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PFIZER PIGMENTS INC.
A subsidiary of Pfizer Inc.
4650 SHELLMOUND ST., P.O. BOX 8215 • EMERYVILLE, CA 94662-0905
415 / 653-6151

August 17, 1988

Alameda County
Division of Environmental Health
Underground Storage Tank Unit
470-27th Street, Room 324
Oakland, CA 94612

Attention: Ms. Lizabeth Rose

Enclosed you will find the final report and recommendations regarding the site of the removed underground waste oil tank at the Pfizer Pigments Inc. Emeryville plant.

As described in the report, we are recommending that semi-annual monitoring of solvents in the ground-water be instituted to detect any downgradient migration. We anticipate biodegradation of the solvents in the pit area. We also recommend that absorbed oil and grease in the soil be left in place without remediation.

Please direct any questions or comments to me at the above address.

Michael S. Herzog
Manager, Process Engineering

MSH/jm
\wp\m\msh260

cc: G. L. Metcalf
W. E. McCoy

UNDERGROUND STORAGE TANK

SITE INVESTIGATION

Pfizer Pigments, Inc.

Emeryville, California

August 12, 1988

Job No. 04711

ROUX ASSOCIATES
1430 Willow Pass Road - Suite 140
Concord, California 94520
(415)685-8742

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SUMMARY

An underground storage tank used for storage of waste oil and a minor amount of laboratory and shop solvents was removed from the Pfizer Pigments Emeryville, California Plant in December, 1987. Following tank removal, soil contamination was detected in a sample collected from the open tank pit excavation. This report presents the results of a site investigation completed between February and July, 1988 to assess soil and ground-water contamination from the leaking underground storage tank. The investigation included the drilling and sampling of 11 soil borings and installation, development, and sampling of 6 monitoring wells.

Dissolved solvents were detected within the immediate vicinity of the former tank pit. Ground-water sampling detected acetone, 2-butanone, and hexone (MIBK) along with trace concentrations of dimethylnaphthalene in a monitoring well within the former tank pit. Other monitoring wells on the Site including wells downgradient from the tank pit showed Not Detected results for all analyses. Ground water appears to be partially stagnant within the tank pit area.

Monitoring of wells RW-2, RW-3, and MW-4 is recommended to confirm that solvents do not migrate from the tank pit area and to assess the rate of degradation of solvents. Based on the minor amount of solvents estimated to be

present, natural biodegradation and dispersion are expected to reduce the dissolved solvents to acceptable levels within the period of a few years. If ground-water monitoring indicates that solvent levels do not decrease at a sufficient rate or if solvents are detected in any downgradient monitoring wells, pumping and surface treatment of the contaminated ground water is recommended.

Soils in the immediate vicinity of the tank pit had Not Detected levels of priority pollutants, base/neutrals, and total petroleum hydrocarbons. The solvents detected in ground water are below detection limits in the soils. Oil and grease were within background levels within soils in the immediate vicinity of the former tank pit indicating that little or no waste oil was discharged from the tank.

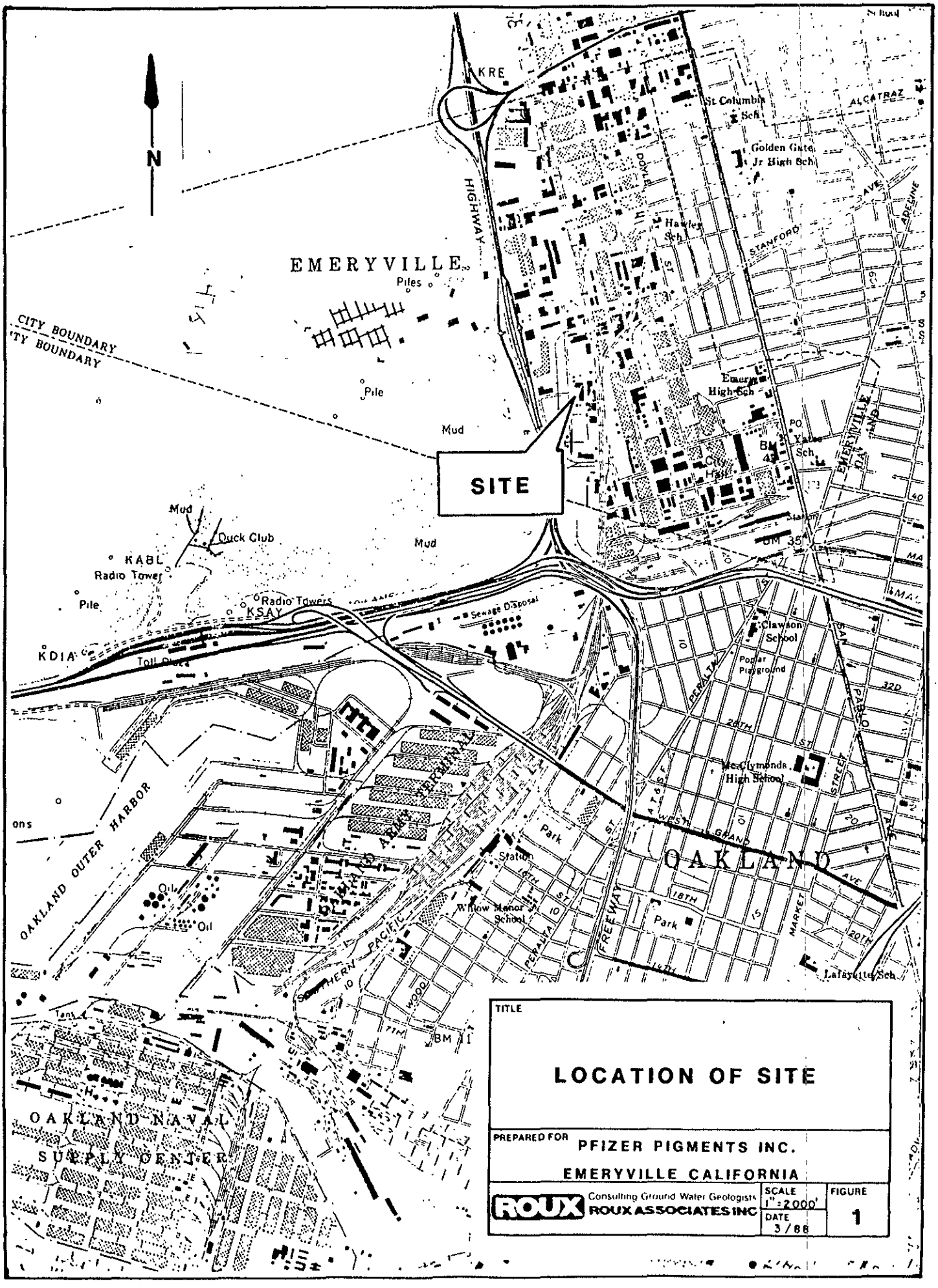
Oil and grease from an unknown, probably older source is adsorbed to soils within an area west and northwest of the former tank pit. No recent or current sources of subsurface oil are known within the immediate vicinity of the oil and grease contamination. The adsorbed oil and grease is not soluble or volatile and does not pose a threat to human health or the environment. Oil and grease was below detection limits in ground water throughout the Site. Conventional remediation of the adsorbed oil and grease is not feasible. Therefore, we recommend that the oil and grease be left in place without remediation.

INTRODUCTION

This report presents the results of a site investigation to assess soil and ground-water contamination from a leaking underground storage tank at the Pfizer Pigments Plant in Emeryville, California. The Pfizer Pigments Plant (Site) is located at 4650 Shellmound Street in a mainly industrial area of Emeryville (Figure 1). The Site is bordered on the north, south, and west by industrial businesses. A retail shopping center and vacant lot are east of the Site. San Francisco Bay is about 1000 ft west of the Plant.

An underground storage tank was removed from the Pfizer Pigments Plant on December 1, 1987. Following tank removal, a soil sample was collected from the open tank pit excavation by R. Larsen of Brown and Caldwell Laboratories. Laboratory analysis of the sample indicated that the soil contained 4 mg/kg acetone, 20 mg/kg 2-hexanone, 490 mg/kg oil and grease, and 720 mg/kg total fuel hydrocarbons. An Underground Storage Tank Unauthorized Release (Leak)/ Contamination Site Report was filed with the appropriate regulatory agencies by Pfizer Pigments Inc.

The underground storage tank was a steel tank with a capacity of about 350 gallons. The tank was placed into service in 1972. Waste oil and a minor amount of laboratory and shop solvents were stored in the tank prior to periodic offsite disposal. Storage of waste oil in the tank was discontinued in 1985; only solvents were added to the tank



TITLE

LOCATION OF SITE

PREPARED FOR PFIZER PIGMENTS INC.

EMERYVILLE CALIFORNIA

ROUX Consulting Ground Water Geologists
ROUX ASSOCIATES INC

SCALE	FIGURE
1" = 2000'	1
DATE 3/88	

during the last two years of service.

Roux Associates has been retained by Pfizer Pigments Inc. to conduct a site assessment characterizing the extent and nature of contamination from the leaking storage tank. An initial investigation that included the drilling and sampling of four soil borings was conducted February 18th and 19th, 1988. Each of the soil borings was converted to a ground-water monitoring well. Based on results from soil and ground-water sampling in the initial investigation, an additional investigation was planned. Seven soil borings were drilled and sampled between May 2nd and 5th, 1988. Two of the borings were converted to monitoring wells. Water levels have been periodically measured in the monitoring wells since installation of the wells.

METHODS OF INVESTIGATION

Subsurface soil and water conditions were investigated from February 18, 1988 through July 9, 1988 at Pfizer's Emeryville, California Plant. The investigation included the drilling of eleven soil borings, installation of six monitoring wells, soil and water sampling/analysis, and water level measurements. Soil boring and monitoring well locations are shown on Figure 2.

Soil Borings and Sampling

The soil borings were drilled and the monitoring wells were installed using a truck mounted hollow stem auger rig, under the direction of Roux Associates. California split-spoon samplers with brass tube inner liners were collected at five-foot intervals ahead of the auger flights by placing the sampler through the hollow stem of the augers to the bottom of the borehole and then by driving it into undisturbed sediments with a 140 lb. hammer. The California sampler was then withdrawn from the borehole and the inside liners removed. Both ends of one liner were immediately covered with a sheet of teflon, capped with plastic end caps and wrapped with electrical tape. The liner was then labeled and placed on ice.

The soil in the remaining liners was extruded, examined and logged by the hydrogeologist. Geologic logs are given in

N

- LEGEND -

- Monitoring Well
- Soil Boring
- Surface Water Measuring Point

RW-1

YELLOW DRYER BLDG. NO. 8

NO.6 PCKR. BLDG. NO. 9

FILTER HOUSE BLDG. NO.13

ROASTER BLDG. NO.1

OXIDE MILL BLDG. NO.2

STAGING AREA BLDG. NO.3

WAREHOUSE NO.1 BLDG. NO. 11

CREEK

FORKLIFT BRIDGE

RAILROAD TRACK

TRUCK BRIDGE

TEMESCAL

Map Inset

W. O. Tank Pit

RW-11 RW-4 RB-9 RB-10

BLDG. No. 10

BLEND AREA BLDG. NO. 5

MAINTENANCE SHOP BLDG. NO. 6

SETTLING POND

MECH. STORE RM.

SUP. OFF.

RES. LAB

W.O. TANK PIT SEE MAP INSET

BOILER BLDG. HOUSE NO.4

SERVICE BLDG. NO. 10

RB-7

OFFICE BLDG. NO. 7

FILTER HOUSE NO. 3

FILTER HOUSE NO.4

B2 B4 B3 B5

UNDERGROUND OIL STORAGE TANKS

W-2

RW-8 14,800 ppm TOG

RB-6 16,870 ppm TOG

RW-3 53,750 ppm TOG

RB-5 29,400 ppm TOG

CHAIN LINK FENCE (℄)

PARKING SPACE

SHELL MOUND

2/18/88 - 7/9/88

TITLE

LOCATION OF SOIL BORINGS AND MONITORING WELLS

PREPARED FOR PFIZER PIGMENT INC.
EMERYVILLE, CALIFORNIA

ROUX Consulting Ground-Water Geologists
ROUX ASSOCIATES INC

SCALE 1" = 40'
DATE 6/88

FIGURE 2

Appendix A. The California sampler and liners were cleaned between uses by scrubbing with a brush and detergent solution then rinsing with clean water. The auger flights were steam cleaned prior to initial use, in between borings, and after completion of drilling. Soil cuttings generated during drilling were stored on-site in sealed drums until laboratory analyses were completed.

A total of 18 soil samples were submitted to Curtis and Tompkins laboratory for analysis. A chain-of-custody was maintained through delivery of the samples to the laboratory. Chain-of-custody forms are included in Appendix B. Laboratory reports are given in Appendix C. Soil analyses are discussed in a later section of the report.

Monitoring Well Installation

After the boreholes for the monitoring wells were advanced to the desired depth, a 15-foot long, threaded, 2-inch diameter, PVC slotted (0.010 inch slot) section and an appropriate length of blank PVC riser pipe was placed in each borehole. The screen zone was gravel packed with Monterey #2 sand. A one-foot thick layer of bentonite pellets was emplaced above the sand pack. A locking 6-inch diameter, 2-foot long steel pipe was then placed over the well and a Christy box was cemented in over the locking pipe finishing the well at land surface. A well construction diagram is shown on Figure 3 and well construction details are given on

Table 1.

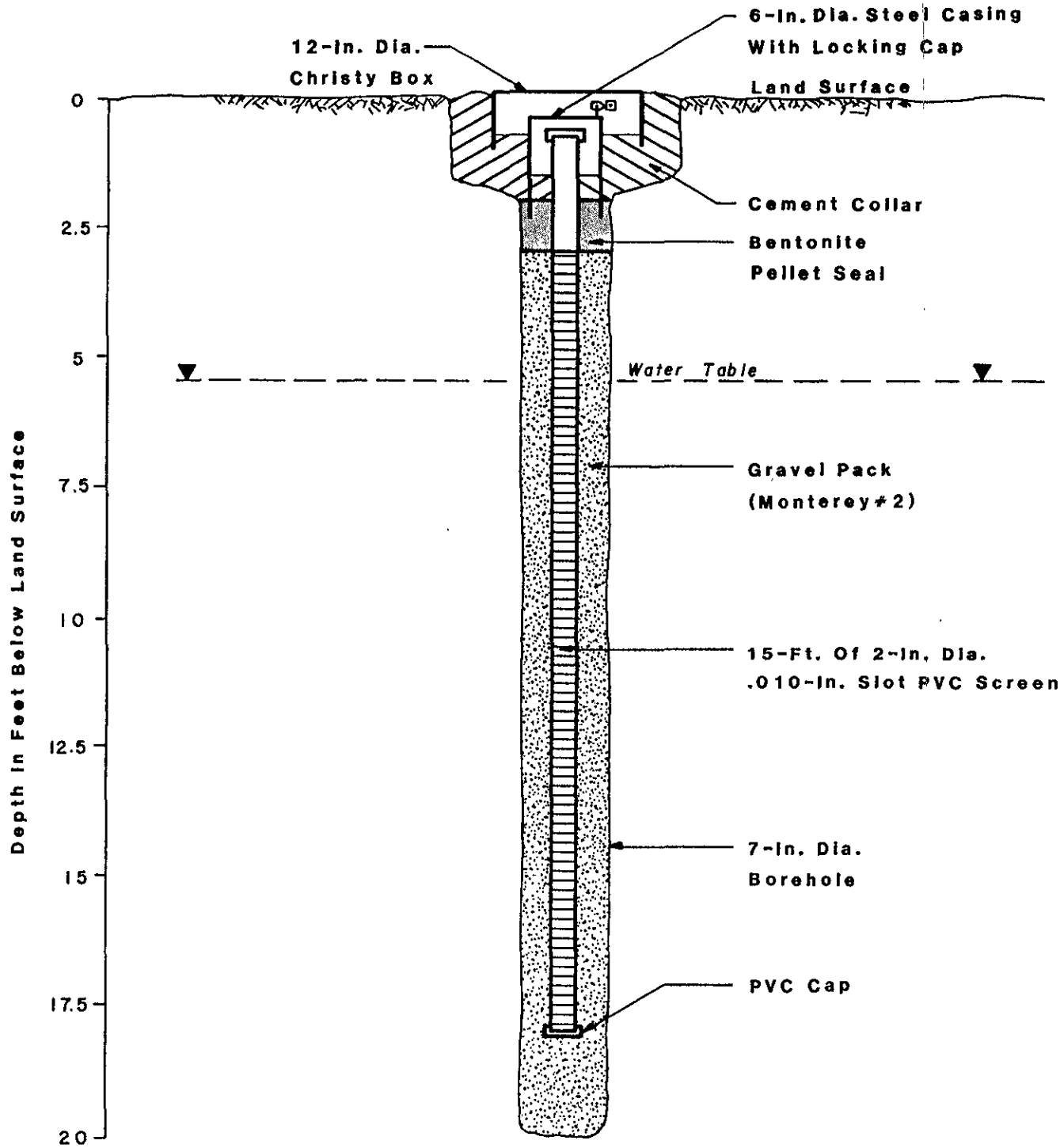
After the monitoring wells were installed they were developed by removing five to ten casing volumes of water from the well, to insure that the well screens were open to the formation.

