Shell Oil Products US

RECEIVED
By lopprojectop at 3:49 pm, May 04, 2006

May 1, 2006

Re: **Work Plan for Soil and Groundwater Assessment**
Shell Service Station
809 East Stanley Boulevard
Livermore, California

Dear Mr. Jerry Wickham:

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge.

Sincerely,
Shell Oil Products US

Denis L. Brown
Sr. Environmental Engineer

20945 S. Wilmington Avenue, Carson, CA 90810 P: (559) 645-9306; F: (559) 645-5643

Delta
Environmental
Consultants, Inc.

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175 Bernal Road • Suite 200
San Jose, California 95119 USA

800.477.7411
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RECEIVED
By lopprojectop at 3:49 pm, May 04, 2006

May 1, 2006
Project SJ80-9ST-1.2006

Mr. Jerry Wickham
Environmental Health Services – Environmental Protection
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Re: Work Plan for Soil and Groundwater Assessment
Shell Service Station
809 East Stanley Boulevard
Livermore, California

Dear Mr. Wickham:

Delta Environmental Consultants, Inc. (Delta), on behalf of Shell Oil Products US (Shell), proposes soil and groundwater confirmation sampling at the above referenced site (Figure 1). Shell anticipates that a request for an issuance of a no further action case closure letter will be submitted along with the results of a soil and groundwater sampling report.

BACKGROUND

The following sections present a description of the current service station and a brief summary of previous site soil and groundwater investigations.

SITE DESCRIPTION

The site is located on the southeastern corner of the intersection of East Stanley and Murrieta Boulevards in Livermore, California (Figure 1). The site is the location of a Shell-branded service station. The service station consists of a convenience store, car wash, four fuel dispenser islands, and three underground fuel storage tanks (USTs). A station plan is presented on Figure 2.

PREVIOUS SITE INVESTIGATIONS

In August 1986, Emcon Associates drilled four soil borings (S-A through S-D) adjacent to the fuel USTs and a waste oil UST scheduled for removal and replacement. The fuel USTs were then located in the southern portion of the site. Boring locations are shown on a map in Attachment A. Soil samples were collected from the borings and analyzed for petroleum hydrocarbons. Petroleum hydrocarbons were not detected in any of the samples analyzed. A copy of an Emcon Associates report dated September 8, 1986 is provided as Attachment A.

The fuel and waste oil USTs were removed and replaced in November 1986. Kaprealian Engineering, Inc. collected soil samples from beneath each UST. Petroleum hydrocarbons were not detected in any of the soil samples analyzed. A copy of the Kaprelian Engineering, Inc. dated December 4, 1986 is provided as Attachment B. The waste oil UST was subsequently removed and not replaced in 1989. Petroleum hydrocarbons were not detected in soil samples from beneath the waste oil UST. A copy of a report by Weiss Associates dated October 6, 1989 is provided as Attachment C. Sometime after 1989, the fuel USTs were relocated to their current position in the northwest portion of the site (Figure 2). Delta was unable to locate any report describing removal and relocation of the fuel USTs.

GRASP

In September 2001, IT Corporation (IT) supervised the drilling and installation of four groundwater monitoring wells (MW-1 through MW-4, Figure 2) as part of Shell's Groundwater Assessment Program (GRASP). GRASP is a voluntary initiative by Shell to install groundwater monitoring wells at numerous retail service stations nationwide that do not have any active release cases but have been identified to be in close proximity to one or more public water supply wells. Delta has field verified California Water Service Well 10-01 located approximately 1,740 feet northeast of the site.

Borings for monitoring wells encountered primarily clays and gravels to their total depths 47.5 feet below grade (bg). Groundwater was encountered in borings at a depth of approximately 37 to 38 feet bg. Wells are screened from 32.5 to 47.5 feet bg. Groundwater beneath the site appears to be confined. Currently, depth to water in site monitoring wells is approximately 16 feet bg. The groundwater flow direction is towards the northeast.

Soil samples from borings for monitoring wells were field screened for the presence of petroleum hydrocarbons by a photo ionization detector. One soil sample from the boring for Well MW-4 at the depth of 35.5 to 36 feet bg was retained for chemical testing. Petroleum hydrocarbons and fuel oxygenates were not detected in the soil sample. MTBE was detected in the initial groundwater sample (9/25/01) from Well MW-3 at 3.6 micrograms per liter (ug/l).

Following submittal of the Third Quarter 2002 GRASP Groundwater Monitoring Report, the Alameda County Health Care Services, in a letter to Shell Dated March 7 2003, placed the site in the Local Oversight Program.

Site wells have been sampled twelve times since installation. Site wells are currently on a semi-annual monitoring program and were last sampled during the first quarter of 2006. MTBE has been detected during five monitoring events, all in groundwater samples from Well MW-3 at concentrations ranging

from 0.64 to 3.6 micrograms per liter (ug/l). MTBE has not been detected in any site well since October 2003. TBA was recently detected in site Wells MW-1 and MW-2 during the first quarter 2006 monitoring event at concentrations of 1000 ug/l and 24 ug/l, respectively. Well MW-1 is located upgradient of all potential site sources of TBA. These are the first detections of TBA in either well. An Arco station at 785 East Stanley Boulevard with an open LUFT case is located directly west (cross-gradient) of the site. Historical laboratory results and depth to water measurements are included in the table in Attachment D.

Work Plan – Soil and Groundwater Investigation

In the pursuit of case closure, Delta proposes to advance five (5) soil borings (SB-1 through SB-5) in the locations shown in Figure 2. The purpose of these borings will be to detect any remaining petroleum hydrocarbon source areas in soil beneath the site.

Description of Methods

Prior to conducting any field work at the site, Delta will prepare a site specific Health and Safety Plan (HASP). The Delta field geologist on-site will review the HASP with site subcontractors at the start of each work day.

Soil Sampling:

Site Borings SB-1 through SB-5 will be advanced using a hollow stem auger rig to an approximate total depth of 40 feet in order to collect soil and groundwater samples. Borings SB-1 and SB-2 are located adjacent to the UST pit, Borings SB-3 and SB-4 are located adjacent to site piping and dispenser locations and Boring SB-5 is located in the area of the former fuel USTs. Prior to drilling, each borehole location will be surveyed by a geophysical locator and marked for underground utilities. Underground Services Alert (USA) will be notified of the proposed borings a minimum of 48-hours before Delta begins work at the site. Prior to drilling, the upper 7 feet of each borehole will be excavated by air vacuum equipment in order to minimize the risk of damaging any unidentified underground utilities. Delta will obtain drilling permits from the Zone 7 Water Agency before initiating any borings at the site.

Soil samples will be collected every 5 feet beginning at 5 feet below grade (bg), to the total depth of each boring. Each boring will be advanced to an approximate total depth of 40 feet bg in order to collect soil and groundwater samples. Soil samples will be collected in brass sample liners and sent to the laboratory for chemical testing. Soil will be analyzed in the field with a photo-ionization detector (PID), and readings from the soil will be recorded on the field logs. Samples will then be placed on ice for transport to Test America Sequoia Analytical in Morgan Hill, California. Additional soil samples may also be selected from site borings for laboratory analysis based on PID readings, field observations, and lithology. If PID readings greater than 10 parts per million by volume (ppmv) are recorded at the total boring depth of 40 feet bg, the boring will be advanced until two consecutive PID readings less than 10 ppmv have been recorded.

Grab groundwater samples will be collected from each boring for analysis. Groundwater will be collected using a Teflon bailer and decanted into laboratory provided containers. After completion of sampling, each borehole will be backfilled with a Portland cement/bentonite slurry mixture (5% bentonite).

Sample Analyses

All soil and groundwater samples submitted for laboratory testing will be analyzed for total petroleum hydrocarbons as gasoline (TPH-G), benzene, toluene, ethyl benzene, total xylenes (BTEX compounds), the five fuel oxygenates tert-butanol (TBA), di-isopropyl ether (DIPE), ethyl tert-butyl ether (ETBE) and tert-

amyl methyl ether (TAME); ethylene dibromide (EDB), 1,2 dichloroethane (1,2-DCA) and Ethanol. Analyses for petroleum hydrocarbons, fuel oxygenates, EDC and EDB will be performed by EPA Method 8260B.

Soil Investigation Report

Delta will prepare a *Soil and Groundwater Investigation Report* presenting data from proposed Borings B-1 through B-5. The report will include a written description of the work performed, boring location map, boring logs, summary table of soil and groundwater analytical data, and certified analytical reports and chain of custody documentation. All work will be performed under the direction of a California Professional Geologist.

Schedule

Delta is prepared to perform field work within 45 days of approval of this work plan by ACHSA. A report will be submitted within 30 days of completion of the field work. If soil and groundwater results are favorable, Delta on behalf of Shell will request case closure for the current leaking underground fuel tank case associated with the site.

REMARKS

The recommendations contained in this report represent Delta's professional opinions based upon the currently available information and are arrived at in accordance with currently acceptable professional standards. This report is based upon a specific scope of work requested by the client. The Contract between Delta and its client outlines the scope of work, and only those tasks specifically authorized by that contract or outlined in this report were performed. This report is intended only for the use of Delta's Client and anyone else specifically listed on this report. Delta will not and cannot be liable for unauthorized reliance by any other third party. Other than as contained in this paragraph, Delta makes no express or implied warranty as to the contents of this report.

