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SUBSURFACE INVESTIGATION
KING PETROLEUM
ALAMEDA, CALIFORNIA
December 3, 1984

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SUBSURFACE INVESTIGATION
KING PETROLEUM
ALAMEDA, CALIFORNIA

HLA Job No. 4167,076.12

by

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December 3, 1984

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I SUMMARY

A 9- to 10-foot-thick sand aquifer underlies the site within the depth interval of 14 to 27.5 feet. Ground water in the sand aquifer is moving toward the north-northeast. It contains no detectable benzene, toluene, or xylene as determined from the three wells sampled. Also, a GC/MS scan of the ground water from the sand aquifer well most down-gradient from the site detected no organic compounds.

The top of the saturated zone is 5 feet deep, which is within the clay cap above the sand aquifer. There were no floating hydrocarbons or sheen on the water surface in two wells completed in this zone, and the water contained no detectable benzene, toluene, or xylene.

Some hydrocarbon odors were detected between 5 and 7 feet below ground at the southern corner of the site in Borings W-3 and SW-2. A GC/MS scan on a soil sample from this interval identified eight straight-chain hydrocarbons, at concentrations of less than 100 parts per million. None of these compounds detected are on the priority pollutant list of the U.S. Environmental Protection Agency.

II INTRODUCTION

This report presents the results of the investigation performed by Harding Lawson Associates (HLA) of the soil and ground water beneath the King Petroleum property at 2001 Versailles Avenue, Alameda, California. Plate 1 shows the location of the site and adjacent residential neighborhoods.

According to Mr. Richard King, Standard Oil of California built a petroleum bulk loading facility on the property in the 1930s. Exxon is reported to have bought the property from Standard Oil in 1968. In 1975, Exxon removed the above-ground gasoline and diesel tanks from the northeast corner of the property and installed underground tanks to store gasoline and diesel fuel and to collect surface spills. Plate 2 shows the former locations of all the reported tanks. Mr. King states that Exxon removed all of the underground tanks just before selling the property to him.

Following some initial subsurface investigation contracted by Mr. King, the California Regional Water Quality Control Board (CRWQCB) required further testing. Exxon agreed to drill three wells, one at each corner of the property, to evaluate the extent and nature of the suspected contamination. They proposed to test water and soil samples from the three borings and to determine the ground-water gradient.

The CRWQCB agreed to Exxon's proposal with some clarification of the chemical parameters to be determined in the samples, and required a survey for the presence of private wells in the vicinity (CRWQCB letter dated September 18, 1984).

The purpose of our investigation was to fulfill the agreements and requirements described above.

III INVESTIGATION

A. Exploration

We drilled three borings (W-1 through W-3), one on each corner of the property, to a depth of approximately 30 feet with hollow-stem auger equipment. We also drilled two borings, SW-1 and SW-2, to a depth of 10 feet adjacent to Borings W-1 and W-3, respectively. The need for the two additional borings will be discussed in Section IV, Discussions and Conclusions. Our geologist logged the borings and obtained samples of the soils by driving a split-barrel soil sampler. The logs of the borings are presented on Plates 3 through 6. The soils are classified in accordance with the Unified Soil Classification System, which is described on Plate 7.

B. Well Completion

A well was constructed in each of the five borings using 2-inch-diameter PVC casing and slotted (0.020 inch) PVC screen. The annular space around the screen was packed with Monterey silica sand, and above the screen the annular space was sealed with cement-bentonite slurry. The well construction details are shown on the logs of monitoring wells, Plates 3 through 6. After construction, the wells were developed by pumping with a centrifugal pump. The pump suction hose was steam-cleaned before being placed in each well.

C. Determination of Ground-Water Gradient

A licensed surveyor determined the elevation of each well in reference to Mean Sea Level Datum. We measured the water levels in all five wells over an entire tidal cycle to determine if the ground-water gradient is influenced by the tides. The contours of equal water elevations are shown on Plate 2.

D. Soil and Ground-Water Sampling

The split-barrel soil sampler was steam-cleaned before each sample, and the augers were steam-cleaned before each boring. Soil samples were retained in the brass tubes which line the sampler. The tubes were sealed with foil-lined taped caps and kept on ice until the end of each day, when they were frozen. The soil samples were kept frozen until delivery to California Analytical Laboratories (Cal Labs) for chemical analysis.

After the wells were developed, they were left undisturbed for three to four days to allow any floating hydrocarbons to come to the water surface. The wells were then sampled on November 6, 1984. First, a cut of the top of the water surface was removed with a transparent bailer and inspected for any floating free product or sheen. Ten well volumes of water were then evacuated from each of the "W" wells by continuously pumping with a centrifugal pump. Immediately after evacuation, water samples were withdrawn with a stainless steel bailer. The SW wells did not yield water fast enough to allow them to be pumped continuously. Therefore, they were completely evacuated twice, the water level was allowed to recover to 80 percent of its static level, and then a sample was bailed. All equipment was steam-cleaned before placement in each well.

The water samples were kept on ice until delivery to Cal Labs on the day of sampling. Chain-of-custody procedures were followed to preserve the legal integrity of the samples.

Cal Labs is U.S. EPA-approved to do such analysis, as demonstrated by their status as an EPA contract laboratory.

E. Well Survey

We researched well records in the files of tne Alameda County Flood Control and Water Conservation District and noted wells reported to the CRWQCB. A door-to-door survey was not undertaken. From the drilling logs examined, it appears that most of the private wells are perforated in a sand layer between 10 and 40 feet deep, although two are perforated in several aquifers between 20 and 80 feet. The locations of known wells within 1/2-mile of the site are shown on Plate 1.

The existence of additional wells, constructed without permits during the 1977 drought for lawn and garden irrigation, is likely. Nearly all the known wells in the area were drilled for that purpose and are probably no longer used.

IV DISCUSSION AND CONCLUSIONS

A. Site Hydrogeology

In general, the site is underlain by silts and clays from the surface to a depth of 14 to 18.5 feet. This unit will hereafter be called the "clay cap." Although the water table is about 5 feet below ground, water did not flow into some boreholes in the clay because of the low permeability of the clay cap. When a thin (1-inch-thick) sand lens was encountered within the clay cap, water would flow slowly into the borehole.

