Report Issued:

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Coliseum Way Oakland

General Construction Gas Yard

Underground Tanks Investigation

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Prepared by

Water Resources Unit/Ecological Services Group

July 1988

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INTRODUCTION

SCOPE

This report describes a site investigation performed at PG&E's General Construction Gas Yard located at 4930 Coliseum Way in Oakland, California.

The objectives of this investigation were to:

- Determine if the petroleum hydrocarbons encountered in subsurface soil and groundwater during a 1987 field investigation and the subsequent tank removal process originated from a cluster of underground tanks formerly located near the north corner of the site.
- Quantify the horizontal and vertical extent of elevated levels of petroleum hydrocarbons and volatile organic compounds in the subsurface soil and groundwater around the former tank cluster location.
- 3. Quantify the horizontal and vertical extent of elevated levels of petroleum hydrocarbons and volatile organic compounds (if any) in the subsurface soil and groundwater around the former underground diesel tank location near the west corner of the site.
- 4. Identify the type(s) of petroleum hydrocarbons and volatile organic compounds encountered during this investigation.

The methodology followed during this investigation was outlined in the Proposed Work Plan for the 4930 Coliseum Way, Oakland General Construction Gas Yard - Preliminary Underground Waste Oil and Diesel Tank Site Investigation prepared by Technical and Ecological Services' Water Resources Unit.

SITE DESCRIPTION

The Oakland General Construction Gas Yard is located at 4390 Coliseum Way in the city of Oakland (Figure 1). The site is wholly owned by PG&E and is used as a vehicle, materials, and equipment storage and distribution facility. Historically, the site was also used as a vehicle service center and aboveground natural gas storage facility.

Figure 2 shows the layout of the site and the former locations of the underground storage tanks. An office building, material storage warehouse,





LOCATION MAP

Oakland General Construction Yard Underground Tank Investigation

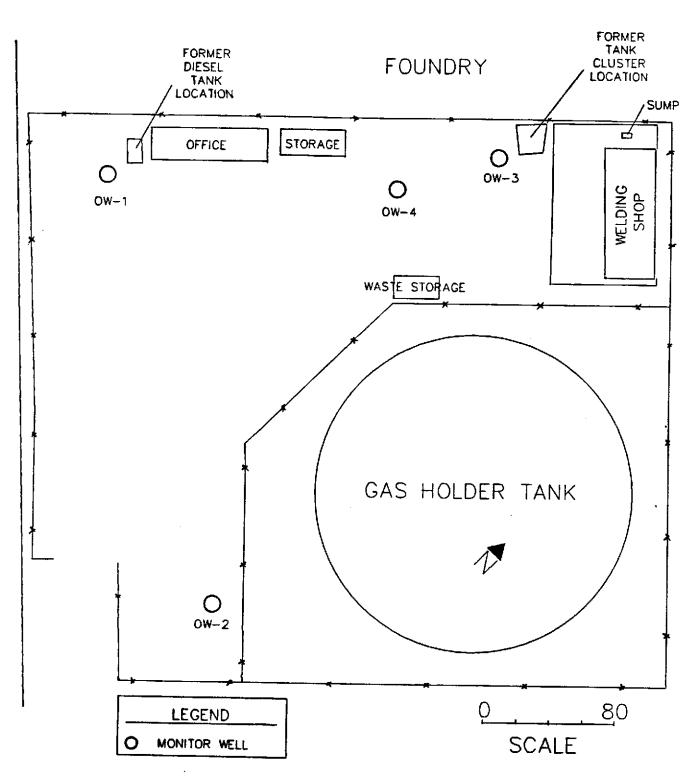


FIGURE 2. SITE PLAN AND MONITOR WELL LOCATIONS

welding shop, hazardous waste storage facility, and aboveground low-pressure gas holder tank (no longer in use) are located onsite. The welding shop was previously used as a vehicle repair garage. With the exception of a concrete pad located in front of the welding shop, the site is graveled.

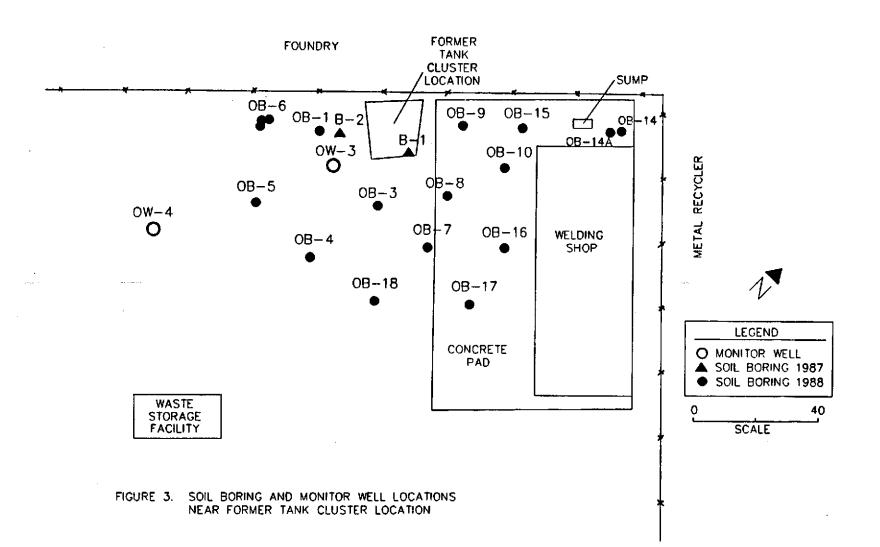
Five underground tanks were formerly located onsite. Four of the tanks (three 500-gallon tanks and one 350-gallon tank) were located in a cluster near the north corner of the site by the welding shop ("tank cluster"). These tanks were thought to be used to store waste oils. A 1000-gallon tank was located near the west corner of the site by the office building ("diesel tank"). It was used to store diesel fuel. The bottom of each tank was approximately 7 feet below the ground surface.

On the north side of the welding shop, about 50 feet from the former tank cluster location, is a concrete sump. The underground layout of the sump and its associated plumbing is unknown.

The site is surrounded by industrial property. Immediately to the northeast of the site is a metal recycler; to the northwest is a metal foundry; to the west and southwest (across Coliseum Way) are two motels and a recreational vehicle sales facility; to the southeast (across 50th Street) is a trucking facility.

BACKGROUND

In February 1987, PG&E's Department of Engineering Research (Civil Unit) conducted a preliminary underground tank leakage study around the tank cluster and the diesel tank. Field work consisted of drilling three exploratory borings to approximately 9 feet below ground surface, and collecting soil samples for laboratory analysis (up to two samples per boring at 3- to 5- foot intervals). Two borings (B-1 and B-2) were located adjacent to the tank cluster, and one boring (B-3) was located next to the diesel tank. Figure 3 shows the location of borings B-1 and B-2. Figure 4 shows the location of boring B-3.



