8015/8030)	TPH - DIESEL (EPA 8015/3550/3510)	PURGEABLE AROMATICS BTEX (EPA 802, 8020)	PURGEABLE HALOCARBONS (EPA 801, 8010)	VOLATILE ORGANICS (EPA 824, 8240)	BASE/NEUTRALS, ACIDS (EPA 825/8270)	TOTAL OIL & GREASE (SMW 830(f))	OC PESTICIDES/PCB (EPA 808, 8080)	OP PESTICIDES (EPA 614/8140)	TITLE 26 METALS (17)	PRIORITY METALS (13)	REMARKS REQUIRED DETECTION LIMITS
SAMPLED BY: (SIGNATURE) <i>Cristobal F. Fleury</i>																		
SAMPLE NUMBER	DATE	TIME	MATRIX	NUMBER OF CONTAINERS	CONTAINER SIZE	PRESERVATIVE												
✓ B4-2	4-9-93	11:30	Soil	1	2.5"x6"	Ice	X	X	X									
✓ B4-3	4-9-93	11:41	Soil	1	2.5"x6"	Ice	X	X	X									
✓ B4-4	4-9-93	11:55	Soil	1	2.5"x6"	Ice	X	X	X									
✓ B5-2	4-9-93	15:02	Soil	1	2.5"x6"	Ice	X	X	X									
✓ B5-3	4-9-93	15:13	Soil	1	2.5"x6"	Ice	X	X	X									
✓ B5-4	4-9-93	15:32	Soil	1	2.5"x6"	Ice	X	X	X									
✓ B5-5	4-9-93	15:43	Soil	1	2.5"x6"	Ice	X	X	X									
✓ B6-1	4-12-93	8:48	Soil	1	2.5"x6"	Ice	X	X	X									
✓ B6-2	4-12-93	8:56	Soil	1	2.5"x6"	Ice	X	X	X									
✓ B6-3	4-12-93	9:05	Soil	1	2.5"x6"	Ice	X	X	X									
✓ B6-4	4-12-93	9:16	Soil	1	2.5"x6"	Ice	X	X	X									
✓ B7-1	4-12-93	10:45	Soil	1	2.5"x6"	Ice	X	X	X									
✓ B7-2	4-12-93	10:50	Soil	1	2.5"x6"	Ice	X	X	X									
✓ B7-3	4-12-93	11:15	Soil	1	2.5"x6"	Ice	X	X	X									
✓ B7-4	4-12-93	11:22	Soil	1	2.5"x6"	Ice	X	X	X									
✓ B8-2	4-12-93	13:29	Soil	1	2.5"x6"	Ice	X	X	X									
✓ B8-3	4-12-93	13:37	Soil	1	2.5"x6"	Ice	X	X	X									
✓ B8-4	4-12-93	13:46	Soil	1	2.5"x6"	Ice	X	X	X									

RELINQUISHED BY: (SIGNATURE) <i>Cristobal F. Fleury</i>	DATE/TIME 4-19-93 10:45am	RECEIVED BY: (SIGNATURE) <i>A. March</i>	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE) <i>A. March</i>	DATE/TIME 4-19-93 13:16	REMARKS * 14 DAY HOLDING TIME SAMPLES Collected 4-9-93	

CHROMALAB, INC.

Environmental Laboratory (1094)

5 DAYS TURNAROUND

April 27, 1993

ChromaLab File No.: 0493220

ENGE0, INC.

Attn: Keith Newell

RE: One water sample for Gasoline and BTEX analysis

Project Name: LVJUSD BUS YARD

Project Number: 3174-F6

Date Sampled: April 20, 1993

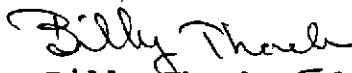
Date Submitted: April 20, 1993

Date Analyzed: April 21, 1993

RESULTS:

Sample I.D.	Gasoline ($\mu\text{g/L}$)	Benzene ($\mu\text{g/L}$)	Toluene ($\mu\text{g/L}$)	Ethyl Benzene ($\mu\text{g/L}$)	Total Xylenes ($\mu\text{g/L}$)
MW-2A	4500	340	110	8.0	630
BLANK	N.D.	N.D.	N.D.	N.D.	N.D.
SPIKE RECOVERY	105%	102%	96%	101%	101%
DUP SPIKE RECOVERY	---	83%	86%	100%	100%
DETECTION LIMIT	50	0.5	0.5	0.5	0.5
METHOD OF ANALYSIS	5030/8015	602	602	602	602

ChromaLab, Inc.


Billy Thach Ec.
Analytical Chemist


Eric Tam
Laboratory Director

do

CHROMALAB, INC.