A 9- to 10-foot-thick fine sand underlies the clay cap to a depth of 23 to 27.5 feet. This unit, the uppermost aquifer beneath the site, yielded water at a rate of about 10 gallons per minute from our 2-inch-diameter wells. This sand is the zone in which most of the domestic irrigation wells, described in the Well Survey section above, are perforated. The geological conditions indicated in the well survey logs agree with the site geology encountered in our borings.

Monitoring both the chemical quality of the water in the uppermost aquifer and the presence of floating hydrocarbons in a single well would require extending the well screen from the bottom of the sand to within 2 feet of the ground surface. This would ensure that floating hydrocarbons at the air-water interface could enter the well. However, potential contaminants within the clay cap or from surface runoff could flow downward through the sand pack around the well screen and into the sand aquifer. To avoid any such vertical migration into the aquifer, the three "W" wells were screened over the sand interval only and the annular space was sealed with cement grout from the ground surface to 2 feet above the top of the screen.

To enable monitoring for floating hydrocarbons, Well SW-1 was constructed adjacent to Well W-1 to a depth of 10 feet, well above the top of the sand. Well SW-1 was screened from 2 to 10 feet below ground. Well SW-2 was similarly constructed adjacent to Well W-3.

Our measurements demonstrated that the aquifer water-level response to the tides is insignificant. The water level in Well W-1 rose 0.05 foot between low and high tide, and the water level in Wells W-2 and W-3 rose 0.02 foot. The ground-water gradient shown on Plate 2 is toward the north-northeast at 0.0078 foot vertically per foot horizontally.

B. Chemistry of Soil and Water Samples

The proposed investigation plan called for soil and water samples from two wells to be tested for free standing petroleum product as well as benzene, toluene and xylene. Soil and water samples from one well were to be analyzed for purgeables (Method 624), base/neutrals and acids (Method 625), and free standing petroleum product. All chromatographic peaks were to be identified. A surface soil sample from a depth of 0.5 to 1.0 foot was analyzed to detect surface contamination, and samples from just above the water table were checked for vertical movement of contaminants in the soil. No surface soil sample was analyzed from Boring W-2 because pavement base rock was encountered to a depth of 3 feet. In Boring SW-2, samples were taken from depths of 5.0 to 5.5 feet, which was the depth at which maximum hydrocarbon odors were detected.

Soil and water samples were analyzed for benzene, toluene, and xylene by EPA Method 602. One soil sample and one water sample were analyzed by gas chromatography/mass spectroscopy (GC/MS) for volatile, base/neutral, and acid compounds using EPA Methods 624 and 625. The soil sample selected for GC/MS was taken from 5 to 5.5 feet in Boring SW-2, the only zone where hydrocarbon odors were noticed in any of the borings. The water sample chosen for the complete analysis was from Well W-1 because it was the aquifer sample that was most down-gradient of the site. — Sample was ND — to eliminate the extent — should be upgradient

The results of the chemical analyses are listed in Tables 1, 2, 3, and 4. No benzene, toluene, or xylene were detected in any of the soil or water samples. No organic compounds were detected in the water sample from Well W-1. The soil sample from Boring SW-2 contains eight straight-chain hydrocarbons. None of the compounds detected are on the U.S. Environmental Protection Agency's priority pollutant list.

EXPLANATION

⊙ Well Location

0 2000 4000 feet

N

Reference: This map is a portion of the Oakland East, California 7.5 minute topographic quadrangle map, U.S.G.S., 1968.

Harding Lawson Associates
Engineers, Geologists & Geophysicists

Location Map
King Petroleum
Alameda, California

MPS 00304

PLATE **1**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
ML	4167,076.12	R. Houfer	11/84		