Ground-Water Sampling

Water samples were collected from the wells on March 9, March 28, 1988 and June 16, 1988 after purging five volumes of water from each well. Development and purge water was stored on-site in sealed 55 gal drums until laboratory analyses were completed. Ground-water sampling protocols are given in Appendix D. A chain-of-custody was maintained through delivery of the samples to Curtis and Tompkins laboratory. Laboratory reports are given in Appendix C. Water analyses are discussed in a later section of this report.

Water level Measurements

Measuring point elevations for the six monitoring wells and the surface water measuring point at Temescal Creek have been surveyed by Roux Associates to a vertical accuracy of 0.02 feet relative to a designated datum of 100 feet elevation assigned to monitoring well MW-4. Water levels were measured in the monitoring wells and Temescal Creek on ten separate



TITLE

MONITORING WELL CONSTRUCTION DIAGRAM

PREPARED FOR PFIZER PIGMENTS INC.
EMERYVILLE CALIFORNIA

ROUX Consulting Ground-Water Geologists
ROUX ASSOCIATES INC

SCALE: SHOWN
DATE: 3/88
FIGURE: 3

TABLE 1
Well Construction Details

Well No.	Well Diameter	Depth of Well (1)	Screen Zone (1)	Elevation of MP (2)	Depth of Boring (1)
RW-1	2"	20.2'	5.2-20.2'	101.90'	21.5'
RW-2	2"	18.0'	3.0-18.0'	98.94'	21.5'
RW-3	2"	18.0'	3.0-18.0'	99.54'	21.0'
RW-4	2"	18.0'	3.0-18.0'	100.00'	21.5'
RW-8	2"	20.3'	5.3-20.3'	100.40'	21.5'
RW-11	4"	17.0'	4.0-17.0'	99.99'	17.0'

(1) Below land Surface

(2) Measuring Point (Top of Christy Box)

occasions during this investigation. Levels were measured hourly on March 7, 1988 for nine hours to record the tidal effects on water levels.

Regional Hydrogeology

The Pfizer Emeryville Plant is located along the eastern edge of San Fransisco Bay at an elevation of about 7-feet above mean sea level. The current bay shoreline is approximately 1,000 feet west of Pfizer's property. A 1936 aerial photograph of the Plant and a United States Geological Survey report I-239 both show a former shoreline located along the eastern edge of present day Shellmound Street.

The regional direction of ground-water movement is from the Berkeley Hills west towards San Francisco Bay. The Temescal Formation covers most of the land surface between the Berkeley Hills and the bay. The Temescal Formation consists of alluvial fan material deposited during the Pleistocene. The thickness of the formation ranges from 5 feet under the eastern portion of the bay to 60 feet at the base of the hills. In most of this region, the water table is found within the Temescal Formation.

The Alameda Formation composed of unconsolidated continental and marine sediments of Quaternary age underlies the Temescal Formation and the bay. The Alameda Formation's known maximum thickness is 1,050 feet and in most places is completely saturated.

Nearby Wells and Ground-water Quality

No active water supply wells are within one-mile of the Site. Industrial supply wells were used in the area several decades ago but are no longer in service. Industrial supply wells were previously located on the property directly north of the Site and at a facility about 0.7 miles south of the Site (Dept. of Water Resources well records). These two industrial supply wells extended to depths of 300 and 326 ft., respectively.

Several ground-water monitoring wells are in close proximity to the Site. The nearest monitoring wells are a series of three wells along Shellmound Street located a few feet west of the [redacted] Pigments Plant property line. An additional 15 monitoring wells are within the shopping center and vacant lot between about 100 and 500 ft west of the Pfizer Plant. These wells range in depth from 11.5 to 17.0 ft. One monitoring well extending to a depth of 29 ft is about 0.4 miles east of the Pfizer Plant (Alameda Flood Control, personal communication).

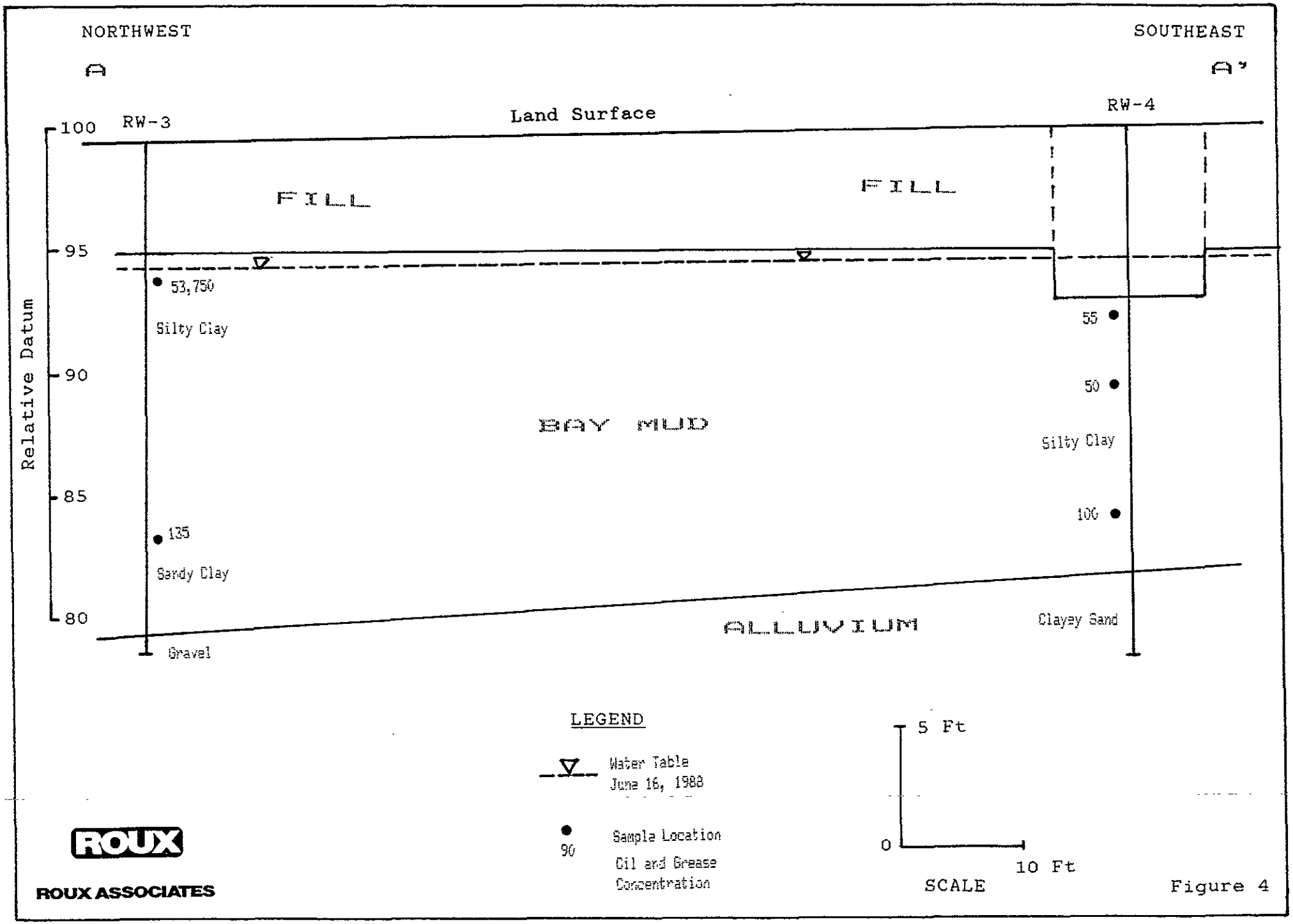
Ground water quality in the region surrounding the Site is expected to be poor. However, the ground water is not saline; a salinity analysis from well RW-2 showed Not Detected results.

The sediments immediately underlying the Site are artificial fill, bay mud, and alluvial fan deposits. Geologic cross-sections A-A' and B-B' are shown on Figures 4 and 5, respectively. These three units are described below:

Artificial fill consisting of gravel, sand, clay, and other miscellaneous refuse were encountered in all but one of the soil borings. The thickness of the fill under the Site averages about five feet. The permeability of the fill varies depending on the composition but in most places it should be greater than the underlying bay mud.

Bay mud consisting of sandy clay to clay with shells and other organic matter underlies the artificial fill at the Site. Fine sediments once held in suspension in the waters of the bay were slowly deposited on the bottom of the bay forming the mud. The bay mud deposit slopes and thickens to the west towards the center of the bay and pinches out to the east. The thickness of the bay mud beneath the site appears to be about 15 feet but may be greater in places, as some of the soil borings did not fully penetrate this unit. The permeability of the mud is low but may vary slightly with its composition. The bay mud has been cut in places by meandering tidal channels. The old channel cuts within the bay mud may contain coarser more permeable material.

Alluvial fan sediments of the Temescal Formation underly the bay mud. According to U.S. Geological Survey



ROUX ASSOCIATES

Figure 4

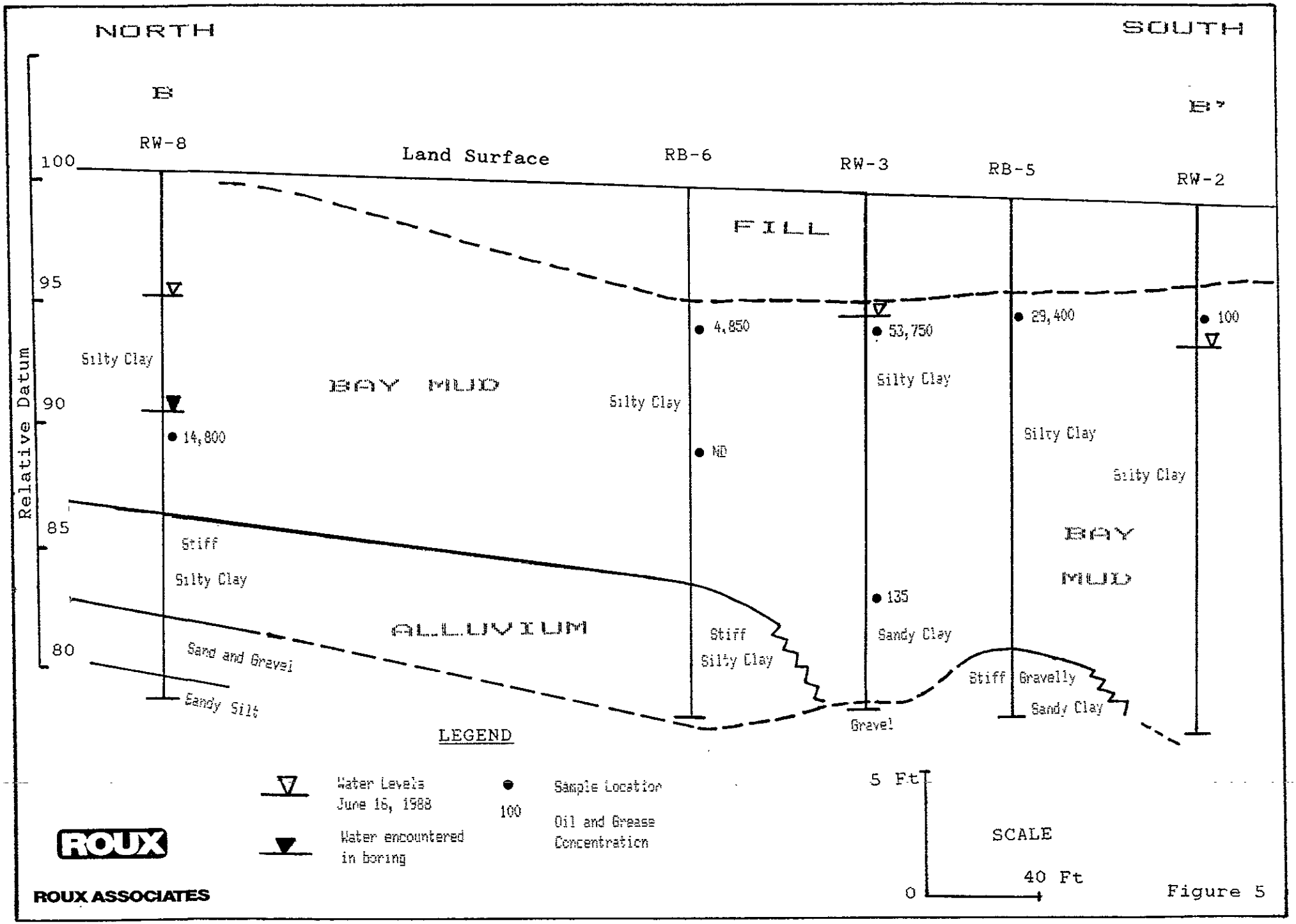

NORTH
SOUTH
B
B'
RW-8
Land Surface
RB-6
RW-3
RB-5
RW-2
100
95
90
85
80
Relative Datum
FILL
BAY MUD
ALLUVIUM
Silty Clay
Silty Clay
Silty Clay
Silty Clay
Silty Clay
Stiff
Silty Clay
Stiff
Silty Clay
Sandy Clay
Stiff Gravelly
Sandy Clay
Sand and Gravel
Sandy Silt
Gravel
4,850
53,750
29,400
100
14,800
ND
135
LEGEND
Water Levels
June 16, 1988
Water encountered
in boring
Sample Location
100
Oil and Grease
Concentration
5 Ft
SCALE
40 Ft
0
ROUX
ROUX ASSOCIATES