If you have any questions regarding this site, please contact Lee Dooley of Delta at (408) 826-1880, or Mr. Denis Brown (Shell project manager) at (707) 865-0251.

Sincerely,
DELTA ENVIRONMENTAL CONSULTANTS, INC.

for Rebecca Wolff
Project Geologist

R. Lee Dooley
Senior Hydrogeologist

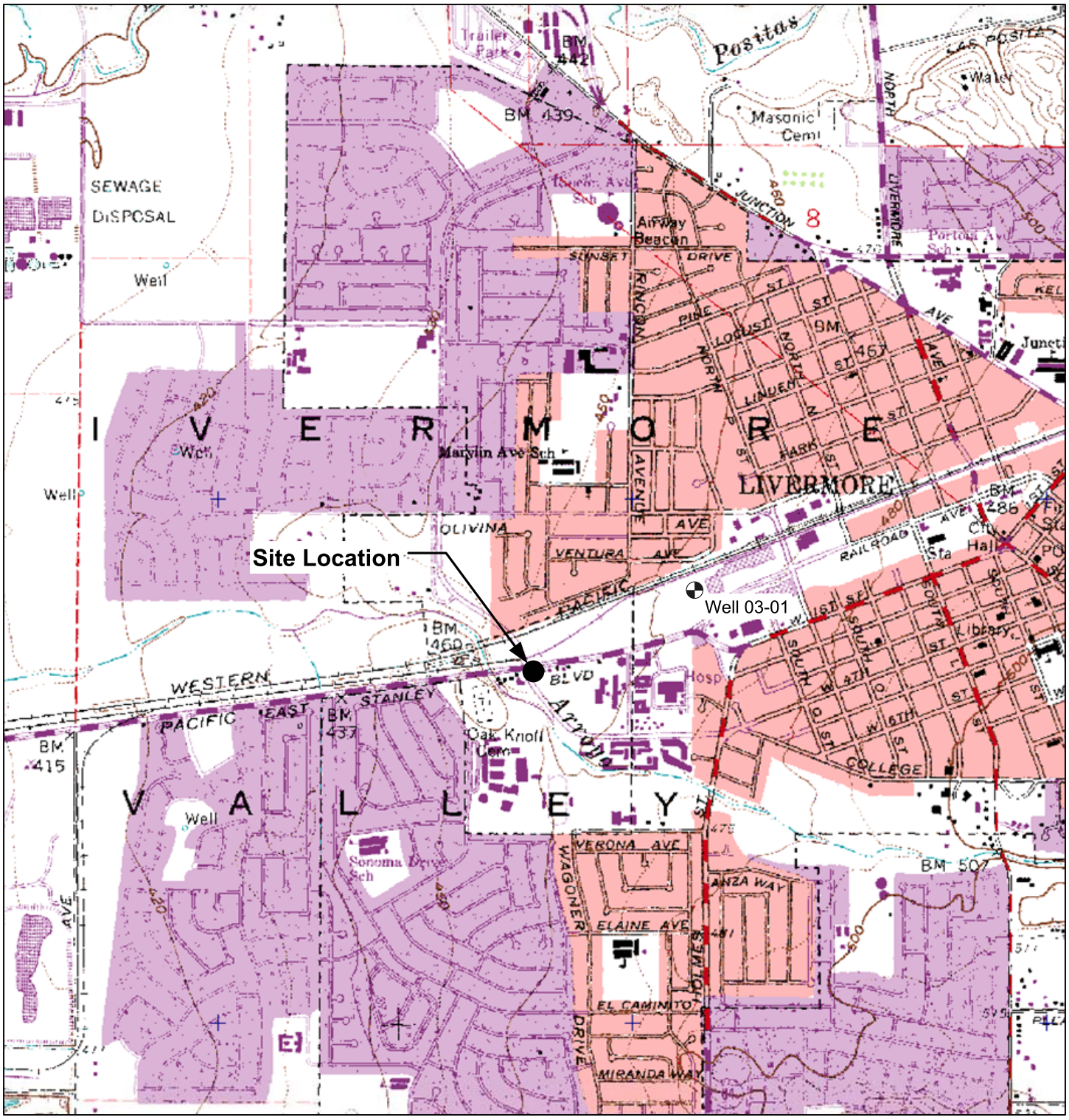
PROFESSIONAL GEOLOGIST
R. LEE DOOLEY
NO. 0183
CERTIFIED
HYDROGEOLOGIST
STATE OF CALIFORNIA

CHG 0183

Attachments:

Figure 1 – Site Location Map
Figure 2 – Site Map with Proposed Boring Locations
Attachment A -- Sampling Report (Emcon, September 8, 1986)
Attachment B – Sampling Report (Kaprealian Engineering, Inc, December 4, 1986)
Attachment C – Waste Oil Tank Removal Report (Weiss Associates, October 6, 1989
Attachment D -- Well Concentrations Table

cc: Denis Brown, Shell Oil Products US, Monte Rio
Isabel Mejia, Shell Oil Products US, Carson



GENERAL NOTES:
Base Map from: DeLorme Yarmouth, ME 04096 Source Data: USGS

QUADRANGLE LOCATION

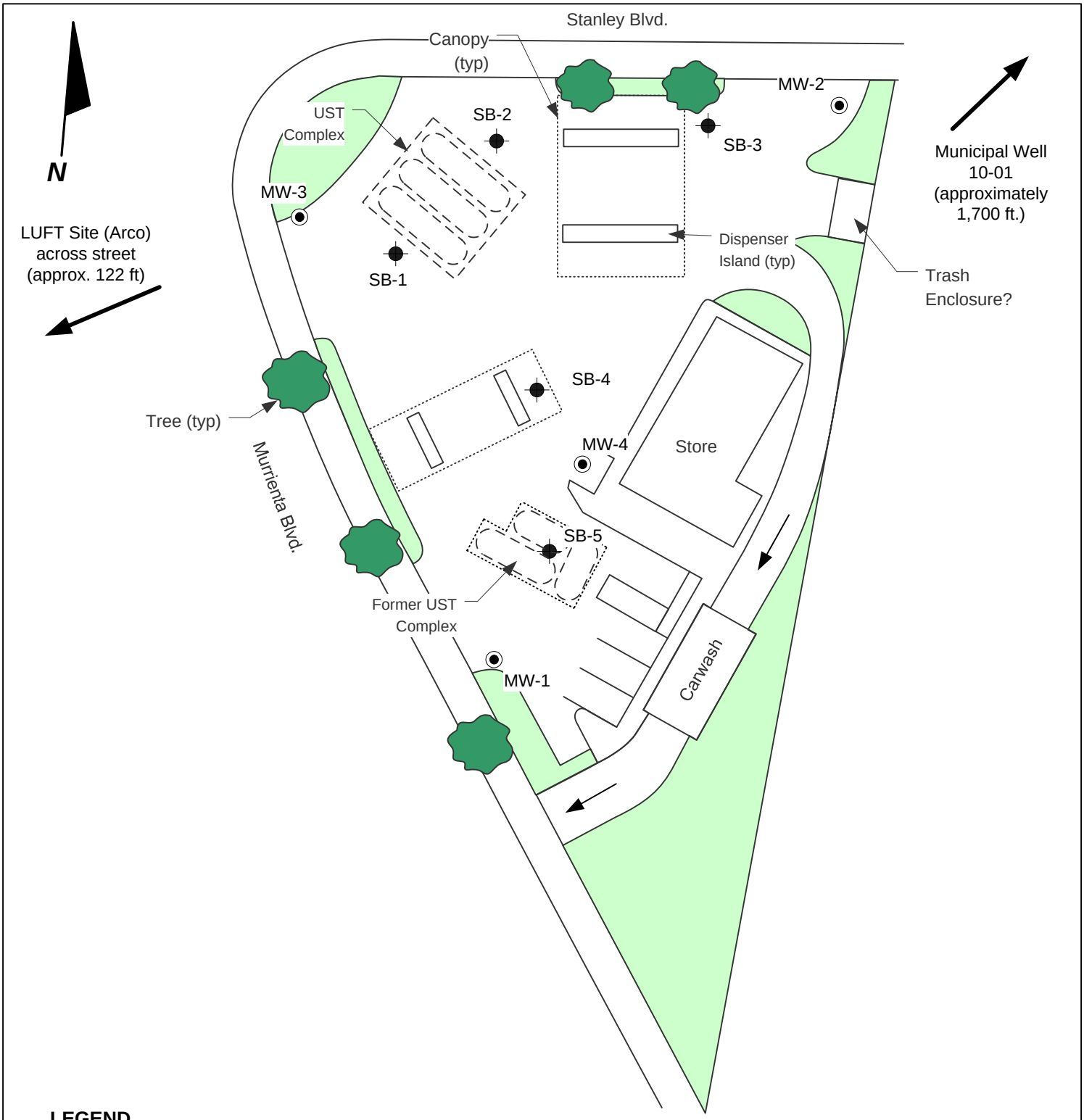
FIGURE 1

SITE LOCATION MAP

Shell-branded Service Station
809 East Stanley Blvd.
Livermore, California

PROJECT NO. SJ80-9ST-1.2005	DRAWN BY VF 12/01/03
FILE NO. SJ80-9ST-1.2005	PREPARED BY VF
REVISION NO. 1	REVIEWED BY DA

Delta Environmental Consultants, Inc.