4167,076.0006

EXPLANATION

W-1 — Well drilled by HLA, fully screens shallow sand

SW-1 — Shallower well drilled by HLA to detect floating hydrocarbons

B-1 — Test boring drilled by others

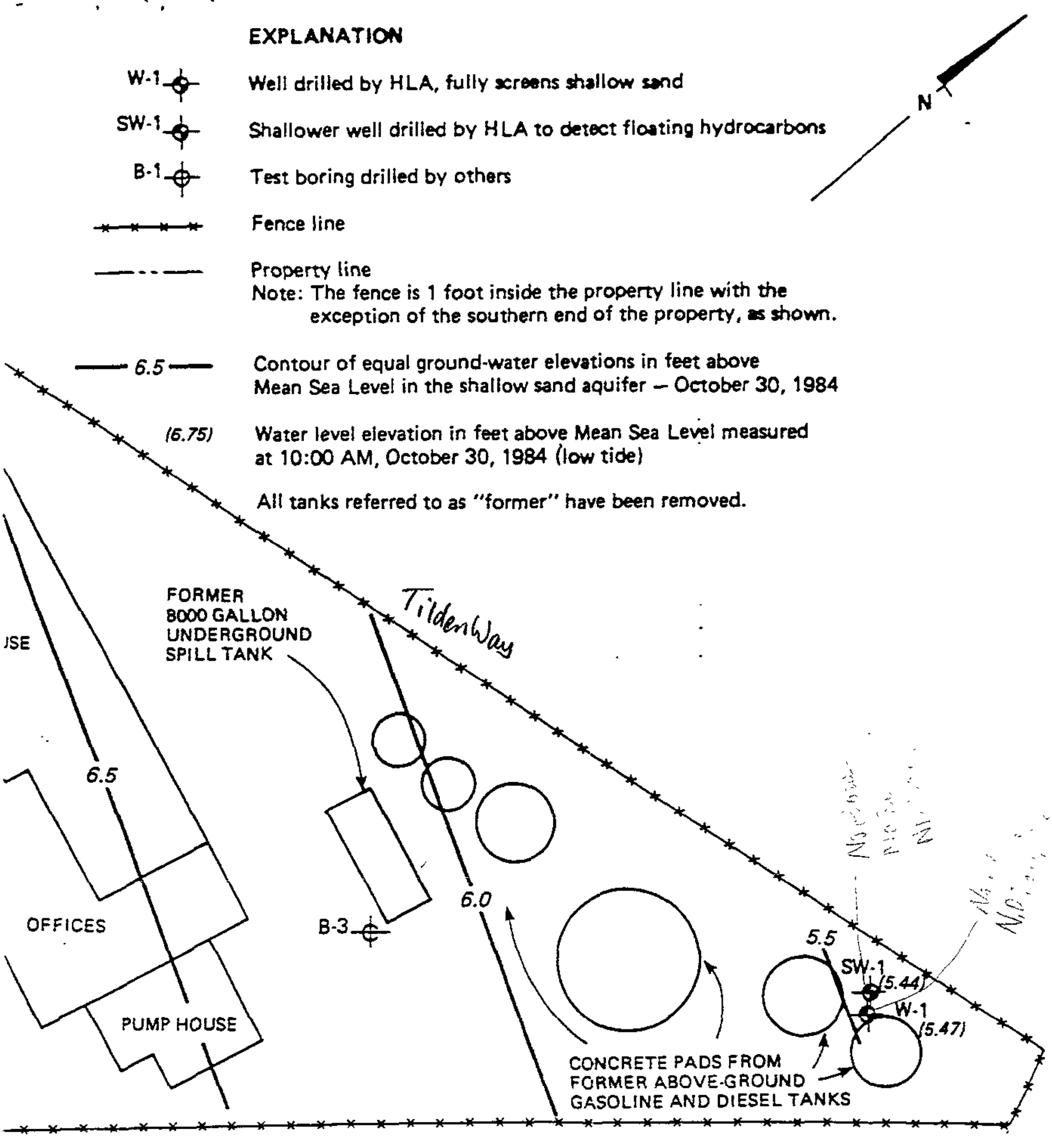
Fence line

Property line
Note: The fence is 1 foot inside the property line with the exception of the southern end of the property, as shown.

6.5 — Contour of equal ground-water elevations in feet above Mean Sea Level in the shallow sand aquifer — October 30, 1984

(6.75) Water level elevation in feet above Mean Sea Level measured at 10:00 AM, October 30, 1984 (low tide)

All tanks referred to as "former" have been removed.



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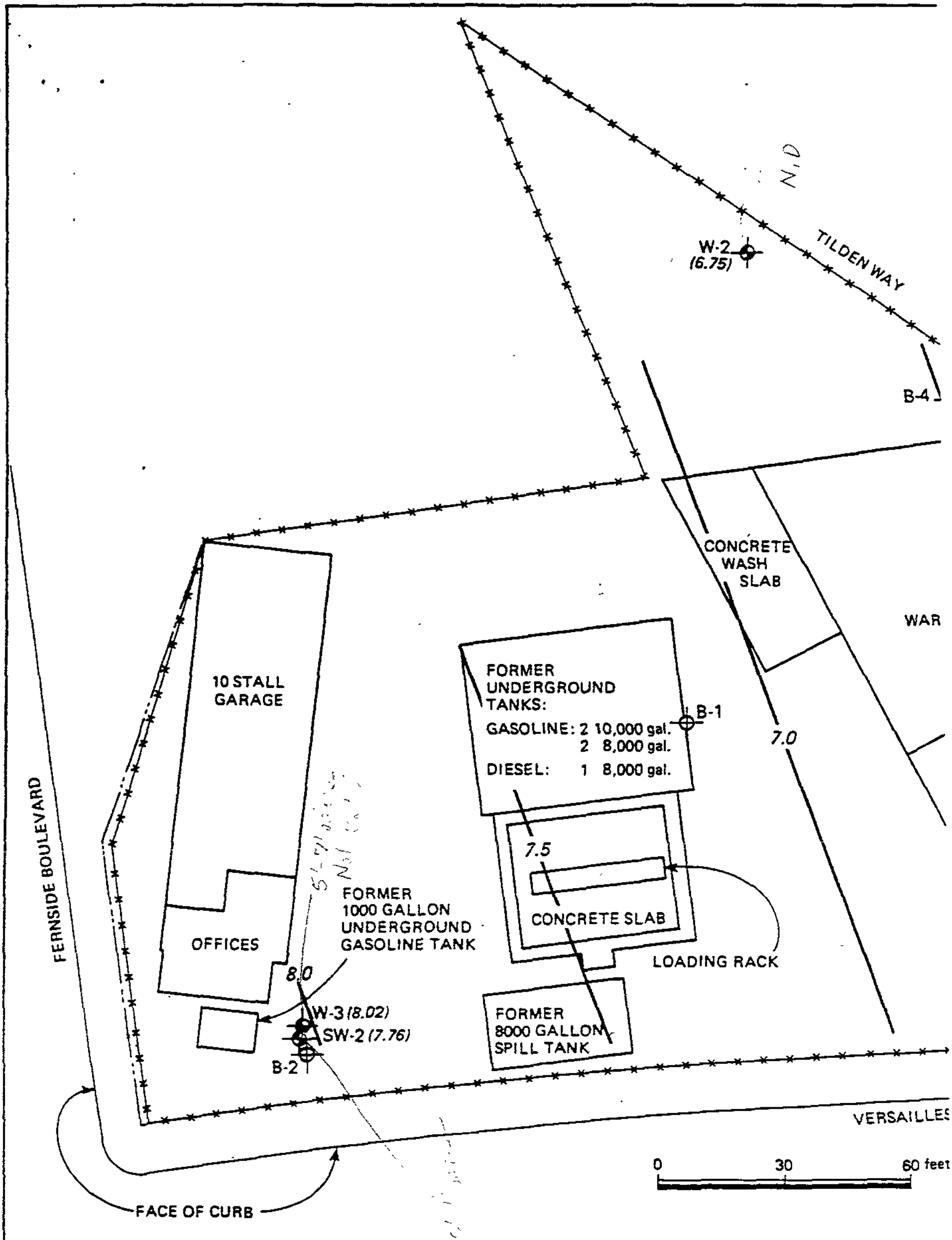
Site Plan
King Petroleum
Alameda, California

MPS 00305

PLATE 2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
ML	4167,076.12	R. [signature]	10/84		

