STATE OF CALIFORNIA PETE WILSON, *Governor*

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION
2101 WEBSTER STREET, SUITE 500
OAKLAND, CA 94612
(510) 286-1255

May 17, 1993
File 2198.17 (UST)

Mr. Dan Kirk
Shell Oil
P. O. Box 5278
Concord, California 94520-9998

Subject: UST case closure for Shell Service Station, 1155 Portola Avenue, Livermore, California.

Dear Mr. Kirk:

The Alameda County Department of Environmental Health has submitted a report which summarizes the investigation of hydrocarbon pollution resulting from leaks associated with a 550 gallon waste oil Underground Storage Tank at the above mentioned site, and recommends that the case be closed. The Regional Board staff reviewed the report and concur with the recommendation. Therefore, based on the available information for the above site, it appears that further investigation and cleanup of the hydrocarbon pollution is not necessary at this time. However, further work may be required if conditions change or a water quality threat is discovered at the site.

Please contact Sumadhu Arigala at (510)-286-0434, if you have any questions.

Sincerely,

Lawrence P. Kolb
for
Steven R. Ritchie,
Executive Officer

CC: Eva Chu, ACDEH

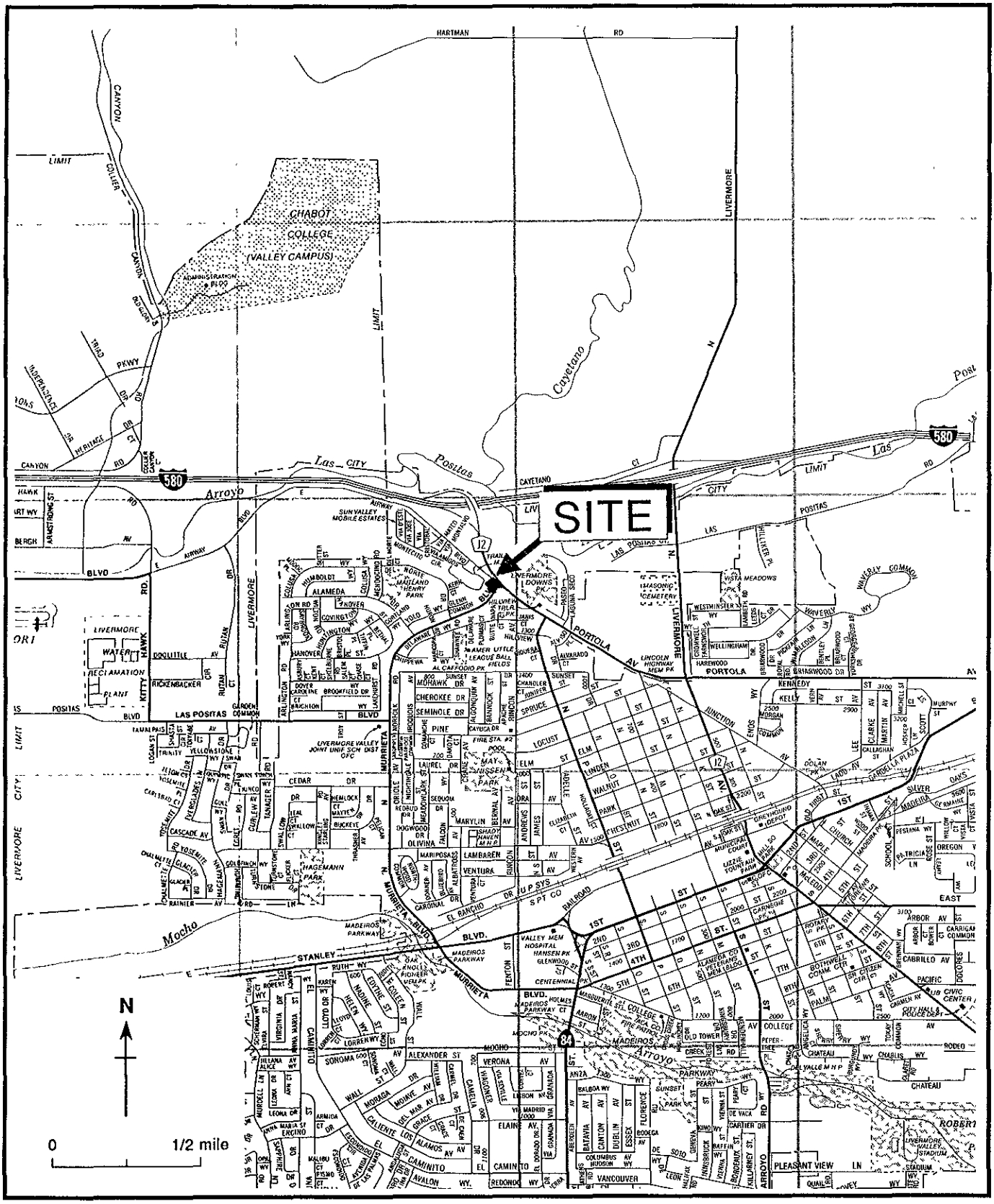


Figure 1. Site Location Map - Shell Service Station WIC #204-4380-0709, 1155 Portola Avenue, Livermore, California