LEGEND

MW-1 **GROUNDWATER MONITORING WELL**

SB-1 **PROPOSED SOIL BORING**

0 40 FT

APPROX. SCALE

FIGURE 2

SITE MAP

Shell-branded Service Station
809 East Stanley Ave.
Livermore, California

PROJECT NO. SJ80-9ST-1.2005	DRAWN BY JL 09./15/05
FILE NO. SJ8-09ST-1.2005	PREPARED BY HB
REVISION NO. 2	REVIEWED BY DA

Delta Environmental Consultants, Inc.

ATTACHMENT A

Sampling Report
(Emcon, September 8, 1986)

EMCON
ASSOCIATES
Consultants in Wastes
Management and
Environmental Control

September 8, 1986
Project 800-70.01

Gettler Ryan Inc.
1992 National Avenue
Hayward, California 94545
Attn: Mr. Jeffrey M. Ryan

Re: Shell Service Station
East Stanley Blvd. and
Murrieta Blvd., Livermore,
California

Gentlemen:

This letter presents the results of a soil investigation conducted by EMCON Associates at the Shell service station located at East Stanley Boulevard and Murrieta Boulevard in Livermore, California. The purpose of this investigation was to examine soil conditions adjacent to and within the subsurface gasoline storage tank complex and waste oil tank located at the site. It is EMCON's understanding that this information will be used to document gasoline concentrations for soil disposal if the underground storage tanks are replaced at the site.

FIELD INVESTIGATION PROCEDURES

Four exploratory borings (S-A through S-D) were drilled at the locations shown on Figure 1. Boring S-A was placed adjacent to the subsurface waste oil tank, Borings S-B, S-C, and S-D were placed within or adjacent to the subsurface gasoline storage tank complex. The borings were drilled using continous-flight hollow-stem auger drilling equipment and were logged by an EMCON geologist. Soil samples for logging were obtained from auger-return materials and by advancing a California split-spoon sampler into undisturbed soil beyond the tip of the auger. Soil samples for chemical analysis were placed in glass containers, packed on ice, and delivered directly to a certified analytical laboratory. Available laboratory results accompany this report.

Upon completion, the borings were backfilled with bentonite and soil cuttings to a depth of 1 foot, and concrete to the ground surface. Boring abandonment details accompany the attached Exploratory Boring Logs.

SITE CONDITIONS

Boring S-A encountered silty sand fill to a depth of 5 feet, underlain by sand, clay, and clayey sand to the total depth explored of 19 feet. Borings S-B, S-C, and S-D encountered sand fill to depths of 9 to 11-1/2 feet, underlain by clay, clayey gravel, and clayey sand to the total depths explored. Ground water was encountered at a depth of approximately 20 to 25 feet.

No product odor was noted in Boring S-A to the total depth explored of 19 feet. In addition, no product odor was noted in samples collected from Borings S-B, S-C, and S-D to a depth to 25 feet. Product odor was noted in soils from these borings at or near the water table, in the approximate depth interval of 27 to 35-1/2 feet. Product odor was described as strong in Boring S-B, moderate in S-C, and faint in S-D.

LABORATORY INVESTIGATIONS AND RESULTS

All soil samples collected from Borings S-B, S-C, and S-D between the depths of 4 and 20 feet (in or just below the tank backfill material), were analyzed for the presence of gasoline and BTX (benzene, toluene, and xylene) compounds as specified by Gettler Ryan. Additionally, soil samples from Boring S-A were analyzed for waste oil. The samples analyzed for gasoline and BTX compounds showed no detection at the lowest detection limits for the compounds being tested. The analysis for waste oil has not been completed at this time, results will be forwarded to Gettler-Ryan by September 12, 1986. Certified analytical results for the gasoline and BTX compounds accompany this letter.

If you have any questions regarding the contents of this letter, please do not hesitate to call.

Very Truly Yours,

EMCON Associates

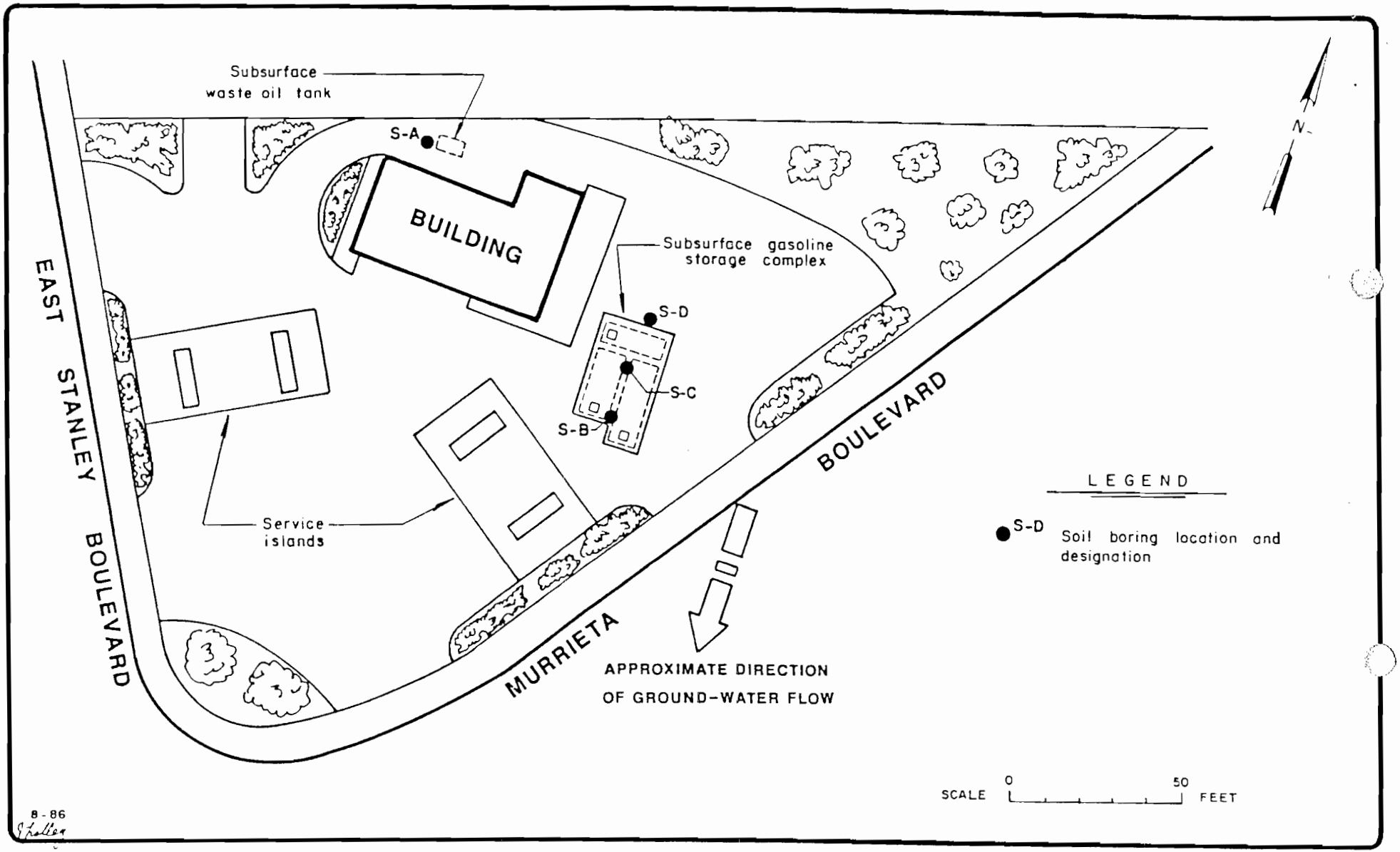
Christine R Wilson

Christine R. Wilson
Staff Geologist

Susan Willhite

Susan M. Willhite
Senior Project Geologist
CEG 1272

CRW/SMW:ebl



8-86

EMCON Associates

GETTLER-RYAN, INC.
SUBSURFACE HYDROGEOLOGIC INVESTIGATION
SHELL STATION, EAST STANLEY BLVD. AND MURRIETA BLVD.
LIVERMORE, CALIFORNIA

SITE PLAN

FIGURE 1

PROJECT NO. 800-70.01

LOG OF EXPLORATORY BORING

PROJECT NUMBER 800-70.01 BORING NO. S-A

PROJECT NAME Gettler-Ryan, Shell, E. Stanley & Murrieta PAGE 1 OF 1

BY EBL DATE 8/11/86 Livermore SURFACE ELEV. 455' ±

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				0			ASPHALT, SAND, and GRAVEL-FILL.
						SM	SILTY SAND-FILL.
				5			
		43			1	SW	SAND; dark grayish brown (10YR, 3/2); 5-10% fines; fine to coarse sand; 5-10% fine to coarse gravel; dense; dry; no product odor.
				10			
		60 for 1 foot			2	CL	CLAY; dark grayish brown (10YR, 4/3); 20-30% fine sand; 20-30% medium to coarse sand; 5-10% fine gravel; firm; moist; no product odor.
				15			
		50 for6"			3	SC	CLAYEY SAND; light olive brown (2.5Y, 5/4); 10-20% fines; 30-40% fine sand; 15-30% medium to coarse sand; medium dense; dry; no product odor.
				20			BOTTOM OF BORING AT 19 FEET.
				25			
				30			
				35			
				40			

REMARKS

Drilled by 5-inch continuous-flight, solid-stem auger; samples collected with 2-inch California modified split-spoon sampler. Boring backfilled with cuttings to 1 foot; concrete to surface.