4167,076.0001


N.D
W-2
(6.75)
TILDEN WAY
B-4
CONCRETE WASH SLAB
WAR
10 STALL GARAGE
FORMER UNDERGROUND TANKS:
GASOLINE: 2 10,000 gal.
2 8,000 gal.
DIESEL: 1 8,000 gal.
B-1
7.0
7.5
FERNSIDE BOULEVARD
FORMER 1000 GALLON UNDERGROUND GASOLINE TANK
CONCRETE SLAB
LOADING RACK
OFFICES
8.0
W-3 (8.02)
SW-2 (7.76)
B-2
FORMER 8000 GALLON SPILL TANK
VERSAILLES
0
30
60 feet
FACE OF CURB

Equipment 7-inch Hollow Stem Auger Date 10/30/84

Ground Surface Elevation (feet above MSL) 11.0

Top of Casing Elevation (feet above MSL) 11.91

DARK BROWN SILTY SAND (SM)
loose, moist (fill)

DARK BROWN AND BLACK CLAYEY SILT (ML) - stiff, moist

BLACK SANDY CLAY (CL)
stiff, moist
water level, 10/30/84
green-gray below 7 feet

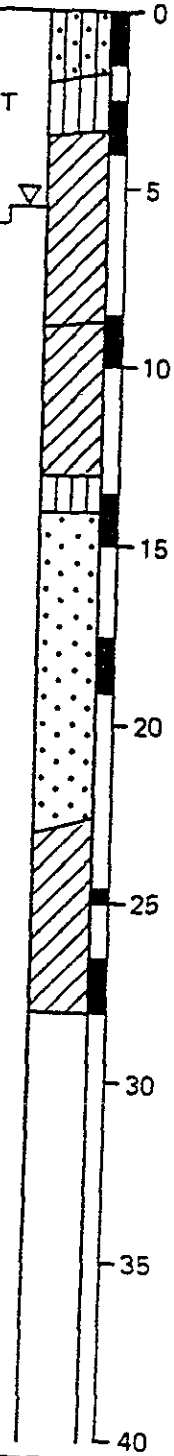
GRAY SILTY CLAY (CL)
very stiff, moist

GRAY CLAYEY SILT (ML)
medium stiff, moist

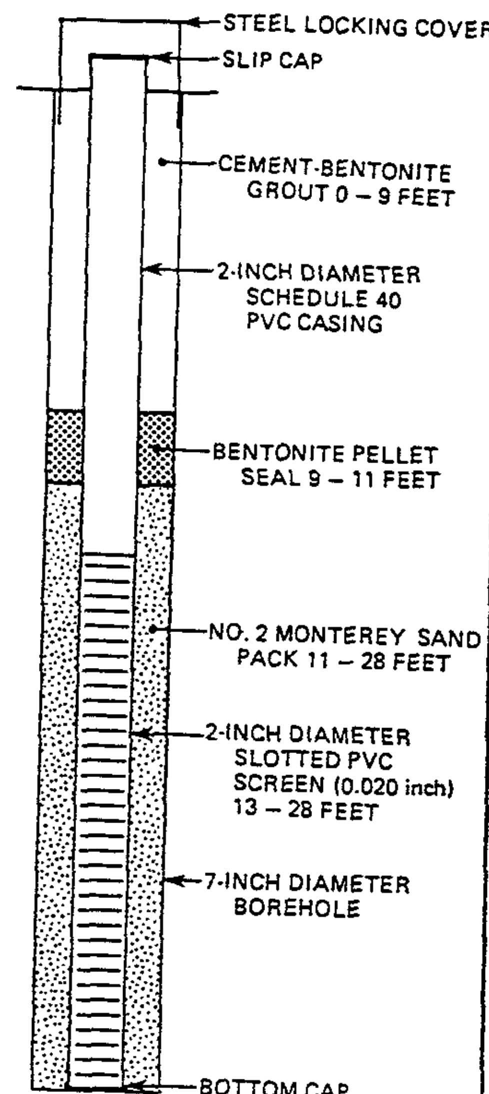
GREEN-BROWN SAND (SP)
medium dense, saturated

BLUE-GRAY SILTY CLAY (CL)
hard, saturated

No hydrocarbon odors encountered



WELL INSTALLATION DESIGN



Harding Lawson Associates
Engineers Geologists & Geophysicists

Log of Well W-1
King Petroleum
Alameda, California

MPS 00307

PLATE 3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
ML	4167,076.12	R. Stufer	11/84		