3/10/92

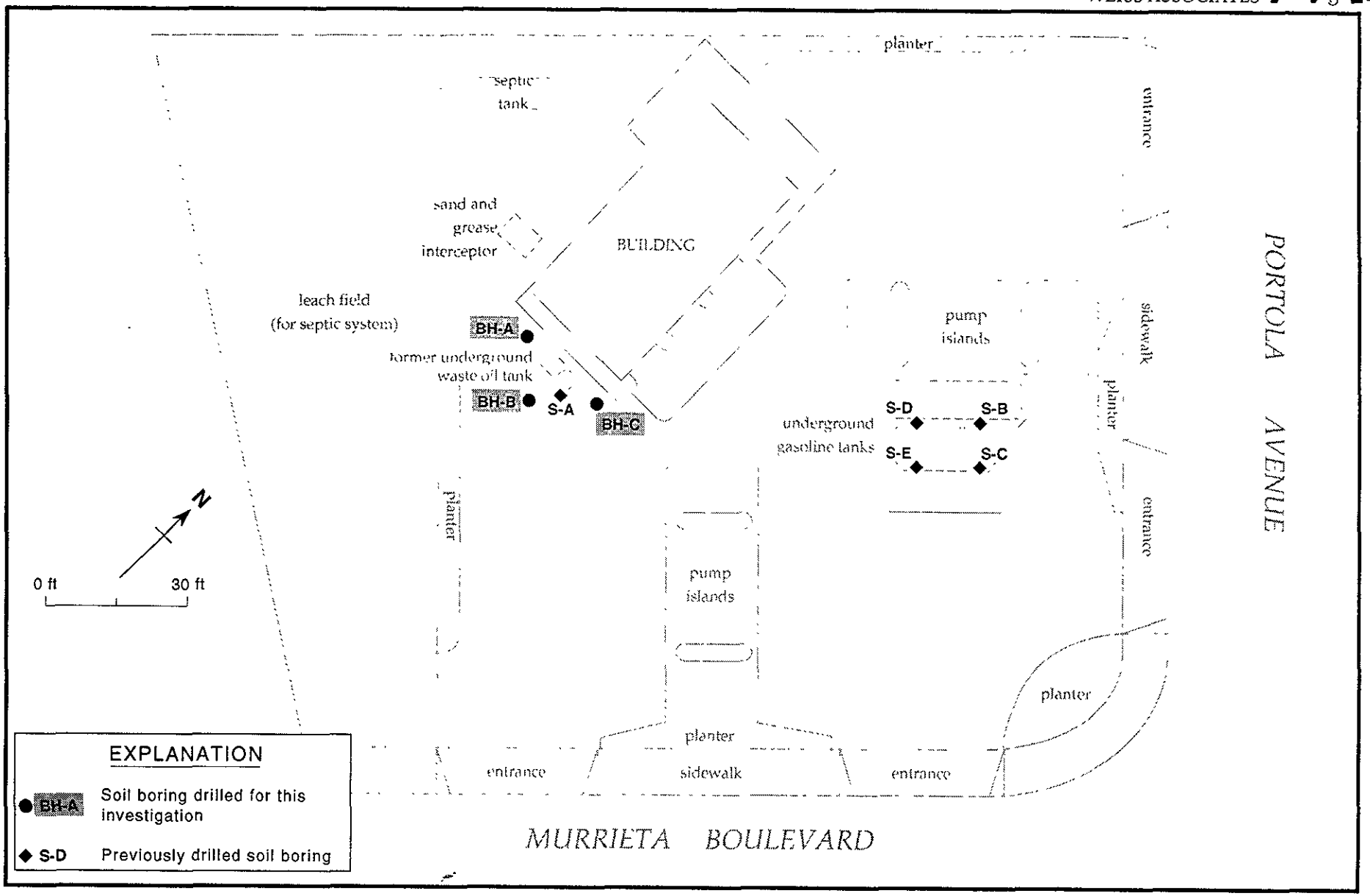


Figure 2. Soil Boring Locations - Shell Service Station WIC #204-4380-0709, 1155 Portola Avenue, Livermore, California

1/27/93

TABLES

Table 1. Cumulative Analytic Results for Soil - Shell Service Station WIC #204-4380-0709, 1155 Portola Avenue, Livermore, California

Sample ID/Soil Boring	Depth Sampled (ft)	Sample Date	TPH-G	TPH-D	POG	B	E	T	X	VOCs
			<----------parts per million (mg/kg)---------->							
S-A	1.0 - 3.0	03/07/86	<250	---	14,000	<1	16[a]	<1	16[a]	---
	7.0 - 8.5	03/07/86	---	---	27,000	---	---	---	---	---
	13.5 - 15.0	03/07/86	---	---	<20	---	---	---	---	---
S-B	4.0 - 5.5	03/07/86	<5	---	---	<0.5	<1[a]	<0.5	<1[a]	---
	7.0 - 8.5	03/07/86	<5	---	---	<0.5	<1[a]	<0.5	<1[a]	---
	11.0 - 12.5	03/07/86	<5	---	---	<0.5	<1[a]	<0.5	<1[a]	---
	13.5 - 15.0	03/07/86	<5	---	---	<0.5	<1[a]	<0.5	<1[a]	---
S-C	4.0 - 5.5	03/07/86	<5	---	---	<0.5	<1[a]	<0.5	<1[a]	---
	7.0 - 8.5	03/07/86	<5	---	---	<0.5	<1[a]	<0.5	<1[a]	---
	11.0 - 12.5	03/07/86	<5	---	---	<0.5	<1[a]	<0.5	<1[a]	---
	14.0 - 15.5	03/07/86	<5	---	---	<0.5	<1[a]	<0.5	<1[a]	---
	19.0 - 20.5	03/07/86	<5	---	---	<0.5	<1[a]	<0.5	<1[a]	---
	24.0 - 25.5	03/07/86	<5	---	---	<0.5	<1[a]	<0.5	<1[a]	---
	29.0 - 30.5	03/07/86	<5	---	---	<0.5	<1[a]	<0.5	<1[a]	---
S-D	4.0 - 5.5	03/07/86	<5	---	---	<0.5	<1[a]	<0.5	<1[a]	---
	7.0 - 8.5	03/07/86	<5	---	---	<0.5	<1[a]	<0.5	<1[a]	---
	11.0 - 12.5	03/07/86	<5	---	---	<0.5	<1[a]	<0.5	<1[a]	---
	19.0 - 20.5	03/07/86	<5	---	---	<0.5	<1[a]	<0.5	<1[a]	---
S-E	4.0 - 5.5	03/07/86	<5	---	---	<0.5	<1[a]	<0.5	<1[a]	---
	7.0 - 8.5	03/07/86	<5	---	---	<0.5	<1[a]	<0.5	<1[a]	---
	11.0 - 12.5	03/07/86	<5	---	---	<0.5	<1[a]	<0.5	<1[a]	---
	19.0 - 20.5	03/07/86	<5	---	---	<0.5	<1[a]	<0.5	<1[a]	---
T-1	b	03/01/89	---	1,700	4,500	<0.05	0.20	1.6	1.1	c
T-2	9.0	03/01/89	---	<10	<30	<0.005	<0.005	<0.005	<0.005	d
BH-A	11.5	12/15/92	<1	<1	<50	<0.0025	<0.0025	<0.0025	<0.0025	d
	21.5	12/15/92	<1	<1	<50	<0.0025	<0.0025	<0.0025	<0.0025	---
	31.5	12/15/92	<1	<1	<50	<0.0025	<0.0025	<0.0025	<0.0025	---
	41.5	12/15/92	<1	<1	<50	<0.0025	<0.0025	<0.0025	<0.0025	---
	51.0	12/15/92	<1	<1	<50	<0.0025	<0.0025	<0.0025	<0.0025	---
	61.5	12/16/92	<1	<1	<50	<0.0025	<0.0025	<0.0025	<0.0025	---
BH-B	6.0	12/15/92	<1	<1	52	<0.0025	<0.0025	<0.0025	<0.0025	---
	11.5	12/15/92	<1	<1	<50	<0.0025	<0.0025	<0.0025	<0.0025	d
	16.5	12/15/92	<1	<1	<50	<0.0025	<0.0025	<0.0025	<0.0025	---