Figure 5

Google Maps

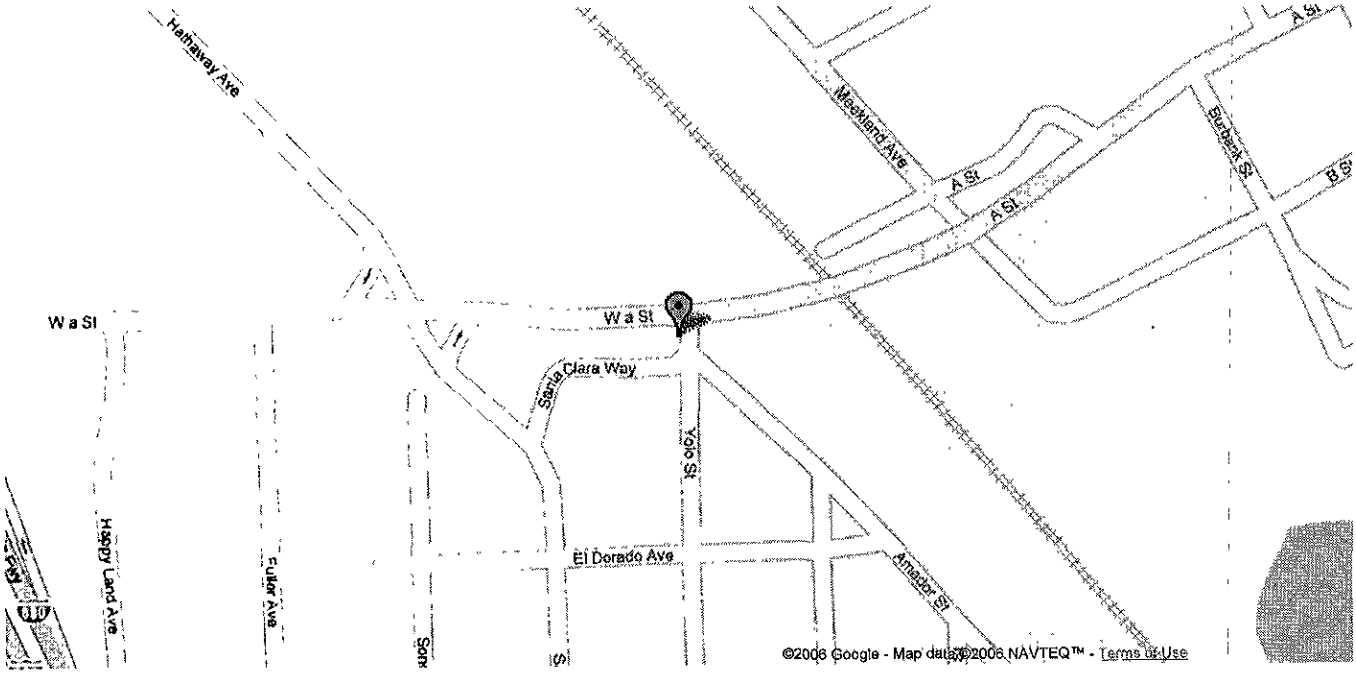

Hathaway Ave
Meekland Ave
A St
Burbank St
B St
W a St
Santa Clara Way
Tyler St
El Dorado Ave
Amador St
Hesperian Blvd
Fuller Ave
©2006 Google - Map data ©2006 NAVTEQ™ - Terms of Use

TABLE 2 Continued

	May 3, 1988	14:00 - 14:20	
RW-1	101.90	6.28	95.62
RW-2	98.94	5.98	92.96
RW-3	99.54	5.07	94.47
RW-4	100.00	3.14	96.86
RW-8	100.40	5.12	95.28
TC-1	100.92	7.90	93.02
	May 26, 1988	08:55 - 09:30	
RW-1	101.90	6.58	95.32
RW-2	98.94	6.14	92.80
RW-3	99.54	5.11	94.43
RW-4	100.00	5.28	94.72
RW-8	100.40	5.29	95.11
TC-1	100.92	7.77	93.15
	June 16, 1988	08:00 - 08:30	
RW-1	101.90	6.67	95.23
RW-2	98.94	5.91	93.03
RW-3	99.54	5.17	94.37
RW-4	100.00	5.27	94.73
RW-8	100.40	5.51	94.89
TC-1	100.92	8.90	92.02
	July 8, 1988	10:00 - 10:30	
RW-1	101.90	7.08	94.82
RW-2	98.94	6.09	92.85
RW-3	99.54	5.24	94.30
RW-4	100.00	5.41	94.59
RW-8	100.40	5.58	94.82
RW-11	99.99	5.55	94.44
TC-1	100.92	8.22	92.70

report I-239, the fan deposit consists of interfingering lenses of yellowish brown clayey gravels, sandy or silty clays, and other sand-silt-clay mixtures. The top of this formation appears to have been encountered in the lower few feet of several soil borings. The overall permeability of the Temescal Formation is moderate, but may vary locally depending on composition.

Ground-water Flow

Water levels have been measured in the monitoring wells and Temescal Creek throughout this investigation. Table contains water level measurements, measuring point elevations and relative water level elevations, for ten different measurement periods.

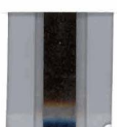
Water levels were measured hourly on March 3, 1988 for nine hours. Only the water levels measured during high and low tides are included on Table 2. The water level data indicates that the bay's tidal water elevation changes, have no significant effect on the water elevations in the monitoring wells located on the Pfizer Plant.

The predominant ground-water flow direction within the bay mud away from the former tank pit is believed to be to the northwest. The regional direction of ground-water movement is westward toward San Leandro Bay. Locally, variations in soil permeability appear to direct ground-water flow to the northwest from the former tank pit. The bay mud

TABLE 2. WATER LEVEL MEASUREMENTS

All elevations and depths shown in the following table are in feet. Monitoring well RW-4 is used as the reference point for elevations and was assigned an arbitrary value of 100 ft. All elevations shown in the table are referenced to the RW-4 datum.

WELL NO.	MEASURING POINT ELEVATION	DEPTH TO WATER	WATER LEVEL ELEVATION
	March 3, 1988 09:15 - 09:40		
RW-1	101.90	5.90	96.00
RW-2	98.94	5.77	93.17
RW-3	99.54	5.00	94.54
RW-4	100.00	5.25	94.75
TC-1	100.92	7.40	93.52
	March 7, 1988 07:54 - 08:08 Low Tide 07:52		
RW-1	101.90	6.25	95.65
RW-2	98.94	5.82	93.12
RW-3	99.54	5.05	94.49
RW-4	100.00	5.36	94.64
TC-1	100.92	9.17	91.75
	March 7, 1988 13:53 - 14:07 High Tide 14:24		
RW-1	101.90	6.26	95.64
RW-2	98.94	5.81	93.13
RW-3	99.54	5.04	94.50
RW-4	100.00	5.40	94.60
TC-1	100.92	7.77	93.15
	March 9, 1988 08:24 - 08:47 Low Tide 09:36		
RW-1	101.90	6.38	95.52
RW-2	98.94	5.87	93.07
RW-3	99.54	5.11	94.43
RW-4	100.00	5.32	94.68
TC-1	100.92	9.18	91.74
	March 28, 1988 10:40 - 11:00 High Tide 08:21		
RW-1	101.90	6.85	95.05
RW-2	98.94	6.15	92.72
RW-3	99.54	5.42	94.12
RW-4	100.00	5.33	94.67
TC-1	100.92	8.54	92.38
	April 7, 1988 13:45 - 14:00		
RW-1	101.90	7.28	94.62
RW-2	98.94	6.05	92.89
RW-3	99.54	5.44	94.10
RW-4	100.00	5.11	94.89
TC-1	100.92	9.20	91.72



solvents from the stagnant zones. As a result, minor quantities of solvents may be retained in ground water within the tank pit area surrounding well RW-4.

Degradation of solvents during transport may also be a factor attenuating the migration of solvents from the tank pit area. Acetone, 2-butanone, and hexone are all susceptible to biodegradation. Natural microbial action in the ground water breaks down the solvents to non-toxic compounds. Natural biodegradation may be effective in attenuating the dispersion of low concentrations of solvents from the tank pit area.

Significant soil adsorption and volatilization of acetone, 2-butanone, and hexone (MIBK) from the ground water are unlikely due to the chemical and physical properties of the solvents. Solvents are below detection limits in soils throughout the Site indicating a lack of adsorption to soils. Volatilization may have removed some of the more volatile compounds that may have been present prior to sampling for this investigation.

Absence of Oil and Grease in Ground Water

Although relatively high levels of oil and grease were detected in soils in some areas, no oil and grease or other petroleum hydrocarbons were detected in the ground water. Each of the monitoring wells was screened across the zone containing relatively high levels of oil and grease. Oil and

grease was below detection limits in ground-water samples from each monitoring well at the Pfizer Plant. Ground Water from monitoring well RW-3, the location with the highest concentrations of oil and grease in the soil, was sampled and analyzed twice for oil and grease with Not Detected results both times. Prior to the second sampling, additional well development was performed using a surge block to assure that the ground-water sample was representative.

Ground-water samples from four of the monitoring wells were also analyzed for total petroleum hydrocarbons (EPA Method 8015). Laboratory results indicated that total petroleum hydrocarbons were also below detection limits in the ground water.

DISCUSSION OF SOIL CONTAMINATION

Adsorbed oil and grease was the only contaminant detected in soils at the Pfizer Plant. Not Detected results were obtained for all soil samples analyzed for priority pollutants (EPA method 8240), base/neutrals (EPA Method 8270), and total petroleum hydrocarbons (EPA Method 8015). Significant levels (above background) of oil and grease are limited to four soil borings along the western portion of the Site. Although solvents were detected in ground water, no solvents or oil and grease were detected in soils near the former tank pit. The extent of adsorbed oil and grease is discussed below followed by a discussion of the absence of soil contamination near the former tank pit.

Extent of Oil and Grease in Soils

Oil and grease levels >1000 mg/kg were detected in soil samples from four soil borings in the western portion of the Site. Figure 6 shows the highest levels of oil and grease encountered in each boring. Oil and grease levels are highest within borings RW-3 and RB-5. As represented on Figure 6, oil and grease levels decrease to the north from RW-3. To the south from RB-5, oil and grease levels decrease abruptly. The highest concentration of oil and grease within Boring RB-5 was 29,400 mg/kg in the 5.0-5.5 ft sample. Further to the south, the highest concentration within RW-2

encountered in soil borings RW-3 and RW-4 contain some coarser and more permeable zones than the bay mud encountered in soil borings RW-2 and RB-5. These permeability differences are expected to have a significant effect on rates of ground-water flow. Where the bay mud is a homogeneous clay or silty clay, the permeability is probably extremely low. Sand layers or lenses probably increase the permeability and ground-water flow rate by orders of magnitude. Therefore, permeability differences are probably the primary factor locally controlling ground-water flow within the bay mud. As a result, ground-water is expected to flow predominantly to the northwest from the tank pit through the more permeable sediments.

Under homogeneous conditions in a water table aquifer, the direction of ground-water flow can be determined from measured gradients on the surface of the water table. Based on all available evidence, the measured gradients from monitoring wells currently located at the Site do not indicate the predominant direction of ground-water flow due to the effects of an upward gradient from the alluvial sediments into the overlying bay mud. Water levels in the wells are apparently affected by the upward component of flow. Because the wells penetrate the alluvium to varying depths, ranging from no penetration to about 7.5 ft, water levels from the wells cannot be compared to determine a gradient within the bay mud.

The upward gradient indicates that water does not move downward through the bay mud into the underlying alluvium from the tank pit. An upward component of flow is demonstrated in comparison of water levels in wells RW-4 and R[illegible] and was observed during drilling of well RW-8. Wells RW-4 and RW-11 are both located within the tank pit and are about five feet apart. Monitoring well RW-4 partially penetrates into the alluvial deposits of the Temescal Formation. Well RW-11 is screened completely within the tank pit fill and bay mud. The higher water level measured in monitoring well RW-4 shows the upward component of flow. Water was encountered while drilling the borehole for [illegible] approximately 9.5-ft below land surface, yet the water levels measured in well [illegible] have been consistently between [illegible] ft below land surface.

Water levels in the tank pit were observed [illegible] feet higher than normal on four occasions during this investigation. The higher water levels were caused by ground-water mounding that periodically occurred in the area of the waste oil tank pit.

The tank pit was backfilled [illegible] and has [illegible] ft [illegible], 1987. A portion of the water which intermittently flows across a concrete pad just north of the tank pit and into a storm drain east of the pit, has been flowing into the edge of the pit. The water then percolated through the gravelly fill to the water table creating the mound. A temporary dam was

constructed on May 5, 1988 to prevent water from entering the tank pit. The higher water level created by this mounding periodically enabled local water movement through the more permeable fill deposits normally above the water table.

RESULTS OF LABORATORY ANALYSES

A total of 18 soil samples were selected for analysis from the eleven soil borings drilled during this investigation. All analyses were performed by Curtis and Tompkins Ltd. Analytical Laboratory, San Francisco, California. Curtis and Tompkins is a Department of Health Services Certified laboratory. A total of 27 individual analyses were run on the 18 samples. Oil and Grease at concentrations ranging from 50 mg/kg to 53,750 mg/kg were the only contaminants detected in the soil samples.

Soil analyses and results are shown on Table 3 and laboratory reports are given in Appendix C. Also included in Appendix C are soil analyses of a soil sample collected on December 3, 1987 by Brown And Caldwell Laboratories from below the waste oil tank just after it was removed.

Ground Water was collected for analysis on three separate occasions from selected monitoring wells installed during this investigation. A total of 17 individual water analyses were performed by Curtis and Tompkins on the ground water samples. Ground Water from monitoring well RW-4 was the only water sample which contained detectable levels of contaminants. Volatile organic analysis (EPA method 624) of the RW-4 sample detected three solvents at part per million levels and semi-volatile organic analysis (EPA method 625) detected trace amounts of two compounds. Water analyses and results are shown on Table 4 and laboratory reports are given in Appendix C.

TABLE 3. SOIL ANALYSES

Boring	Sample No.	Depth Sampled (feet)	Total Petroleum Hydrocarbons EPA 3550/8015 Gasoline (ppm)	Kerosine (ppm)	Diesel (ppm)	Oil and Grease SWMM 503 E (ppm)	Volatile Organics EPA 8240 (ppb)	Base/ Neutral EPA 8270 (ppb)
RW-1	S-1	6.5-7.0	N/A	N/A	N/A	N/A	ND	N/A
RW-1	S-2	7.0-7.5	ND	ND	ND	95	N/A	N/A
RW-1	S-3	15.0-15.5	ND	ND	ND	90	N/A	N/A
RW-2	S-1	4.5-5.0	ND	ND	ND	100	ND	N/A
RW-3	S-1	5.5-6.0	ND	ND	ND	53,750	ND	N/A
RW-3	S-3	16.0-16.5	ND	ND	ND	135	N/A	N/A
RW-4	S-1	7.5-9.0	N/A	N/A	N/A	55	N/A	N/A
RW-4	S-2	10.0-12.0	ND	ND	ND	50	N/A	N/A
RW-4	S-3	15.0-17.0	ND	ND	ND	100	N/A	N/A
RW-4a	S-5	7.5-8.0	N/A	N/A	N/A	N/A	N/A	ND
RW-4a	S-6	8.0-8.5	ND	ND	ND	N/A	ND	N/A
RB-5	S-1	5.0-5.5	N/A	N/A	N/A	29,400	N/A	N/A
RB-6	S-1	5.5-6.0	N/A	N/A	N/A	16,810	N/A	N/A
RB-6	S-2	10.5-11.0	N/A	N/A	N/A	ND	N/A	N/A
RB-7	S-1	6.0-6.5	N/A	N/A	N/A	ND	N/A	N/A
RW-8	S-2	10.5-11.0	N/A	N/A	N/A	14,800	N/A	N/A
RB-9	S-1	3.5-4.0	N/A	N/A	N/A	ND	N/A	N/A
RB-9	S-2	6.0-6.5	N/A	N/A	N/A	N/A	ND	N/A

N/A = Not Analyzed

ND = None Detected

TABLE 4. WATER ANALYSES

Boring	Date Sampled	TPH EPA3550 /8015 (ppm)	Oil and Grease SWWM503E (ppm)	Base/ Neutral EPA625 (ppb)	Volatile Organic EPA624 (ppb)	Salinity
RW-1	3-9-88	ND	ND	N/A	N/A	N/A
RW-2	3-9-88	ND	ND	N/A	N/A	ND
RW-3	3-9-88	ND	ND	N/A	ND	ND
RW-4	3-9-88	ND	ND	A=Trace B=5.2	C=6800 D=8220 E=44,240	N/A
RW-2	3-28-88	N/A	N/A	N/A	ND	N/A
RW-3	3-28-88	N/A	N/A	N/A	ND	N/A
RW-3	6-6-88	N/A	ND	N/A	N/A	N/A
RW-8	6-6-88	N/A	ND	N/A	N/A	N/A

N/A = Not Analyzed
ND = None Detected
A = Naphthalene
B = 2-methylnaphthalene
C = Acetone
D = 2-butanone, (MEK)
E = 4-methyl-2-pentanone, (MIBK), (hexone)

DISCUSSION OF GROUND-WATER CONTAMINATION

Extent of Ground-Water Contamination

Ground-water contamination currently appears to be confined to solvents in ground water in the immediate vicinity of the former waste oil tank pit. Monitoring well RW-4, which is located near the center of the tank pit, is the only monitoring well that yielded contaminated ground water. Well RW-11, an adjacent 4-inch well installed for possible use as a recovery well, was not sampled. Ground Water from monitoring well RW-4 contained acetone, 2-butanone, and hexone (MIBK) (Table 4). Trace levels of naphthalene and methylnaphthalene were also detected in RW-4. No contamination was discovered in any of the other monitoring wells outside the former tank pit.