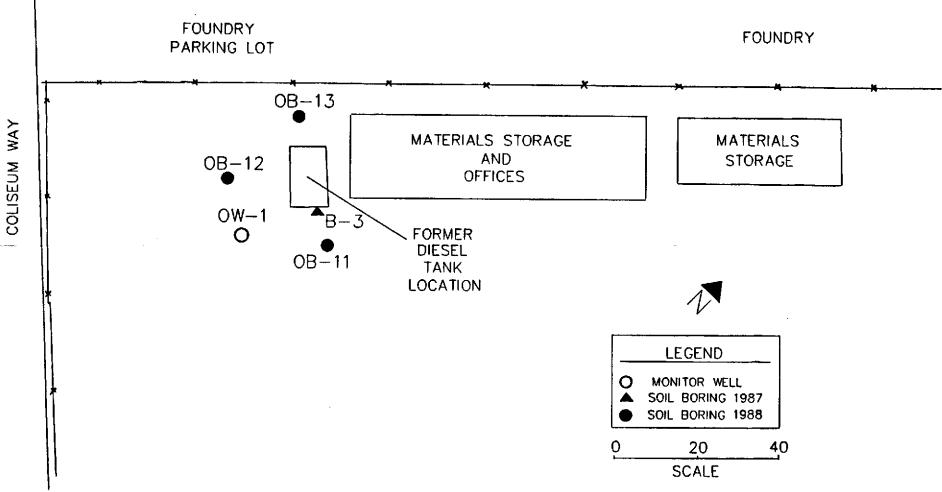


FIGURE 4. SOIL BORING AND MONITOR WELL LOCATIONS NEAR FORMER DIESEL TANK LOCATION

Five soil samples (two samples from borings B-1 and B-2 and one sample from boring B-3) and three water samples (one sample from each boring) were submitted to Clayton Environmental Laboratory for chemical analysis. The soil samples obtained from borings B-1 and B-2 (near the tank cluster) were analyzed for total petroleum hydrocarbons as gasoline, kerosene, diesel, and oil (EPA method 8100/8015); polychlorinated biphenyls (PCBs)(EPA method 8080); and purgeable aromatics including benzene, toluene, ethylbenzene, and xylenes (BTEX)(EPA method 8020). The soil sample collected from boring B-3 (near the diesel tank) was analyzed for total petroleum hydrocarbons (EPA method 8100/8015). The water samples collected from the three borings were analyzed for BTEX only.

Table 1 provides a summary of the sample results from the February 1987 investigation. Elevated levels of oil and trace amounts of BTEX and PCBs were found in soil samples collected from both borings drilled near the tank cluster. Water samples collected from these borings also showed trace amounts of BTEX. Soil and water samples collected from the boring drilled near the diesel tank were nondetectable for all constituents analyzed.

In December 1987, the contents of the five tanks were analyzed by PG&E's Department of Engineering Research chemical laboratory prior to tank removal and disposal. Table 2 provides a summary of the results of these analyses. Two of the tanks in the cluster were found to contain mineral spirits (paint thinner) and water. The other two tanks in the cluster were found to contain heavy oil (diesel and/or hydraulic oil). The fifth tank, located near the west corner of the property, contained diesel oil. PCBs were not detected in any of the tanks.

The five tanks were removed on January 13, 1988 by Universal Engineering, Inc. Soil and water samples were collected from the tank cluster excavation hole and analyzed by IT Analytical Services for high boiling point petroleum hydrocarbons (modified EPA method 8015), oil and grease (Standard Method 503E), and volatile organic compounds (EPA method 8240). Soil and water

Table 1. Analytical results of soil and water samples collected during February 1987 Field Investigation.

SOIL (ppm)

Sample	Depth							Ethyl-		
<u>No</u>	(feet)	<u>Gasoline</u>	<u>Kerosene</u>	<u>Diesel</u>	<u> </u>	<u>Benzene</u>	<u>Toluene</u>	<u>benzene</u>	<u>Xyl enes</u>	PCBs
B1-1-1	3	MD	ND	MD	2000	ND	ND	ND	ND	0.02
B1-2-1	5.5	ND	ND	ND	180	ND	ND	0.056	0.15	ND
B2-1-1	5	0.73	ND	ND	3500	ND	ND	1.2	1.9	0.06
B2-2-1	8.5	ND	ND	ND	1200	ND	ND	0.12	0.09	0.03
B3-1-1	5.5	ND	MD	ND	ND		••			
EPA Meth	nod	8015	8100	8100	8100	8020	8020	8020	8020	808 0
Method Detection Limit (ppm)		0.1	10	20	100	0.04	0.03	0.02	0.04	0.01

WATER (ppb)

Sample				
<u>No.</u>	Benzene	Toluene	Ethylbenzene	<u>Xyl enes</u>
B1	0.84	ND	1.7	3.7
B2	12	1.6	3.5	24
в3	ND	MD	ND	ND.
EPA Method	602	6 02	602	602
Method Detection Limit	0.4	0.3	0.3	0.4

Notes: All samples were collected on February 13, 1987.

ND = Not detected at or above method detection limit.

Table 2. Analytical results of liquid samples collected from tanks in December 1987.

Tank	рН	Flash Point,deg. F	PCB (ppm)	Reactivity	GC/IR Analysis Identification
Northwest Cluster	6.9		<1	NR	Mineral Spirits
Northeast Cluster	5.4	- -	<1	NR	Mineral Spirits
Southwest Cluster	7.1		<1	NR	Lube Oil
Southeast Cluster	6.1	>270	<1	NR	Heavy Oil
Diesel	6.8	153	<1	NR	Diesel

NR = Non-reactive

samples were collected from the diesel tank excavation hole and analyzed by IT for high boiling point petroleum hydrocarbons.

Results of these analyses are summarized in Table 3. Elevated levels of high boiling point petroleum hydrocarbons were detected in soil (up to 1100 ppm) and water (30 ppm) samples collected from the tank cluster excavation hole, and in water samples (up to 150 ppm) collected from the diesel tank excavation hole. Elevated levels of oil and grease were detected in soil (up to 55,400 ppm) and water (8000 ppm) samples collected from the tank cluster excavation hole. Volatile organic compounds were not detected in soil or water samples collected from the tank cluster excavation hole during the tank removal process.

REGIONAL AND SITE GEOLOGY AND HYDROGEOLOGY

Geologic maps of the region constructed by the California Division of Mines and Geology (1961) and by Goldman (1969) show the site is underlain by Quaternary marine and marsh deposits. These sediments consist predominantly of highly plastic, blue-grey bay mud interbedded with grey, organic-rich silty sands and clayey marsh deposits. These deposits form the uppermost water-bearing unit beneath the site.

Shallow stratigraphy specific to the site can be described from boring logs obtained during this investigation (Appendix A). The subsurface material typically consists of 6- to 10- feet of silty clay overlying six to ten feet of sand or gravel, which overlies more clay. The extreme heterogeneity of the materials composing the shallow stratigraphy suggests that several feet of fill have been imported to the site.

The topography of the area in the vicinity of the site is relatively flat. Regional surface water flow is to the southwest (toward San Leandro Bay). Surface water bodies nearest the site include San Leandro Bay (located approximately one-third of a mile south of the site) and a canal that extends north from San Leandro Bay (located about one-half of a mile west of the site).



Table 3. Analytical Results of Soil Samples Collected During January 1988 Tank Removal Process.

Sample Location	Sample ID	ТРН	Oil and Grease	Volatile Organics
Tank Cluster	West Sand	200	00.600	
Tank Cluster	West Wall	320	29,600	ND
Tank Cluster	North Sand	30	2,650	ND
Tank Cluster		63	14,200	ND
	North Soil	12	2,300	ND
Tank Cluster	North Wall	ND	26	ND
Tank Cluster	South Sand	88	55,400	ND
Tank Cluster	South Soil	310 19 1100 30	7,000	ND ND ND ND
Tank Cluster	South Wall		3,850	
Tank Cluster	East Wall		10,500	
Tank Cluster	East Liquid (below tank)		8,000	
Diesel Tank	Soil	ND		
Diesel Tank	Liquid (below tank)	95		
Diesel Tank	Liquid (below tank)	150	••	
EPA Method	то	d 8015	(SM) 503E	8240
method Detecti	on Limit (ppm)	10	10	0.2

TPH = High boiling point petroleum hydrocarbons
ND = Not detected at or above method detection limit
-- = Not analyzed

Note: All results are in parts per million.