-- Table 1 continues on next page --

Table 1. Cumulative Analytic Results for Soil - Shell Service Station WIC #204-4380-0709, 1155 Portola Avenue, Livermore, California (continued)

Sample ID/Soil Boring	Depth Sampled (ft)	Sample Date	TPH-G	TPH-D	POG	B	E	T	X	VOCs
			<----------parts per million (mg/kg)---------->							
	26.5	12/15/92	<1	<1	<50	<0.0025	<0.0025	<0.0025	<0.0025	---
	36.5	12/15/92	<1	<1	<50	<0.0025	<0.0025	<0.0025	<0.0025	---
BH-C	6.0	12/15/92	<1	<1	<50	<0.0025	<0.0025	<0.0025	<0.0025	---
	16.5	12/15/92	<1	<1	<50	<0.0025	<0.0025	<0.0025	<0.0025	d
	26.0	12/15/92	<1	<1	<50	<0.0025	<0.0025	<0.0025	<0.0025	---
	36.5	12/15/92	<1	<1	<50	<0.0025	<0.0025	<0.0025	<0.0025	---

Abbreviations:

TPH-G = Total petroleum hydrocarbons as gasoline by Modified EPA Method 8015
TPH-D = Total petroleum hydrocarbons as diesel by Modified EPA Method 8015
POG = Petroleum oil and grease by American Public Health Association Standard Method 503E or 5520F
B = Benzene by EPA Method 8020 or 8240
E = Ethylbenzene by EPA Method 8020 or 8240
T = Toluene by EPA Method 8020 or 8240
X = Xylenes by EPA Method 8020 or 8240
VOCs = Volatile organic compounds by EPA Method 8010 or 8240
<n = Not detected at laboratory reporting limit of n ppm
--- = Not analyzed

Notes:

a = Ethylbenzene and xylenes reported as one value
b = Composite sample of soil excavated during tank removal
c = No VOCs detected; semi-VOCs (SVOCs) detected by EPA Method 8270 include 0.64 ppm naphthalene and 1.0 ppm 2-methyl-naphthalene. Laboratory also estimated concentrations of other SVOCs which are not classified as priority pollutants: 4.5 ppm decane, 1.5 ppm 1,2,4-trimethylbenzene, 4.6 ppm undecane, 2.1 ppm pentadecane, 0.50 ppm 1-ethyl-3-methylbenzene, 0.50 ppm 3-3-dimethyloctane, 1.0 ppm 1,3,5-trimethylbenzene and 0.70 ppm undecanal
d = No VOCs detected

1986 samples collected by Emcon Associates of San Jose, California and analyzed by International Technology Analytical Services of San Jose, California; 1989 samples collected by Crosby & Overton of Oakland, California and analyzed by Anametrix, Inc. of San Jose, California; 1992 samples collected by Weiss Associates of Emeryville, California and analyzed by National Environmental Testing (NET) Pacific of Santa Rosa, California

J:\SHELL\425\430L1FE3.WP

Table 2. Metal Concentrations in Soil - Shell Service Station WIC #204-4380-0709, 1155 Portola Avenue, Livermore, California

Sample ID/ Soil Boring	Depth Sampled (ft)	Sample Date	Cd	Cr	Pb	Ni	Zn
			<----------parts per million (mg/kg)---------->				
T-1	a	03/01/89	---	---	131[b]	---	---
T-2	9.0	03/01/89	---	---	7.9	---	---
BH-A	11.5	12/15/92	6.2	59	6.0	200	45
BH-B	11.5	12/15/92	6.5	61	8.0	200	47
BH-C	16.5	12/15/92	4.9	38	4.7	82	41
TTLC			100	2,500	1,000	2,000	5,000

Abbreviations:

Cd = Cadmium by EPA Method 6010
Cr = Chromium by EPA Method 6010
Pb = Lead by EPA Method 7421
Ni = Nickel by EPA Method 6010
Zn = Zinc by EPA Method 6010
TTLC = Title 22 Total Threshold Limit Concentration
--- = Not analyzed

Notes:

a = Composite sample of soil excavated during tank removal
b = 2.79 ppm detected for Pb STLC by EPA Method 7420

1989 samples collected by Crosby & Overton of Oakland, California and analyzed by Anametrix, Inc. of San Jose, California; 1992 samples collected by Weiss Associates of Emeryville, California and analyzed by National Environmental Testing (NET) Pacific of Santa Rosa, California

J:\SHELL\425\430L1FE3.WP

ATTACHMENT A

STANDARD FIELD PROCEDURES

STANDARD FIELD PROCEDURES

Weiss Associates (WA) has developed standard procedures for drilling and sampling soil borings and installing, developing and sampling ground water monitoring wells. These procedures comply with Federal, State and local regulatory guidelines. Specific procedures are summarized below.