PLATE A

LOG OF EXPLORATORY BORING

PROJECT NUMBER 800-70.01 BORING NO. S-B

PROJECT NAME Gettler-Ryan, Shell, E. Stanley & Murrieta, Livermore PAGE 1 OF 1

BY EBL DATE 8/11/86 SURFACE ELEV. 455'±

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
							CONCRETE, SAND, and GRAVEL-FILL.
						SM	SILTY SAND-FILL; dark grayish brown (10YR, 4/2); 10-20% fines; 15-25% medium to coarse sand; loose; dry; no product odor.
		6		5	1	SW	SAND-FILL; dark brown (10YR, 3/3); 10-15% fines; fine to medium sand; 5-10% coarse sand; loose; moist; no product odor.
	4.0	11		10	2	CH	@8-1/2': 10-20% fine to coarse gravel.
	4.5	38			3		CLAY; dark brown (10YR, 3/3); 10-20% fine sand; very stiff; moist; no product odor.
				15			@ 12': occasional root fragments; no product odor.
		65	▽	20	4	GC	CLAYEY GRAVEL; dark brown (10YR, 3/3); 40-50% fines; 50-60% coarse sand to coarse gravel; very dense; damp to wet; no product odor.
		75 for 1 foot		25	5		@ 24-1/2': brown (10YR,4/3); 40-50% fines; 10-20% fine to medium sand; 40-50% coarse sand to coarse gravel.
		28		30	6	SC	CLAYEY SAND; dark grayish brown (2.5Y, 4/2); 20-30% fines; 40-50% fine sand; 10-20% medium to coarse sand; trace gravel; medium dense; damp to wet; strong product odor; root holes.
	1.0	22		35	7	CL	CLAY; light olive brown (2.5Y, 5/6); 15-25% fine sand; firm to stiff; damp to wet; strong product odor; root holes and root fragments.
				40			BOTTOM OF BORING AT 35-1/2 FEET.

REMARKS

Drilled by 8-inch continuous-flight, hollow-stem auger; samples collected with 2-inch California modified split-spoon sampler. Boring backfilled with Bentonite to 33 feet, cuttings to 1 foot; concrete to surface.

PLATE B

LOG OF EXPLORATORY BORING

PROJECT NUMBER 800-70.01 BORING NO. S-C

PROJECT NAME Gettler-Ryan, Shell, E. Stanley & Murrieta, Livermore PAGE 1 OF 1

BY EBL DATE 8/11/86 SURFACE ELEV. 455'±

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				0			CONCRETE, SAND, and GRAVEL-FILL.
						SW	SAND-FILL: dark brown (10YR, 3/3): 10-20% fines; fine to medium sand; 10-15% coarse sand; loose; dry; no product odor.
				5	1		
		5		10	2		@ 8-1/2": grayish brown (2.5Y, 5/2); moist; no product odor.
	4.0	28			3	CH	CLAY; brown (10YR, 4/3); 10-20% fine sand; very stiff to hard; moist; no product odor.
				15			
	0.5	10			4	CL	CLAY; brown (10YR, 4/2); 10-20% fine sand; 5% fine to coarse gravel; moist; soft; no product odor.
				20			
		52				GC	
			▽	25	5		CLAYEY GRAVEL; dark brown (10YR, 4/3); 40-50% fines; fine to coarse gravel; 10-15% fine sand; 10-20% medium to coarse sand; loose; wet; no product odor.
						SC	CLAYEY SAND; dark gray (5Y, 4/1); 20-30% fines; fine sand; 10-15% medium to coarse sand; loose; wet; moderate product odor.
	2.5	18		30	6	CL	CLAY; brown (10YR, 4/3); 10-20% fine sand; very stiff; damp to wet; moderate product odor.
				35			BOTTOM OF BORING AT 31-1/2 FEET.
				40			

REMARKS

Drilled by 8-inch continuous-flight, hollow-stem auger; samples collected with 2-inch California modified split-spoon sampler. Boring backfilled with Bentonite to 30-1/2 feet; cuttings to 1 foot; concrete to surface.

PLATE C

LOG OF EXPLORATORY BORING

PROJECT NUMBER 800-70.01 BORING NO. S-D

PROJECT NAME Gettler-Ryan, Shell, E. Stanley & Murrieta, PAGE 1 OF 1

BY EBL DATE 8/11/86 Livermore SURFACE ELEV. 455'±

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				5	1	SW	ASPHALT, SAND, and GRAVEL-FILL. SAND-FILL; brown (10YR, 3/3); 5-10% fines; medium to coarse sand; 20-25% fine to coarse gravel; loose; moist; no product odor.
	3.0	15		10	2	CH	CLAY; dark brown (10YR, 3/3); 10-15% fine sand; 5-10% medium to coarse sand; very stiff; moist; no product odor.
	4.0	32		15	3		@12 to 13-1/2': 10-20% fine sand; hard; occasional root fragments.
		60	▽	20	4	SC/SW	CLAYEY SAND, SAND-INTERBEDDED; dark brown (10YR, 3/3); CLAYEY SAND: 40-45% fines; fine sand; stiff; moist; SAND: 10-20% fines; 40-60% fine to coarse sand; 20-30% fine to coarse gravel; very dense; wet; no product odor.
	2.5	55		25	5	SC	
						CL	CLAYEY SAND; brown (10YR, 4/2); 30-40% fine sand; 5-10% coarse sand; 10-15% fine to medium gravel; very dense; moist; no product odor.
	1.5	20		30	6		CLAY; brown (10YR, 4/2); 10-20% fine sand; 5-10% coarse sand; stiff; moist; faint product odor.
				35			BOTTOM OF BORING AT 31-1/2 FEET.
				40			

REMARKS

Drilled by 8-inch continuous-flight, hollow-stem auger; samples collected with 2-inch California modified split-spoon sampler. Boring backfilled with Bentonite to 27-1/2 feet; concrete to 20 feet; cuttings to 1 foot; concrete to surface

PLATE D

EMCON ASSOCIATES • CHEMICAL LABORATORIES
Analysis • Consultation • Research • Environmental Studies
State Approved Water Laboratory

EMCON ASSOCIATES

CERTIFIED ANALYTICAL REPORT

Report to:
Gettler-Ryan
1992 National Ave
Hayward, CA 94545

Project Number: 800-70.01

Sample Type: SOIL
Units: mg/kg

Sample Designation:	SB:4-5.5	SB:8.5-10	SB:12-13.5	SB:19-20.5
Field Date:	08/11/86	08/11/86	08/11/86	08/11/86
Laboratory Number:	E86-0755	E86-0755	E86-0755	E86-0755
Benzene	<0.05	<0.05	<0.05	<0.05
Toluene	<0.1	<0.1	<0.1	<0.1
Xylenes and Ethylbenzene	<0.4	<0.4	<0.4	<0.4
Volatile Hydrocarbons due to Gasoline	<5	<5	<5	<5

Sample Designation:	SC:4-5.5	SC:8.5-10	SC:12-13.5	SC:18-19.5
Field Date:	08/11/86	08/11/86	08/11/36	08/11/86
Laboratory Number:	E86-0755	E86-0755	E86-075[illegible]	E86-0755
Benzene	<0.05	<0.05	<0.05	<0.05
Toluene	<0.1	<0.1	<0.1	<0.1
Xylenes and Ethylbenzene	<0.4	<0.4	<0.4	<0.4
Volatile Hydrocarbons due to Gasoline	<5	<5	<5	<5

Sample Designation:	SD:4-5.5	SD:8.5-10	SD:12-13.5	SD:18-19.5
Field Date:	08/11/86	08/11/86	08/11/86	08/11/86
Laboratory Number:	E86-0755	E86-0755	E86-0755	E86-0755
Benzene	<0.05	<0.05	<0.05	<0.05
Toluene	<0.1	<0.1	<0.1	<0.1
Xylenes and Ethylbenzene	<0.4	<0.4	<0.4	<0.4
Volatile Hydrocarbons due to Gasoline	<5	<5	<5	<5