Description of Contaminants

Acetone, 2-butanone, and hexone (MIBK) are water soluble compounds with acetone and 2-butanone being the most soluble. All of these compounds are found within common solvents. Small amounts of solvents were stored in the former waste oil tank. Physical properties of the solvents are shown on Table 5.

TABLE 5. PHYSICAL AND CHEMICAL PROPERTIES OF SOLVENTS

Compound	Density	Solubility	Vapor Pressure	Boiling Point
Acetone	0.80	Miscible	400@34.5 C	56.2 C
2-butanone (MEK)	0.805	Vy.Soluble 100,000@25 C	71.2@20 C	76.6 C
hexone (MIBK)	0.801	Slightly Sol. 19,000@ 25 C	16@20 C	116.85 C

Source: EPA (1980)

The predominant ground-water flow direction from the former tank pit is generally to the west or northwest. Therefore, a contaminant plume should generally travel from the former waste oil tank pit towards monitoring well RW-3. However, no solvents were detected in well RW-3 or any other monitoring well outside the former tank pit.

The possibility of a solvent plume moving through the alluvial sediments beneath the downgradient monitoring wells was considered but rejected. Water level measurements in wells RW-11 and RW-4 indicate an upward hydraulic gradient from the alluvial sediments into the overlying bay mud. An upward gradient from the alluvial sediments to the bay mud was also observed during drilling of well RW-8.

The absence of detectable levels of solvents in monitoring wells downgradient from the tank pit indicates that solvents are not migrating from the tank pit at significant concentrations. The rate of hydrodynamic dispersion of solvents from the tank pit area is probably low. Ground water containing dissolved solvents appears to be partially stagnant within the area of the former tank pit.

The bay mud contains many low permeability clayey zones. These low permeability zones may immobilize contaminated water causing some dissolved solvents to stagnate within the vicinity of the tank pit. Sampling of the monitoring well in the tank pit may draw some of the immobile water containing

N

RW-1
95

YELLOW DRYER
BLDG. NO. 8

NO.6 PCKR.
BLDG. NO.
9

FILTER
HOUSE
BLDG.
NO. 13

ROASTER BLDG.
NO. 1

OXIDE MILL
BLDG.
NO.2

STAGING AREA
BLDG.
NO.3

WAREHOUSE NO.1
BLDG. NO. 11

CREEK

FORKLIFT BRIDGE

RAILROAD TRACK

-LEGEND-

- Monitoring Well
- Soil Boring
- 95 Highest Concentration Of Oil And Grease (ppm) Detected
- ND Less Than 50 ppm Oil And Grease

Map Inset
W. O. Tank Pit

RW-11
RW-4
RB-9
ND
RB-10

BLDG. No. 10

BLEND AREA
BLDG. NO. 5

MAINTENANCE
SHOP
BLDG. NO. 6

SETTLING
POND

MECH.
STORE
RM.

SUP.
OFF.

RES.
LAB

BOILER
BLDG.

HOUSE
NO.4

W.O. TANK PIT
SEE MAP
INSET

SERVICE
BLDG. NO. 10

RB-7
ND

OFFICE
BLDG. NO. 7

TRUCK
BRIDGE

TEMESCAL

0 40 Ft.

FILTER
HOUSE
NO. 3

FILTER
HOUSE
NO.4

82
84
83
85

RW-3

RB-6

RW-2

UNDERGROUND OIL
STORAGE TANKS

CHAIN LINK FENCE (℄)

PARKING SPACE

SHELL MOUND

TITLE

DISTRIBUTION OF OIL AND GREASE

PREPARED FOR PFIZER PIGMENT INC.
EMERYVILLE, CALIFORNIA

ROUX Consulting Ground-Water Geologists
ROUX ASSOCIATES INC

SCALE 1" = 40'
DATE 6/88

FIGURE 6

was 100 mg/kg in the 4.5-5.0 ft sample, which is probably a background level.

Higher concentrations of oil and grease were limited to depths of about 4 to 10 ft below land surface. In each soil boring, the zone of observed oil and grease was within the zone of probable water table fluctuations and capillary fringe. Samples below the water table generally had oil and grease levels less than 200 mg/kg.

Low levels of oil and grease (<200 mg/kg) were detected in 7 of 9 soil borings across the Site including the upgradient boring, RW-1. The low levels of oil and grease were also detected fairly uniformly in soil samples from both below and above the water table. Based on the hydrogeology of the Site and the lack of solubility of the oil and grease, this unusual distribution of apparent oil and grease probably is an artifact caused by organic matter within the soils. Some organic soils contain compounds that appear as oil and grease in laboratory analyses. Therefore, the low levels of oil and grease throughout much of the Site are probably background levels caused by organic material in the soils.

Absence of Soil Contamination Near Former Tank Pit

Soils within the immediate vicinity of the former waste oil tank pit do not contain detectable levels of volatile organics, base/neutrals, or total petroleum hydrocarbons.

Oil and grease is within background levels (<100 mg/kg) or Not Detected in borings near the former tank pit. Four soil borings were drilled within or in close proximity to the former tank pit (Figure 2). Two of the borings, RW-4 and RW-11, are within the backfill material in the central portion of the tank pit and penetrate below the tank pit into native soils. The base of the tank pit is about 7 feet below land surface. Borings RB-9 and RB-10 are within a few feet of the eastern and western edges, respectively, of the tank pit. These two borings are outside the tank pit excavation within the older artificial fill and underlying native soils.

Soil samples collected from the four borings near the tank pit during this investigation were analyzed for priority pollutants (EPA Method 8240), base/neutrals (EPA Method 8270), total petroleum hydrocarbons (EPA Method 8015), and oil and grease (Method SWWM 503E). All laboratory results for soil samples from the four borings were Not Detected, except for background levels of oil and grease (Appendix A). However, a soil sample collected by Brown & Caldwell Laboratories on December 3, 1987 immediately following tank removal contained 7 ppm acetone, 20 ppm 2-Hexanone, 450 ppm oil and grease, and 720 ppm total petroleum hydrocarbons

The reason for this apparent inconsistency in laboratory results is unknown. The possibility that contaminants were desorbed from soils and transported from the pit area during the short time period between the initial tank pit sample collection and sampling during this

investigation is unlikely. Possible causes for the inconsistency include differences in laboratory procedures, laboratory error, or different sampling locations. The drilling of four soil borings during this investigation within the tank pit makes different sampling locations an unlikely explanation. Differences in laboratory procedures or laboratory error appear to be the most likely source of the inconsistency in laboratory results. Laboratory results from this investigation have been confirmed by repeated sampling and duplication of results. No details of the laboratory procedures used to analyze the initial sample from the tank pit were available.

The lack of oil and grease contamination in the vicinity of the leaking waste oil tank indicates that waste oil was probably not discharged from the tank. During inspection of the tank following removal, a probable tank leak was observed about 6-inches above the base of the tank. Physical separation of the solvents and waste oil due to density differences would cause the waste oil to float on top of the solvents in [redacted]. Therefore, only s[redacted] probably have been discharged from a tank leak near the base. In addition, only solvents were placed in the tank during the last two years of operation; waste oil was not added to the tank during that time period.

Source of Oil and Grease Contamination

The source of oil and grease in soil beneath the Pfizer Plant is unknown. We speculate that an older unknown source may at some time in the past have caused the oil and grease contamination in the soil. The oil and grease could have been emplaced with the overlying fill material. No recent or current sources of subsurface oil other than the Pfizer waste oil tank were identified in the immediate vicinity of the oil and grease contamination. The absence of oil and grease contamination in the vicinity of the tank pit area indicates that the removed waste oil tank was not the source of the oil and grease. In addition, the hydrogeology of the Site and the observed extent of the oil and grease also indicate it is highly unlikely that the removed tank was the source of the oil and grease.

During earlier Plant operations, a boiler that may have had an underground fuel line carrying Bunker C oil was previously located about 30 to 40 ft. north of the tank pit. The boiler was fueled from an above-ground welded steel tank. Both the boiler and above-ground tank were removed in 1971 or 1972. An infrared analysis of oil and grease in the soil was indeterminate as to the type of oil.

A former waste oil tank leak has been identified on the property west of the Pfizer Plant. The waste oil tank on the former trucking site was about 480 ft west of the Pfizer Plant. Based on data from the former trucking site, it

appears unlikely that the waste oil migrated eastward to the Pfizer Plant at the concentrations observed.

Oil and Grease Migration and Exposure Pathways

The oil and grease encountered in borings RW-3, RB-5, RB-6, and RW-8 is adsorbed to soils within the zone of water table fluctuation and the capillary fringe zone. The adsorbed oil and grease does not appear to be water soluble. Repeated ground water sampling of monitoring wells within the area of adsorbed oil and grease have not detected oil and grease in the ground water.

The adsorbed oil and grease is not volatile; photoionization detector readings of soil vapors from contaminated soils were generally similar or less than levels for ambient air. Most samples had no odor; samples with higher concentrations of oil and grease had a faint odor. Volatile organic compounds were not detected by the priority pollutants analysis (EPA 8240) of the 5.5-6.0 ft. soil sample from RW-3 which contained the highest levels of oil and grease at the Site.

Based on these results, the adsorbed oil and grease in soils does not pose a risk to human health or the environment. The adsorbed oil and grease is fixed in the soil and is not currently migrating from the Site. In addition, there are no pathways for exposure to the adsorbed oil and grease in the subsurface. Potential exposure to the

contamination should be limited to direct exposure during any excavations or drilling that extend into the zone of oil and grease.

RECOMMENDATIONS

1) We recommend that a monitoring program be implemented to monitor potential migration of solvents downgradient from the former tank pit and to determine the rate of degradation of solvents in the immediate vicinity of the tank pit. Repeated ground-water sampling of monitoring well RW-4, located near the center of the former tank pit is expected to show a decrease in solvent concentrations with time. We believe that solvents are biodegrading within the immediate vicinity of the tank pit. In order to assure that solvents are not migrating from the Site, downgradient monitoring wells RW-2 and RW-3 should be monitored simultaneously with RW-4. We recommend that all wells be sampled and analyzed for priority pollutants (EPA Method 624) on a semi-annual basis until solvent concentrations are below acceptable limits.

If the solvent concentrations do not decrease at an appreciable rate or if solvents are detected in any downgradient monitoring wells, we recommend that a pump and surface treatment system be implemented.

2) The adsorbed oil and grease is effectively contained in the subsurface beneath the Pfizer Plant. Because the adsorbed oil and grease is not soluble or volatile, the soil contamination does not pose a hazard to ground water, surface water, human health, or the environment. Therefore, we

recommend that the adsorbed oil and grease be left in place without remediation.

RESPECTFULLY SUBMITTED,
ROUX ASSOCIATES WEST, INC.

Paul V. Supple
Hydrogeologist

Jerry T. Wickham
Senior Hydrogeologist
Cal. Reg. Geologist No. 3766
Cal. CEG No. 1177

APPENDIX A

GEOLOGIC LOGS

REFERENCES

Alameda County Flood Control, Calvin Hickenbottom (personal communication - February 9, 1988)

Alton Geoscience (1988), Report on Additional Site Characterization Studies at P.I.E. Nationwide Property, 5500 Eastshore Freeway, Emeryville, California, submitted April 28, 1988.

Radbruch, Dorothy H. (1957), Areal and Engineering Geology of the Oakland West Quadrangle, California, U.S. Geological Survey Miscellaneous Investigations Map I-239.

U.S. Environmental Protection Agency (1980), Subtitle C Resource and Conservation Recovery Act of 1976. Listing of Hazardous Waste, Background Document for RCRA, section 261.31 and 261.32. Office of Solid Waste, Washington, D.C.

CONSULTING GROUND WATER GEOLOGISTS
ROUX ASSOCIATES INC

WELL LOG

WELL NO: RW-1

Project: 04711 Pfizer Emeryville
Date:
Client: Pfizer Pigments Inc.
Page 1 of 1
Logged By: Jerry Wickham
Location:
M.P. Elevation: 101.90
Drilling Start: 2/18/88 End: 2/18/88
Driller: Exceltech
Type of Rig: Mobil B-53 Hollow Stem Auger

WELL DATA

Hole Diameter: 7'
Final Depth: 20.2'
Casing Diameter: 2'
Casing Length: 4.9'
Screen Setting: 5.2'-20.2'
Screen Slot & Type: .010 inch PVC
Well Status: Monitoring

G W READINGS(1)

Date	DTW MP (2)	Elev.W.T.

SAMPLER

Type: Cal. split-spoon
Hammer: 140 lb.
Fall: 30 in.

DEVELOPMENT

Elev. (1)	SAMPLE No.	Rec.	Depth	Blows 6	Strata Change & Gen. Desc.	Depth (ft.)	SAMPLE DESCRIPTION
					Fill		Yellowish brown Sandy Clay with Gravel, dry; contains brick fragments. (fill)
	1	2"	5.0-6.5'	0,2,2		5	Very dark gray to black Clay, scattered shells, some gravel, scattered charcoal; shells most prominent between 2.5 and 5 ft., becomes gray, firmer , more cohesive below about 7 ft.
	2	18"	6.5-7.5'	Pushed	Clay		
	3	18"	10.0-11.5'	4,5,8		10	
	4	18"	15.0-16.5'	8,12,14	Clay	15	Grayish brown mottled Clay, firm, scattered gravel, wet; gradational change to stiff clay.
	5	18"	20.0-21.5"	10,14,15	Sandy Clay	20	Grayish brown mottled Sandy Clay with sand pockets, stiff, wet.
							B.O.B.= 21.5' Encountered water in boring at about 7 ft. No odors in any samples or during drilling.

REMARKS: (1) in feet relative to a common datum
(2) from top of ~~PVC casing~~ Christy Box

CONSULTING GROUND WATER GEOLOGISTS

ROUX ASSOCIATES INC

WELL LOG

WELL NO: RW-2

Project: 04711 Pfizer Emeryville
Date:
Client: Pfizer Pigments Inc.
Page 1 of 1
Logged By: Jerry Wickham
Location:
M.P. Elevation: 98.94
Drilling Start: 2/18/88 End: 2/18/88
Driller: Exceltech
Type of Rig: Mobil B-53 Hollow Stem Auger

WELL DATA

Hole Diameter: 7"
Final Depth: 18'
Casing Diameter: 2"
Casing Length: 2.7'
Screen Setting: 3.0-18.0'
Screen Slot & Type: .010 inch PVC
Well Status: Monitoring

G W READINGS(1)

Date	DTW	MP(2)	Elev.W.T.

SAMPLER

Type: Cal. split-spoon
Hammer: 140 lb.
Fall: 30 in.