The potentiometric surface of the uppermost aquifer beneath the site is estimated from monitor well water measurements recorded from March to July 1988 to be approximately 3 to 6 feet below the ground surface. Saturated soil was encountered while drilling soil borings and monitor wells in March 1988 at 7 to 10 feet below the ground surface. Water samples collected from four wells constructed onsite showed typical conductivity levels of 1000 to 1500 microsiemen per centimeter, indicating a relatively high concentration of dissolved salts in the uppermost groundwater.

PHASE 1 FIELD WORK

MONITOR WELL INSTALLATION, WELL DEVELOPMENT, AND HYDRAULIC GRADIENT DETERMINATION

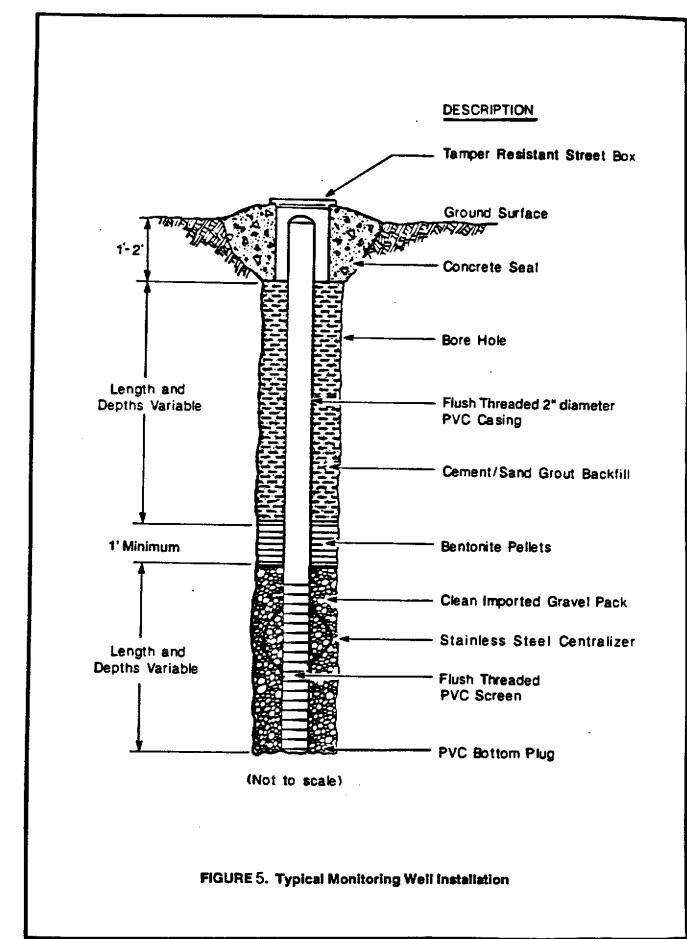
To determine the groundwater flow direction and gradient, three monitor wells were installed (OW-1, OW-2, and OW-3) in March 1988. Figure 2 shows the locations of these wells. An attempt was made to position one well hydraulically downgradient of the former diesel tank location (OW-1) and one well hydraulically downgradient of the former tank cluster location (OW-3). Well OW-2 was positioned along the southern border of the site to serve as an additional water level measurement point. Well permits were obtained from the Alameda County Flood Control and Water Conservation District prior to installation.

Each monitor well was constructed of flush-threaded 2-inch schedule 40 polyvinyl chloride (PVC) casing, with 0.01-inch openings in the screened portion of the well. The screened interval of each well was placed approximately 5 feet above to 10 feet below the encountered water table (3 to 19 feet below the ground surface) to allow for seasonal water level fluctuations.

The filter pack material selected for all wells was Lone Star #2/12 sand. This sand was selected mainly for convenience, since the fine texture of some of the subsurface strata made a designed filter pack infeasible.

Stainless steel centralizers were used in each well to ensure an evenly distributed filter pack. Figure 5 shows the construction specifications for the monitor wells installed during this investigation.

The borehole for monitor well OW-2 was advanced with 8-inch outside diameter hollow stem augers. The augers were advanced to the desired depth and removed from the borehole. The borehole remained open, allowing a PVC well casing to be inserted and filter pack to be placed around the casing. A



weighted tape was used to ensure that no material sloughed off the sides of the borehole during this process.

The boreholes for wells OW-1 and OW-3 were advanced with 12-inch augers. When the augers had been advanced to the desired depth (approximately 20 feet), the PVC well casing was lowered down the center of the augers and set to the appropriate depth. The annular space between the augers and the screened portion of the well was then backfilled with filter pack. As the filter pack was deposited, the augers were withdrawn from the hole so the sand would flow out of the augers and fill the annular space of the borehole. The filter pack for each well was deposited to approximately 0.5 foot above the top of the screen. A 1- to 2-foot layer of bentonite pellets was then placed in the annular space above the filter pack. Since the bentonite was above the water table, approximately 3 gallons of potable water were added to allow the pellets to swell. After sufficient time had passed for the bentonite to swell (at least one hour), the remaining annular space was backfilled to the ground surface with neat cement.

Each monitor well was finished with a tamper-resistant, watertight street box set into concrete. The street boxes were set slightly above the existing ground surface to provide additional protection against infiltration of surface water. A PVC cap was placed over the end of each well casing inside the street box.

Each well was developed by pumping with a centrifugal pump. A new flexible hose was placed in each well, and water was pumped out of the well to the nearest excavation hole (except for well OW-2, where the development water was retained in labeled drums pending analysis). During the development process, each well was repeatedly pumped dry and allowed to recover. Due to the fine texture of some of the strata surrounding the wells, none of the wells produced clear water, even after extensive development.

The monitor wells were located a sufficient distance from each other to allow determination of the groundwater gradient and flow direction through

analysis of water level data collected from the wells. The top of each well casing was surveyed to the nearest 0.01 foot to allow comparison of water elevations in the wells. The depth to water from the top of the well casing was measured with an electronic immersion probe. The groundwater elevation at each well was computed by subtracting the depth to water from the elevation at the top of the well casing. Water level data were collected on March 29 and April 7, 1988, to observe any fluctuations in groundwater flow direction and gradient and to assess the influence of tidal action on groundwater flow.

GROUNDWATER SAMPLING AND ANALYSIS

Groundwater samples were collected from wells OW-1, OW-2, and OW-3 for chemical analysis. Prior to purging each well, the depth to water was measured and recorded. Approximately 5 to 13 well volumes of water were then purged with a centrifugal pump and new flexible hose. Because the recharge rate was slower than the purge rate, the wells were repeatedly purged dry during this process. Each well was allowed to recharge before samples were collected. Turbidity (qualitative only), conductivity, pH, and temperature were monitored during purging. These data are included in Appendix B.

After purging, water samples were collected with a clean teflon bailer. The samples were transferred from the bailer to appropriate sample bottles with as little agitation as possible. Sample containers for volatile constituents were visually inspected after filling to ensure that there were no air bubbles.