SOIL BORING AND SAMPLING

Objectives/Supervision

Soil sampling objectives include characterizing subsurface lithology, assessing whether the soils exhibit obvious hydrocarbon or other compound vapor or staining, and collecting samples for analysis at a State-certified laboratory. All borings are logged using the Unified Soil Classification System by a trained geologist working under the supervision of a California Registered Geologist (RG) or a Certified Engineering Geologist (CEG).

Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers. Split-barrel samplers lined with steam-cleaned brass or stainless steel tubes are driven through the hollow auger stem into undisturbed sediments at the bottom of the borehole using a 140 pound hammer dropped 30 inches. Soil samples can also be collected without using hollow-stem augers by progressively driving split-barrel soil samplers to depths of up to 20 ft.

Soil samples are collected at least every five ft to characterize the subsurface sediments and for possible chemical analysis. Near the water table and at lithologic changes, the sampling interval may be less than five ft.

Drilling and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

Sample Analysis

After noting the lithology at each end of the sampling tubes, the tube chosen for analysis is immediately trimmed of excess soil and capped with teflon tape and plastic end caps. The sample is labelled, stored at or below 4°C, and transported under chain-of-custody to a State-certified analytic laboratory.

Screening

One of the remaining tubes is partially emptied leaving about one-third of the soil in the tube. The tube is capped with plastic end caps and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable photoionization detector (PID) measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. PID measurements are used along with the stratigraphy and ground water depth to select soil samples for analysis.

Grouting

If the borings are not completed as wells, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe. If wells are completed in the borings, the well installation, development and sampling procedures summarized below are followed.

MONITORING WELL INSTALLATION, DEVELOPMENT AND SAMPLING

Well Construction and Surveying

Wells are installed to monitor ground water quality and determine the ground water elevation, flow direction and gradient. Well depths and screen lengths are based on ground water depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and state and local regulatory guidelines. Well screens typically extend 15 ft below and 5 ft above the static water level at the time of drilling. However, the well screen will generally not extend into or through a clay layer that is at least three to five ft thick.

Well casing and screen are flush-threaded, Schedule 40 PVC. Screen slot size varies according to the sediments screened, but slots are generally 0.010 or 0.020 inches wide. A rinsed and graded sand occupies the annular space between the boring and the well screen to about one to two ft above the well screen. A two ft thick hydrated bentonite seal separates the sand from the overlying sanitary surface seal composed of cement with 3-5% bentonite.

Well-heads are secured by locking well-caps inside traffic-rated vaults finished flush with the ground surface. A stovepipe may be installed between the well-head and the vault cap for additional security. The well top-of-casing elevation is surveyed with respect to mean sea level and the well is surveyed for horizontal location with respect to an onsite or nearby offsite landmark.

Well Development

After 24 hours, the wells are developed using a combination of ground water surging and extraction. Surging agitates the ground water and dislodges fine sediments from the sand pack. After about ten minutes of surging, ground water is extracted from the well using bailing, pumping and/or reverse air-lifting through an eductor pipe to remove the sediments from the well. Surging and extraction continue until at least ten well-casing volumes of ground water are extracted and the sediment volume in the ground water is negligible. All equipment is steam-cleaned prior to use and air used for air-lifting is filtered to prevent oil entrained in the compressed air from entering the well. Wells that are developed using air-lift evacuation are not sampled until at least 24 hours after they are developed.

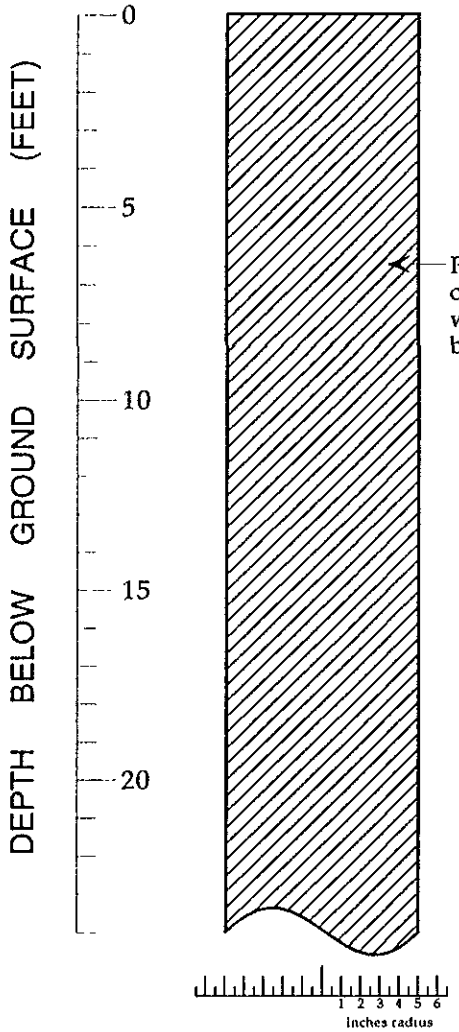
Ground Water Sampling

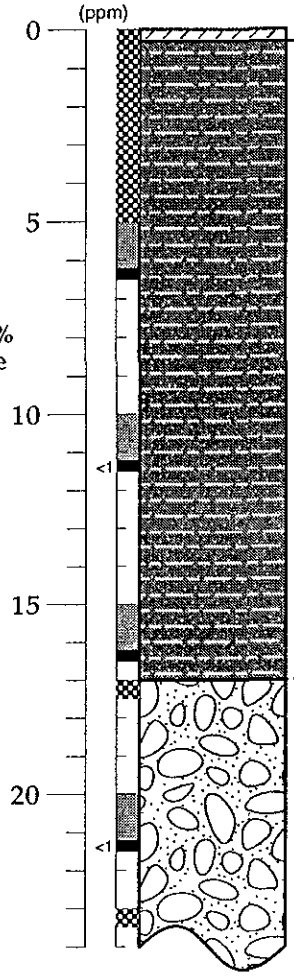
Depending on local regulatory guidelines, three to four well-casing volumes of ground water are purged prior to sampling. Purging continues until ground water pH, conductivity, and temperature have stabilized. Ground water samples are collected using bailers or pumps and are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labelled, placed in protective foam sleeves, stored at 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

