EMCON ASSOCIATES
Consultants in Wastes Management and Environmental Control

August 12, 1985
Project 738-08.01

Gettler-Ryan, Incorporated
1992 National Avenue
Hayward, California 94545

Attention: Mr. Jeffrey M. Ryan

Re: Shell Service Station,
Washington Avenue and
Lewelling Boulevard,
San Leandro, California

Gentlemen:

This letter presents the results of a soil and ground-water investigation conducted by EMCON Associates at the Shell service station located at Washington Avenue and Lewelling Boulevard in San Leandro, California. The purpose of this investigation was to examine soil and ground-water conditions adjacent to the subsurface product storage tanks located at the site.

FIELD INVESTIGATION PROCEDURES

Four exploratory borings (S-1 through S-4) were drilled at the locations shown on Figure 1. The borings were drilled using continuous-flight hollow-stem auger drilling equipment and were logged by an EMCON geologist. Soil samples for logging and chemical analysis 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 testing were placed in glass containers, packed on ice, and delivered directly to an independent laboratory as authorized by Gettler-Ryan. Laboratory results accompany this report.

Upon completion, all borings were converted to ground-water monitoring wells by the installation of 3-inch-diameter PVC casing. Well construction details accompany the attached Exploratory Boring Logs.

Each well was field-checked for the presence of free-floating product with a clear acrylic bailer upon completion. A sample of ground water from each of the wells which did not contain floating product was analyzed for the presence of gasoline using gas chromatography followed by flame-ionization and photo-ionization detectors.

SITE CONDITIONS

Boring S-1 was placed upgradient of the subsurface gasoline tank complex. Borings S-2, S-3 and S-4 were placed downgradient of the subsurface tank complex. Subsurface conditions explored during drilling ranged in depth from 18 to 21.5 feet. The borings generally encountered clay materials with a silty sand interbed in the approximate depth interval of 5 to 7 feet. Ground water was encountered at a depth of approximately 6 feet in all borings within the silty sand.

Strong product odor was noted in the silty sand interbed in Borings S-2, S-3, and S-4 in the depth interval of 4.5- to 7.5 feet. In addition, soils at the 5- to 6.5-foot depth interval in Boring S-3 were saturated with gasoline.

LABORATORY INVESTIGATIONS AND RESULTS

Soil samples collected between the depths of 5 and 8.5 feet in Borings S-2, S-3, and S-4 were analyzed for gasoline. Laboratory analysis of those soils revealed no gasoline at a depth of 7 to 8.5 feet for Boring S-2, 3,900 parts per million (ppm) gasoline at a depth of 5 to 6.5 feet for Boring S-3, and 3,100 ppm gasoline at a depth of 5 to 6.5 feet for Boring S-4.

Laboratory analysis of ground-water samples revealed gasoline concentrations of 520 ug/l or parts per billion (ppb) in Well S-1, 2,200 ppb in Well S-2, and 32,000 ppb in Well S-4. Well S-3 has contained approximately 6 inches of free-floating gasoline since the date drilled.