DEVELOPMENT

Elev. (1)	SAMPLE No.	Rec.	Depth	Blows 6	Strata Change & Gen. Desc.	Depth (ft.)	SAMPLE DESCRIPTION
					Fill		Black Silty Clay, scattered gravel; Contains ceramic tile and copper wire. (fill)
	1	18"	4.5-6.0'	2,2,3	Clay	5	Dark gray Clay, Contains roots, wood fragments, charcoal and chert pebbles, moist. highly cohesive; becomes silty clay in lower half with less wood fragments; organic smell, no contaminant odor.
	2	18"	10.0-11.5'	3,5,5		10	
	3	24"	15.0-17.0'	3,3,3,5	Clay	15	Gray Clay wiyh sand pockets, contains roots and plant fragments, moist, highly cohesive; becomes bluish gray towards base, stiffer; no odor.
	4	18"	20.0-21.5'	4,5,6		20	B.O.B.= 21.5'
							Encountered water in boring at about 5'

REMARKS: (1) in feet relative to a common datum
(2) from top of PVC casing

CONSULTING GROUND WATER GEOLOGISTS

ROUX ASSOCIATES INC

WELL LOG

WELL NO: RW-3

Project: 04711 Pfizer Emeryville
Date:
Client: Pfizer Pigments Inc.
Page 1 of 1
Logged By: Jerry Wickham
Location:
M.P. Elevation: 99.54
Drilling Start: 2/18/88 End: 2/18/88
Driller: Exceltech
Type of Rig: Mobil B-53 Hollow Stem Auger

WELL DATA

Hole Diameter: 7"
Final Depth: 18'
Casing Diameter: 2"
Casing Length: 2.7'
Screen Setting: 3.0-18.0'
Screen Slot & Type: .010 inch PVC
Well Status: Monitoring

G W READINGS(1)

Date	DTW	MP (2)	Elev.W.T.

SAMPLER

Type: Cal. split-spoon
Hammer: 140 lb.
Fall: 30 in.

DEVELOPMENT

Elev. (1)	SAMPLE No.	Rec.	Depth	Blows 6	Strata Change & Gen. Desc.	Depth (ft.)	SAMPLE DESCRIPTION
					Fill		Brown Sandy Clay (fill).
	1	18"	5.5-7.0'	1,1,1	Silty Clay	5	Black Silty Clay, wet, cohesive; strong odor.
	2	18"	10.0-11.5'	---	Sandy Clay	10	Gray Sandy Clay, uniform, scattered pebbles, roots, and plant fragments, wet.
	3	18"	15.0-16.5'	3,4,6	Sandy Clay	15	Greenish gray Sandy Clay with sand pockets, scattered roots, plant fragments, and greenish gray pebbles, wet; sand layer about 1.5" thick at 20.2'
	4	12"	20.0-21.0	8,50/.5'	Gravel	20	Orange brown Clayey Gravel, pebble size, loose. B.O.B.= 21.0' Encountered water in boring at about 5'

REMARKS: (1) in feet relative to a common datum
(2) from top of PVC casing

CONSULTING GROUND WATER GEOLOGISTS

ROUX ASSOCIATES INC

WELL LOG

WELL NO: RW-4

Project: 04711 Pfizer Emeryville
Date:
Client: Pfizer Pigments Inc.
Page 1 of 1
Logged By: Jerry Wickham
Location:
M.P. Elevation: 100.00
Drilling Start: 2/19/88 End: 2/19/88
Driller: Exceltech
Type of Rig: Mobil B-53 Hollow Stem Auger

WELL DATA

Hole Diameter: 7"
Final Depth: 18"
Casing Diameter: 2"
Casing Length: 2.5'
Screen Setting: 3.0-18.0'
Screen Slot & Type: .010 inch PVC
Well Status: Monitoring

G W READINGS(1)

Date	DTW MP(2)	Elev.W.T.

SAMPLER

Type: Cal. split-spoon
Hammer: 140 lb.
Fall: 30 in.

DEVELOPMENT

Elev. (1)	SAMPLE No.	Rec.	Depth	Blows 6	Strata Change & Gen. Desc.	Depth (ft.)	SAMPLE DESCRIPTION
					Fill		Gravel, dry. (fill)
							Clayey Gravel, wet.(fill)
						5	Gravel cobble-size, wet. (fill)
	1	18"	7.5-9.0'	3,4,4	Silty Clay		Very dark gray Silty Clay, wet; moderate Contaminant odor.
	2	18"	10.0-11.5'	---	Silty Clay	10	Greenish Gray Silty Clay with sand and shell layers, scattered gravel; fraint odor.
	3	18"	15.0-16.5'	---	Silty Clay	15	Gray Silty Clay, scattered pebbles, abundant wood fragments.
	4	18"	20.0-21.5'	14,20,20	Clayey Sand	20	Greenish gray mottled Clayey Sand, contains sand layers and sand pockets, scattered pebbles; much slower drilling than soils above. B.O.B.= 21.5' Encountered water in boring at about 3'

REMARKS: (1) in feet relative to a common datum
(2) from top of PVC casing

CONSULTING GROUND WATER GEOLOGISTS
ROUX ASSOCIATES

GEOLOGIC LOG

Study No. _____ Date _____
Project 04711 Emeryville, CA
Client Pfizer Pigments Inc.
Page 1 of 1
Logged By Jerry Wickham
Well No. RB-5
Loc. _____
M.P. Elevation _____
Drilling Started 5/2/88 Ended 5/2/88
Driller Bay Area Exploration
Type Of Rig CME-55 Hollow Stem Auger

WELL DATA

Hole Diam. (in.) _____
Final Depth (ft.) _____
Casing Diam. (in.) _____
Casing Length (ft.) _____
Screen Setting (ft.) _____
Screen Slot & Type _____
Well Status soil boring

G W READINGS(1)

Date	DTW MP(2)	Elev.W.T.

SAMPLER

Type CA. split spoon
Hammer 140 lb.
Fall 30 in.

DEVELOPMENT

Elev. (1)	SAMPLE No.	Rec.	Depth (ft.)	Blows/6"	Strata Change & Gen. Desc.	Depth (ft.)	SAMPLE DESCRIPTION
					Fill		Asphalt & road base
	1	18"	4.0'-5.5'	1, 5, 6			Dark gray Silty Clay, Faint odor, Slight mottling.
					Silty Clay	5	Greenish gray Silty Clay, some gravel, mottled, grades to black mottled greenish gray clay at 4.7', Some O & G odor, wood frgments in shoe.
	2	18"	9.5'-11.0	1, 1, 2	Silty Clay	10	Greenish gray Silty Clay, trace sand, some root fibres, charcoal, wood fragments, very sticky below 10'.
	3	18"	14.5'-16.0	0, 0, 2		15	
	4	18"	19.5'-21'	5, 10, 12	Sandy Clay	20	Greenish gray Gravelly sandy clay, very stiff, sand pockets.
							BOB 21'
						25	

REMARKS: (1) in feet relative to a common datum
(2) from top of PVC casing

CONSULTING GROUND WATER GEOLOGISTS
ROUX ASSOCIATES

GEOLOGIC LOG

Study No. _____ Date _____
Project 04711 Emeryville, CA
Client Pfizer Pigments Inc.
Page 1 Of 1
Logged By Jerry Wickham
Well No. RB-6
Loc. _____
M.P. Elevation _____
Drilling Started 5/2/88 Ended 5/2/88
Driller Bay area Exploration
Type Of Rig CME-55 Hollow Stem Auger

WELL DATA
Hole Diam. (in.) _____
Final Depth (ft.) _____
Casing Diam. (in.) _____
Casing Length (ft.) _____
Screen Setting (ft.) _____
Screen Slot & Type _____
Well Status soil boring

G W READINGS(1)

Date	DTW MP(2)	Elev. W.T.

SAMPLER
Type CA. split-spoon
Hammer 140 lb.
Fall 30 in.

DEVELOPMENT

Elev. (1)	SAMPLE No.	Rec.	Depth (ft.)	Blows/6"	Strata Change & Gen. Desc.	Depth (ft.)	SAMPLE DESCRIPTION
							Dark gray Gravelly Clay, brick fragments, dry.
				(push)	Fill		
	1	18"	5.0'-6.5'	0,0,0		5	Black Silty Clay, some greenish gray mottling, faint odor at top, becomes uniform black below 5.5' obvious Oil and Grease.
					Silty Clay		
							Dark gray Silty Clay, some sand root, fibres, 3" sand layer at 10.2', shelly medium sand.
	2	18"	10.0'-11.5'	0,1,2	Silty Clay	10	
					Gravel		Greenish gray Gravel, poorly-sorted, wet possibly cavings.
	3	18"	15'-16.5'	3,7,8		15	
	4	18"	16.5'-18'	1,4,5			
					Silty Clay		Light yellowish-brown Silty Clay, mottled, very stiff, trace of charcoal, some sand, sandy clay in places.
	5	18"	20'-21.5'	4,6,10		20	
							B.O.B. 21.5'
						25	

REMARKS: (1) in feet relative to a common datum
(2) from top of PVC casing

CONSULTING GROUND WATER GEOLOGISTS
ROUX ASSOCIATES

GEOLOGIC LOG

Study No. _____ Date _____
Project 04711 Emeryville, CA
Client Pfizer Pigments Inc.
Page 1 Of 1
Logged By Jerry Wickham
Well No. RB-7
Loc. _____
M.P. Elevation _____
Drilling Started 5/2/88 Ended 5/2/88
Driller Bay Area Exploration
Type Of Rig CME-55 Hollow Stem Auger

WELL DATA

Hole Diam. (in.) _____
Final Depth (ft.) _____
Casing Diam. (in.) _____
Casing Length (ft.) _____
Screen Setting (ft.) _____
Screen Slot & Type _____
Well Status Soil boring

G W READINGS(1)

Date	DTW MP(2)	Elev.W.T.

SAMPLER

Type CA. split spoon
Hammer 140 lb.
Fall 30 in.

DEVELOPMENT

Elev. (1)	SAMPLE No.	Rec.	Depth (ft.)	Blows/6"	Strata Change & Gen. Desc.	Depth (ft.)	SAMPLE DESCRIPTION
					Fill		Gravelly, sandy clay (fill)
	1	18"	5'-6.5'	0, 1, 1		5	Yellow-brown Silty Clay, mottled shell/bone layer, charcoal layer.
	2	NR	10'-11.5'	W O H	Silty Clay	10	Light gray Silty Clay to Clayer Silt, some yellow-brown Mottling, plant fibres, charcoal.
	3	NR	12'-13.5'	W O H			
	4	18"	13.5-15'	W O H			
	5	18"	15'-16.5'	0, 1, 2	Sandy Clay	15	Gray sandy (very fine) clay to silty clay, apparently layered.
	6	18"	20'-21.5'	2, 3, 6	Silty Clay	20	Gray sand and pebbles grading to Greenish gray silty clay, charcoal
							B.O.B. 21.5'
						25	

REMARKS: (1) in feet relative to a common datum
(2) from top of PVC casing

CONSULTING GROUND WATER GEOLOGISTS
ROUX ASSOCIATES

GEOLOGIC LOG

Study No. _____ Date _____
Project 04711 Emeryville, CA
Client Pfizer Pigments Inc.
Page 1 Of 1
Logged By Jerry Wickham
Well No. RW-8
Loc. _____
M.P. Elevation 100.40
Drilling Started 5/3/88 Ended 5/3/88
Driller ~~Bay Area Exploration~~
Type Of Rig CME-55 Hollow Stem Auger

WELL DATA

Hole Diam. (in.) 7
Final Depth (ft.) 20.3
Casing Diam. (in.) 2
Casing Length (ft.) 4.8
Screen Setting (ft.) 5.3-20.3
Screen Slot & Type 010 in. PVC
Well Status monitoring

G W READINGS(1)

Date	DTW MP(2)	Elev. W.T.

SAMPLER

Type CA split spoon
Hammer 140 lb.
Fall 30 in.

DEVELOPMENT

Elev. (1)	SAMPLE No.	Rec.	Depth (ft.)	Blows/6"	Strata Change & Gen. Desc.	Depth (ft.)	SAMPLE DESCRIPTION
	1	12"	5.0'-6.5'	0, 1, 1	Silty Clay	5	Dark gray Silty Clay, some pebbles no odor, moist
	2	18"	10'-11.5'	0, 1, 2	Silty Clay	10	Black Silty Clay, with organic fibris, petroleum odor.
					Silty Clay		Dark gray Silty Clay, some pebbles well preserved plant fibres, charcoal, wood fragments.
	3	18"	15'-16.5'	3,10,12	Silty Clay	15	Light yellowish-brown Silty Clay mottled, some sand and pebbles no organics observed, much stiffer than above.
	4	18"	20'-21.5'		Sand and Gravel	20	Poorly sorted yellowish-brown sand and gravel.
					Sandy Silt		Sandy clayey Silt, light yellowish-brown, no pebbles, very fine sand, cohesive.
						25	B. O. B. 21.5'
							Encountered water at approx. 9.5'

REMARKS: (1) in feet relative to a common datum
(2) from top of christy box

CONSULTING GROUND WATER GEOLOGISTS
ROUX ASSOCIATES

GEOLOGIC LOG

Study No. _____ Date _____
Project 04711 Emeryville, CA
Client Pfizer Pigments Inc.
Page 1 Of 1
Logged By Jerry Wickham
Well No. RB-9
Loc. _____
M.P. Elevation _____
Drilling Started 5/3/88 Ended 5/3/88
Driller Bay Area Exploration
Type Of Rig CME-55 Hollow Stem Auger

WELL DATA

Hole Diam. (in.) _____
Final Depth (ft.) _____
Casing Diam. (in.) _____
Casing Length (ft.) _____
Screen Setting (ft.) _____
Screen Slot & Type _____
Well Status Soil boring

G W READINGS(1)

Date	DTW MP(2)	Elev.W.T.

SAMPLER

Type CA. split-spoon
Hammer 140 lb.
Fall 30 in.

DEVELOPMENT

Elev. (1)	SAMPLE No.	Rec.	Depth (ft.)	Blows/6"	Strata Change & Gen. Desc.	Depth (ft.)	SAMPLE DESCRIPTION
	1	18"	2.5'-4'	1,1, 2	Fill		Gravelly Fill Dark gray silty clay, back shelly sand layer and dark gray fine sand layer, no pebbles or organic fibres, no order.
	2	18"	5'-6.5'	1, 1, 2		5	
	3	18"	7.5'-9'	0,0,1	Silty Clay		Very dark grey Silty clay, abundant organic fibrers, faint organic odor
						10	B. O. B. 9 feet
						15	
						20	
						25	

REMARKS: (1) in feet relative to a common datum
(2) from top of PVC casing

CONSULTING GROUND WATER GEOLOGISTS
ROUX ASSOCIATES

GEOLOGIC LOG

Study No. _____ Date _____
Project 04711 Emeryville, CA
Client Pfizer Pigments Inc.
Page 1 of 1
Logged By Jerry Wickham
Well No. RB-10
Loc. _____
M.P. Elevation _____
Drilling Started 5/5/88 Ended 5/5/88
Driller Bay Area Exploration
Type Of Rig CME-55 Hollow Stem Auger

WELL DATA

Hole Diam. (in.) _____
Final Depth (ft.) _____
Casing Diam. (in.) _____
Casing Length (ft.) _____
Screen Setting (ft.) _____
Screen Slot & Type _____
Well Status Soil boring

G W READINGS(1)

Date	DTW MP (2)	Elev. W.T.

SAMPLER

Type CA. split-spoon
Hammer 140 lb.
Fall 30 in.

DEVELOPMENT

Elev. (1)	SAMPLE No.	Rec.	Depth (ft.)	Blows/6"	Strata Change & Gen. Desc.	Depth (ft.)	SAMPLE DESCRIPTION
					Fill		Gravelly Fill Dark shelly layer at 3 feet
	1	18"	3.0-4.5'	0, 1, 2			
	2	18"	5.0'-6.5'	1, 1, 2	Silty Clay	5	Dark gray Silty Clay, some greenish gray mottling, fine sand laminae or pockets, scattered charcoal, organic odor, no solvent or oil odor, no rending on PID meter.
	3	18"	10'-11.5'	0, 1, 1	Sand	10	Greenish gray sand, scattered pebbles. B. O. B. 11.5'
						15	
						20	
						25	

REMARKS: (1) in feet relative to a common datum
(2) from top of PVC casing

CONSULTING GROUND WATER GEOLOGISTS
ROUX ASSOCIATES

GEOLOGIC LOG

Study No. _____ Date _____
Project 04711 Emeryville, CA
Client Pfizer Pigments Co.
Page 1 Of 1
Logged By Jerry Wickham
Well No. RW-11
Loc. _____
M.P. Elevation _____
Drilling Started 5/5/88 Ended 5/5/88
Driller Bay Area Exploration
Type Of Rig CME-55 Hollow Stem Auger

WELL DATA

Hole Diam. (in.) 8
Final Depth (ft.) 17
Casing Diam. (in.) 4
Casing Length (ft.) 3.5
Screen Setting (ft.) 4-13
Screen Slot & Type 010 inch PVC
Well Status _____

G W READINGS(1)

Date	DTW MP(2)	Elev.W.T.