4167,076.0002

Equipment 7-inch Hollow Stem Auger Date 10/24/84

Ground Surface Elevation (feet above MSL) 12.0

Top of Casing Elevation (feet above MSL) 13.24

ASPHALT PAVEMENT SECTION

LIGHT BROWN SILTY SAND (SM)
loose, dry (fill)
water level, 10/30/84

GRAY SILTY CLAY (CL)
very stiff, moist

LIGHT GRAY AND ORANGE CLAYEY SILT (ML) - stiff, moist

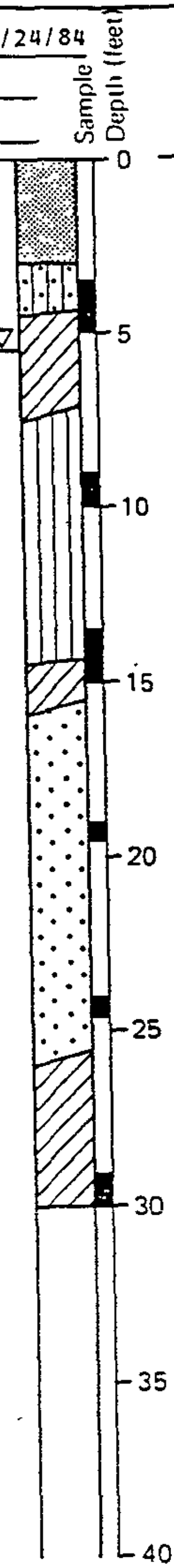
saturated below 13.5 feet

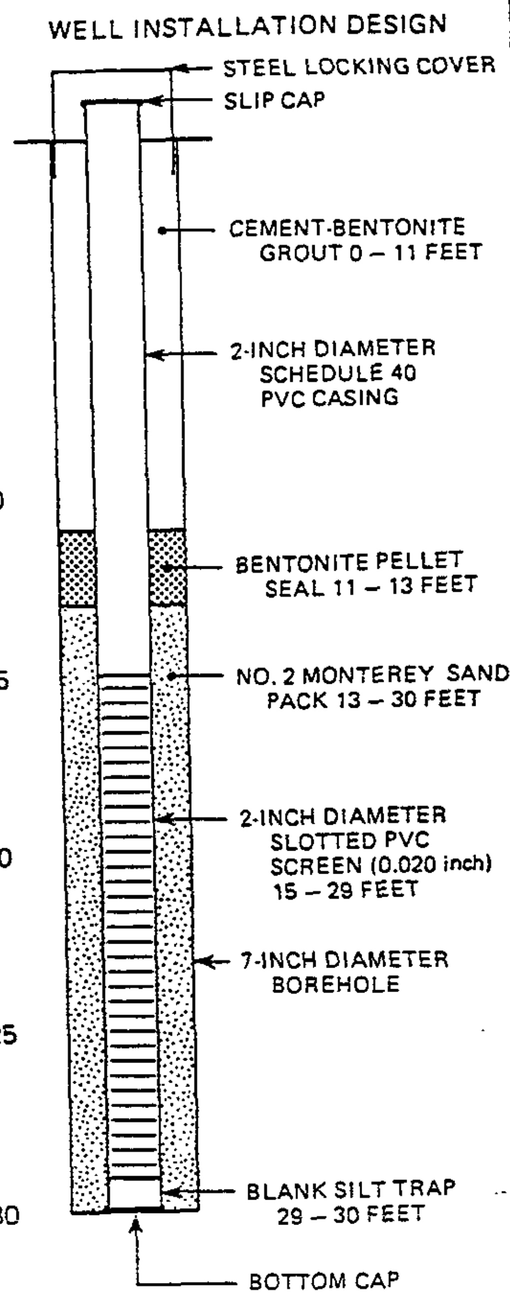
BROWN SANDY CLAY (CL)
hard, saturated

BROWN SAND (SP)
dense, saturated

BLUE-GRAY SILTY CLAY (CL)
hard, saturated

No hydrocarbon odors encountered





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Log of Well W-2
King Petroleum
Alameda, California

MPS 00308

PLATE 4

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
ML	4167,076.12	R. Stouler	11/84		

4167,076.0003

Equipment 7-inch Hollow Stem Auger Date 10/24/84

Ground Surface Elevation (feet above MSL) 12.0

Top of Casing Elevation (feet above MSL) 12.48

ASPHALT PAVEMENT SECTION

DARK BROWN GRAVELLY SAND (SP)
loose, moist, with oily odor

BROWN SILTY SAND (SM)
medium dense, moist

YELLOW-BROWN SAND (SP)
medium dense, moist
water level, 10/30/84

GRAY SANDY CLAY (CL)
medium dense, moist, with diesel fuel or gasoline odor at 5 feet

GRAY-BROWN SILTY SAND (SM)
medium dense, moist

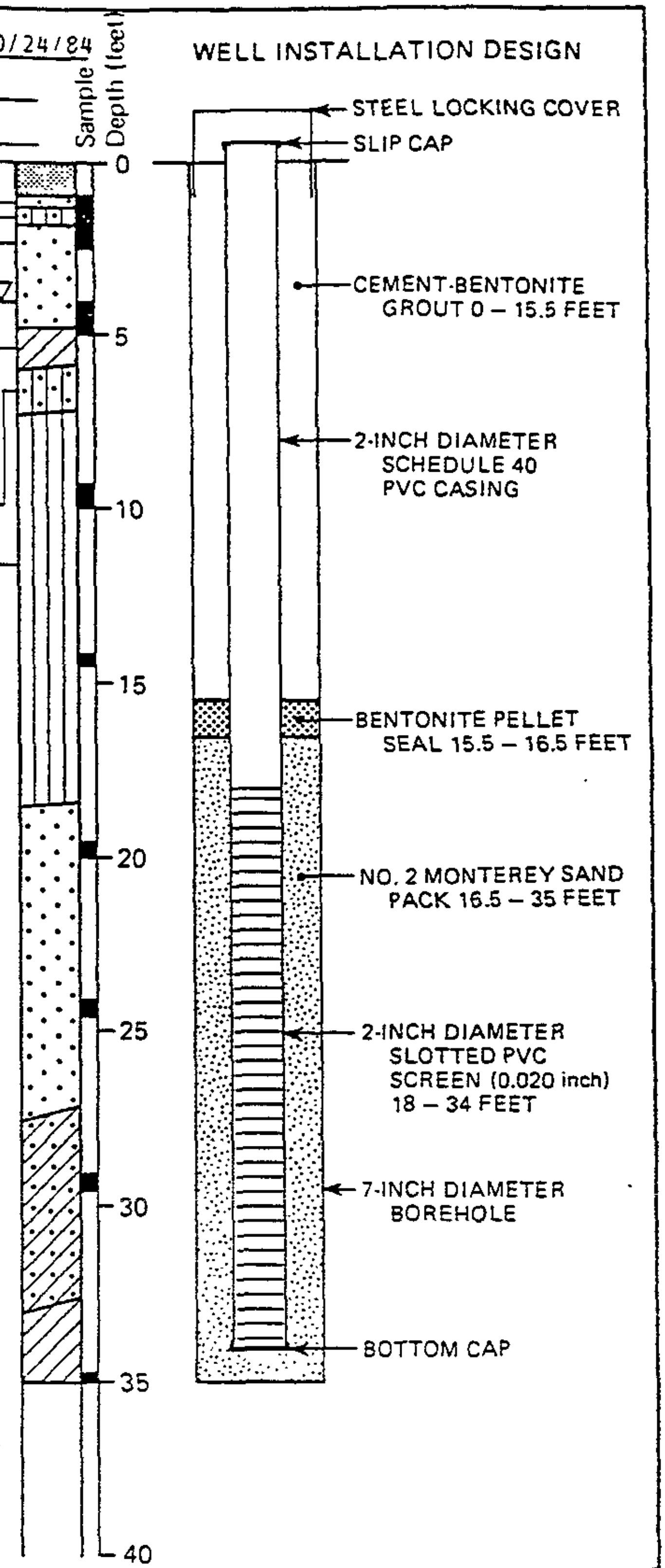
ORANGE-GRAY CLAYEY SILT (ML)
stiff, moist to wet
saturated below 10 feet