The sample containers were labeled with the following information: well number, site location, date and time of collection, type of analysis requested, and initials of person(s) collecting the sample. The samples were then placed on ice and transported to a certified analytical laboratory (Brown and Caldwell Laboratories). The samples were analyzed for total fuel hydrocarbons (modified EPA method 8015), oil and grease (EPA method 413.2), and volatile organics (EPA method 624) within the allowable holding times.

A chain-of-custody form accompanied the samples to serve as a record of sample possession from the time of collection to the time of arrival at the analytical laboratory.

SOIL SAMPLING AND ANALYSIS

Soil samples were collected at 2- to 3- foot intervals during the drilling of the monitor well borings. Soil samples were similarly collected from nine soil borings (OB-1, OB-3, OB-4, OB-5, OB-6, OB-7, OB-8, OB-9, and OB-10) drilled in the vicinity of the former tank cluster location and three soil borings (OB-11, OB-12, and OB-13) drilled near the former diesel tank location. Figures 3 and 4 show the locations of these soil borings. Soil samples were collected from all borings with a 2.5-inch inside diameter split-spoon sampler containing three brass tube liners. The sampler was driven 18 inches beyond the tip of the augers by a 140-pound hammer dropping 30 inches (except for boring OB-13, which was augured and sampled by hand because of the presence of overhead electrical wires). The number of blows was counted for each 6-inch interval the sampler was advanced. sample tubes were then quickly extracted from the sampler. The ends of the samples in the two brass tubes closest to the shoe of the sampler were examined by a geologist and logged according to the Unified Soil Classification System prior to being labeled, capped, sealed with tape, and placed on ice. The soil collected in the brass tube farthest from the shoe was logged, placed in an airtight ziplock bag, and held for headspace analysis. To avoid cross contamination, the sampling equipment was cleaned with potable water and trisodium phosphate prior to collecting each sample.

After warming the ziplock bags containing soil samples from the borings, headspace vapors were analyzed with a Photovac TIP 1 air analyzer. The TIP 1 was periodically calibrated to measure all of the ionizable hydrocarbons as if they were benzene, using a standard gas. The results of these field analyses are noted on the drilling logs (Appendix A), and were used as an aid in the selection of soil samples for chemical analysis.

One to three soil samples were selected for chemical analysis from each boring according to the following criteria:

- (1) The sample collected closest to the water table.
- (2) The sample with the highest apparent hydrocarbon concentration.
- (3) The deepest sample with apparent presence of hydrocarbons.

In soil borings where headspace analysis indicated no hydrocarbon presence, samples were chosen by criteria (1). The water table was estimated in the field as the depth where the first saturated soil sample was recovered (typically 7 to 10 feet below ground surface).

Soil samples were submitted to a certified analytical laboratory (Groundwater Technology Environmental Laboratories) for high boiling point petroleum hydrocarbons (kerosene, mineral spirits, and diesel)(modified EPA method 8015), volatile organics (EPA method 8010/8020), and oil and grease (EPA method 413.2). Chain-of-custody forms accompanied all soil samples to the laboratory.

Each soil boring was backfilled to the ground surface with a cement/ bentonite slurry. The slurry was tremied into each boring with a flexible hose.

PHASE 1 RESULTS

HYDRAULIC GRADIENT ANALYSIS

Figures 6 and 7 are potentiometric surface maps showing relative groundwater elevation contour (solid) lines interpolated from water level measurements taken on March 29 and April 7, 1988, respectively. Extrapolated water elevations are depicted with dashed contour line. Assuming groundwater flow is approximately perpendicular to the water table contour lines in the direction of decreasing elevation, groundwater flow beneath the site was estimated to be to the south southwest with an average gradient of approximately 0.009 foot/foot (1 foot of drop in hydraulic head per 114 feet of horizontal distance in the assumed direction of flow). Tidal action did not appear to influence hydraulic gradient or flow direction.

This analysis indicates that monitor well OW-1 is located hydraulically downgradient of the former diesel tank location, and that monitor well OW-3 is located hydraulically downgradient of the former tank cluster location.

GROUNDWATER ANALYSES

Results of chemical analyses performed on groundwater samples collected on April 11, 1988, from monitor wells OW-1 (located downgradient of the former diesel tank location), OW-2 (located near the southern boundary of the site), and OW-3 (located downgradient of the former tank cluster location) are summarized in Table 4. A blind duplicate sample was also collected from well OW-3 for quality control purposes. Laboratory data sheets for groundwater analyses performed as part of this investigation are included in Appendix B.

Total Fuel Hydrocarbons

Total fuel hydrocarbons were not detected in groundwater samples collected on April 11 from monitor wells OW-1, OW-2, or OW-3. The method detection limit for fuel hydrocarbons in groundwater was 1 ppm.

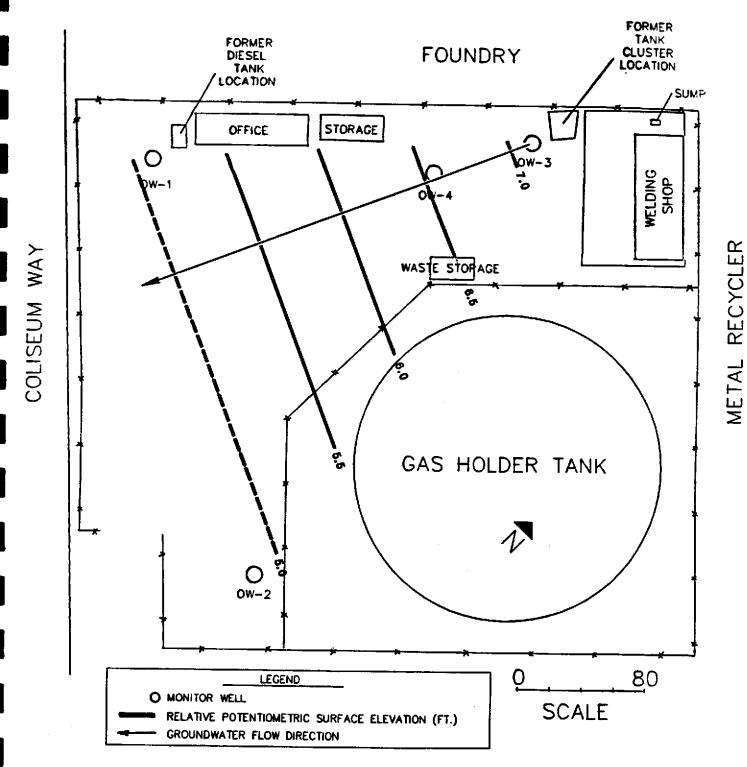


FIGURE 6. POTENTIOMETRIC CONTOUR MAP FOR MARCH 29, 1988.