SAMPLER

Type CA split spoon
Hammer 140 lb.
Fall 30 in.

DEVELOPMENT

Pumped 110 gallons with hand pump.

Elev. (1)	SAMPLE No.	Rec.	Depth (ft.)	Blows/6"	Strata Change & Gen. Desc.	Depth (ft.)	SAMPLE DESCRIPTION
	1	6"	5'-6.5'	1, 2, 3	Fill	5	Gravelly fill, cobble layer at 6 feet. 5-foot sample contain shelly sand and gravel with a solvent odor.
	2	10"	10'-11.5'	0, 1, 1	Silty Sand	10	Greenish gray Silty Sand, root fibres, gravelly sand layer at 11.5 feet, no odor.
	3	18"	15-16.5'	0, 1, 1	Silty Clay	15	Gray-brown Silty Clay, abundant wood fragments, no odor.
							B. O. B. 17.0'
						20	Water encountered at 3'.
						25	

REMARKS: (1) in feet relative to a common datum
(2) from top of PVC casing

APPENDIX B

CHAIN-OF-CUSTODY FORMS

ROUX ASSOCIATES INC

CHAIN OF CUSTODY RECORD

Project No. 04711

Project Title Pfizer - Emeryville

Sample Source Soil samples from drilling

Collectors Name Jerry Wickham / Jerry Wickham
print signature

Field Information

Method Of Shipping In cooler

Relinquished By:

sign Jerry Wickham

for Roux Associates

Date/Time 2-19-88 1010

Received By:

sign

for Curtis Tompkins Ltd.

Date/Time 2/19/88 1011 AM

Sample Designation	Sample Location	Date	Time	Analyte	No. Of Containers
1-6.5-7.0'	RW-1	2-18-88	0840	8240 Method 2	1 Liner
2-7.0-7.5'	RW-1	2-18-88	0840	TPH 3550/8015 Meth 3 Oil & Grease 503E Meth 5	1 Liner
3-15-15.5'	RW-1	2-18-88	0910	TPH 3550/8015 Meth 3 Oil & Grease 503E Meth 5	1 Liner
1-4.5-5'	RW-2	2-18-88	1130	8240 Method 2 TPH 3550/8015 Meth 3 Oil & Grease 503E Meth 5	1 Liner
1-5.5-6'	RW-3	2-18-88	1510	8240 Method 2 TPH 3550/8015 Meth 3 Oil & Grease 503E Meth 5	1 Liner
3-16-16.5'	RW-3	2-18-88	1537	TPH 3550/8015 Meth 3 Oil & Grease 503E Meth 5	1 Liner
2-10-12'	RW-4	2-19-88	0755	TPH 3550/8015 Meth 3 Oil & Grease 503E Meth 5	1 Liner
3-15-17'	RW-4	2-19-88	0805	TPH 3550/8015 Meth 3 Oil & Grease 503E Meth 5	1 Liner

Comments:

ROUX ASSOCIATES INC

CHAIN OF CUSTODY RECORD

Project No. 04711

Project Title Pfizer - Emeryville

Sample Source Soil samples from drilling

Collectors Name Jerry Wickham (print) / Jerry Wickham (signature)

Field Information

Method Of Shipping In cooler

Relinquished By:

sign Jerry Wickham

for Roux Associates

Date/Time 2-19-88 1010

Received By:

sign

for Curtis-Tompkins Ltd.

Date/Time 2/19/88 1011 AM

Sample Designation	Sample Location	Date	Time	Analyte	No. Of Containers
1-7.5-9'	RW-4	2-19-88	0745	Oil & Grease 503E Meth 5	1 Liner
5 7.5-8'	RW-4a	2-19-88	0955	8270	1 Liner
6 8-8.5'	RW-4a	2-19-88	0955	TPH 3550/8015 Meth 3 8240 Method 2	1 Liner

Comments:

ROUX ASSOCIATES INC

CHAIN OF CUSTODY RECORD

Project No. 0471.1

Project Title Pfizer - Emeryville

Sample Source Groundwater from Monitoring wells

Collectors Name Paula Supple / [signature]
print signature

Field Information Chain - of - Custody Forms

Method Of Shipping

Relinquished By:
sign [signature]
for Roux Associates
Date/Time 3/9/88 1.45 PM

Received By:
sign
for
Date/Time

Sample Designation	Sample Location	Date	Time	Analyte	No. Of Containers
RW-1		3/9/88	12.00	Oil + Grease TPH 3550/8015	1 quart plastic 1 pt Amber
RW-2		3/9/88	12.30 PM	Oil + Grease TPH 3550/8015	1 qt plastic 1 pt Amber
				Salinity	
RW-3		3/9/88	1.00 PM	Oil + Grease TPH 3550/8015	1 qt plastic 1 pt Amber
				Salinity EPA 624	2 VOA vials
RW-4		3/9/88	1.30 PM	Oil + Grease TPH 3550/8015	1 qt plastic 1 pt Amber
				EPA 624 EPA 625	2 VOA vials 2 pt Amber

Comments:

ROUX ASSOCIATES INC

CHAIN OF CUSTODY RECORD

Project No. 04711

Project Title Pfizer, Emeryville

Sample Source Groundwater from Monitoring wells

Collectors Name Paul Supple (print) / Paul Supple (signature)

Field Information

Method Of Shipping

Relinquished By:

sign Paul Supple

for Roux Associates

Date/Time 3/28/88 1.00 PM

Received By:

sign

for Curtis & Tompkins

Date/Time 3/29/88

Sample Designation	Sample Location	Date	Time	Analyte	No. Of Containers
RW-2		3/28/88	12.15PM	EPA 624	2 VOA VIALS
RW-3		3/28/88	12.30 PM	EPA 624	2 VOA VIALS

Comments:

ROUX ASSOCIATES INC

CHAIN OF CUSTODY RECORD

Project No. 04711

Project Title Pfizer – Emeryville, CA.

Sample Source Soil Samples From drilling

Collectors Name Paul Supple / Paul Supple
print signature

Field Information

Method Of Shipping

Relinquished By:
sign Paul Supple
for Roux Associates
Date/Time 5/4/88 2.35 PM

Received By:
sign
for CrT – S. Fran. CA
Date/Time 5/4/88

Sample Designation	Sample Location	Date	Time	Analyte	No. Of Containers
5.0 - 5.5'	RB-5	5/2/88	9.50AM	Oil + Grease SM1WM 503 E	1
5.5' - 6.0'	RB-6	5/2/88	11.05AM	"	1
10.5' - 11.0'	RB-6	5/2/88	11.15 AM	"	1
6.0' - 6.5'	RB-7	5/2/88	3.03PM	"	1
10.5' - 11.0'	RW-8	5/3/88	830 AM	"	1
3.5' - 4.0'	RW-9	5/3/88	12.28PM	Hold will call by 5/6/88	1
6.0' - 6.5'	RW-9	5/3/88	12.38PM	Hold will call by 5/6/88	1

Comments:

ROUX ASSOCIATES INC

CHAIN OF CUSTODY RECORD

Project No. 04711

Project Title Pfizer Emeryville, CA

Sample Source Groundwater from Monitoring wells

Collectors Name Paul Supple / [signature]
print signature

Field Information

Method Of Shipping

Relinquished By:
sign [signature]
for Roux Associates
Date/Time 6/15/88 0955

Received By:
sign [signature]
for
Date/Time 6/16 9:55

Sample Designation	Sample Location	Date	Time	Analyte	No. Of Containers
RW-8		6/16/88	0940	Oil and Grease	2
RW-3		6/16/88	0950	Oil and Grease	2

Comments:

APPENDIX C

LABORATORY REPORTS

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
290 Division Street, San Francisco, CA 94103, Phone (415) 861-1863

LAB NUMBER: 14237
CLIENT: ROUX ASSOCIATES
JOB ID: 04711, PFIZER-EMERYVILLE

DATE RECEIVED: 02/19/88
DATE ANALYZED: 02/26/88
DATE REPORTED: 03/10/88

Results of Analysis for Petroleum Hydrocarbons

Method References: O&G: Oil and Grease, SWWM 503 E
TPH: Total Petroleum Hydrocarbons, EPA 3550/8015

C&T ID	CLIENT ID	GASOLINE (mg/Kg)	KEROSINE (mg/Kg)	DIESEL (mg/Kg)	O&G (mg/Kg)
14237-2	RW-1, 2-7.07.5	ND(10)	ND(10)	ND(10)	95
14237-3	RW-1, 3-15-15.5	ND(10)	ND(10)	ND(10)	90
14237-4	RW-2, 1-4.5-5	ND(10)	ND(10)	ND(10)	100
14237-5	RW-3, 1-5.5-6	ND(10)	ND(10)	ND(10)	53,750
14237-6	RW-3, 3016-16.5	ND(10)	ND(10)	ND(10)	135
14237-7	RW-4, 2-10-12	ND(10)	ND(10)	ND(10)	50
14237-8	RW-4, 3-15-17	ND(10)	ND(10)	ND(10)	100
14237-11	RW-4a, 6-8-8.5	ND(10)	ND(10)	ND(10)	N/R
14237-9	RW-4, 1-7.5-9	N/R	N/R	N/R	55

ND = NONE DETECTED. LIMIT OF DETECTION IS INDICATED IN PARENTHESES.

N/R = NOT REQUESTED.

QA/QC SUMMARY

Duplicate: Relative % Difference	5
Spike: % Recovery	92

Laboratory Director

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 14237-1
CLIENT: ROUX ASSOCIATES
PROJECT #: 04711, PFIZER-EMERYVILLE
SAMPLE ID: RW-1, 1-6.5-70'

DATE RECEIVED: 02/19/88
DATE EXTRACTED: 03/04/88
DATE ANALYZED: 03/04/88
DATE REPORTED: 03/10/88

EPA Method 8240: Volatile Organics in Soils & Wastes

COMPOUND	Result ug/kg	LOD ug/kg
benzene	ND	500
carbon tetrachloride	ND	500
chlorobenzene	ND	500
1,2-dichloroethane	ND	500
1,1,1-trichloroethane	ND	500
1,1-dichloroethane	ND	500
1,1,2-trichloroethane	ND	500
1,1,2,2-tetrachloroethane	ND	500
chloroethane	ND	500
2-chloroethylvinyl ether	ND	1000
chloroform	ND	500
1,1-dichloroethene	ND	500
1,2-trans-dichloroethene	ND	500
1,2-dichloropropane	ND	500
1,3-dichloropropene	ND	500
ethylbenzene	ND	500
methylene chloride	ND	1000
chloromethane	ND	500
bromomethane	ND	500
bromoform	ND	500
bromodichloromethane	ND	500
fluorotrichloromethane	ND	500
chlorodibromomethane	ND	500
tetrachloroethene	ND	500
toluene	ND	500
trichloroethene	ND	500
vinyl chloride	ND	500

Non-Priority Hazardous Pollutant Substances List Compounds

acetone	ND	1000
2-butanone	ND	1000
carbon disulfide	ND	500
2-hexanone	ND	500
4-methyl-2-pentanone	ND	500
styrene	ND	500
vinyl acetate	ND	500
total xylenes	ND	500

QA/QC: Spike Recovery %

1,2 Dichloroethane-d4	104
Toluene-d8:	99
Bromofluorobenzene	108

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 14237-4
CLIENT: ROUX ASSOCIATES
PROJECT #: 04711, PFIZER-EMERYVILLE
SAMPLE ID: RW-2, 3-15-15.5'

DATE RECEIVED: 02/19/88
DATE EXTRACTED: 03/04/88
DATE ANALYZED: 03/04/88
DATE REPORTED: 03/10/88

EPA Method 8240: Volatile Organics in Soils & Wastes

COMPOUND	Result ug/kg	LOD ug/kg
benzene	ND	500
carbon tetrachloride	ND	500
chlorobenzene	ND	500
1,2-dichloroethane	ND	500
1,1,1-trichloroethane	ND	500
1,1-dichloroethane	ND	500
1,1,2-trichloroethane	ND	500
1,1,2,2-tetrachloroethane	ND	500
chloroethane	ND	500
2-chloroethylvinyl ether	ND	1000
chloroform	ND	500
1,1-dichloroethene	ND	500
1,2-trans-dichloroethene	ND	500
1,2-dichloropropane	ND	500
1,3-dichloropropene	ND	500
ethylbenzene	ND	500
methylene chloride	ND	1000
chloromethane	ND	500
bromomethane	ND	500
bromoform	ND	500
bromodichloromethane	ND	500
fluorotrichloromethane	ND	500
chlorodibromomethane	ND	500
tetrachloroethene	ND	500
toluene	ND	500
trichloroethene	ND	500
vinyl chloride	ND	500

Non-Priority Hazardous Pollutant Substances List Compounds

acetone	ND	1000
2-butanone	ND	1000
carbon disulfide	ND	500
2-hexanone	ND	500
4-methyl-2-pentanone	ND	500
styrene	ND	500
vinyl acetate	ND	500
total xylenes	ND	500

QA/QC: Spike Recovery %

1,2 Dichloroethane-d4	91
Toluene-d8:	90
Bromofluorobenzene	98

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 14237-5
CLIENT: ROUX ASSOCIATES
PROJECT #: 04711, PFIZER-EMERYVILLE
SAMPLE ID: RW-3, 1-5.5-6'

DATE RECEIVED: 02/19/88
DATE EXTRACTED: 03/04/88
DATE ANALYZED: 03/04/88
DATE REPORTED: 03/10/88

EPA Method 8240: Volatile Organics in Soils & Wastes

COMPOUND	Result ug/kg	LOD ug/kg
benzene	ND	500
carbon tetrachloride	ND	500
chlorobenzene	ND	500
1,2-dichloroethane	ND	500
1,1,1-trichloroethane	ND	500
1,1-dichloroethane	ND	500
1,1,2-trichloroethane	ND	500
1,1,2,2-tetrachloroethane	ND	500
chloroethane	ND	500
2-chloroethylvinyl ether	ND	1000
chloroform	ND	500
1,1-dichloroethene	ND	500
1,2-trans-dichloroethene	ND	500
1,2-dichloropropane	ND	500
1,3-dichloropropene	ND	500
ethylbenzene	ND	500
methylene chloride	ND	1000
chloromethane	ND	500
bromomethane	ND	500
bromoform	ND	500
bromodichloromethane	ND	500
fluorotrichloromethane	ND	500
chlorodibromomethane	ND	500
tetrachloroethene	ND	500
toluene	ND	500
trichloroethene	ND	500
vinyl chloride	ND	500

Non-Priority Hazardous Pollutant Substances List Compounds

acetone	ND	1000
2-butanone	ND	1000
carbon disulfide	ND	500
2-hexanone	ND	500
4-methyl-2-pentanone	ND	500
styrene	ND	500
vinyl acetate	ND	500
total xylenes	ND	500

QA/QC: Spike Recovery %

1,2 Dichloroethane-d4	94
Toluene-d8:	92
Bromofluorobenzene	105

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 14237-11
CLIENT: ROUX ASSOCIATES
PROJECT #: 04711, PFIZER-EMERYVILLE
SAMPLE ID: RW-4a, 6-8-8.5'