Environmental Laboratory (1094)

5 DAYS TURNAROUND

April 27, 1993

ChromaLab File No.: 0493220

ENGEQ, INC.

Attn: Keith Newell

RE: One water sample for Diesel analysis

Project Name: LVJUSD BUS YARD

Project Number: 3174-F6

Date Sampled: April 20, 1993

Date Submitted: April 20, 1993

Date Extracted: April 23, 1993

Date Analyzed: April 23, 1993

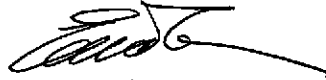
RESULTS:

<u>Sample I.D.</u>	<u>Diesel ($\mu\text{g/L}$)</u>
MW 2B	N.D.
BLANK	N.D.
SPIKE RECOVERY	98%
DUP SPIKE RECOVERY	93%
DETECTION LIMIT	50
METHOD OF ANALYSIS	3510/8015

ChromaLab, Inc.



Yiu Tam
Analytical Chemist



Eric Tam
Laboratory Director

do

CHAIN OF CUSTODY RECORD

PROJECT NUMBER		PROJECT NAME					TPH - GASOLINE (EPA 8015/5030)	TPH - DIESEL (EPA 8015/3550/3510)	PURGEABLE AROMATICS BTX (EPA 602, 8020)	PURGEABLE HALOCARBONS (EPA 601, 8010)	VOLATILE ORGANICS (EPA 624, 8240)	BASE/NEUTRALS, ACIDS (EPA 625, 8270)	TOTAL OIL & GREASE (SMWW 5520.F1)	OC PESTICIDES/PCB (EPA 606, 8080)	OP PESTICIDES (EPA 614/8140)	TITLE 26 METALS (17)	PRIORITY METALS (13)	REMARKS REQUIRED DETECTION LIMITS
SAMPLED BY: (SIGNATURE)																		
SAMPLE NUMBER	DATE	TIME	MATRIX	NUMBER OF CONTAINERS	CONTAINER SIZE	PRESERVATIVE												
3174-FG	LVJUSD Bus Yard																	
Kurt S. Newell																		
MW2A	4-20-93	1100	Aqueous	3	40ml	Ice	X	X										
MW2B	4-20-93	1105	Aqueous	2	1L	Ice		X										
RELINQUISHED BY: (SIGNATURE)							DATE/TIME	RECEIVED BY: (SIGNATURE)					DATE/TIME	RECEIVED BY: (SIGNATURE)				
Kurt S. Newell							1425 4-20-93	Gary Cook										
RELINQUISHED BY: (SIGNATURE)							DATE/TIME	RECEIVED BY: (SIGNATURE)					DATE/TIME	RECEIVED BY: (SIGNATURE)				
RELINQUISHED BY: (SIGNATURE)							DATE/TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)					DATE/TIME	REMARKS				
														5 day TAT				

CHAIN OF CUSTODY RECORD

PROJECT NUMBER		PROJECT NAME					TPH - GASOLINE (EPA 8015/5030)	TPH - DIESEL (EPA 8015/3550/3510)	PURGEABLE AROMATICS BTX (EPA 602, 8020)	PURGEABLE HALOCARBONS (EPA 601, 8010)	VOLATILE ORGANICS (EPA 624, 8240)	BASE/NEUTRALS, ACIDS (EPA 825, 8270)	TOTAL OIL & GREASE (SMWW 5520 (F))	OC PESTICIDES/PCB (EPA 605, 8080)	OP PESTICIDES (EPA 614/8140)	TITLE 26 METALS (17)	PRIORITY METALS (13)	REMARKS REQUIRED DETECTION LIMITS
SAMPLED BY: (SIGNATURE)																		
SAMPLE NUMBER	DATE	TIME	MATRIX	NUMBER OF CONTAINERS	CONTAINER SIZE	PRESERVATIVE												
3174-F6	LVJUSD Bus Yard																	
Kurt S. Nwoll																		
MW2A	4-20-93	1100	Aggrav	3	40ml	Ice	X	X										
MW2B	4-20-93	1105	Aggrav	2	1L	Ice		X										
RELINQUISHED BY: (SIGNATURE)							DATE/TIME	RECEIVED BY: (SIGNATURE)					DATE/TIME	RECEIVED BY: (SIGNATURE)				
Kurt S. Nwoll							1425 4-20-93	Gary Cook										
RELINQUISHED BY: (SIGNATURE)							DATE/TIME	RECEIVED BY: (SIGNATURE)					DATE/TIME	RECEIVED BY: (SIGNATURE)				
RELINQUISHED BY: (SIGNATURE)							DATE/TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)					DATE/TIME	REMARKS				
														5 day TAT				