ATTACHMENT B

BORING LOGS

BORING BH-A





DESCRIPTION

Asphaltic Concrete

Sandy SILT (ML); dark brown; medium stiff; damp; 10% clay; 50% silt; 25% sand; 15% gravel to 3" diameter; low plasticity; low to moderate K

[fill] from 0.0 to 3.5'

Brown; 80-85% silt; 15% sand; <5% gravel to 0.25" diameter; moderate K; rootholes from 3.5'

Soft; 65% silt; 35% very fine to medium sand from 9.0'

Medium stiff; damp; 5% clay; 80% silt; 15% very fine sand; [Mn-oxide] nodules; bioturbation holes from 13.0'

(contact-driller)

Sandy GRAVEL (GW); gray-brown; dense; moist; <5% silt; 30% sand; 65-70% gravel to greater than 2" diameter; high K

Moist to wet; 5% clay; 5-10% silt; 25% sand; 60-65% gravel to 2" diameter; moderate to high K from 24.0'

EXPLANATION

- ▼ Water level during drilling (date)
- ▽ Water level (date)
- ——..... Contact (dotted where approximate)
- —?—?— Uncertain contact
- //////// Gradational contact
- Location of recovered drive sample
- Location of drive sample sealed for chemical analysis
- Cutting sample
- K = Estimated hydraulic conductivity

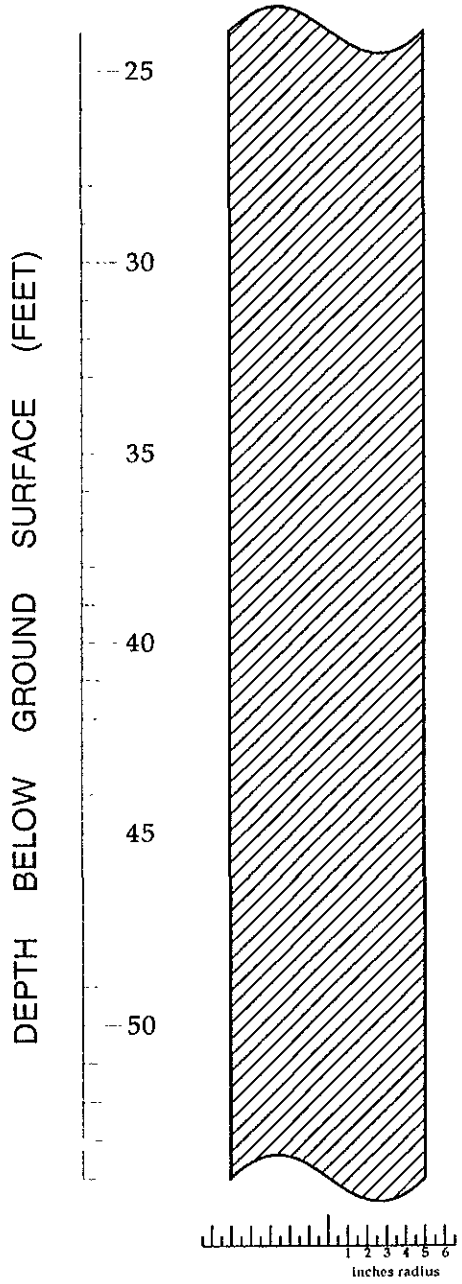
Logged By: Tom Fojut
Supervisor: Joseph P. Theisen, CEG #1645
Drilling Company: Soils Exploration Services, Vacaville, CA
License Number: C57-582696
Driller: Scott Fitchie
Drilling Method: Hollow-stem auger
Date Drilled: December 15, 1992
Type of Sampler: Split barrel (2" ID)
TPH-G: Total petroleum hydrocarbon as gasoline in soil by modified EPA Method 8015

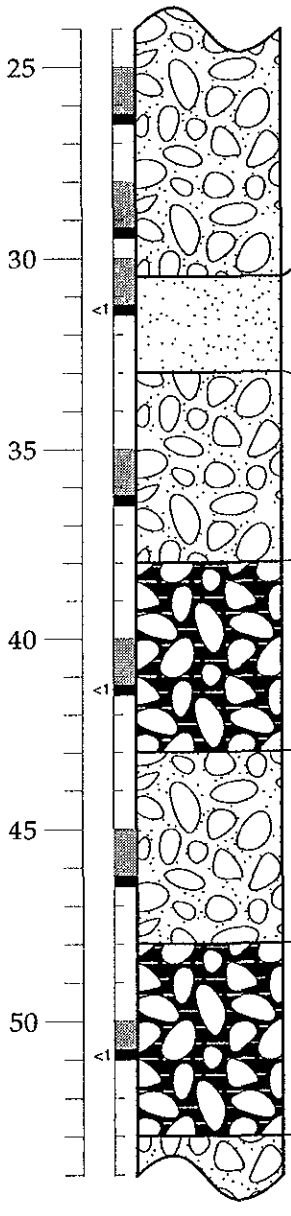
Boring Log Construction Details - Boring BH-A - Shell Service Station WIC #204-4380-0709, 1155 Portola Avenue, Livermore, California

1/25/93

BORING BH-A (cont.)