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

Very truly yours,

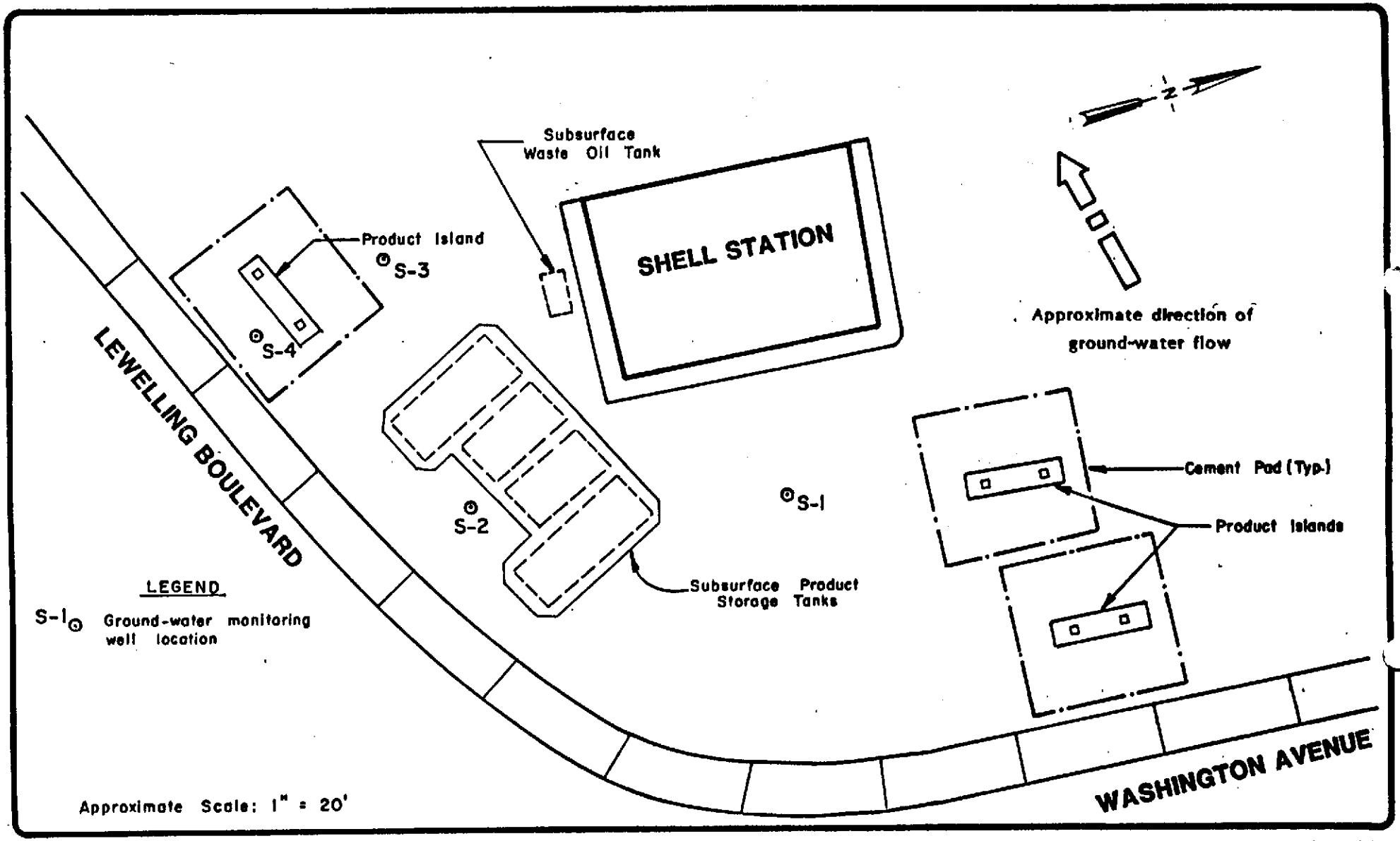
EMCON Associates

Erin Garner
Staff Geologist

Susan M. Willhite
Project Geologist

EG/SMW:mtg

Enclosures



EMCON Associates
San Jose, California

GETTLER-RYAN, INC.
SUBSURFACE HYDROGEOLOGIC INVESTIGATION
SHELL STATION, LEWELLING BLVD & WASHINGTON AVE.
SAN LEANDRO, CALIFORNIA

MONITORING WELL LOCATION MAP

FIGURE
1
PROJECT NO.
738-08.01

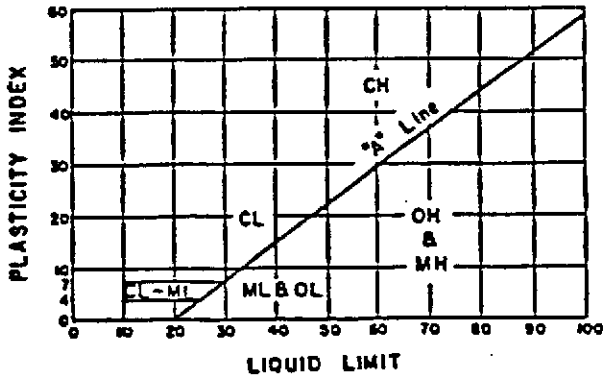
MAJOR DIVISIONS		SYMBOLS	TYPICAL SOIL DESCRIPTIONS
COARSE GRAINED SOILS (More than 1/2 of soil > no. 200 sieve size)	GRAVELS (More than 1/2 of coarse fraction > no. 4 sieve size)	GW	Well graded gravels or gravel-sand mixtures, little or no fines
		GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS (More than 1/2 of coarse fraction < no. 4 sieve size)	SW	Well graded sands or gravelly sands, little or no fines
		SP	Poorly graded sands or gravelly sands, little or no fines
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS (More than 1/2 of soil < no. 200 sieve size)	SILTS & CLAYS LL < 50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
	SILTS & CLAYS LL > 50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silty clays, organic silts
HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils

CLASSIFICATION CHART

(Unified Soil Classification System)

CLASSIFICATION	RANGE OF GRAIN SIZES	
	U.S. Standard Sieve Size	Grain Size in Millimeters
BOULDERS	Above 12"	Above 305
COBBLES	12" to 3"	305 to 76.2
GRAVEL	3" to No. 4	76.2 to 4.76
coarse	3" to 3/4"	76.2 to 19.1
fine	3/4" to No. 4	19.1 to 4.76
SAND	No. 4 to No. 200	4.76 to 0.074
coarse	No. 4 to No. 10	4.76 to 2.00
medium	No. 10 to No. 40	2.00 to 0.420
fine	No. 40 to No. 200	0.420 to 0.074
SILT & CLAY	Below No. 200	Below 0.074

GRAIN SIZE CHART



PLASTICITY CHART

METHOD OF SOIL CLASSIFICATION

EMCON

NOTES: Logs of Exploratory Borings

2.5 YR 6/2 — Denotes color as field checked to Munsell Soil Color Charts (1975 Edition)

 Denotes undisturbed sample taken in 2-inch split-spoon sampler.

 Denotes disturbed sample (bag sample).

 Denotes first observation of ground water.

 Denotes static ground-water level.

Penetration — Sample drive hammer weight - 140 pounds, drop - 30 inches. Blows required to drive sampler 1 foot are indicated on the logs.

LOG OF EXPLORATORY BORING

PROJECT NUMBER 738-08.01 BORING NO. S-1

PROJECT NAME Gettler-Ryan, Shell @ Washington & Lewelling, San Leandro PAGE 1 OF 2

BY JB DATE 6/18/85 SURFACE ELEV.

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				0		GC FILL	ASPHALT CLAYEY GRAVEL; Fill; dark olive gray (5Y, 3/2); fine to coarse gravel; 30-35% fines; damp; no product odor.
						CL	CLAY; dark gray (5Y, 4/1); trace fine sand; slightly silty; moist; no product odor.
				5			
			▽				
							@8.5': black (2.5Y, 3/0); no product odor.
	1.25	28		10			@10': grayish brown (2.5Y, 5/2); stiff; wet; slight product odor.
	3.0	25		15			
	1.5	12		20			@20': light olive brown (2.5Y, 5/4); very silty; firm; wet; no product odor.

REMARKS Drilled using 8-inch continuous flight hollow-stem auger.
Converted to a 3-inch monitoring well, detailed on Plate C.

EMCON ASSOCIATES

PLATE A

LOG OF EXPLORATORY BORING

PROJECT NUMBER 738-08.01 BORING NO. S-1

PROJECT NAME Gettler-Ryan, Shell @ Washington & Lewelling, PAGE 2 OF 2

BY JB DATE 6/18/85 San Leandro SURFACE ELEV.