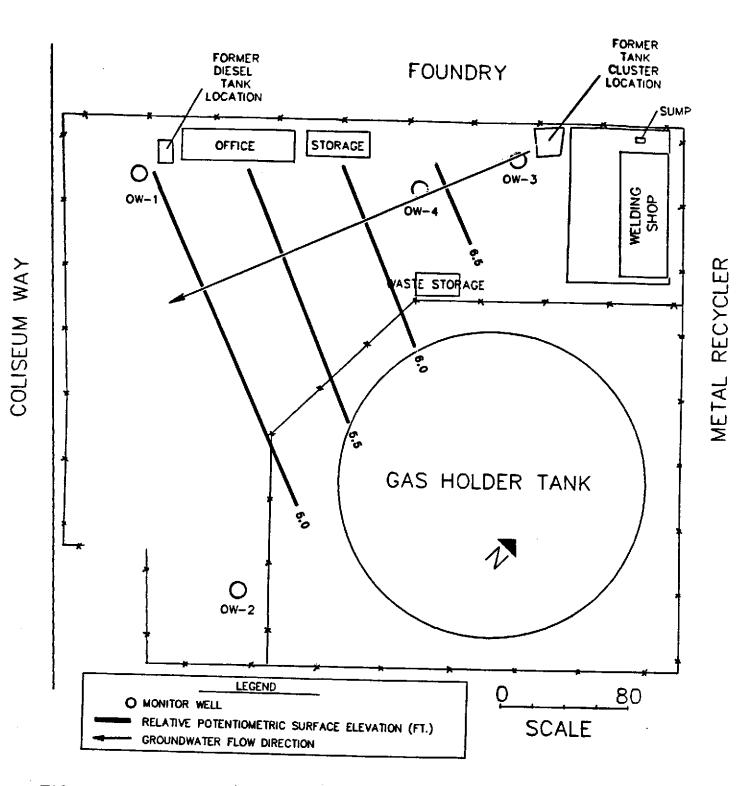


FIGURE 7. POTENTIOMETRIC CONTOUR MAP FOR APRIL 9, 1988.

Table 4. Laboratory Results of Groundwater Samples Collected Groundwater Sample Results.

Well	Date Sampled	Total fuel hydrocarbons (ppm)	Oil and Grease (ppm)	Vo]	624 latile organics (ppb)
OW-1	4-11-88	ND	ND	5 4	C ₆ H ₁₄ O (Ether) Dichlorobenzene
OW-2	4-11-88	ND	ND	ND	
OW-3	4-11-88	ND	ND		1,1-dichloroethane Chloroform C ₆ H ₁₄ O (Ether)
OW-3 (replicate)	4-11-88	ND	ND	1	1,1-dichloroethane Chloroform C ₆ H ₁₄ O (Ether)
OW-3	6-16-88	ND	ND	30 5 2 1	C ₆ H ₁₄ O (Ether) 1,1-dichloroethane trans 1,2-dichloroethylene chlorobenzene
OW-4	6-16-88	ND	ND	7	C ₆ H ₁₄ O (Ether)
EPA Method Method Detect	ion Limit (modified 8015 ppm) 1	413.2 5	62 Var	4 ious

ND - not detected at or above method detection limit.

Note: For those compounds with DHS drinking water action limits and/or safe levels set by Safe Drinking Water Act Amendments of 1986, concentrations encountered during this investigation are below these limits/levels.

Oil and Grease

Oil and grease were not detected in groundwater samples collected on April 11 from monitor wells OW-1, OW-2, and OW-3. The method detection limit for oil and grease in groundwater was 5 ppm.

Volatile Organic Compounds (VOCs)

Laboratory analysis for VOCs detected dichlorobenzene (4 ppb) and an unidentifiable ($C_6H_{14}O$) ether compound (5 ppb) in the groundwater sample collected on April 11 from monitor well OW-1; nothing in the groundwater sample collected on April 11 from monitor well OW-2; and 1,1-dichloroethane (4 ppb), chloroform (2 ppb), and the ($C_6H_{16}O$) ether compound (10 ppb) in the groundwater sample collected on April 11 from monitor well OW-3.

Detection limits varied for each VOC. Refer to the laboratory data sheets in Appendix A for specific VOC detection limits.

SOIL ANALYSES

Results of chemical analyses performed on selected soil samples collected from borings drilled near the former tank cluster location and the former diesel tank location are summarized in Tables 5 and 6, respectively. Laboratory data sheets for soil sample analyses performed as part of this investigation are included in Appendix B.

High Boiling Point Petroleum Hydrocarbons

Laboratory analysis of selected soil samples collected near the former tank cluster location during Phase 1 of this investigation detected high boiling point petroleum hydrocarbons at concentrations above 1000 ppm in soil boring 0B-9 (3900 ppm as diesel at a depth of five feet, 400 ppm as diesel at seven feet, nondetectable at 12.5 feet), above 100 ppm in the boring for monitor well 0W-3 (210 ppm as diesel at a depth of 4.5 feet, nondetectable at 6.5 feet), and below 100 ppm in soil borings 0B-1 (54 ppm as mineral spirits at a depth of 6.5 feet, nondetectable at 9 feet), 0B-3 (30 ppm as mineral spirits at a depth of 6.5 feet, nondetectable at 8.5 feet), and 0B-7 (59 ppm as mineral spirits at a depth of 8 feet, nondetectable at 9 feet). Laboratory

Table 5. Laboratory results of selected soil samples collected from borings located near former Tank Cluster location on March 16-17 and May 17-18, 1988.

	TIP		Analytical										
	Sample		Sample		TPH								
Soil	Depth	TIP	Depth	TPH	(mineral	TPH	Oil and	Volatile					Misc.
boring	(feet)	reading	(feet)	(diesel)	<u>spirits)</u>	(kerosene)	<u>Grease</u>	Organics	<u>Benzene</u>	Toluene	Ethylbenzene	Xylenes	C4 - C12
08-1	6-6.5	105	6.5-7	ND	54	ND	630	ND					
OB-1	8-8.5	115	9-9.5	ND	ND	ND	ND	ND					
OB-3	3.5-4	33	4-4.5	ND	ND	ND	27	ND					
08-3	5.5-6	99	6.5-7	ND	30	ND	250	ND					
08-3	7.5-8	128	8.5-9	ND	ND	ND	13	ND					
OB-4	7.5-8	2	8-8.5	MD	ND	ND	29	ND					
OB-5	7-7.5	2	7.5-8	ND	ND	ND	ND	ND					
08-6	9.5-10	3	10-10.5	ND	NĐ	ND	21	ND					
OB-7	7.5-8	10	8-8.5	MD	59	ND	34	ND					
08-8	8.5-9	2	9-9.5	ND	ND	ND	ND	33 (methylene chlo	ride)				
08-9	4-4.5	92	5-5.5	3900	ND	NĐ	52000	1.1 (ethylbenzene)	-				
08-9	6-6.5	22	7-7.5	400	ND	ND	1000	ND					
OB-9	12-12.5	15	12.5-13	MD	ND	ND	ND	ND					
OB-10	11-11.5	2	11.5-12	ND	ND	ND	ND	ND					
OB-14A	7-7.5	55	7.5-8	NO	MD	260	1200	••	ND	ND	NO	ND	80
OB-14A	10.5-11	0	11-11.5	ND	ND	ND	ND		ND	ND	ND	ND	ND
OB-15	6-6.5	40	6.5-7	ND	ND	340	4800	••	ND	ND	ND	1	130
OB-15	9.5-10	3	10-10.5	ND	ND	ND	5	••	ND	ND	ND	ND	ND
OB-16	6.5-7	5	7-7.5	ND	ND	MD	100	••	ND	ND	ND	ND	ND
OB-16	8.5-9	4	9-9.5	ND	ND	ND	ND	••	ND	ND	ND	ND	MD
OB-17	6-6.5	3	6.5-7	ND	ND	ND	9	••	NO	ND	ND:	NO	MD
08-17	8.5-9	3	9-9.5	NĐ	ND	ND	ND	••	ND	ND	MD	ND	MD
OB-18	6.5-7	3	7-7.5	ND	ND ·	ND	ND		ND	ND	ND	MD	ND
OB-18	8.5-9	3	9-9.5	ND	ND	ND	ND	••	ND	ND	ND	MD	ND
ON-3	4-4.5	16	4.5-5	210	ND	ND	220	ND					
OW-3	6-6.5	96	6.5-7	ND	ND	ND	1100	ND					
OW-3	7.5-8	292	8.5-9	ND	ND	ND	ND	ND					
OU-4	7-7.5	2	7.5-8	ND	ND	ND	ND	••	ND	ND	ND.	MD	ND
OW-4	10.5-11	3	11-11.5	ND	ND	ND	ND	••	ND	ND	ND	ND	ND
EPA Meth	nod			<	modified 8	015>	413.2	8010/8020	<	******	8015/8020		>
Method D	etection Li	mit (ppm)		10	10	10	5	various	0.5	0.5	0.5	0.5	1.0

TPH = total petroleum hydrocarbons.