TPH-G concentration (ppm) | GRAPHIC LOG | DESCRIPTION





SAND/Silty SAND (SP); light brown; medium dense; moist; 10% silt; 85-90% sand; <5% gravel to 0.25" diameter; high K

Sandy GRAVEL (GW); brown; dense; wet, but not saturated; 5% clay; 5% silt; 20% sand; 75% gravel to greater than 2" diameter; moderate to high K

Clayey GRAVEL (GC); brown; dense; wet, but not saturated; 20% clay; 10% silt; 15% sand; 55% gravel to 1" diameter; low to moderate K

Sandy GRAVEL (GW); brown; dense; wet, but not saturated; 5% clay; 10% silt; 25% sand; 60% gravel to greater than 2" diameter; moderate to high K

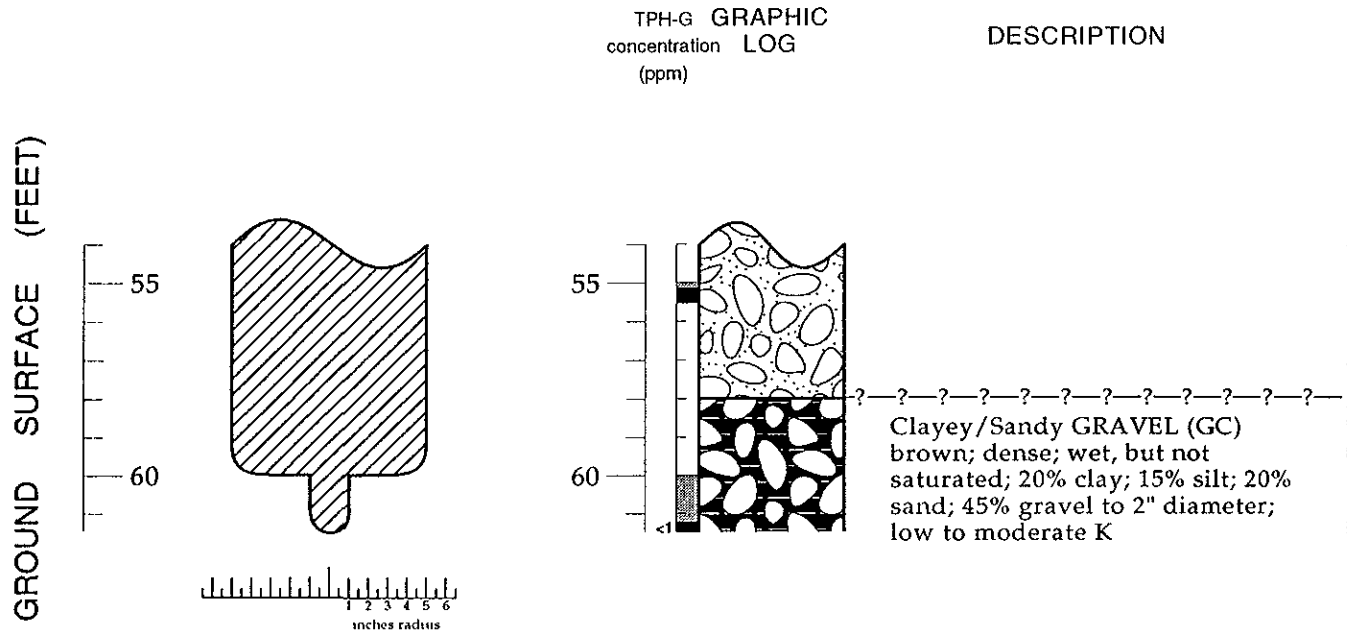
Clayey GRAVEL (GC); brown; dense; wet, but not saturated; 20% clay; 10% silt; 15% sand; 55% gravel to greater than 2" diameter; low to

Sandy GRAVEL (GW); brown; dense; damp; 5% clay; 15% silt; 30% sand; 50% gravel to greater than 2" diameter; moderate to high K

Boring Log Construction Details - Boring BH-A - Shell Service Station WIC #204-4380-0709, 1155 Portola Avenue, Livermore, California

1/25/93

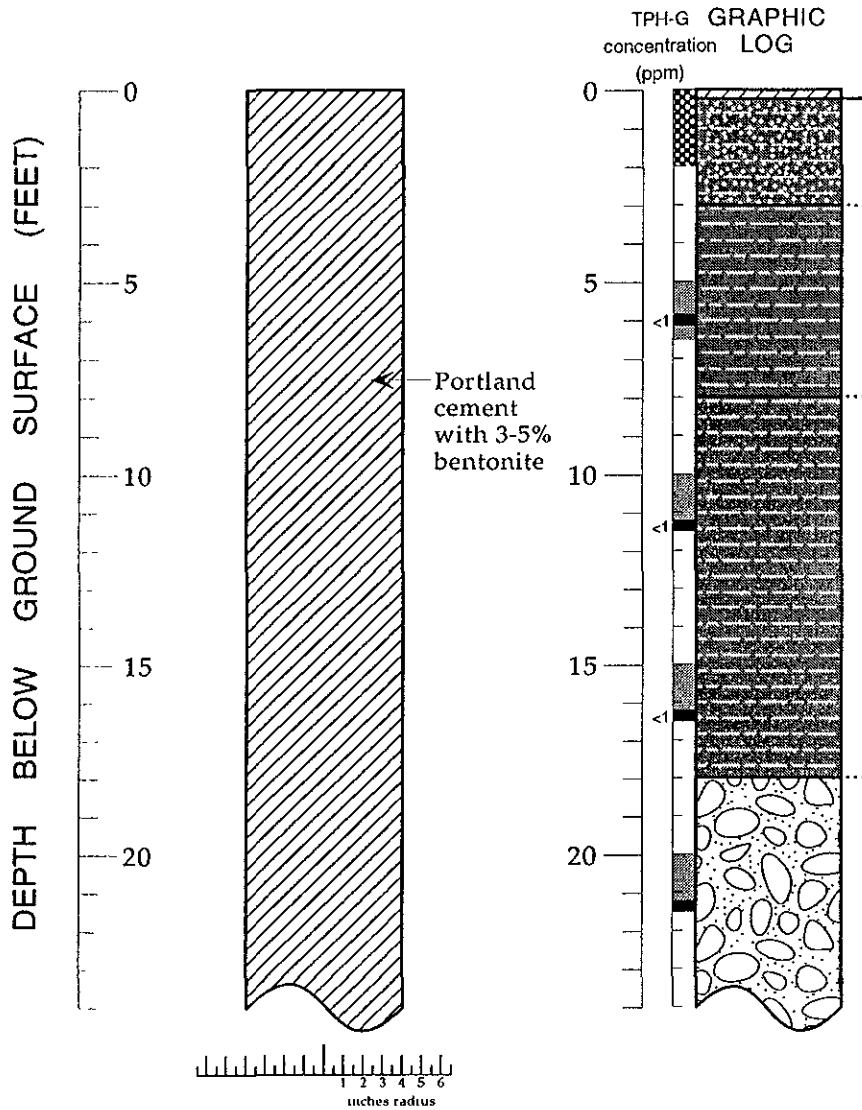
BORING BH-A (cont.)