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				20			HOLE TERMINATED AT 21½ FEET.
				25			

REMARKS

EMCON ASSOCIATES

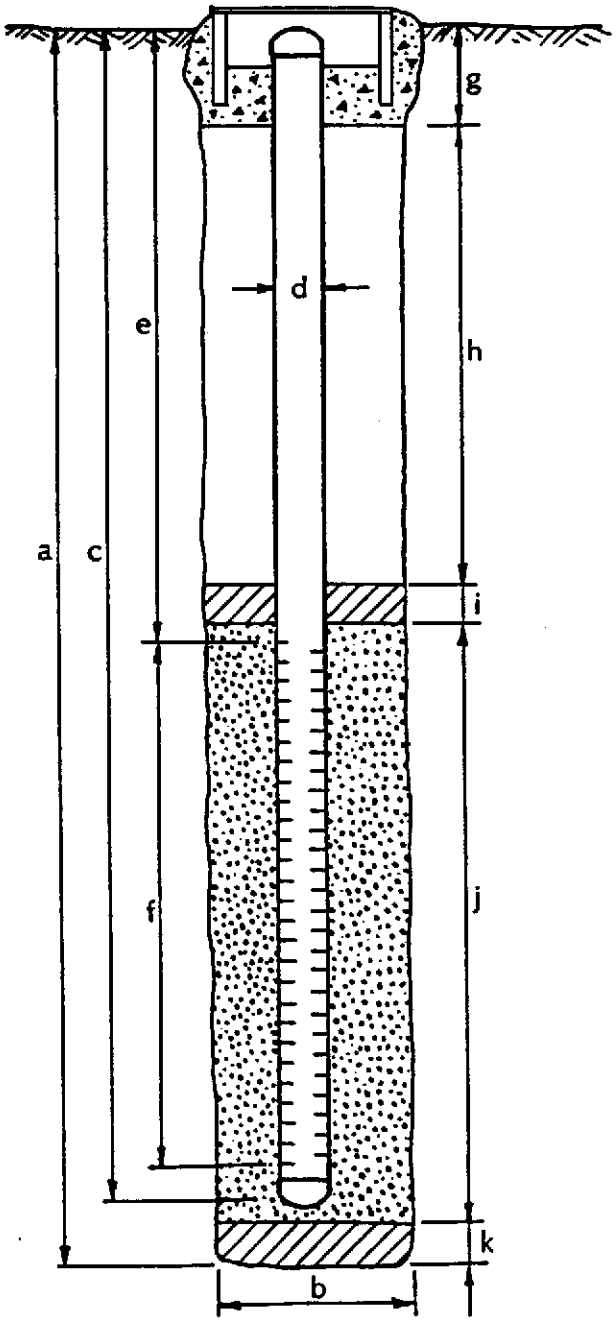
PLATE B

WELL DETAILS

PROJECT NUMBER 738-08.01
PROJECT NAME Gettler-Ryan, Shell @ Washington & Lewelling
COUNTY Alameda
WELL PERMIT NO. _____

BORING / WELL NO. S-1
TOP OF CASING ELEV. _____
GROUND SURFACE ELEV. _____
DATUM _____

G-5 vault box (Std.)



EXPLORATORY BORING

a. Total depth 21½ ft.
b. Diameter 8 in.
Drilling method Hollow-Stem Auger

WELL CONSTRUCTION

c. Casing length 19 ft.
Material Schedule 40 PVC
d. Diameter 3 in.
e. Depth to top perforations 4 ft.
f. Perforated length 15 ft.
Perforated interval from 4 to 19 ft.
Perforation type Machined Slot
Perforation size 0.020 inch
g. Surface seal 1 ft.
Seal material Cement
h. Backfill 2 ft.
Backfill material Cement
i. Seal ½ ft.
Seal material Bentonite
j. Gravel pack (3½ to 19') 15½ ft.
Pack material 6 x 12 Monterey Sand
k. Bottom seal 2½ ft.
Seal material Bentonite 20-21½
Compacted Clay 19-20

PLATE C

LOG OF EXPLORATORY BORING

PROJECT NUMBER 738-08.01 BORING NO. S-2

PROJECT NAME Gettler-Ryan, Shell @ Washington & Lewelling, San Leandro PAGE 1 OF 1

BY JB DATE 6/18/85 SURFACE ELEV.

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				0		GC FILL	ASPHALT GRAVEL; Fill; 30% fines
						CL	CLAY; dark gray (5Y, 3/1); trace fine sand; slightly silty; moist; slight product odor.
				5		SM	SILTY SAND; very dark gray (5Y, 3/1); 50% fine sand; 50% silt; loose; wet; strong product odor.
			▽			CL	CLAY; black (2.5Y, 2/0); slightly silty ; very stiff; very moist; slight product odor.
	2.0	32		10			
							@13.5': grayish brown (2.5Y, 5/2); stiff; wet; no product odor.
	3.0	28		15			
							@18.5': light brownish gray (2.5Y, 6/2); 40% silt; trace fine sand; stiff; wet; no product odor.
	1.75	15		20			HOLE TERMINATED AT 20 FEET.