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

5997 PARKSIDE DRIVE PLEASANTON, CALIFORNIA 94566 (415) 484-2600

GROUNDWATER PROTECTION ORDINANCE PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

1. LOCATION OF PROJECT 2900 Ladd Avenue Livermore, California

PERMIT NUMBER 93167 LOCATION NUMBER

2. CLIENT Name Livermore Valley Joint Unified School District Address 685 E Jack London Rd Phone 447-9500 City Livermore Zip 94550

PERMIT CONDITIONS

Circled Permit Requirements Apply

3. APPLICANT Name Brian Flaherty - ENGEO Incorporated 2401 Crow Canyon Rd, Ste. 200 Address Phone 838-1600 City San Ramon Zip 94583

- A. GENERAL 1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date. 2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects. 3. Permit is void if project not begun within 90 days of approval date. B. WATER WELLS, INCLUDING PIEZOMETERS 1. Minimum surface seal thickness is two inches of cement grout placed by tremie. 2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic, irrigation, and monitoring wells unless a lesser depth is specially approved. C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings. D. CATHODIC. Fill hole above anode zone with concrete placed by tremie. E. WELL DESTRUCTION. See attached.

4. DESCRIPTION OF PROJECT Water Well Construction X Geotechnical Investigation Cathodic Protection General Well Destruction Contamination X

5. PROPOSED WATER WELL USE Domestic Industrial Irrigation Municipal Monitoring X Other

6. PROPOSED CONSTRUCTION Drilling Method: Mud Rotary Air Rotary Auger X Cable Other

DRILLER'S LICENSE NO. 482390

WELL PROJECTS Drill Hole Diameter 7 in. Maximum Casing Diameter 2 in. Depth 50 ft. Surface Seal Depth 35 ft. Number 1

GEOTECHNICAL PROJECTS Number of Borings 5 Maximum Hole Diameter 7 in. Depth 50 ft.

ESTIMATED STARTING DATE 4/9/93 ESTIMATED COMPLETION DATE 4/13/93

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

Approved Wyman Hong Date 5 Apr 93

APPLICANT'S SIGNATURE Brian Flaherty Date 4/5/93

ENGEO INCORPORATED
FIELD HEALTH AND SAFETY PLAN

Project Name: Livermore Valley Joint Unified School District Date: April 9, 1993

Project No.: 3174-F6 Client: L.V.J.U.S.D.

Project Location: 2900 Ladd Avenue

Work Activities: Drilling and logging of five exploratory test borings with conversion of one of the borings to a groundwater monitoring well.

Project H & S Officer: Eric Harrell

Site H & S Officer: Eric Harrell

Expected Chemical Hazards

Chemical Name (CAS #)	OSHA (PEL)	Field Criteria
<u>Benzene</u>	<u>1.0 ppm</u>	<u>See attached</u>
<u>Toluene</u>	<u>200 ppm</u>	<u>See attached</u>
<u>Ethyl Benzene</u>	<u>100 ppm</u>	<u>See attached</u>
<u>Xylenes</u>	<u>100 ppm</u>	<u>See attached</u>

Physical Hazards

- Noise
- Traffic
- Equipment
- Underground Hazards
- Overhead Hazards
- Excavations/Trenches
- Other _____

Potential Explosion and Fire Hazards None expected

Level of Protection Equipment

A B C D (See Personal Protective Equipment)

Personal Protective Equipment

R = Required

A = As Needed

R Hard Hat

A Safety Glasses

R Safety Boots

Respirator (Type) 1/2 mask

R Orange Vest

Filter (Type) GMA

A Hearing Protection

R Gloves (Type) Nitrile

A Tyvek Coveralls

Other _____

Field Monitoring Equipment

PID (1000V)

Site Control Measures

Cones, Baricades,

Emergency Response Plans

Stop operations, evaluate conditions, administer first aid, call for emergency personnel, transport injured.

Hospital: VALLEY MEMORIAL HOSPITAL Phone: 447-7000

Address: 1111 E. Stanley Boulevard

Fire Department: 911 Police: 911

Comments

See Attached MAP.