Reported by: Philip Murphy Date: 9-4-86

1921 RINGWOOD AVENUE, SAN JOSE, CALIFORNIA 95131 TELEPHONE (408) 275-1444

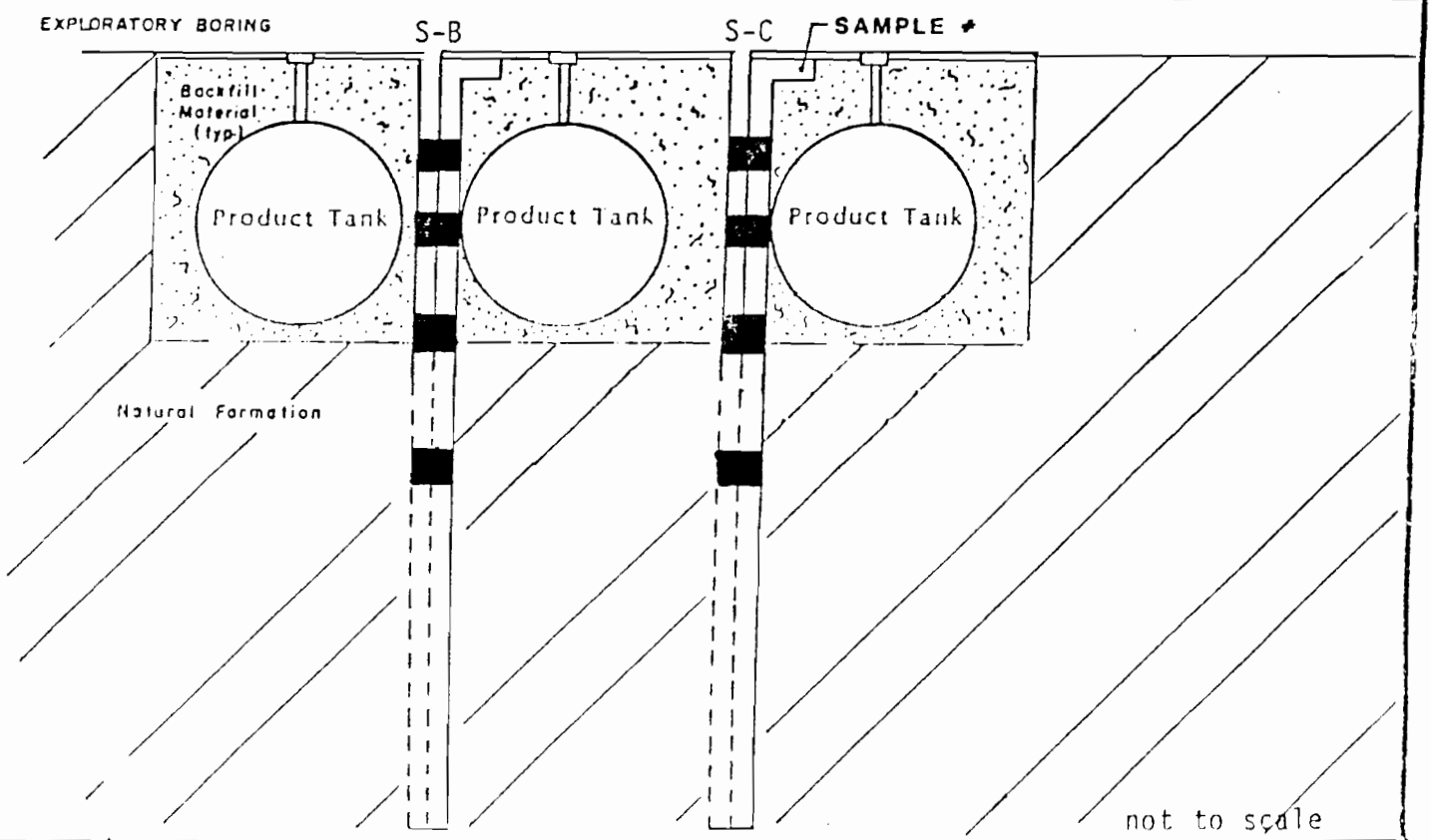
EMCON ASSOCIATES

GETTLER-RYAN, INC.

GENERALIZED PROFILE OF SUBSURFACE TANK COMPLEX AND GASOLINE CONCENTRATIONS WITHIN BACKFILL MATERIAL

PROJECT NUMBER 800-70.01
PROJECT NAME G-R Shell, Livermore
NUMBER OF TANKS IN COMPLEX 3

MAPVIEW DIMENSIONS 20' x 36'
APPROXIMATE DEPTH 11-1/2'



SAMPLE #	BORING	DEPTH INTERVAL (feet)	GASOLINE CONCENTRATION (parts per million)
1	S-B	4 to 5-1/2	nd
2	S-B	8-1/2 to 10	nd
3	S-B	12 to 13-1/2	nd
4	S-B	19 to 20-1/2	nd
1	S-C	4 to 5-1/2	nd
2	S-C	8-1/2 to 10	nd
3	S-C	12 to 13-1/2	nd
4	S-C	18 to 19-1/2	nd

nd= no detection

Detection limit = 5 ppm

ATTACHMENT B

Sampling Report

(Kaprealian Engineering, Inc., December 4, 1986)

KAPREALIAN ENGINEERING, INC.
Consulting Engineers
535 Main Street
Martinez, Ca. 94553
(415) 372-5444

KEI-J86-1116
December 4, 1986

Shell Oil Corporation
P.O. Box 7004
Lafayette, CA 94549

Attn: Ms. D. Lundquist

Re: Soil Sampling Report for
Shell Service Station Located at
809 Stanley Blvd.
Livermore California

Dear Ms. Lundquist:

This report summarizes Kaprealian Engineering, Inc. (KEI) findings at the referenced site.

On November 10, 1986 KEI conducted tank inspection and soil sampling during the removal of four (4) underground tanks from the site. The underground tanks consisted of three (3) fuel tanks, and one (1) waste oil tank. The purpose of the inspection and sampling was to comply with regulatory agencies requirements. The attached sketch shows the approximate location of the removed tanks and the locations where the soil samples were taken.

KEI's activities included the following:

1) Soil sample collection from the site

2) Tank inspection

3) Chemical analyses of the soil samples by a certified laboratory

4) Technical report preparation

FIELD INVESTIGATION

KEI's field investigation was conducted on November 10 and 11, 1986, and consisted of visual inspection of the tanks and soil sampling.

The tanks were removed prior to soil sampling. The tanks appeared to be in good condition. The depth of excavation of the fuel tank pit was approximately eleven (11) feet. A total of eight (8) soil samples were taken. Six (6) samples were taken beneath the fuel tanks, one (1) sample from the waste oil tank pit, and one composite sample from stockpiled soil. (Composite soil sample consisted of four (4) individual grab samples taken at various depths and composited as comp.-1). Except the composite soil sample, all samples were taken at a minimum depth of two feet below the tanks. The locations where the samples were taken are identified on the attached sketch. The soil samples were placed in clean brass tubes; sealed with aluminium foil, plastic caps and tape, and stored in a cooled ice chest for delivery to the laboratory.

The subsurface soil exposed in the excavation consisted primarily of sand. No odor was noted in the soil.

ANALYTICAL RESULTS

The six (6) soil samples (A-1, A-2, B-1, B-2, C-1, and C-2) from the fuel tank pit and composite sample (comp.-1) from the stockpiled soil were analyzed for Total Hydrocarbons (THC), and Benzene, Toluene and Xylene (BTX) concentrations. Sample W.O.-1, taken from beneath the waste oil tank, was analyzed for THC and EPA 8240 constituents. The laboratory results are attached to this report.

CONCLUSIONS AND RECOMMENDATIONS

Based on the analytical results (concentrations of THC, BTX and volatile organic compound being below the detection limits), visual inspection, and no evidence of shallow groundwater, KEI recommends no further investigation.

This report, consisting of professional opinions and recommendations, has been prepared in accordance with generally accepted professional principles and practices existing for such work. This acknowledgement is in lieu of all warranties either express or implied. It should be noted that environmental changes, either naturally-occuring or artificially-induced, may cause changes in groundwater levels and flow paths and hence, the extent and concentration of any contaminants may change with time.

Copies of this report and the attachments should be sent to the Alemeda County Department of Public Health and the California Regional Water Quality Control Board.

Should you have any questions on this report please do not hesitate to contact me at (415) 372-5444.