BROWN SAND (SP)
dense, saturated

BROWN CLAYEY SAND (SC)
very dense, saturated

BROWN SILTY CLAY (CL)
hard, saturated

Hydrocarbon odors between 5 and 7 feet



Harding Lawson Associates
Engineers, Geologists & Geophysicists

Log of Well W-3
King Petroleum
Alameda, California

MPS 00309

PLATE 5

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
ML	4167,076 12	R. Stouler	11/84		

4167,076.0004

LOG OF BORING SW-1

Equipment 7-inch Hollow Stem Auger Date 10/26/84

Ground Surface Elevation (feet above MSL) 10.8

Top of Casing Elevation (feet above MSL) 11.52

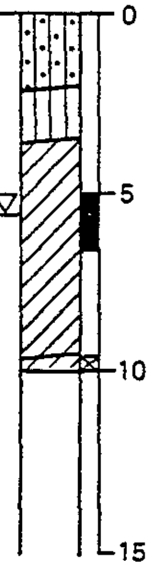
DARK BROWN SILTY SAND (SM)
loose, moist

DARK BROWN AND BLACK CLAYEY SILT (ML) - stiff, moist

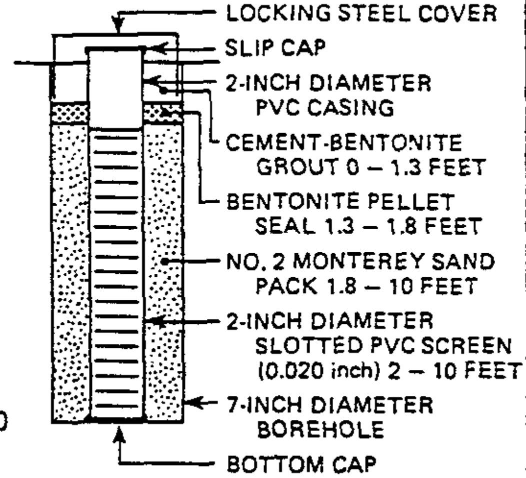
BLACK SANDY CLAY (CL)
stiff, moist
water level, 10/30/84
green-gray below 6.7 feet

BROWN SANDY CLAY (CL)
saturated

No hydrocarbon odors encountered



WELL INSTALLATION DESIGN



LOG OF BORING SW-2

Equipment 7-inch Hollow Stem Auger Date 10/26/84

Ground Surface Elevation (feet above MSL) 12.0

Top of Casing Elevation (feet above MSL) 13.02

ASPHALT PAVEMENT SECTION

DARK BROWN GRAVELLY SAND (SP)
loose, moist

BROWN SILTY SAND (SM)
medium dense, moist

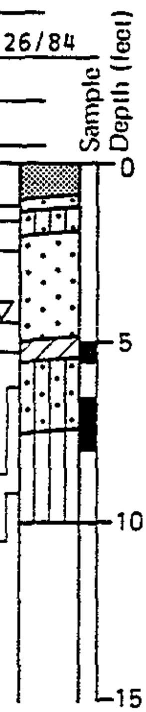
YELLOW-BROWN SAND (SP)
medium dense, moist
water level, 10/30/84

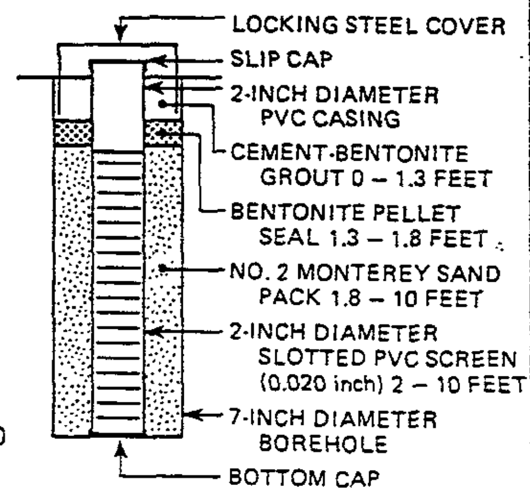
GREEN-GRAY SANDY CLAY (CL)
very stiff, moist

GRAY-BROWN SILTY SAND (SM)
medium dense, moist

GRAY AND ORANGE CLAYEY SILT (ML)
very stiff, saturated

Hydrocarbon odors between 5 and 7 feet





Harding Lawson Associates
Engineers Geologists & Geophysicists

Logs of Wells SW-1 and SW-2
King Petroleum
Alameda, California

MPS 00310

PLATE 6

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
ML	4167,076.12	R. Stouder	11/84		

4167,076.0005

MAJOR DIVISIONS					TYPICAL NAMES
COARSE - GRAINED SOILS MORE THAN HALF IS LARGER THAN NO 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN No 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES
			GP		POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES
		GRAVELS WITH OVER 12% FINES	GM		SILTY GRAVELS, POORLY GRADED GRAVEL-SAND-SILT MIXTURES
			GC		CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND-CLAY MIXTURES
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL-GRADED SANDS, GRAVELLY SANDS
			SP		POORLY GRADED SANDS, GRAVELLY SANDS
		SANDS WITH OVER 12% FINES	SM		SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES
			SC		CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE - GRAINED SOILS MORE THAN HALF IS SMALLER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		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 CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH		INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			OH		ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			Pt		PEAT AND OTHER HIGHLY ORGANIC SOILS

UNIFIED SOIL CLASSIFICATION SYSTEM

Perm	—	Permeability
Conso	—	Consolidation
LL	—	Liquid Limit (%)
PI	—	Plastic Index (%)
G_s	—	Specific Gravity
MA	—	Particle Size Analysis
■	—	"Undisturbed" Sample
⊠	—	Bulk or Classification Sample

	Shear Strength (psf)	Confining Pressure		
TxUU	3200	(2600)	—	Unconsolidated Undrained Triaxial Shear
	(FM) or (S)			(field moisture or saturated)
TxCU	3200	(2600)	—	Consolidated Undrained Triaxial Shear
	(P)			(with or without pore pressure measurement)
TxCD	3200	(2600)	—	Consolidated Drained Triaxial Shear
SSCU	3200	(2600)	—	Simple Shear Consolidated Undrained
	(P)			(with or without pore pressure measurement)
SSCD	3200	(2600)	—	Simple Shear Consolidated Drained
DSCD	2700	(2000)	—	Consolidated Drained Direct Shear
UC	470		—	Unconfined Compression
LVS	700		—	Laboratory Vane Shear