Note: All results are in parts per million.

Table 6. Laboratory results of selected soil samples collected from borings located near former Diesel Tank location on March 16-17, 1988.

EPA Meth Method I	nod Detection Li	lmit (ppm)		< 1 1	modified 801	.5>	413.2 5	8010/8020 various
OW-1	10-10.5	3	10.5-11	ND	ND	ND	ND	ND
OB-13		-	8.5-9	ND	ND	ND	ND	ND
OB-13		•	4-4.5	ND	ND	ND	ND	ND
OB-12	10-10.5	2	10.5-11	ND	ND	ND	ND	ND
OB-11	10-10.5	1	10.5-11	ND	ND	ND	ND	ND
Soil boring	TIP Sample Depth (feet)	TIP reading	Analytical Sample Depth (feet)	TPH (diesel)	TPH (mineral spirits)	TPH (kerosene)	Oil and Grease	Volatile Organics

TPH - total petroleum hydrocarbons

ND - not detected at or above method detection limit.

Note: All results are in parts per millon.

analyses of soil samples collected from borings OB-4, OB-5, OB-6, OB-8, and OB-10 did not detect high boiling point petroleum hydrocarbons.

Laboratory analyses did not detect high boiling point petroleum hydrocarbons in any of the selected soil samples collected from borings drilled near the former diesel tank location (OB-11, OB-12, OB-13, and OW-1) during Phase 1 of this investigation.

The method detection limit for high boiling point petroleum hydrocarbons in soil was 10 ppm.

Oil and Grease

Laboratory analysis of selected soil samples collected near the former tank cluster location during Phase 1 of this investigation detected oil and grease at concentrations at or above 1000 ppm in soil boring OB-9 (52,000 ppm at a depth of 5 feet, 1000 ppm at 7 feet, and nondetectable at 12.5 feet) and the boring for well OW-3 (220 ppm at a depth of 4.5 feet, 1100 ppm at 6.5 feet, and nondetectable at 8.5 feet); above 100 ppm in soil borings OB-1 (630 ppm at a depth of 6.5 feet, nondetectable at 9 feet) and OB-3 (27 ppm at a depth of 4 feet, 250 ppm at 6.5 feet, and 13 ppm at 8.5 feet); and below 100 ppm in soil borings OB-4 (29 ppm at a depth of 8 feet), OB-5 (none detected), OB-6 (21 ppm at a depth of 10 feet), OB-7 (34 ppm at a depth of 8 feet), OB-8 (none detected), and OB-10 (none detected).

Laboratory analysis did not detect oil and grease in any of the selected soil samples collected from borings drilled near the former diesel tank location (OB-11, OB-12, OB-13, and OW-1) during Phase 1 of this investigation.

The method detection limit for oil and grease in soils was 5 ppm.

Volatile Organic Compounds (VOCs)

Laboratory analysis of selected soil samples collected near the former tank cluster location during Phase 1 of this investigation detected ethylbenzene

in one soil sample collected from boring OB-9 (1.1 ppm at a depth of 5 feet, nondetectable at 7 feet) and methylene chloride in one soil sample collected from boring OB-8 (33 ppm at a depth of 9 feet). Methylene chloride is a common laboratory solvent, and its detection in a single soil sample can most likely be attributed to laboratory contamination.

VOCs were not detected in any other soil samples collected from borings drilled near the former tank cluster and former diesel tank locations during Phase 1 of this investigation.

Detection limits varied for each VOC. Refer to the laboratory data sheets in Appendix B for specific detection limits.

PHASE 2 FIELD WORK

ADDITIONAL MONITOR WELL INSTALLATION, WELL DEVELOPMENT, AND HYDRAULIC GRADIENT DETERMINATION

To further investigate the water quality of the uppermost aquifer near the former tank cluster location, monitor well OW-4 was installed on May 18, 1988. Figure 2 shows the location of this well, positioned hydraulically downgradient of the former tank cluster location and monitor well OW-3. Well OW-4 was constructed similarly to wells OW-1 and OW-3. Alameda County Flood Control and Water Conservation District representatives were notified prior to well installation. The well was developed in the same manner as the previously installed monitor wells. Monitor well OW-3 was also redeveloped at this time, following the same development procedure.

Water level measurements were obtained on June 9 and July 21, 1988, to observe any fluctuations in groundwater flow direction and gradient.

GROUNDWATER SAMPLING AND ANALYSIS

On June 16, 1988, groundwater samples were collected for chemical analysis from wells OW-3 and OW-4. Prior to purging each well, the depth to water was measured and recorded. Approximately five to seven well volumes of water were then purged with a centrifugal pump and new flexible hose. Both wells were repeatedly purged dry during this process. Each well was allowed to recharge overnight before samples were collected with a clean teflon bailer. Sampling and analyses were performed according to procedures outlined in the Phase 1 investigation discussion.

SOIL SAMPLING AND ANALYSIS

To further define the distribution of petroleum hydrocarbons in the soil surrounding the former tank cluster location, five additional soil borings were drilled (OB-14A through OB-18). Figure 3 shows the locations of these soil borings. Drilling, sampling, and laboratory analyses were performed according to procedures outlined in the Phase 1 investigation discussion, with the exception of the volatile organics analyses. Soil samples selected

from borings drilled during Phase 2 of this investigation were analyzed for volatiles using EPA methods 8015/8020 (aromatic hydrocarbons including BTEX) instead of EPA methods 8010/8020.

PHASE 2 RESULTS

HYDRAULIC GRADIENT ANALYSIS

Figures 8 and 9 are potentiometric surface maps showing relative groundwater elevation contour lines interpolated from water level measurements taken on June 9 and July 21, 1988, respectively. Assuming groundwater flow is approximately perpendicular to the water table contour lines in the direction of decreasing elevation, the flow direction beneath the site was estimated to be south southwest, with an average gradient of approximately 0.009 foot/foot (1 foot of drop in hydraulic head per 110 feet of horizontal distance in the assumed direction of flow). Tidal action did not appear to influence hydraulic gradient or flow direction.

GROUNDWATER ANALYSES

Results of chemical analyses performed on groundwater samples collected from monitor wells OW-3 and OW-4 (located downgradient of the former tank cluster location) on June 16, 1988 are summarized in Table 3. Laboratory data sheets for groundwater analyses performed as part of this investigation are included in Appendix B.

Total fuel hydrocarbons

Total fuel hydrocarbons were not detected in groundwater samples collected on June 16 from monitor wells OW-3 or OW-4. The method detection limit for total fuel hydrocarbons in groundwater was 1 ppm.

Oil and grease

Oil and grease were not detected in groundwater samples collected on June 16 from monitor wells OW-3 and OW-4. The method detection limit for oil and grease in groundwater was 5 ppm.