DATE RECEIVED: 02/19/88
DATE EXTRACTED: 03/04/88
DATE ANALYZED: 03/04/88
DATE REPORTED: 03/10/88

EPA Method 8240: Volatile Organics in Soils & Wastes

COMPOUND	Result ug/kg	LOD ug/kg
benzene	ND	500
carbon tetrachloride	ND	500
chlorobenzene	ND	500
1,2-dichloroethane	ND	500
1,1,1-trichloroethane	ND	500
1,1-dichloroethane	ND	500
1,1,2-trichloroethane	ND	500
1,1,2,2-tetrachloroethane	ND	500
chloroethane	ND	500
2-chloroethylvinyl ether	ND	1000
chloroform	ND	500
1,1-dichloroethene	ND	500
1,2-trans-dichloroethene	ND	500
1,2-dichloropropane	ND	500
1,3-dichloropropene	ND	500
ethylbenzene	ND	500
methylene chloride	ND	1000
chloromethane	ND	500
bromomethane	ND	500
bromoform	ND	500
bromodichloromethane	ND	500
fluorotrichloromethane	ND	500
chlorodibromomethane	ND	500
tetrachloroethene	ND	500
toluene	ND	500
trichloroethene	ND	500
vinyl chloride	ND	500

Non-Priority Hazardous Pollutant Substances List Compounds

acetone	ND	1000
2-butanone	ND	1000
carbon disulfide	ND	500
2-hexanone	ND	500
4-methyl-2-pentanone	ND	500
styrene	ND	500
vinyl acetate	ND	500
total xylenes	ND	500

QA/QC: Spike Recovery %

1,2 Dichloroethane-d4	97
Toluene-d8:	93
Bromofluorobenzene	104

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 14237-10
CLIENT: ROUX ASSOCIATES
PROJECT ID: 04711, PFIZER-EMERYVILLE
SMAPLE ID: RW-4a, 5-7.5-8'

DATE RECEIVED: 02/19/88
DATE EXTRACTED: 02/26/88
DATE ANALYZED: 02/26/88
DATE REPORTED: 03/10/88

EPA METHOD 8270: BASE/NEUTRAL AND ACID EXTRACTABLES IN SOILS & WASTES
EXTRACTION METHOD: EPA 3550 SONICATION

ACID COMPOUNDS	RESULT mg/kg	LOD mg/kg
Phenol	ND	0.33
2-Chlorophenol	ND	0.33
2-Nitrophenol	ND	1.65
2,4-Dimethylphenol	ND	0.33
2,4-Dichlorophenol	ND	0.33
4-Chloro-3-methylphenol	ND	0.33
2,4,6-Trichlorophenol	ND	0.33
2,4-Dinitrophenol	ND	1.65
4-Nitrophenol	ND	1.65
2-Methyl-4,6-dinitrophenol	ND	1.65
Pentachlorophenol	ND	1.65
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	0.33
1,3-Dichlorobenzene	ND	0.33
1,4-Dichlorobenzene	ND	0.33
1,2-Dichlorobenzene	ND	0.33
Bis(2-chloroisopropyl)ether	ND	0.33
N-nitrosodi-n-propylamine	ND	0.33
Hexachloroethane	ND	0.33
Nitrobenzene	ND	0.33
Isophorone	ND	0.33
Bis(2-chloroethoxy)methane	ND	0.33
1,2,4-Trichlorobenzene	ND	0.33
Naphthalene	ND	0.33
Hexachlorobutadiene	ND	0.33
Hexachlorocyclopentadiene	ND	0.33
2-Chloronaphthalene	ND	0.33
Dimethyl phthalate	ND	0.33
Acenaphthylene	ND	0.33
2,6-Dinitrotoluene	ND	0.33
Acenaphthene	ND	0.33
2,4-Dinitrotoluene	ND	0.33
Fluorene	ND	0.33
Diethyl phthalate	ND	0.33
4-Chlorophenylphenyl ether	ND	0.33
N-Nitrosodiphenylamine	ND	0.33
1,2-Diphenylhydrazine	ND	0.33
4-Bromophenylphenyl ether	ND	0.33

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 14237-10
SMAPLE ID: RW-4a, 5-7.5-8'

BASE/NEUTRAL COMPOUNDS	RESULT mg/kg	LOD mg/kg
Hexachlorobenzene	ND	0.33
Phenanthrene	ND	0.33
Anthracene	ND	0.33
Dibutylphthalate	ND	0.33
Fluoranthene	ND	0.33
Benzidine	ND	1.65
Pyrene	ND	0.33
Butylbenzylphthalate	ND	0.33
Benzo (a) anthracene	ND	0.33
3,3'-Dichlorobenzidine	ND	1.65
Chrysene	ND	0.33
Bis (2-ethylhexyl)phthalate	ND	0.33
Di-n-octyl phthalate	ND	0.33
Benzo (b) fluoranthene	ND	0.33
Benzo (k) fluoranthene	ND	0.33
Benzo (a) pyrene	ND	0.33
Indeno (1,2,3-cd) pyrene	ND	1.65
Dibenzo (a,h) anthracene	ND	1.65
Benzo (ghi) perylene	ND	1.65
HSL COMPOUNDS		
Benzoic Acid	ND	3.3
2-Methylphenol	ND	0.33
4-Methylphenol	ND	0.33
2,4,5-Trichlorophenol	ND	0.33
Aniline	ND	0.33
Benzyl Alcohol	ND	1.65
4-Chloroaniline	ND	0.66
2-Methylnaphthalene	ND	0.33
2-Nitroanline	ND	1.65
3-Nitroaniline	ND	1.65
Dibenzofuran	ND	0.33
4-Nitroaniline	ND	1.65

ND = None Detected, Limit of Detection (LOD) appears in far right column

QA/QC SUMMARY

Compound	%Recovery	Compound	%Recovery
2-Flourophenol	62	2-Flourobiphenyl	70
2,4,6-tribromophenol	105	Terphenyl-d14	82
Nitrobenzene-d5	64		

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
290 Division Street, San Francisco, CA 94103, Phone (415) 861-1863

LAB NUMBER: 14321
CLIENT: ROUX ASSOCIATES
PROJECT ID: 0 4711, PFIZER-EMERYVILLE

DATE RECEIVED: 03/09/88
DATE ANALYZED: 03/10/88
DATE REPORTED: 03/29/88

Results of Analysis for Petroleum Hydrocarbons/Oil & Grease

Method References: O&G: Oil and Grease, EPA 413.1
TPH: Total Petroleum Hydrocarbons, EPA 3510/8015

LAB ID	CLIENT ID:	GASOLINE (mg/L)	KEROSINE (mg/L)	DIESEL (mg/L)	O&G (mg/L)
14321-1	RW-1	ND(0.05)	ND(0.05)	ND(0.05)	ND(20)
14321-2	RW-2	ND(0.05)	ND(0.05)	ND(0.05)	ND(20)
14321-3	RW-3	ND(0.05)	ND(0.05)	ND(0.05)	ND(20)
14321-4	RW-4	ND(0.05)	ND(0.05)	ND(0.05)	ND(20)

SALINITY: SMWW 210C

		SALINITY (g/Kg)
14321-2	RW-2	ND(1)
14321-3	RW-3	ND(1)

ND = Not Detected; Limit of detection indicated in parentheses.

QA/QC SUMMARY

	TPH	O&G
Duplicate: Relative % Difference	21	7
Spike: % Recovery	116	--

LABORATORY DIRECTOR

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 14321-3
CLIENT: ROUX ASSOCIATES
SAMPLE ID: RW-3
PROJECT ID: 0 4711, PFIZER-EMERYVILLE

DATE RECEIVED: 03/09/88
DATE ANALYZED: 03/21/88
DATE REPORTED: 03/29/88

EPA METHOD 624: VOLATILE ORGANICS IN WATER

COMPOUND	Result ug/L	Detection Limit ug/L
benzene	ND	5
carbon tetrachloride	ND	5
chlorobenzene	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
1,1-dichloroethane	ND	5
1,1,2-trichloroethane	ND	5
1,1,2,2-tetrachloroethane	ND	5
chloroethane	ND	5
2-chloroethylvinyl ether	ND	10
chloroform	ND	5
1,1-dichloroethene	ND	5
1,2-trans-dichloroethene	ND	5
1,2-dichloropropane	ND	5
1,3-dichloropropene	ND	5
ethylbenzene	ND	5
methylene chloride	ND	10
chloromethane	ND	5
bromomethane	ND	5
bromoform	ND	5
bromodichloromethane	ND	5
fluorotrichloromethane	ND	5
chlorodibromomethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
trichloroethene	ND	5
vinyl chloride	ND	5

Non-Priority Hazardous Pollutant Substances List Compounds

acetone	ND	10
2-butanone	ND	10
carbon disulfide	ND	5
2-hexanone	ND	5
4-methyl-2-pentanone	ND	5
styrene	ND	5
vinyl acetate	ND	5
total xylenes	ND	5

QA/QC Summary	Spike Recovery %
1,2 Dichloroethane-d4	111
Toluene-d8	101
Bromofluorobenzene	101

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 14321-4
CLIENT: ROUX ASSOICATES
SAMPLE ID: RW-4
PROJECT ID: 0 4711, PFIZER-EMERYVILLE

DATE RECEIVED: 03/09/88
DATE ANALYZED: 03/21/88
DATE REPORTED: 03/29/88

EPA METHOD 624: VOLATILE ORGANICS IN WATER

COMPOUND	Result ug/L	Detection Limit ug/L
benzene	ND	5
carbon tetrachloride	ND	5
chlorobenzene	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
1,1-dichloroethane	ND	5
1,1,2-trichloroethane	ND	5
1,1,2,2-tetrachloroethane	ND	5
chloroethane	ND	5
2-chloroethylvinyl ether	ND	10
chloroform	ND	5
1,1-dichloroethene	ND	5
1,2-trans-dichloroethene	ND	5
1,2-dichloropropane	ND	5
1,3-dichloropropene	ND	5
ethylbenzene	ND	5
methylene chloride	ND	10
chloromethane	ND	5
bromomethane	ND	5
bromoform	ND	5
bromodichloromethane	ND	5
fluorotrichloromethane	ND	5
chlorodibromomethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
trichloroethene	ND	5
vinyl chloride	ND	5

Non-Priority Hazardous Pollutant Substances List Compounds

acetone	2,000	10
2-butanone	1,000	10
carbon disulfide	ND	5
2-hexanone	ND	5
4-methyl-2-pentanone	8,600	5
styrene	ND	5
vinyl acetate	ND	5
total xylenes	ND	5

QA/QC Summary	Spike Recovery %
1,2 Dichloroethane-d4	112
Toluene-d8	100
Bromofluorobenzene	106

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 14321-4(RERUN)
CLIENT: ROUX ASSOCIATES
SAMPLE ID: RW-4
PROJECT ID: 0 4711, PFIZER-EMERYVILLE

DATE RECEIVED: 03/09/88
DATE ANALYZED: 03/23/88
DATE REPORTED: 03/29/88

EPA METHOD 624: VOLATILE ORGANICS IN WATER

COMPOUND	Result ug/L	Detection Limit ug/L
benzene	ND	15
carbon tetrachloride	ND	15
chlorobenzene	ND	15
1,2-dichloroethane	ND	15
1,1,1-trichloroethane	ND	15
1,1-dichloroethane	ND	15
1,1,2-trichloroethane	ND	15
1,1,2,2-tetrachloroethane	ND	15
chloroethane	ND	15
2-chloroethylvinyl ether	ND	30
chloroform	ND	15
1,1-dichloroethene	ND	15
1,2-trans-dichloroethene	ND	15
1,2-dichloropropane	ND	15
1,3-dichloropropene	ND	15
ethylbenzene	ND	15
methylene chloride	ND	30
chloromethane	ND	15
bromomethane	ND	15
bromoform	ND	15
bromodichloromethane	ND	15
fluorotrichloromethane	ND	15
chlorodibromomethane	ND	15
tetrachloroethene	ND	15
toluene	ND	15
trichloroethene	ND	15
vinyl chloride	ND	15
Non-Priority Hazardous Pollutant Substances List Compounds		
acetone	6,800	30
2-butanone	8,200	30
carbon disulfide	ND	15
2-hexanone	ND	15
4-methyl-2-pentanone	44,200	15
styrene	ND	15
vinyl acetate	ND	15
total xylenes	ND	15

QA/QC Summary	Spike Recovery %
1,2 Dichloroethane-d4	112
Toluene-d8	98
Bromofluorobenzene	94

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 14321-4
CLIENT: ROUX ASSOCIATES
PROJECT ID: 0 4711, PFIZER-EMERYVILLE
SAMPLE ID: RW-4

DATE RECEIVED: 03/09/88
DATE EXTRACTED: 03/23/88
DATE ANALYZED: 03.23.88
DATE REPORTED: 10/23/87

EPA METHOD 625: BASE/NEUTRAL AND ACID EXTRACTABLES IN WATER
EXTRACTION METHOD: EPA 3510 LIQUID/LIQUID

ACID COMPOUNDS	RESULT ug/L	LOD ug/L
Phenol	ND	5
2-Chlorophenol	ND	5
2-Nitrophenol	ND	25
2,4-Dimethylphenol	ND	5
2,4-Dichlorophenol	ND	5
4-Chloro-3-methylphenol	ND	10
2,4,6-Trichlorophenol	ND	5
2,4-Dinitrophenol	ND	25
4-Nitrophenol	ND	25
2-Methyl-4,6-dinitrophenol	ND	25
Pentachlorophenol	ND	25
BASE/NEUTRAL COMPOUNDS		
Bis(2-chloroethyl)ether	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5
Bis(2-chloroisopropyl)ether	ND	5
N-nitrosodi-n-propylamine	ND	5
Hexachloroethane	ND	5
Nitrobenzene	ND	5
Isophorone	ND	5
Bis(2-chloroethoxy)methane	ND	5
1,2,4-Trichlorobenzene	ND	5
Naphthalene	TRACE	5
Hexachlorobutadiene	ND	5
Hexachlorocyclopentadiene	ND	5
2-Chloronaphthalene	ND	5
Dimethyl phthalate	ND	5
Acenaphthylene	ND	5
2,6-Dinitrotoluene	ND	5
Acenaphthene	ND	5
2,4-Dinitrotoluene	ND	5
Fluorene	ND	5
Diethyl phthalate	ND	5
4-Chlorophenylphenyl ether	ND	5
N-Nitrosodiphenylamine	ND	5
1,2-Diphenylhydrazine	ND	5
4-Bromophenylphenyl ether	ND	5

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 14321-4
SAMPLE ID: RW-4

BASE/NEUTRAL COMPOUNDS	RESULT ug/L	LOD ug/L
Hexachlorobenzene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Dibutylphthalate	ND	5
Fluoranthene	ND	5
Benzidine	ND	25
Pyrene	ND	5
Butylbenzylphthalate	ND	5
Benzo (a) anthracene	ND	5
3,3'-Dichlorobenzidine	ND	25
Chrysene	ND	5
Bis (2-ethylhexyl)phthalate	ND	5
Di-n-octyl phthalate	ND	5
Benzo (b) fluoranthene	ND	5
Benzo (k) fluoranthene	ND	5
Benzo (a) pyrene	ND	5
Indeno (1,2,3-cd) pyrene	ND	25
Dibenzo (a,h) anthracene	ND	25
Benzo (ghi) perylene	ND	25
HSL COMPOUNDS		
Benzoic Acid	ND	50
2-Methylphenol	ND	5
4-Methylphenol	ND	5
2,4,5-Trichlorophenol	ND	5
Aniline	ND	5
Benzyl Alcohol	ND	25
4-Chloroaniline	ND	10
2-Methylnaphthalene	5.2	5
2-Nitroanline	ND	25
3-Nitroaniline	ND	25
Dibenzofuran	ND	5
4-Nitroaniline	ND	25

ND = None Detected, Limit of Detection (LOD) appears in far right column

QA/QC SUMMARY

Compound	Recovery,%	Compound	Recovery,%
2-Flourophenol	61	2-Flourobiphenyl	66
2,4,6-tribromophenol	57	Terphenyl	50
Nitrobenzene-d5	89		

LABORATORY CERTIFICATE

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
290 Division Street, San Francisco, CA 94103, Phone (415) 861-1863

Laboratory No. 14438
Preliminary No.