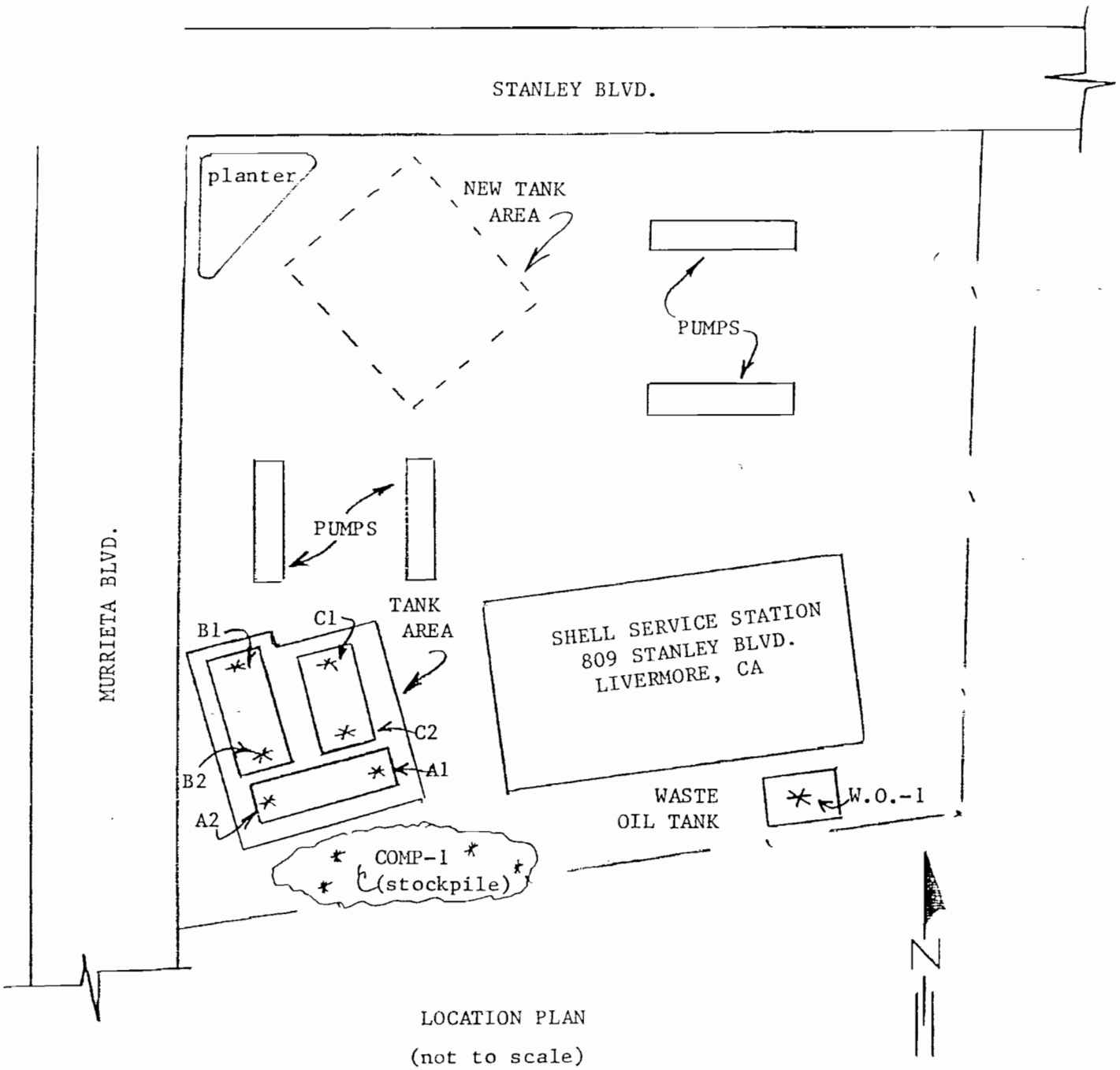
Sincerely,

Kaprealian Engineering, Inc.

Mardo Kaprealian

Attachments: Table-1 Analytical Results
Location Plan
Laboratory Analyses

KAPREALIAN ENGINEERING, INC.
Consulting Engineers
535 Main Street
Martinez, Ca. 94553
(415) 372-5444



LOCATION PLAN

(not to scale)

* soil sample

SEQUOIA Analytical Laboratory
2549 Middlefield Road
Redwood City, CA 94063 • (415) 364-9222

Kaprealian Engineering, Inc.
535 Main Street, Suite 309
Martinez, CA 94553
Attn: Mardo Kaprealian, P.E.
President

Date Sampled: 11/11/86
Date Received: 11/11/86
Date Reported: 11/25/86

Sample Number
6110591

Sample Description
Soil, A-1
Shell-Livermore

ANALYSIS

	Detection Limit ppm	Sample Results ppm
Total Hydrocarbons	1	< 1.0
Benzene	0.1	< 0.1
Toluene	0.1	< 0.1
Xylenes	0.1	< 0.1

NOTE: Analysis was performed using EPA methods 5020 and 8015 with method 8020 used for BTX distinction.

SEQUOIA ANALYTICAL LABORATORY

Arthur G. Burton
Laboratory Director

sem

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Kaprealian Engineering, Inc.
535 Main Street, Suite 309
Martinez, CA 94553
Attn: Mardo Kaprealian, P.E.
President

Date Sampled: 11/11/86
Date Received: 11/11/86
Date Reported: 11/25/86

Sample Number
6110592

Sample Description
Soil, A-2
Shell-Livermore

ANALYSIS

	Detection Limit ppm	Sample Results ppm
Total Hydrocarbons	1	< 1.0
Benzene	0.1	< 0.1
Toluene	0.1	< 0.1
Xylenes	0.1	< 0.1

NOTE: Analysis was performed using EPA methods 5020 and 8015 with method 8020 used for BTX distinction.

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Arthur G. Burton
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sem

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535 Main Street, Suite 309
Martinez, CA 94553
Attn: Mardo Kaprealian, P.E.
President

Date Sampled: 11/11/86
Date Received: 11/11/86
Date Reported: 11/25/86

Sample Number
6110593

Sample Description
Soil, B-1
Shell-Livermore

ANALYSIS

	Detection Limit ppm	Sample Results ppm
Total Hydrocarbons	1	< 1.0
Benzene	0.1	< 0.1
Toluene	0.1	< 0.1
Xylenes	0.1	< 0.1

NOTE: Analysis was performed using EPA methods 5020 and 8015 with method 8020 used for BTX distinction.

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sem

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Kaprealian Engineering, Inc.
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Martinez, CA 94553
Attn: Mardo Kaprealian, P.E.
President

Date Sampled: 11/11/86
Date Received: 11/11/86
Date Reported: 11/25/86

Sample Number
6110594

Sample Description
Soil, B-2
Shell-Livermore

ANALYSIS

	Detection Limit ppm	Sample Results ppm
Total Hydrocarbons	1	< 1.0
Benzene	0.1	< 0.1
Toluene	0.1	< 0.1
Xylenes	0.1	< 0.1

NOTE: Analysis was performed using EPA methods 5020 and 8015 with method 8020 used for BTX distinction.

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535 Main Street, Suite 309
Martinez, CA 94553
Attn: Mardo Kaprealian, P.E.
President

Date Sampled: 11/11/86
Date Received: 11/11/86
Date Reported: 11/25/86

Sample Number
6110595

Sample Description
Soil, C-1
Shell-Livermore

ANALYSIS

	Detection Limit ppm	Sample Results ppm
Total Hydrocarbons	1	< 1.0
Benzene	0.1	< 0.1
Toluene	0.1	< 0.1
Xylenes	0.1	< 0.1

NOTE: Analysis was performed using EPA methods 5020 and 8015 with method 8020 used for BTX distinction.

SEQUOIA ANALYTICAL LABORATORY

Arthur G. Burton
Laboratory Director

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2549 Middlefield Road
Redwood City, CA 94063 • (415) 364-9222

Kaprealian Engineering, Inc.
535 Main Street, Suite 309
Martinez, CA 94553
Attn: Mardo Kaprealian, P.E.
President

Date Sampled: 11/11/86
Date Received: 11/11/86
Date Reported: 11/25/86

Sample Number
6110596

Sample Description
Soil, C-2
Shell-Livermore

ANALYSIS

	Detection Limit ppm	Sample Results ppm
Total Hydrocarbons	1	< 1.0
Benzene	0.1	< 0.1
Toluene	0.1	< 0.1
Xylenes	0.1	< 0.1

NOTE: Analysis was performed using EPA methods 5020 and 8015 with method 8020 used for BTX distinction.

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Arthur G. Burton
Laboratory Director

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2549 Middlefield Road
Redwood City, CA 94063 • (415) 364-9222

Kaprealian Engineering, Inc.
535 Main Street, Suite 309
Martinez, CA 94553
Attn: Mardo Kaprealian, P.E.
President

Date Sampled: 11/13/86
Date Received: 11/13/86
Date Reported: 11/20/86

Sample Number	Sample Description	Detection Limit ppm	Total Hydrocarbons as Gasoline ppm
6110770	Shell - Livermore, Soil W.O. #1	1.0	< 1.0

NOTE: Analysis was performed using EPA methods 5020 and 8015.

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Arthur G. Burton
Laboratory Director

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2549 Middlefield Road
Redwood City, CA 94063 • (415) 364-9222

Kaprealian Engineering, Inc.
535 Main Street, Suite 309
Martinez, CA 94553
Attn: Mardo Kaprealian, P.E.
President

Date Sampled: 11/13/86
Date Received: 11/13/86
Date Extracted: 11/17/86
Date Reported: 11/20/86

Sample Number	Sample Description
6110770	Shell - Livermore, Soil W.O. #1

PRIORITY POLLUTANTS

VOLATILE ORGANIC COMPOUNDS
results in ppb

Acrolein	< 10,000	trans-1,2-Dichloroethene	< 50
Acrylonitrile	< 10,000	1,2-Dichloropropane	< 50
Benzene	< 50	1,3-Dichloropropene	< 50
Bromomethane	< 50	Ethylbenzene	< 50
Bromodichloromethane	< 50	Methylene chloride	< 50
Bromoform	< 50	1,1,2,2-Tetrachloroethane	< 50
Carbon tetrachloride	< 50	Tetrachloroethene	< 50
Chlorobenzene	< 50	1,1,1-Trichloroethane	< 50
Chloroethane	< 50	1,1,2-Trichloroethane	< 50
2-Chloroethylvinyl ether	< 50	Trichloroethene	< 50
Chloroform	< 50	Toluene	< 50
Chloromethane	< 50	Vinyl chloride	< 50
Dibromochloromethane	< 50	1,2-Dichlorobenzene	< 50
1,1-Dichloroethane	< 50	1,3-Dichlorobenzene	< 50
1,2-Dichloroethane	< 50	1,4-Dichlorobenzene	< 50
1,1-Dichloroethene	< 50		

SEQUOIA ANALYTICAL LABORATORY

Arthur G. Burton
Laboratory Director

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NOTE: Methods 8010 & 8020 of the EPA were used for this analysis.

SEQUOIA Analytical Laboratory
2549 Middlefield Road
Redwood City, CA 94063 • (415) 364-9222

Kaprealian Engineering, Inc.
535 Main Street, Suite 309
Martinez, CA 94553
Attn: Mardo Kaprealian, P.E.
President

Date Sampled: 11/10/86
Date Received: 11/11/86
Date Reported: 11/12/86

Sample Number
6110581

Sample Description
Shell - Livermore, Soil
Comp. #1

ANALYSIS

	Detection Limit ppm	Sample Results ppm
Total Hydrocarbons	1	< 1.0
Benzene	0.1	< 0.1
Toluene	0.1	< 0.1
Xylenes	0.1	< 0.1

NOTE: Analysis was performed using EPA methods 5020 and 8015 with method 8020 used for BTX distinction.