VOCs

Laboratory analysis for VOCs detected chlorobenzene (1 ppb), 1,1-dichloroethane (5 ppb), trans 1,2-dichloroethylene (1 ppb), and the previously encountered $C_6H_{14}O$ ether compound (30 ppb) in the groundwater

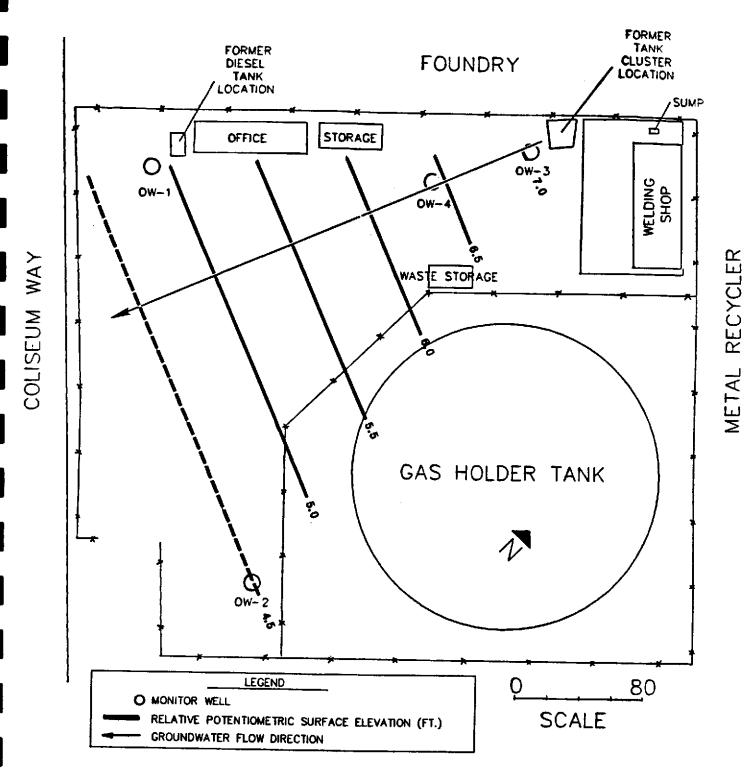


FIGURE 8. POTENTIOMETRIC CONTOUR MAP FOR JUNE 9, 1988.

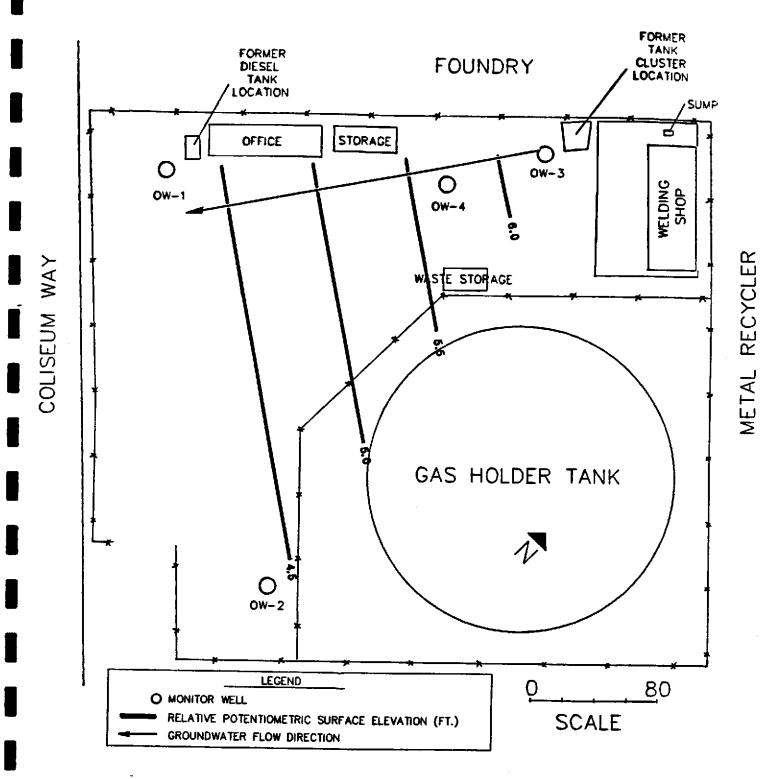


FIGURE 9. POTENTIOMETRIC CONTOUR MAP FOR JULY 21, 1988.

sample collected on June 16 from monitor well OW-3; and nothing in the groundwater sample collected on June 16 from monitor well OW-4. Detection limits varied for each VOC. Refer to the laboratory data sheets in Appendix B for specific detection limits.

SOIL ANALYSES

Results of chemical analyses performed on selected soil samples collected from soil borings OB-14A, OB-15, OB-16, OB-17, and OB-18 and the boring for monitor well OW-4 are summarized in Table 4. Laboratory data sheets for these analyses are included in Appendix B.

High Boiling Point Petroleum Hydrocarbons

Laboratory analysis of selected soil samples collected from borings drilled near the former tank cluster location during Phase 2 of this investigation detected high boiling point petroleum hydrocarbons at concentrations above 100 ppm in soil borings OB-14A (260 ppm as kerosene at a depth of 7.5 feet, nondetectable at 11 feet) and OB-15 (340 ppm at a depth of 6.5 feet, nondetectable at 10 feet); and below 100 ppm in soil borings OB-16 (nondetectable), OB-17 (nondetectable), and OB-18 (nondetectable).

Oil and Grease

Laboratory analysis of selected soil samples collected from borings drilled near the former tank cluster location during Phase 2 of this investigation detected oil and grease at concentrations above 1000 ppm in soil borings OB-14A (1200 ppm at a depth of 7.5 feet, nondetectable at 11 feet) and OB-15 (4800 ppm at a depth of 6.5 feet, 5 ppm at 10 feet); at or above 100 ppm in soil boring OB-16 (100 ppm at a depth of 7 feet, nondetectable at 9 feet); and below 100 ppm in soil borings OB-17 (9 ppm at a depth of 6.5 feet, nondetectable at 9 feet) and OB-18 (nondetectable), and the boring for monitor well OW-4 (nondetectable).

Aromatic Hydrocarbons (including BTEX)

Laboratory analysis of selected soil samples collected from borings drilled near the former tank cluster location during Phase 2 of this investigation detected miscellaneous C_4 to C_{12} hydrocarbons in soil borings OB-14A (80 ppm at a depth of 7.5 feet, nondetectable at 11 feet) and OB-15 (130 ppm at a depth of 6.5 feet, nondetectable at 10 feet); and xylenes in soil boring OB-15 (1 ppm at a depth of 6.5 feet, nondetectable at 10 feet). Aromatic hydrocarbons (including BTEX) were not detected in any other soil samples collected from borings drilled near the former tank cluster location during Phase 2 of this investigation.