NOTE: Although the boring was left open overnight, no water accumulated in the boring.

Boring Log Construction Details - Boring BH-A - Shell Service Station WIC #204-4380-0709, 1155 Portola Avenue, Livermore, California

BORING BH-B



DESCRIPTION

Asphaltic Concrete

Silty SAND (SM); dark brown; loose; dry; 5% clay; 45% silt; 35% sand; 15% gravel to 0.5" diameter; moderate to high K; [fill]

SILT (ML); brown; soft; dry to damp; 90% silt; 10% very fine to fine sand; rare coarse sand; low plasticity; moderate K

Sandy SILT (ML); light brown; stiff; dry to damp; 75-80% silt; 20-25% very fine sand; low plasticity; moderate K; bioturbation holes

Damp; 5% clay; 65% silt; 30% very fine to fine sand; [Mn-nodules] from 15.0'

(contact-driller)

Sandy GRAVEL (GW); brown; dense; damp; 5-10% clay; 10% silt; 30-35% sand; 50% gravel to greater than 2" diameter; moderate K

EXPLANATION

- Water level during drilling (date)
- Water level (date)
- Contact (dotted where approximate)
- Uncertain contact
- Gradational contact
- Location of recovered drive sample
- Location of drive sample sealed for chemical analysis
- Cutting sample
- K = Estimated hydraulic conductivity

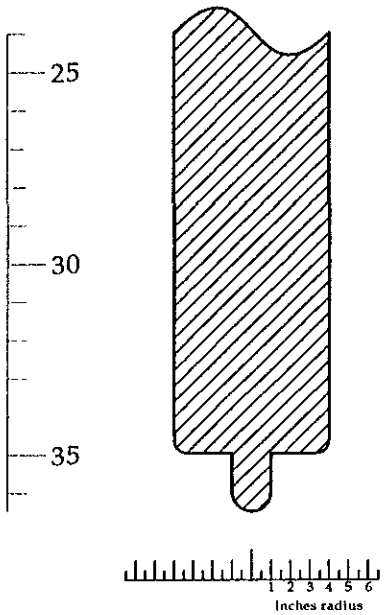
Logged By: Tom Fojut
Supervisor: Joseph P. Theisen, CEG #1645
Drilling Company: Soils Exploration Services, Vacaville, CA
License Number: C57-582696
Driller: Scott Fitchie
Drilling Method: Hollow-stem auger
Date Drilled: December 15, 1992
Type of Sampler: Split barrel (2" ID)
TPH-G: Total petroleum hydrocarbon as gasoline in soil by modified EPA Method 8015

Boring Log Construction Details - Boring BH-B - Shell Service Station WIC #204-4380-0709, 1155 Portola Avenue, Livermore, California

1/25/93

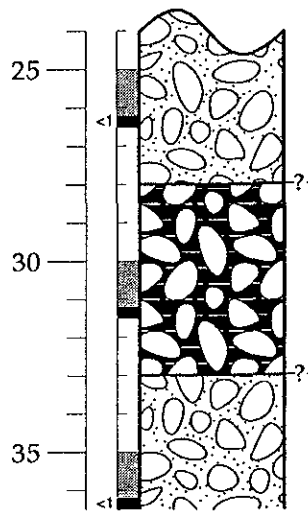
BORING BH-B (cont.)

DEPTH BELOW GROUND SURFACE (FEET)



TPH-G concentration (ppm)

GRAPHIC LOG



DESCRIPTION

Moist from 25.0'

?—?—?—?—?—?—?—?—?—?—?—?—?—

Clayey GRAVEL (GC); brown; dense; moist; 20% clay; 10% silt; 25% sand; 45% gravel to 1" diameter; low to moderate K