REMARKS Drilled using 8-inch continuous flight hollow-stem auger.
Converted to 3-inch monitoring well, detailed on Plate E.

EMCON ASSOCIATES

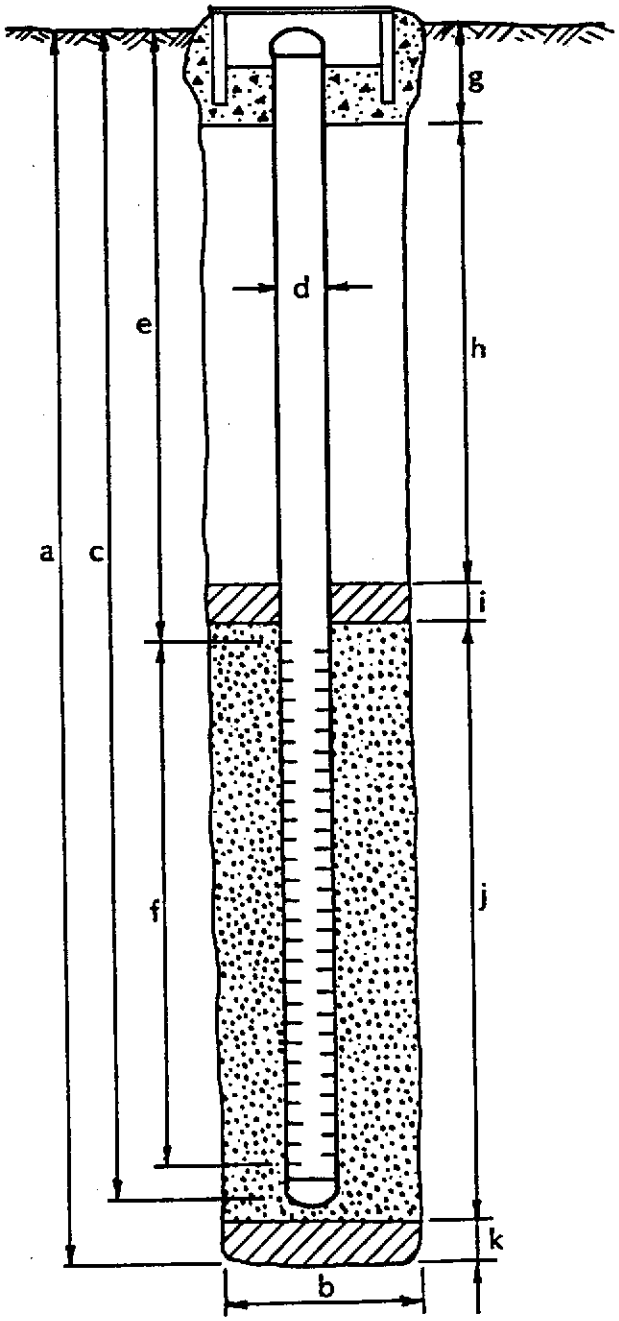
PLATE D

WELL DETAILS

PROJECT NUMBER 738-08.01
PROJECT NAME Gettler-Ryan, Shell @ Washington & Lewelling
COUNTY Alameda
WELL PERMIT NO.

BORING / WELL NO. S-2
TOP OF CASING ELEV.
GROUND SURFACE ELEV.
DATUM

G-5 vault box (Std.)