KEY TO TEST DATA

Harding Lawson Associates
Engineers Geologists
& Geophysicists

Soil Classification Chart
and Key to Test Data
King Petroleum
Alameda, California

MPS 00311

PLATE
7

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
ML	4167,076.12	R. [signature]	11/84		

4167.076.0007

Table 1. Concentrations of Benzenes, Toluene, and Xylenes in Soil and Ground-Water Samples

Sample Locations	Sample Type	Depth (ft)	Benzene (µg/kg)	Toluene (µg/kg)	Chlorobenzene (µg/kg)	Ethyl-benzene (µg/kg)	Total Xylenes (µg/kg)	Total Dichloro-benzene (µg/kg)
W-1	Soil	0.5-1.0	<50	<50	<50	<50	<50	<50
W-1	Soil	3.5-4.0	<50	<50	<50	<50	<50	<50
W-2	Soil	4.0-4.5	<100	<100	<100	<100	<100	<100
SW-2	Soil	5.0-5.5	<200	<200	<200	<500	<200	<200
			(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
W-1	Water		<5	<5	<5	<5	<5	<10
W-2	Water		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
W-3	Water		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SW-1	Water		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SW-2	Water		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Note: The analyses of the soil sample from SW-2 (5.0-5.5 feet) and the water sample from W-1 were performed by EPA Methods 624 and 625. The rest of the analyses on this table were performed by EPA Method 602.
A concentration stated as <50 indicates that the concentration is less than the analytical detection limit of 50 µg/Kg.

volatiles

Table 2. Compounds Identified in Samples by GC/MS, EPA Methods 624 and 625 semivolatiles

Sample	Sample Type	Depth (ft)	Compound Identified	Concentration (µg/kg)*
W-1	Water	NA	None	-
SW-2	Soil	5.0-5.5	Trimethyl cyclohexane	750
			Ethyl methyl cyclohexane	200
			Tetramethyl hexene	850
			Decahydromethyl naphthalene	7000
			Trimethyl octane	11,000
			Dimethyl naphthalene	13,000
			Heptadecane	20,000
			Dioctylester hexane dioicacid	86,000

* Approximately equivalent to parts per billion.

Table 3. Compounds Analyzed for but not Detected by GC/MS
EPA Methods 624 and 625 in W-1 Water Sample

PP#	VOLATILES	ug/L
2V	acrolein	<100
3V	acrylonitrile	<100
4V	benzene	<5
6V	carbon tetrachloride	<5
7V	chlorobenzene	<5
10V	1,2-dichloroethane	<5
11V	1,1,1-trichloroethane	<5
13V	1,1-dichloroethane	<5
14V	1,1,2-trichloroethane	<5
15V	1,1,2,2-tetrachloroethane	<10
16V	chloroethane	<10
19V	2-chloroethylvinyl ether	<10
23V	chloroform	<5
29V	1,1-dichloroethene	<5
30V	trans-1,2-dichloroethene	<5
32V	1,2-dichloropropane	<10
33V	1,3-dichloropropene	<5
38V	ethylbenzene	<5
44V	methylene chloride	<5
45V	chloromethane	<10
46V	bromomethane	<10
47V	bromoform	<10
48V	bromodichloromethane	<5
49V	fluorotrichloromethane	<10
50V	dichlorodifluoromethane	<10
51V	chlorodibromomethane	<5
85V	tetrachloroethene	<5
86V	toluene	<5
87V	trichloroethene	<5
88V	vinyl chloride	<10

NON-PRIORITY POLLUTANT HAZARDOUS SUBSTANCES LIST COMPOUNDS

CL13	acetone	<5
CL14	2-butanone	<5
CL15	carbondisulfide	<5
CL16	2-hexanone	<5
CL17	4-methyl-2-pentanone	<5
CL18	styrene	<5
CL19	vinyl acetate	<5
CL20	total xylenes	<5

The less-than (<) symbol means "not present at or above the indicated value (detection limit)".

Table 3 (continued)

PP#	ACID COMPOUNDS	ug/L	PP#	BASE/NEUTRAL COMPOUNDS	ug/L
21A	2,4,6-trichlorophenol	<10	40B	4-chlorophenyl phenyl ether	<10
22A	p-chloro-m-cresol	<10	41B	4-bromophenyl phenyl ether	<10
24A	2-chlorophenol	<10	42B	bis(2-chloroisopropyl) ether	<20
31A	2,4-dichlorophenol	<10	43B	bis(2-chloroethoxy) methane	<20
34A	2,4-dimethylphenol	<10	52B	hexachlorobutadiene	<10
57A	2-nitrophenol	<20	53B	hexachlorocyclopentadiene	<10
58A	4-nitrophenol	<50	54B	isophorone	<10
59A	2,4-dinitrophenol	<50	55B	naphthalene	<10
60A	4,6-dinitro-o-cresol	<20	56B	nitrobenzene	<10
64A	pentachlorophenol	<10	62B	N-nitrosodiphenylamine	<10
65A	phenol	<10	63B	N-nitrosodipropylamine	<10
			66B	bis(2-ethylhexyl)phthalate	20
	BASE/NEUTRAL COMPOUNDS		67B	benzyl butyl phthalate	<10
			68B	di-n-butyl phthalate	<10
1B	acenaphthene	<10	69B	di-n-octyl phthalate	<10
5B	benzidine	<40	70B	diethyl phthalate	<10
8B	1,2,4-trichlorobenzene	<10	71B	dimethyl phthalate	<10
9B	hexachlorobenzene	<10	72B	benzo(a)anthracene	<10
12B	hexachloroethane	<10	73B	benzo(a)pyrene	<20
18B	bis(2-chloroethyl)ether	<10	74B	benzo(b)fluoranthene	<20*
20B	2-chloronaphthalene	<10	75B	benzo(k)fluoranthene	<20*
25B	1,2-dichlorobenzene	<10	76B	chrysene	<20
26B	1,3-dichlorobenzene	<10	77B	acenaphthylene	<10
27B	1,4-dichlorobenzene	<10	78B	anthracene	<10
28B	3,3'-dichlorobenzidine	<20	79B	benzo(ghi)perylene	<20
35B	2,4-dinitrotoluene	<20	80B	fluorene	<10
36B	2,6-dinitrotoluene	<20	81B	phenanthrene	<10
37B	1,2-diphenylhydrazine		82B	dibenzo(a,h)anthracene	<20
	(as azobenzene)	<20	83B	indeno(1,2,3-cd)pyrene	<20
39B	fluoranthene	<10	84B	pyrene	<10
1.	aldrin	<10	8.	dieldrin	<10
2.	B-BHC	<10	9.	endosulfan sulfate	<20
3.	D-BHC	<10	10.	endrin aldehyde	<20
4.	chlordane	<100	11.	heptachlor	<10
5.	4,4'-DDD	<10	12.	heptachlor epoxide	<10
6.	4,4'-DDE	<10	13.	PCB	<50
7.	4,4'-DDT	<10	14.	toxaphene	<500