SEQUOIA ANALYTICAL LABORATORY

Arthur G. Burton
Laboratory Director

sem

ATTACHMENT C

Waste Oil Tank Removal Report
(Weiss Associates, October 6, 1989)

WEISS ASSOCIATES
Consulting in Geology & Geohydrology
2938 McClure Street, Oakland, CA 94609
415-465-1100

October 6, 1989

Wendy Howell
Shell Oil Company
P.O. Box 4848
Anaheim, CA 92803

Re: Shell Service Station
WIC #204-438-008
809 East Stanley Boulevard
Livermore, California
WA Job #81-431-02

Dear Ms. Howell:

This letter is submitted to satisfy the tank closure requirements of the California Regional Water Quality Control Board - San Francisco Bay Region (WQCB), and California Administrative Code Title 23 Waters, Chapter 3, Subchapter 16, Article 7, for the November 1986 removal of a former waste oil tank at the Shell service station at 809 East Stanley Boulevard in Livermore, California.

Summarized below are previous and current data, including the site background, a site history summary, discussion of site and regional hydrogeologic conditions, descriptions of current tank closure requirements, and recommendations for achieving closure of the former waste oil tank excavation.

BACKGROUND

The subject station is located about 500 ft north of Arroyo Mocho, a perennial stream, on the southeastern corner of the intersection of East Stanley Boulevard and Murrieta Boulevard in Livermore, California. The operating station currently retails gasoline from three 10,000 gallon fiberglass storage tanks located in the southern portion of the site adjacent to Murrieta Boulevard. Waste oil is stored in a 550 gallon fiberglass tank immediately east of the station building. A site map showing the location of the former waste oil tank is presented as Attachment A.

SITE HISTORY SUMMARY

Shell Oil Company records indicate that two 8,000 gallon and one 10,000 gallon steel gasoline tanks and a steel 550 gallon waste oil tank were removed from the site in November

1986 by Petroleum Engineering, of Santa Rosa, California. The removed waste oil tank and two of the gasoline tanks were apparently installed in 1968 when the station opened. The third gasoline tank was apparently installed in 1970. The steel waste oil tank was replaced with a 550 gallon fiberglass tank. This report is submitted to document the closure of the waste oil tank.

Following the tank removal, Kaprealian Engineering Inc. of Martinez, California (KEI), observed and documented the tank condition and collected one soil sample from beneath the former tank location, and samples of the soil stockpiles excavated from the tank pit. The native soil sample from beneath the waste oil tank was submitted to Sequoia Analytical Laboratory of Redwood City, California (Sequoia). Sequoia analyzed the soil sample for:

- Total Hydrocarbons (THC) by EPA Method 8015, gas chromatography/flame ionization detection (GC/FID),
- Aromatic hydrocarbons, including, benzene, toluene, ethylbenzene and xylenes (BETX) by EPA Method 8020, gas chromatography with photoionization detection (GC/PID), and
- Halogenated hydrocarbons by EPA Methods 8010, gas chromatography/"Hall" detection (GC/Hall).

The stockpile soil samples were analyzed for total and organic lead by EPA method 7420, Furnace Atomic Adsorption, and for flashpoint to characterize the stockpile for disposal. The Sequoia analytic results are presented in Table 1. The Sequoia analytic reports are included in the KEI report (Attachment B).

According to Kaprealian Engineering tank removal records, no ground water was encountered in the excavation and the steel tank was rusted and pitted but had no obvious holes when it was removed.

A subsurface investigation was conducted at the site in September 1986 by EMCON Associates of San Jose, California, to characterize subsurface conditions prior to the tank removals. Four soil borings were drilled at the site, including one adjacent to the waste oil tank. Results of the EMCON investigation were presented to Shell on September 8, 1986. A copy of the EMCON report is presented as Attachment C. The boring logs for the EMCON investigation indicate that the site is underlain by silty sand fill to depths between about 5 and

10 ft. Interbedded clay, clayey gravel and clayey sand underlies the fill to between 19 and 35.5 ft below ground surface. Ground water was encountered in the borings at depths between 19.5 and 25.5 ft. Soil samples collected from the boring adjacent to the waste oil tank between depths of 7.0 and 19.5 ft were analyzed for Total Petroleum Hydrocarbons (TPH) as oil. The analytic results for the samples were below the method detection limits, and no hydrocarbon odor was noted in the boring samples or drill cuttings.

SITE HYDROGEOLOGIC CONDITIONS

To estimate the stratigraphy, ground water flow direction and the approximate ground water depth in the site vicinity WA:

- Observed neighboring sites and reviewed local and state agency files to determine whether any water wells were nearby, and
- Researched local and regional hydrogeologic data.

Results of this work indicate:

- Other than the four soil borings drilled on the Shell service station property, no water wells or soil borings are on the adjacent properties.
- An Alameda County Flood Control and Water Conservation District (Zone 7) August 1989 listing of recorded wells in the Livermore ground water basin indicates that 28 wells are within a one-half mile radius of the site.
- Based on a Zone 7 Fall 1988 ground water contour map,[1] in the vicinity of the subject Shell station, unconfined ground water in the upper ground water-bearing zone flows northwestward and, in the fall of 1988, occurred at a depth of about 30 ft below ground surface. The Zone 7 map shows two distinct ground water-bearing zones beneath the site. In the fall of 1988, the potentiometric surface of

[1] Memorandum from D. Malonkowski to J. Killingstad, March 24, 1989, Fall 1988 Ground Water Level Contour Map, Alameda County Flood Control and Water Conservation District (Zone 7), 3 pp and 2 figures.

According to a June 2, 1988 (revised May 1989), Northern California WQCB guidance document,[5] if less than 100 ppm hydrocarbons are detected in the native soil, no hydrocarbons are detected at or below the seasonal high ground water level, low permeability soil underlies the tank, and no hydrocarbons are in ground water beneath the tank, the tank excavation can generally be closed with no further investigation.

SITE STATUS WITH RESPECT TO CLOSURE REQUIREMENTS

The results of the previous work at the site and WA's hydrogeologic research indicate:

- No fuel hydrocarbons or other volatile organic compounds were detected in the soil samples collected immediately below the removed tank.
- The tank was in apparently good condition at the time of its removal, and no evidence of tank leakage was noted in the tank excavation following the tank removal.
- According to the 1988 Zone 7 study cited above, the ground water depth in this part of the Livermore Valley was about 30 to 35 ft below ground surface in the fall of 1988. Assuming a historic ground water level of about 20 ft below ground surface, there is no indication that hydrocarbons are in soil below the historic high ground water elevation.
- The EMCON boring logs indicate that soils beneath the site consist of clay, clayey sand and clayey gravel.

RECOMMENDATIONS

Based on these site characteristics and the tank condition, there is no evidence that the former waste oil tank excavation presents a potential threat to ground water. In addition, the excavation meets tank closure requirements in effect at the time of the tank removal.

---

[5] North Coast, San Francisco Bay and Central Valley Regional Water Quality Control Boards, June 2, 1988, Regional Board Staff Recommendations for Initial Evaluation and Investigation of Underground Tanks, 18 pp.

Therefore, we recommend that Shell Oil apply for closure of the former waste oil tank excavation by submitting this report to the following agencies:

Alameda County Department of Environmental Health
Hazardous Materials Program
80 Swan Way, Room 200
Oakland, California 94621
Attn: Mr. Edgar Howell

California Regional Water Quality Control Board - San Francisco Bay Region
1111 Jackson Street
Oakland, California 94607
Attn: Mr. Lester Feldman

Alameda County Flood Control and Water Conservation District (Zone 7)
5997 Parkside Drive
Pleasanton, California 94566
Attn: Mr. Craig Mayfield

We are pleased to provide hydrogeologic consulting services to Shell Oil and trust this submittal meets your needs. Please call if you have any questions or comments.