EXPLORATORY BORING

a. Total depth 20 ft.
b. Diameter 8 in.
Drilling method Hollow-Stem Auger

WELL CONSTRUCTION

c. Casing length 18½ ft.
Material Schedule 40 PVC
d. Diameter 3 in.
e. Depth to top perforations 4 ft.
f. Perforated length 14½ ft.
Perforated interval from 4 to 18½ ft.
Perforation type Machined Slot
Perforation size 0.020 inch
g. Surface seal 1 ft.
Seal material Cement
h. Backfill 2 ft.
Backfill material Cement
i. Seal ½ ft.
Seal material Bentonite
j. Gravel pack (3½ to 18½') 15 ft.
Pack material 6 x 12 Monterey Sand
k. Bottom seal 1½ ft.
Seal material Compacted clay

PLATE E

LOG OF EXPLORATORY BORING

PROJECT NUMBER 738-08.01 BORING NO. S-3

PROJECT NAME Gettler-Ryan, Shell @ Washington & Lewelling, San Leandro PAGE 1 OF 1

BY JB DATE 6/18/85 SURFACE ELEV.

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				0			ASPHALT
					GP		GRAVEL; Fill
					CL		CLAY; dark gray (5Y, 3/1); slightly silty; trace fine sand; moist; slight product odor.
				5			
		12	▽		SM-ML		SILTY SAND TO SANDY SILT; very dark gray (5Y, 3/1); 50% fine sand; 50% silt; loose; wet; strong product odor; saturated with product
					CL		CLAY; dark gray (5Y, 4/1); silty; firm; very moist; slight product odor.
				10			@ 10': no product odor.
	1.25	11					
				15			@ 15': stiff; wet; no product odor.
	3.0	24					HOLE TERMINATED AT 16½ FEET.
				20			

REMARKS Drilled using 8-inch continuous flight hollow-stem auger. Converted to 3-inch monitoring well, detailed on Plate G.

EMCON ASSOCIATES

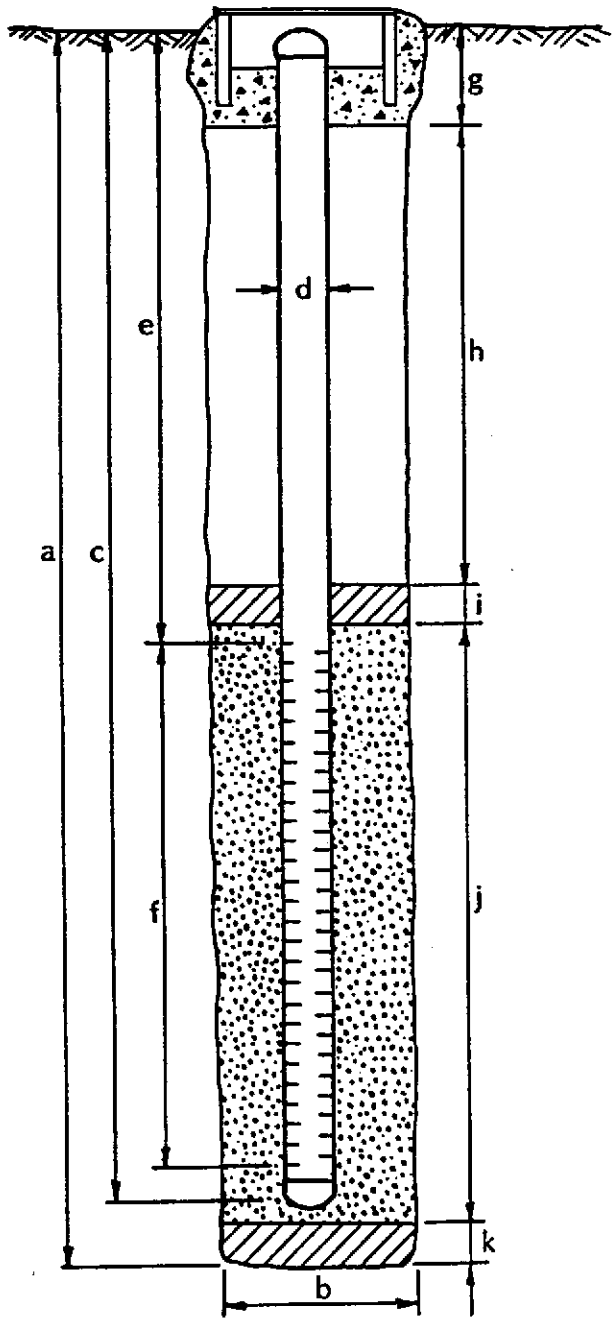
PLATE F

WELL DETAILS

PROJECT NUMBER 738-08.01
PROJECT NAME Gettler-Ryan, Shell @ Washington & Lewelling
COUNTY Alameda
WELL PERMIT NO. _____

BORING / WELL NO. S-3
TOP OF CASING ELEV. _____
GROUND SURFACE ELEV. _____
DATUM _____

G-5 vault box (Std.)