HSP Preparer: E. Harrell

Review/Approval: _____

<u>Contractor/Agency</u>	<u>Signature</u>	<u>Date</u>
<u>K.W.D.</u>	<u>Robert J. Lusk</u>	<u>4/9/93</u>
<u>Kuilhaug Well Drilling</u>	<u>[Signature]</u>	<u>9 April 93</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

TABLE 1

HYDROCARBON VAPOR CRITERIA AND RESPONSES

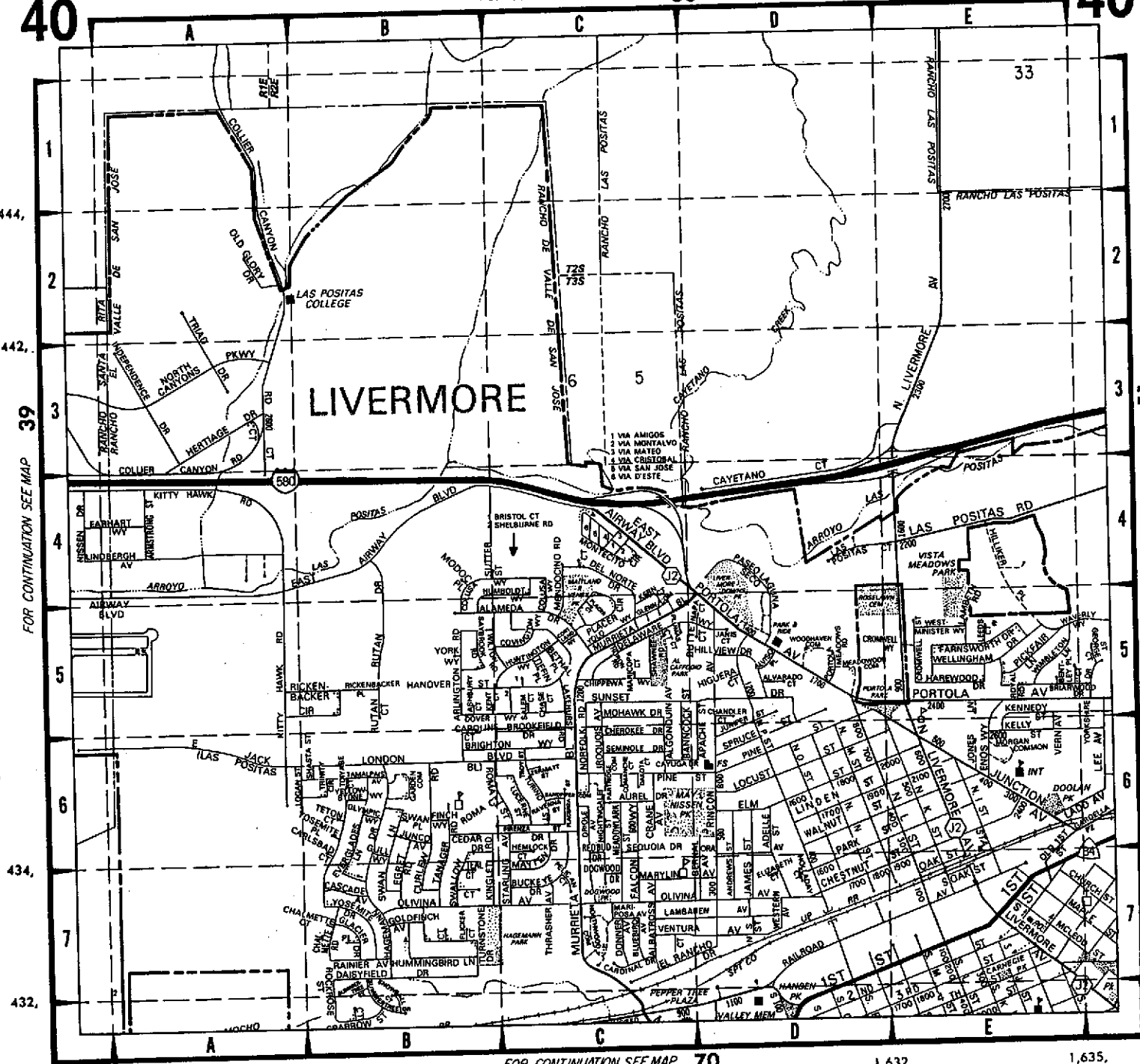
<u>Hydrocarbon Concentrations*</u>	<u>Response</u>
< 30 ppmv	No special action.
30 ppmv - 300 ppmv	Half-mask Organic Vapor (OV) respirators worn by all in work area.
300 ppmv - 1000 ppmv	Benzene detector tube measurements every 15 minutes.
> 1000 ppmv	Discontinue work activities and evacuate area. Evaluate measures to subdue excessive vapor levels.
> 1 ppmv Benzene	Half-mask OV respirators worn by all in work area.
> 10 ppmv Benzene	Discontinue work activities and evacuate area. Evaluate measures to subdue excessive vapor levels.

* in parts-per-million by volume within breathing zone, measured by photoionization detector equipped with 10.04 eV bulb.

ALAMEDA CO.

FOR CONTINUATION SEE MAP 39

DETAIL



1,620,

1,623,

FOR CONTINUATION SEE MAP 70

1,632,

1,635,

FOR CONTINUATION SEE MAP 51

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