* - compounds co-elute - analysed as a single compound
The less-than (<) symbol means "not present at or above the indicated value (detection limit)".

Table 4. Compounds Analyzed for but not Detected by GC/MS EPA Methods 624 and 625 in SW-2 Soil Sample, 5.0-5.5 feet

PP#	VOLATILES	ug/Kg
2V	acrolein	<1000
3V	acrylonitrile	<1000
4V	benzene	<200
6V	carbon tetrachloride	<200
7V	chlorobenzene	<200
10V	1,2-dichloroethane	<200
11V	1,1,1-trichloroethane	<200
13V	1,1-dichloroethane	<200
14V	1,1,2-trichloroethane	<200
15V	1,1,2,2-tetrachloroethane	<200
16V	chloroethane	<200
19V	2-chloroethylvinyl ether	<1000
23V	chloroform	<200
29V	1,1-dichloroethene	<200
30V	trans-1,2-dichloroethene	<200
32V	1,2-dichloropropane	<200
33V	1,3-dichloropropene	<200
38V	ethylbenzene	<500
44V	methylene chloride	<500
45V	chloromethane	<200
46V	bromomethane	<200
47V	bromoform	<200
48V	bromodichloromethane	<200
49V	fluorotrichloromethane	<200
50V	dichlorodifluoromethane	<200
51V	chlorodibromomethane	<200
85V	tetrachloroethene	<200
86V	toluene	<200
87V	trichloroethene	<200
88V	vinyl chloride	<200

NON-PRIORITY POLLUTANT HAZARDOUS SUBSTANCES LIST COMPOUNDS

CL13	acetone	<500
CL14	2-butanone	<500
CL15	carbondisulfide	<200
CL16	2-hexanone	<500
CL17	4-methyl-2-pentanone	<500
CL18	styrene	<200
CL19	vinyl acetate	<1000
CL20	total xylenes	<200

The less-than (<) symbol means "not present at or above the indicated value (detection limit)".

Table 4 (continued)

PP#	ACID COMPOUNDS	ug/Kg	PP#	BASE/NEUTRAL COMPOUNDS	ug/Kg
21A	2,4,6-trichlorophenol	<200	40B	4-chlorophenyl phenyl ether	<200
22A	p-chloro-m-cresol	<200	41B	4-bromophenyl phenyl ether	<200
24A	2-chlorophenol	<200	42B	bis(2-chloroisopropyl) ether	<400
31A	2,4-dichlorophenol	<200	43B	bis(2-chloroethoxy) methane	<400
34A	2,4-dimethylphenol	<200	52B	hexachlorobutadiene	<200
57A	2-nitrophenol	<400	53B	hexachlorocyclopentadiene	<200
58A	4-nitrophenol	<1000	54B	isophorone	<200
59A	2,4-dinitrophenol	<1000	55B	naphthalene	<200
60A	4,6-dinitro-o-cresol	<400	56B	nitrobenzene	<200
64A	pentachlorophenol	<200	62B	N-nitrosodiphenylamine	<200
65A	phenol	<200	63B	N-nitrosodipropylamine	<200
			66B	bis(2-ethylhexyl)phthalate	<200
	BASE/NEUTRAL COMPOUNDS		67B	benzyl butyl phthalate	<200
			68B	di-n-butyl phthalate	3200
1B	acenaphthene	<200	69B	di-n-octyl phthalate	<200
5B	benzidine	<800	70B	diethyl phthalate	<200
8B	1,2,4-trichlorobenzene	<200	71B	dimethyl phthalate	<200
9B	hexachlorobenzene	<200	72B	benzo(a)anthracene	<200
12B	hexachloroethane	<200	73B	benzo(a)pyrene	<400
18B	bis(2-chloroethyl)ether	<200	74B	benzo(b)fluoranthene	<400*
20B	2-chloronaphthalene	<200	75B	benzo(k)fluoranthene	<400*
25B	1,2-dichlorobenzene	<200	76B	chrysene	<400
26B	1,3-dichlorobenzene	<200	77B	acenaphthylene	<200
27B	1,4-dichlorobenzene	<200	78B	anthracene	<200
28B	3,3'-dichlorobenzidine	<400	79B	benzo(ghi)perylene	<400
35B	2,4-dinitrotoluene	<400	80B	fluorene	560
36B	2,6-dinitrotoluene	<400	81B	phenanthrene	1500
37B	1,2-diphenylhydrazine		82B	dibenzo(a,h)anthracene	<400
	(as azobenzene)	<400	83B	indeno(1,2,3-cd)pyrene	<400
39B	fluoranthene	<200	84B	pyrene	230
1.	aldrin	<500	8.	dieldrin	<500
2.	B-BHC	<500	9.	endosulfan sulfate	<1000
3.	D-BHC	<500	10.	endrin aldehyde	<1000
4.	chlordane	<5000	11.	heptachlor	<500
5.	4,4'-DDD	<500	12.	heptachlor epoxide	<500
6.	4,4'-DDE	<500	13.	PCB	<5000
7.	4,4'-DDT	<500	14.	toxaphene	<10000

* - compounds co-elute - analysed as a single compound
The less-than (<) symbol means "not present at or above the indicated value (detection limit)".