Reported > 04/08/88
Sampled
Received > 03/28/88

For > ROUX ASSOCIATES

Report on > 2 WATER SAMPLES

Mark > Job Location: PFIZER-EMERYVILLE
Job Number: 04711

See Attached Results

Laboratory Director

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 14438-1
CLIENT: ROUX ASSOCIATES
SAMPLE ID: RW-2
Job ID: 04711, PFIZER-EMERYVILLE

DATE RECEIVED: 03/28/88
DATE ANALYZED: 04/01/88
DATE REPORTED: 04/08/88

EPA METHOD 624: VOLATILE ORGANICS IN WATER

COMPOUND	Result ug/L	Detection Limit ug/L
benzene	ND	5
carbon tetrachloride	ND	5
chlorobenzene	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
1,1-dichloroethane	ND	5
1,1,2-trichloroethane	ND	5
1,1,2,2-tetrachloroethane	ND	5
chloroethane	ND	5
2-chloroethylvinyl ether	ND	10
chloroform	ND	5
1,1-dichloroethene	ND	5
1,2-trans-dichloroethene	ND	5
1,2-dichloropropane	ND	5
1,3-dichloropropene	ND	5
ethylbenzene	ND	5
methylene chloride	ND	10
chloromethane	ND	5
bromomethane	ND	5
bromoform	ND	5
bromodichloromethane	ND	5
fluorotrichloromethane	ND	5
chlorodibromomethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
trichloroethene	ND	5
vinyl chloride	ND	5

Non-Priority Hazardous Pollutant Substances List Compounds

acetone	ND	10
2-butanone	ND	10
carbon disulfide	ND	5
2-hexanone	ND	5
4-methyl-2-pentanone	ND	5
styrene	ND	5
vinyl acetate	ND	5
total xylenes	ND	5

QA/QC:	Average Spike Recovery %
1,2 Dichloroethane-d4	121
Toluene-d8	105
Bromofluorobenzene	97

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 14438-2
CLIENT: ROUX ASSOCIATES
SAMPLE ID: RW-3
Job ID: 04711, PFIZER-EMERYVILLE

DATE RECEIVED: 03/28/88
DATE ANALYZED: 04/01/88
DATE REPORTED: 04/08/88

EPA METHOD 624: VOLATILE ORGANICS IN WATER

COMPOUND	Result ug/L	Detection Limit ug/L
benzene	ND	5
carbon tetrachloride	ND	5
chlorobenzene	ND	5
1,2-dichloroethane	ND	5
1,1,1-trichloroethane	ND	5
1,1-dichloroethane	ND	5
1,1,2-trichloroethane	ND	5
1,1,2,2-tetrachloroethane	ND	5
chloroethane	ND	5
2-chloroethylvinyl ether	ND	10
chloroform	ND	5
1,1-dichloroethene	ND	5
1,2-trans-dichloroethene	ND	5
1,2-dichloropropane	ND	5
1,3-dichloropropene	ND	5
ethylbenzene	ND	5
methylene chloride	ND	10
chloromethane	ND	5
bromomethane	ND	5
bromoform	ND	5
bromodichloromethane	ND	5
fluorotrichloromethane	ND	5
chlorodibromomethane	ND	5
tetrachloroethene	ND	5
toluene	ND	5
trichloroethene	ND	5
vinyl chloride	ND	5

Non-Priority Hazardous Pollutant Substances List Compounds

acetone	ND	10
2-butanone	ND	10
carbon disulfide	ND	5
2-hexanone	ND	5
4-methyl-2-pentanone	ND	5
styrene	ND	5
vinyl acetate	ND	5
total xylenes	ND	5

QA/QC:	Average Spike Recovery %
1,2 Dichloroethane-d4	141
Toluene-d8	105
Bromofluorobenzene	97

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290 Division Street, San Francisco, CA 94103, Phone (415) 861-1863

LABORATORY NUMBER: 14635
CLIENT: ROUX ASSOCIATES
REPORT ON: 6 SOIL SAMPLES
PROJECT ID: 04711, PFIZER-EMERYVILLE

DATE RECEIVED: 05/05/88
DATE ANALYZED: 05/10/88
DATE REPORTED: 05/18/88

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OIL & GREASE ANALYSIS IN SOIL
METHOD: SMWW 503A

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C&T ID	SAMPLE ID	OIL & GREASE, mg/Kg	
14635-1	RB-5 @5.0-5.5	29,400	
14635-2	RB-6 @5.5-6.0	4,850	(Rerun) Reported 6/8/88 16,810 mg/kg
14635-3	RB-6 @10.5-11.0	ND(50)	
14635-4	RB-7 @6.0-6.5	ND(50)	
14635-5	RW-8 @10.5-11.0	14,800	
14635-6	RW-9 @3.5-4.0	ND(50)	

ND = NONE DETECTED. LIMIT OF DETECTION IS INDICATED IN PARENTHESES.

LABORATORY DIRECTOR

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 14635-7
CLIENT: ROUX ASSOCIATES
SAMPLE ID: RW-9 @6.0-6.5
JOB #: 04711, PFIZER-EMERYVILLE

DATE RECEIVED: 05/05/88
DATE EXTRACTED: 05/17/88
DATE ANALYZED: 05/17/88
DATE REPORTED: 05/18/88

EPA Method 8240: Volatile Organics in Soils & Wastes

COMPOUND	Result ug/kg	LOD ug/kg
benzene	ND	500
carbon tetrachloride	ND	500
chlorobenzene	ND	500
1,2-dichloroethane	ND	500
1,1,1-trichloroethane	ND	500
1,1-dichloroethane	ND	500
1,1,2-trichloroethane	ND	500
1,1,2,2-tetrachloroethane	ND	500
chloroethane	ND	500
2-chloroethylvinyl ether	ND	1000
chloroform	ND	500
1,1-dichloroethene	ND	500
1,2-trans-dichloroethene	ND	500
1,2-dichloropropane	ND	500
1,3-dichloropropene	ND	500
ethylbenzene	ND	500
methylene chloride	ND	1000
chloromethane	ND	500
bromomethane	ND	500
bromoform	ND	500
bromodichloromethane	ND	500
fluorotrichloromethane	ND	500
chlorodibromomethane	ND	500
tetrachloroethene	ND	500
toluene	ND	500
trichloroethene	ND	500
vinyl chloride	ND	500

Non-Priority Hazardous Pollutant Substances List Compounds

acetone	ND	1000
2-butanone	ND	1000
carbon disulfide	ND	500
2-hexanone	ND	500
4-methyl-2-pentanone	ND	500
styrene	ND	500
vinyl acetate	ND	500
total xylenes	ND	500

QA/QC: Surrogate Spike Recovery %

1,2 Dichloroethane-d4	78
Toluene-d8:	96
Bromofluorobenzene	89

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290 Division Street, San Francisco, CA 94103, Phone (415) 861-1863

LABORATORY NUMBER: 14903
CLIENT: ROUX ASSOCIATES
REPORT ON: 2 WATER SAMPLES
PROJECT #: 04711
PROJECT TITLE: PFIZER EMERYVILLE, CA

DATE RECEIVED: 06-16-88
DATE ANALYZED: 06-16-88
DATE REPORTED: 06-23-88

OIL & GREASE ANALYSIS, SMWW 503 A

LAB ID	CLIENT ID	OIL & GREASE (mg/L)
14903-1	RW - 8	ND(20)
14903-2	RW - 3	ND(20)

ND = None Detected; Limit of Detection is Indicated in Parentheses.

LABORATORY DIRECTOR

BROWN AND CALDWELL LABORATORIES
1255 POWELL STREET EMERYVILLE, CA 94608 • (415) 428-2300

ANALYTICAL REPORT

LOG NO: E87-12-088

Received: 03 DEC 87
Reported: 18 DEC 87

Mr. Michael Herzog
Pfizer Pigments Inc.
4650 Shellmound Street
Emeryville, California 94608

Purchase Order: EM-62946

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
12-088-1	Waste Oil Tank Excavation Core	03 DEC 87

PARAMETER	12-088-1
Oil and Grease, mg/kg	490
Total Fuel Hydrocarbons, mg/kg	720

BROWN AND CALDWELL LABORATORIES
1255 POWELL STREET EMERYVILLE, CA 94608 • (415) 428-2300

ANALYTICAL REPORT

LOG NO: E87-12-088

Received: 03 DEC 87
Reported: 18 DEC 87

Mr. Michael Herzog
Pfizer Pigments Inc.
4650 Shellmound Street
Emeryville, California 94608

Purchase Order: EM-62946

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
12-088-1	Waste Oil Tank Excavation Core	03 DEC 87

PARAMETER	12-088-1
Purgeable Priority Pollutants	
Extraction	12.07.87
1,1,1-Trichloroethane, mg/kg	<0.2
1,1,2,2-Tetrachloroethane, mg/kg	<0.2
1,1,2-Trichloroethane, mg/kg	<0.2
1,1-Dichloroethane, mg/kg	<0.2
1,1-Dichloroethylene, mg/kg	<0.2
1,2-Dichloroethane, mg/kg	<0.2
1,2-Dichloropropane, mg/kg	<0.2
1,3-Dichloropropene, mg/kg	<0.2
2-Chloroethylvinylether, mg/kg	<0.2
Acrolein, mg/kg	<2
Acrylonitrile, mg/kg	<2
Bromodichloromethane, mg/kg	<0.2
Bromomethane, mg/kg	<0.2
Benzene, mg/kg	<0.2
Chlorobenzene, mg/kg	<0.2
Carbon Tetrachloride, mg/kg	<0.2
Chloroethane, mg/kg	<0.2
Bromoform, mg/kg	<0.2
Chloroform, mg/kg	<0.2
Chloromethane, mg/kg	<0.2
Dibromochloromethane, mg/kg	<0.2
Ethylbenzene, mg/kg	<0.2
Methylene chloride, mg/kg	<0.2

BROWN AND CALDWELL LABORATORIES
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ANALYTICAL REPORT

LOG NO: E87-12-088

Received: 03 DEC 87
Reported: 18 DEC 87

Mr. Michael Herzog
Pfizer Pigments Inc.
4650 Shellmound Street
Emeryville, California 94608

Purchase Order: EM-62946

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
12-088-1	Waste Oil Tank Excavation Core	03 DEC 87

PARAMETER	12-088-1
Tetrachloroethylene, mg/kg	<0.2
Trichloroethylene, mg/kg	<0.2
Trichlorofluoromethane, mg/kg	<0.2
Toluene, mg/kg	0.2
Vinyl chloride, mg/kg	<0.2
trans-1,2-Dichloroethylene, mg/kg	<0.2
trans-1,3-Dichloropropene, mg/kg	<0.2
Semi-Quantified Results **	
2-Hexanone, mg/kg	20
Acetone, mg/kg	4

** Quantification based upon comparison of total ion count of the compound with that of the nearest internal standard.

Steve Fisher, Laboratory Director

APPENDIX D

GROUND-WATER SAMPLING PROTOCOLS

GROUNDWATER SAMPLING PROCEDURE - Volatile Organic Compounds

(1) Identify the well and enter presampling information in the field notebook and sampling form. Fill out other items on sampling form.

(2) Inspect protective casing and note any items of concerns such as lock missing or casing bent.

(3) Cut a slit in one corner of a dedicated plastic sheet and slip it over and around the well or place near the well, creating a clean surface onto which the sampling equipment can be positioned. Do not kick, transfer, drop or in any way let soil or other material fall onto this sheet unless it comes from inside the well. Do not place any meters, tools, equipment, etc., on the sheet unless they have been cleaned with a clean rag to remove any sediments.

(4) Clean the top of the well off with a clean rag and remove the cap or plug, placing it on the plastic sheet.

(5) Clean the first 10 feet of the steel tape with a clean rag, then wash with distilled water and measure the depth to water. Record this and compute the volume of water in the well.

(6) Existing wells will be purged by the hydrogeologist on site. All monitoring wells will be pumped or bailed before sampling and a minimum of five to ten casing volumes will be removed, if the recharge rate is adequate to accomplish this within a reasonable amount of time. Hand bailers, submersible pumps, etc. will be clean and sediment-free prior to use. Dedicated equipment will be used if normal cleaning methods are not adequate to remove potential cross-contamination.

(7) Record the physical appearance of the water on the field data form (color, odor, turbidity, etc.) as it is pumped or bailed.

(8) Prepare the bottles for receiving their samples (labels, place on ice, etc.).

(9) After the well has been purged and developed, an appropriate bailer for the constituents to be analyzed for will be used to collect the groundwater sample. This bailer will have been thoroughly pre-cleaned. Immediately prior to lowering the bailer

in the well, rinse three volumes of distilled water through the bailer. In addition, the first three bailer volumes obtained from the well should be discarded. Use non-absorbent polyethylene cord to lower the bailer into the well. This cord will be discarded after use in the well.

(10) Lower the bailer into the well gently making certain to only submerge it far enough to fill it completely.

(11) Standard 40 ml, pre-cleaned, volatile organic sample bottles with teflon caps, are required. Fill the bottles to the top creating a convex surface with no air bubbles. Place the cap on tightly. Gently turn the bottle over and tap lightly on the soft surface to insure that no air bubbles are present.

(12) Label the bottle with location number, date and other pertinent information. Record all information on the sampling data form. Cool the sample immediately on ice. Maintain the samples in a secure area and deliver to the laboratory within 24 hours.

(13) After the last sample is collected, measure and record the temperature, conductivity, pH, and the physical appearance of the water.

(14) Replace the well cap and cover the well, locking the protective cap.

(15) Rinse out the bailer and/or pump with clean water.

(16) Discard the cord, rags, gloves, and plastic sheeting in an appropriate manner.

(17) Complete sampling data form.

GROUND-WATER SAMPLING PROCEDURE - GENERAL Constituents

1. Identify the well and enter the number in the field notebook.

2. Cut a slit in one corner of a new plastic sheet and slip it over and around the well, creating a clean surface onto which the sampling equipment can be positioned. **Do not kick, transfer, drop or in any way let soil or other material fall onto this sheet unless it comes from inside the well. Do not place any meters, tools, equipment, etc. on the sheet unless they have been cleaned with a clean rag to remove any sediments.**

3. Clean the top of the well off with a clean rag and remove the cap or plug placing it on the plastic sheet.

4. Clean the first 10 feet of the steel tape with a clean rag, then wash with distilled water and measure the depth to water. Record this and compute the volume of water in the well.

5. Existing wells will be purged by the hydrogeologist on site. All monitoring wells will be pumped or bailed before sampling. A minimum of five to ten casing volumes will be removed prior to sampling. Hand bailers, submersible pumps, etc. are expected to be clean and sediment-free prior to use.

6. Record the physical appearance of the water (color, smell, turbidity, etc.) as it is pumped or bailed.

7. Prepare the bottles for receiving their samples (labels, place on ice, etc.).

8. After the well has been purged and developed, a stainless steel bailer with a plugged bottom will be used to collect the ground-water sample. This bailer will have been thoroughly pre-cleaned. Immediately prior to lowering in the well, rinse three volumes of distilled water through the bailer. In addition, the first three bailer volumes obtained from the well should be discarded. Use non-absorbent polyethylene cord to lower the bailer into the well. This cord will be discarded after use in the well.

9. Use appropriate sampling bottles as provided by the laboratory, as required for each sampling site. Use vinyl electrical tape to further strengthen the seal.

10. Label the bottle with location number, date and other pertinent information. Record all information in field notebook. Cool the sample immediately on ice (if required). Maintain the samples in a secured area at ambient conditions and deliver to the laboratory within twenty-four hours.

11. After the last sample is collected, measure and record the temperature, conductivity, pH, and the physical appearance of the water.

12. Replace the well cap and cover the well.

13. Rinse out the bailer and/or pump with clean water.

14. Discard the cord, rags, gloves, and plastic sheeting in an appropriate manner.