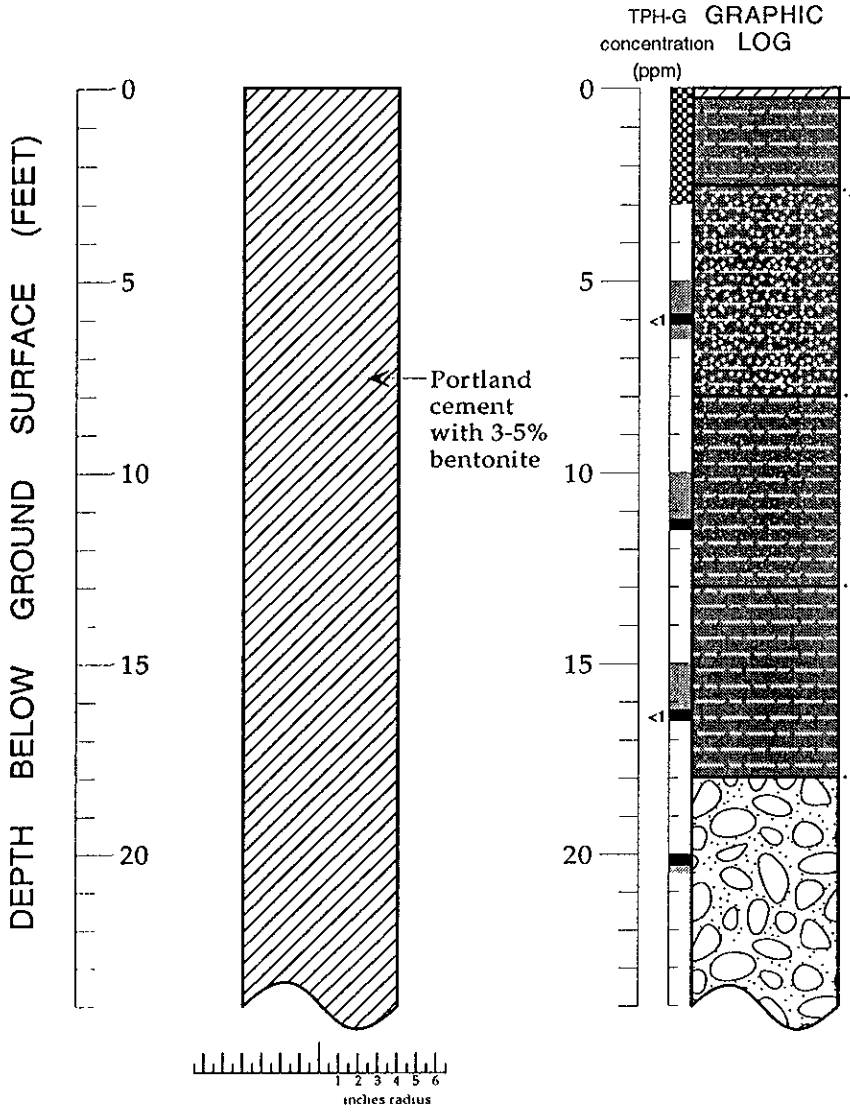
?—?—?—?—?—?—?—?—?—?—?—?—?—

Sandy GRAVEL (GW); brown; dense; wet, but not saturated; 5-10% clay; 10% silt; 30% sand; 50-55% gravel to greater than 2" diameter; moderate to high K

Boring Log Construction Details - Boring BH-B - Shell Service Station WIC #204-4380-0709, 1155 Portola Avenue, Livermore, California

1/25/93

BORING BH-C



DESCRIPTION

Asphaltic Concrete

Sandy SILT (ML); dark brown; soft; dry; 10% clay; 55-60% silt; 30% sand; <5% gravel to 0.5" diameter; low plasticity; moderate K; [fill]

Silty SAND (SM); brown; loose; dry to damp; 35% silt; 60% sand; 5% gravel to 0.5" diameter; moderate to high K

Sandy SILT (ML); brown; medium stiff; damp; 75% silt; 25% very fine sand; low plasticity; moderate K

SILT (ML); brown; soft; damp; 5% clay; 90% silt; 5% very fine sand; low plasticity; moderate K

Sandy GRAVEL (GW); brown/gray; dense; dry; 5% clay; 15% silt; 35% sand; 45% gravel to greater than 2" diameter; moderate to high K

EXPLANATION

- ▼ Water level during drilling (date)
- ▽ Water level (date)
- ——..... Contact (dotted where approximate)
- —?—?— Uncertain contact
- ////////// Gradational contact
- Location of recovered drive sample
- Location of drive sample sealed for chemical analysis
- Cutting sample
- K = Estimated hydraulic conductivity

Logged By: Tom Fojut
Supervisor: Joseph P. Theisen, CEG #1645
Drilling Company: Soils Exploration Services, Vacaville, CA
License Number: C57-582696
Driller: Scott Fitchie
Drilling Method: Hollow-stem auger
Date Drilled: December 15, 1992
Type of Sampler: Split barrel (2" ID)
TPH-G: Total petroleum hydrocarbon as gasoline in soil by modified EPA Method 8015

Boring Log Construction Details - Boring BH-C - Shell Service Station WIC #204-4380-0709, 1155 Portola Avenue, Livermore, California

1/25/93

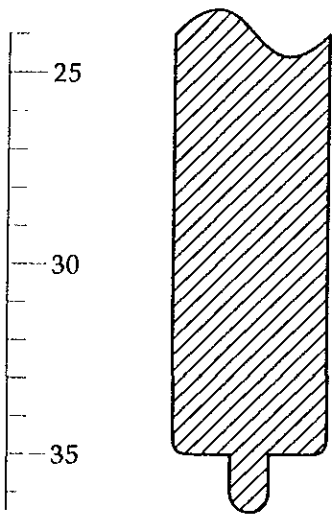
BORING BH-C (cont.)

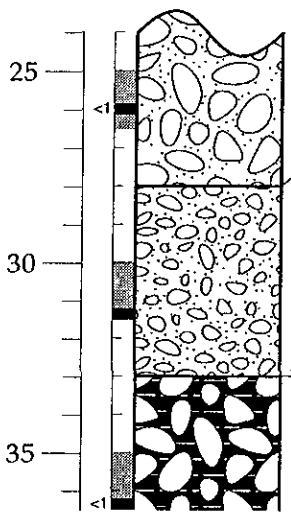
TPH-G concentration (ppm)

GRAPHIC LOG

DESCRIPTION

DEPTH BELOW GROUND SURFACE (FEET)





Moist from 25.0'

Gravelly SAND (SW/SM); brown; medium dense; moist; 15% silt; 65% sand; 20% gravel to 0.75" diameter; moderate to high K

3" thick brown-black [organic-rich?] sand lens at 31.5'

Clayey GRAVEL (CG); brown; dense; wet, but not saturated; 20% clay; 10% silt; 15% sand; 55% gravel to greater than 2" diameter; low to moderate K

Boring Log Construction Details - Boring BH-C - Shell Service Station WIC #204-4380-0709, 1155 Portola Avenue, Livermore, California

1/25/93