EXPLORATORY BORING

a. Total depth 16½ ft.
b. Diameter 8 in.
Drilling method Hollow-Stem Auger

WELL CONSTRUCTION

c. Casing length 16½ ft.
Material Schedule 40 PVC
d. Diameter 3 in.
e. Depth to top perforations 4 ft.
f. Perforated length 12½ ft.
Perforated interval from 4 to 16½ ft.
Perforation type Machined Slot
Perforation size 0.020 inch
g. Surface seal 1 ft.
Seal material Cement
h. Backfill 1 ft.
Backfill material Cement
i. Seal 1 ft.
Seal material Bentonite
j. Gravel pack (3 to 16½') 13½ ft.
Pack material 6x12 Monterey Sand
k. Bottom seal - ft.
Seal material -

PLATE G

LOG OF EXPLORATORY BORING

PROJECT NUMBER 738-08.01 BORING NO. S-4

PROJECT NAME Gettler-Ryan, Shell @ Washington & Lewelling, San Leandro PAGE 1 OF 1

BY JDB DATE 6/18/85 SURFACE ELEV.

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				0			CONCRETE.
						GW	GRAVEL FILL.
						CL	CLAY; dark gray (2.5Y, 3/2); slightly silty; moist; slight product odor.
				5		SP-ML	SILTY SAND to SANDY SILT; very dark gray (5Y, 3/1); loose; wet; strong product odor; saturated with product.
		11	▽				
						CL	CLAY; dark gray (5Y, 4/1); very silty; firm; wet; moderate product odor.
				10			
	2.0	9					
				15			@ 15': less silt; stiff; no product odor.
	2.75	24					
							HOLE TERMINATED AT 18 FEET.
				20			

REMARKS Drilled using 8-inch continuous flight hollow-stem auger. converted to 3-inch monitoring well as detailed on Plate I.