Sincerely,
Weiss Associates,

Joseph P. Theisen
Project Geologist

Richard B. Weiss
Principal Hydrogeologist

RBW/JPT:ag

F:\ALL\SHELL\431L1OC9.WP

Enclosures: Attachment A - Site Map
Attachment B - Kaprealian Engineering Report
Attachment C - EMCON Report

TABLE 1. Analytic Results for Soil, Shell Service Station WIC #204-438-008, 809 E. Stanley Boulevard, Livermore, California

Sample ID	Sample Depth	Date Sampled	Sampled By	Sample Type	Analytic Lab	Analytic Technique	ANALYTIC RESULTS TPH	B	E	T	X	VOCs
							<----------parts per million---------->					
WO1	[a]	11/11/86	KE	Waste Oil Excavation	SAL	5020/8010/ 8015/8020	<1.0	<0.05	<0.05	<0.05	NA	ND
SA	7 - 8.5	8/11/86	EMCON	Waste Oil Soil Boring	EMCON	8015	<20[b]	NA	NA	NA	NA	NA
SA	13.5 - 14.5	8/11/86	EMCON	Waste Oil Soil Boring	EMCON	8015	<20[b]	NA	NA	NA	NA	NA
SA	18.5 - 19	8/11/86	EMCON	Waste Oil Soil Boring	EMCON	8015	<20[b]	NA	NA	NA	NA	NA

Abbreviations:

TPH = Total Petroleum Hydrocarbons as Diesel
B = Benzene
E = Ethylbenzene
T = Toluene
X = Xylenes
VOCs = Volatile Organic Compounds
NA = Not Analyzed
ND = Not detected at detection limit of 0.05 ppm
KE = Kaprealian Engineering, Martinez, California
EMCON = EMCON Associates, San Jose, California
SEQ = Sequoia Analytical Laboratory, Redwood City, California

Analytic Methods:

5020 = EPA Method 5020, Headspace Extraction
8010 = EPA Method 8010, Gas Chromatography with "Hall" Detector
8020 = EPA Method 8020, Gas Chromatography with Photoionization Detector
8015 = EPA Method 8015, Gas Chromatography with Flame Ionization Detector

Footnotes:

[a] = Sample collected 2 ft below tank bottom
[b] = TPH calculated as oil

ATTACHMENT D

Well Concentrations Table

WELL CONCENTRATIONS
Shell-branded Service Station
809 East Stanley Boulevard
Livermore, CA

Well ID	Date	TPPH (ug/L)	B (ug/L)	T (ug/L)	E (ug/L)	X (ug/L)	MTBE 8260 (ug/L)	DIPE (ug/l)	ETBE (ug/l)	TAME (ug/l)	TBA (ug/l)	TOC (MSL)	Depth to Water (ft.)	GW Elevation (MSL)
MW-1	09/25/2001	NA	<0.50	<0.50	<0.50	<0.50	<0.50	<2.0	<2.0	<2.0	<50	NA	NA	NA
MW-1	07/09/2002	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.0	<2.0	<2.0	<50	455.49	20.06	435.43
MW-1	10/25/2002	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.0	<2.0	<2.0	<50	455.49	19.71	435.78
MW-1	01/24/2003	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.0	<2.0	<2.0	<50	455.49	18.05	437.44
MW-1	04/21/2003	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<2.0	<2.0	<2.0	<5.0	455.49	17.57	437.92
MW-1	07/17/2003	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<2.0	<2.0	<2.0	<5.0	455.49	18.76	436.73
MW-1	10/20/2003	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<2.0	<2.0	<2.0	5.0	455.49	20.01	435.48
MW-1	01/13/2004	<50	<0.50	<0.50	<0.50	<1.0	<0.50	NA	NA	NA	NA	455.49	16.58	438.91
MW-1	07/27/2004	<50	<0.50	<0.50	<0.50	<1.0	<0.50	NA	NA	NA	NA	455.49	19.43	436.06
MW-1	01/06/2005	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<2.0	<2.0	<2.0	<5.0	455.49	17.20	438.29
MW-1	07/20/2005	<50	<0.50	<0.50	<0.50	<1.0	<0.50	NA	NA	NA	NA	455.49	17.69	437.80
MW-1	**01/10/2006**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**1,000**	**455.49**	**16.03**	**439.46**
MW-2	09/25/2001	NA	<0.50	<0.50	<0.50	<0.50	<0.50	<2.0	<2.0	<2.0	<50	NA	NA	NA
MW-2	07/09/2002	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.0	<2.0	<2.0	<50	454.84	20.40	434.44
MW-2	10/25/2002	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.0	<2.0	<2.0	<50	454.84	20.17	434.67
MW-2	01/24/2003	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.0	<2.0	<2.0	<50	454.84	18.30	436.54
MW-2	04/21/2003	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<2.0	<2.0	<2.0	<5.0	454.84	17.93	436.91
MW-2	07/17/2003	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<2.0	<2.0	<2.0	<5.0	454.84	19.01	435.83
MW-2	10/20/2003	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<2.0	<2.0	<2.0	<5.0	454.84	20.36	434.48
MW-2	01/13/2004	<50	<0.50	<0.50	<0.50	<1.0	<0.50	NA	NA	NA	NA	454.84	16.99	437.85
MW-2	07/27/2004	<50	<0.50	<0.50	<0.50	<1.0	<0.50	NA	NA	NA	NA	454.84	19.64	435.20
MW-2	01/06/2005	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<2.0	<2.0	<2.0	<5.0	454.84	17.60	437.24
MW-2	07/20/2005	<50	<0.50	<0.50	<0.50	<1.0	<0.50	NA	NA	NA	NA	454.84	17.90	436.94
MW-2	**01/10/2006**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**24**	**454.84**	**16.27**	**438.57**

WELL CONCENTRATIONS
Shell-branded Service Station
809 East Stanley Boulevard
Livermore, CA

Well ID	Date	TPPH (ug/L)	B (ug/L)	T (ug/L)	E (ug/L)	X (ug/L)	MTBE 8260 (ug/L)	DIPE (ug/l)	ETBE (ug/l)	TAME (ug/l)	TBA (ug/l)	TOC (MSL)	Depth to Water (ft.)	GW Elevation (MSL)
MW-3	09/25/2001	NA	<0.50	<0.50	<0.50	<0.50	3.6	<2.0	<2.0	<2.0	<50	NA	NA	NA
MW-3	07/09/2002	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.0	<2.0	<2.0	<50	454.87	19.95	434.92
MW-3	10/25/2002	<50	<0.50	<0.50	<0.50	<0.50	0.83	<2.0	<2.0	<2.0	<50	454.87	19.63	435.24
MW-3	01/24/2003	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.0	<2.0	<2.0	<50	454.87	17.90	436.97
MW-3	04/21/2003	<50	<0.50	<0.50	<0.50	<1.0	0.71	<2.0	<2.0	<2.0	<5.0	454.87	17.45	437.42
MW-3	07/17/2003	<50	<0.50	<0.50	<0.50	<1.0	0.69	<2.0	<2.0	<2.0	<5.0	454.87	18.69	436.18
MW-3	10/20/2003	<50	<0.50	<0.50	<0.50	<1.0	0.64	<2.0	<2.0	<2.0	<5.0	454.87	19.90	434.97
MW-3	01/13/2004	<50	<0.50	<0.50	<0.50	<1.0	<0.50	NA	NA	NA	NA	454.87	16.50	438.37
MW-3	07/27/2004	<50	<0.50	<0.50	<0.50	<1.0	<0.50	NA	NA	NA	NA	454.87	19.31	435.56
MW-3	01/06/2005	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<2.0	<2.0	<2.0	<5.0	454.87	17.15	437.72
MW-3	07/20/2005	<50	<0.50	<0.50	<0.50	<1.0	<0.50	NA	NA	NA	NA	454.87	17.53	437.34
MW-3	**01/10/2006**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<5.0**	**454.87**	**15.94**	**438.93**
MW-4	09/25/2001	NA	<0.50	<0.50	<0.50	<0.50	<0.50	<2.0	<2.0	<2.0	<50	NA	NA	NA
MW-4	07/09/2002	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.0	<2.0	<2.0	<50	456.24	21.15	435.09
MW-4	10/25/2002	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.0	<2.0	<2.0	<50	456.24	20.85	435.39
MW-4	01/24/2003	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.0	<2.0	<2.0	<50	456.24	19.15	437.09
MW-4	04/21/2003	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<2.0	<2.0	<2.0	<5.0	456.24	18.65	437.59
MW-4	07/17/2003	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<2.0	<2.0	<2.0	<5.0	456.24	19.87	436.37
MW-4	10/20/2003	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<2.0	<2.0	<2.0	<5.0	456.24	21.12	435.12
MW-4	01/13/2004	<50	<0.50	<0.50	<0.50	<1.0	<0.50	NA	NA	NA	NA	456.24	17.65	438.59
MW-4	07/27/2004	<50	<0.50	<0.50	<0.50	<1.0	<0.50	NA	NA	NA	NA	456.24	20.50	435.74
MW-4	01/06/2005	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<2.0	<2.0	<2.0	<5.0	456.24	18.29	437.95
MW-4	07/20/2005	<50	<0.50	<0.50	<0.50	<1.0	<0.50	NA	NA	NA	NA	456.24	18.73	437.51
MW-4	**01/10/2006**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<5.0**	**456.24**	**17.08**	**439.16**

WELL CONCENTRATIONS
Shell-branded Service Station
809 East Stanley Boulevard
Livermore, CA

Well ID	Date	TPPH (ug/L)	B (ug/L)	T (ug/L)	E (ug/L)	X (ug/L)	MTBE 8260 (ug/L)	DIPE (ug/l)	ETBE (ug/l)	TAME (ug/l)	TBA (ug/l)	TOC (MSL)	Depth to Water (ft.)	GW Elevation (MSL)

Abbreviations:
TPPH = Total petroleum hydrocarbons as gasoline by EPA Method 8260B.
BTEX = Benzene, toluene, ethylbenzene, xylenes by EPA Method 8260B.
MTBE = Methyl tertiary butyl ether
DIPE = Di-isopropyl ether, analyzed by EPA Method 8260B
ETBE = Ethyl tertiary butyl ether, analyzed by EPA Method 8260B
TAME = Tertiary amyl methyl ether, analyzed by EPA Method 8260B
TBA = Tertiary butyl alcohol or tertiary butanol, analyzed by EPA Method 8260B
TOC = Top of Casing Elevation
GW = Groundwater
ug/L = Parts per billion
MSL = Mean sea level
ft. = Feet
<n = Below detection limit
NA = Not applicable

Notes:
Survey data provided by KHM Environmental Management, Inc.