EMCON ASSOCIATES

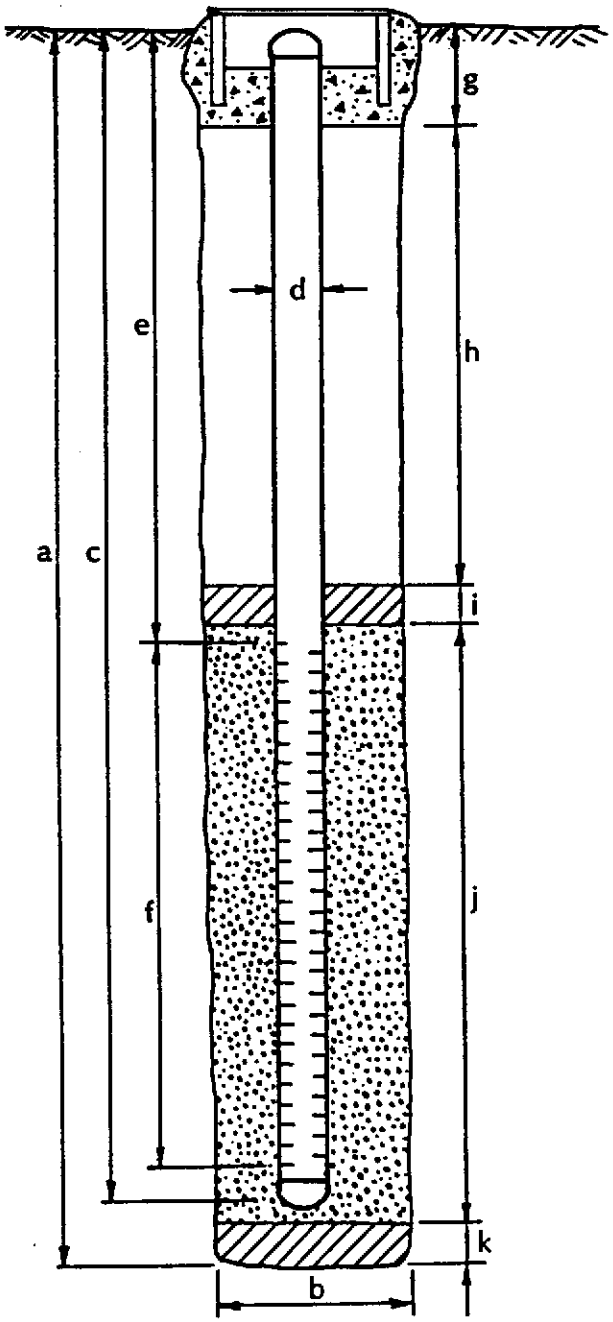
PLATE H

WELL DETAILS

PROJECT NUMBER 738-08.01
PROJECT NAME Gettler-Ryan, Shell @ Washington & Lewelling
COUNTY Alameda
WELL PERMIT NO. _____

BORING / WELL NO. S-4
TOP OF CASING ELEV. _____
GROUND SURFACE ELEV. _____
DATUM _____

G-5 vault box (Std.)



EXPLORATORY BORING

a. Total depth 18 ft.
b. Diameter 8 in.
Drilling method Hollow-Stem Auger

WELL CONSTRUCTION

c. Casing length 18 ft.
Material Schedule 40 PVC
d. Diameter 3 in.
e. Depth to top perforations 4 ft.
f. Perforated length 14 ft.
Perforated interval from 4 to 18 ft.
Perforation type Machined Slot
Perforation size 0.020 inch
g. Surface seal 1 ft.
Seal material Cement
h. Backfill 1 ft.
Backfill material Cement
i. Seal 1 ft.
Seal material Bentonite
j. Gravel pack (3 to 18') 15 ft.
Pack material 6x12 Monterey Sand
k. Bottom seal - ft.
Seal material -

PLATE I

July 23, 1985

Emcon Associates
90 Archer Street
San Jose, CA 95112

Reference: Shell Purchase Order MOH050908

ATTN: Erin Garner

Following are the results of our analyses for the presence of volatile hydrocarbons due to gasoline in three samples of soil received on June 27, 1985.

The samples were examined using the purge and trap technique. Final detection was by gas chromatography using a flame ionization detector as well as a photoionization detector and a Carbopack B/3% SP-1500 column.

nd = none detected

Lab. #	Sample Identification	Results: Parts per Million (dry soil basis) Volatile Hydrocarbons Due to Gasoline (includes benzene, toluene and xylenes)	Benzene	Toluene	Xylene isomers and ethyl benzene
	Job 738-8.1 15275 Washington San Leandro, 6/18/85				
29747	S-2 @ 7 - 8.5'	nd	nd	nd	nd
29748	S-3 @ 5 - 6.5'	3,900.	6.	170.	840.
29749	S-4 @ 5 - 6.5'	3,100.	nd*	18.	530.
Detection Limits		2.	0.1 10.*	0.1	0.4

Patricia L. Murphy

Patricia L. Murphy

PLM/jd

cc: Stan Roller
Shell Oil Company

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

July 26, 1985

ATTN: Stan Roller

Following are the results of analyses on the samples described below.

Lab Numbers: 30038 - 30040
Date Received: July 9, 1985 from Emcon
Analyses Requested: Volatile Fuel Hydrocarbons

The method of analysis for volatile fuel hydrocarbons is taken from E.P.A. Methods 8015 and 5030. The samples are examined using the purge and trap technique. Final detection is by gas chromatography using a flame ionization detector as well as a photoionization detector.

Results

Lab Number	Sample Identification	Micrograms per Liter Volatile Fuel Hydrocarbons (calculated as gasoline)
	15275 Washington & Lewelling	
30038	S-1, 7-8-85	520.
30039	S-2, 7-8-85	2,200.
30040	S-4, 7-8-85	32,000.

Patricia L. Murphy
Patricia L. Murphy

PLM/aid
cc: Emcon Associates