Detection limits for aromatic hydrocarbons in soil were 0.5 ppm for individual constituents and 1 ppm for miscellaneous constituents.



ooths

SUMMARY OF RESULTS

- An analysis of water level data collected from three wells located onsite from March to July 1988 indicated that groundwater flow in the uppermost water-bearing zone beneath the site was consistently in a south southwesterly direction, the hydraulic gradient was consistently 0.009 foot per foot, monitor well OW-1 was hydraulically downgradient of the former diesel tank location, and wells OW-3 and OW-4 were hydraulically downgradient of the former tank cluster location.
- Total fuel hydrocarbons and oil and grease were not detected in groundwater samples collected from monitor well OW-1 (located hydraulically downgradient of the former diesel tank location), monitor well OW-2 (located near the southern boundary of the site), or monitor wells OW-3 and OW-4 (located hydraulically downgradient of the former tank cluster location). Below
- An unidentifiable C6H14O ether was detected in groundwater samples Dein't int collected from wells OW-1 (5 ppb), OW-3 (up to 30 ppb), and OW-4 (7 ppb). Other volatile organic compounds including dichlorobenzene (4 ppb) in well OW-1 and 1,1-dichloroethane (up to 5 ppb), trans 1,2-dichloroethylene (2 ppb), chloroform (2 ppb), and chlorobenzene (1 ppb) in well OW-3 were detected during this investigation. None of these concentrations exceed state or federal drinking water standards.
- Laboratory analyses of selected soil samples collected from borings drilled near the former diesel tank location did not detect high boiling point petroleum hydrocarbons, oil and grease, or VOCs in any of the 4. Laboratory analyses of selected soil samples collected from borings point petroleum hydrocarbons, oil and grease, or VOCs in any of the samples.
- Laboratory analyses of selected soil samples collected from borings drilled near the former tank cluster location detected high boiling point petroleum hydrocarbons (diesel, mineral spirits, and kerosene), oil and grease, and low levels of VOCs in some of the samples collected at depths of 5 to 8 feet. In a flew of the soil samples, concentrations of petroleum hydrocarbons and/or oil and grease were found to be above 1000 ppm.



- 1. Results of laboratory analyses of groundwater and soil samples collected from a monitor well and borings drilled near the former diesel tank location indicate that the diesel tank did not substantially leak to the surrounding soil or groundwater.
 - 2. Results of laboratory analyses of soil samples collected from borings drilled near the former tank cluster location indicate that the tank cluster leaked mineral spirits, oil and grease, and possibly diesel to the surrounding soil; and the sump located approximately 50 feet to the northeast of the tank cluster (and/or piping connecting the sump to the tank cluster) leaked kerosene, oil and grease, and possibly diesel to the surrounding soil. The affected soil appears to be restricted to a band located approximately 5 to 8 feet below ground surface.
 - 3. Although water level measurements in the monitor wells indicate the potentiometric water elevation of the uppermost water-bearing zone is 3 to 5 feet below the ground surface, soil borings were drilled 7 to 10 feet deep before saturated samples were obtained. This suggests that the uppermost water-bearing zone is confined below the soil material containing elevated levels of petroleum hydrocarbons near the former tank cluster location.
 - 4. Results of laboratory analyses of groundwater samples collected from monitor wells located hydraulically downgradient of the former tank cluster location indicate that the groundwater has not been substantially affected by the hydrocarbon leak.

DEPENDS ON UGT PAll SALPLY DEPTHS.

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APPENDIX A

Boring Logs

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F 6-		2.6	c iĕ i	CL	(Grades some fine g	ravel, very stiff)						
F -	i		28		(Grades hard) Encountered water 3/1							
- 8 		10.4	D 222		Greenish grey clayey gra	vel with silt (dense, wet,						
F -	Ì				•							
10			201	GC A								
F 1	1	3.9	E 18	4/4								
-1 2-					(Grades brown, some	sand)						
14	ł		_ sol_									
		2.8	F 65		(Grades to mediem d	ense)						
-16-		[[End of boring							
F 4	Ì				•							
-18-												
F -	!]]		- 4								
-20												
 	1		.	- +								
-2 2-				- 1								
				- 1								
				- 1								

Project PG&E/ Location Oak1a Date Drilled Surface Elevation Screen: Dia Casing: Dia Drilling Company	GROUNDWATER Geologist / Engineer TECHNOLOGY, INC. OIL RECOVERY SYSTEMS Soil Boring OB-8 Drilling Lease No. 4 Drilling Lease No										
Depth (Feet) Well Construction	T1P (mpm)	Sample Number	Graphic Log	Description/Soil Classification							
	5.5 0.6 2.3 2.0 3.2 1.7	48849644335588 422544 4235888		8 inches concrete over 4 in. base course Black silty clay with some gravel (hard, slightly moist, no product odor) Grey fine to coarse sand (very dense, slightly moist, no product odor) Black, green mottled, silty clay with some sand (very stiff, moist, no product odor) (Grades some gravel, hard) The Encountered water 3/17/88 (0920 hrs) Grey green clay with some gravel (hard, wet, no product odor) Brownish grey sandy gravel with clay and silt (very dense, wet, no product odor) End of boring Page 1 of 1							

GROUNDWATER TECHNOLOGY, INC. OIL RECOVERY SYSTEMS Soil Boring OB-9 Project PG&E/Oakland Owner Pacific Gas & Electric Co. Location Oakland Project Number 203-799-2727 Date Drilled Total Depth of Hole 14.5 ftDiameter 8 in Surface Elevation Water Level Initial 10 ft. 24-hrs Screen: Dia Length Shot Size Orilling Company Pacific Gas & Drilling Method Hollow stem suger Driller R. Hendren Log by D. Higgins									
Depth (Feet) Well Construction	TIP (ppm)	Sample Number	Graphic Log	Description/Sc	oil Classification				
- 0	92 21.7 3.5 5.4 3.9	「	CL SC	no product odor) (Grades no gravel Greenish grey clayey sa moist, moderate ta (Grades orange mote	h silt(very stiff, moist, , moderate tar odor) nd with silt (very dense, r odor) tled, no product odor) 7/88 (1015hrs) el with clay (very dense,				

	3 G	ROUND	<i>N</i> ATER		A 3							
	TECHNOLOGY, INC. Geologist / Engineer 16 Jam License No. 4394											
!!	OIL RECOVERY SYSTEMS Soil Boring OB-10 Drilling Log											
Project	Project PG&E/Oakland Owner Pacific Gas & Electric Co. Sketch Map											
	Location Oakland Project Number 203-799-2727											
	Date Drilled 3/17/88 Total Depth of Hole 15 ft : Diameter 8 in.											
	Surface Elevation Water Level, Initial 10_ft = 24-hrs											
	Screen: Dia Length Slot Size											
					Type Notes							
Orilling C	ompany E	acilic La lectric C	.o.	_ Drilling	Method notitow stell auger							
		uoien	11		D. Higgins							
Depth (Fael)	Well Construction	T1P (ppm)	Sample Number	Graphic Log	Description/Soil Classification							
	\$0			5								
 												
				roll Park	8 in. concrete over 4 in. base course							
					Black gravelly clay with silt(hard, moist, no							
2		4.6	A 40		product odor)							
				CLA								
L 4		3.7	B 4 C	1772	(Grades stiff)							
 -6- 			00		(Grades more gravel)							
- -	ſ	2.6	P 3		(Grades greenish-grey, some sand, hard)							
- 8 -			3	11/1	(Grades less gravel, more sand)							
F - 11	1	5.7	G 22		(oraces less graver, more sand)							
10	1		24		Encounter water 3/17/88 (1100hrs) Brownish-orange sandy gravel with silt(very dense)							
L. 1	! ;	1.7	H 30	rhiit	wet, no product odor)							
[-1 2-]		"	35 50	GM								
		1.8	19 J 21									
L 4		"-	K 23	•	End of boring							
-16-				L 4								
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-18-	l f			┝╶┩								
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02100144	,				Page1 of1_							

	ROUNDWATER ECHNOLOGY, I		Geologist / Enginee	r ABSam License No. 435
	RECOVERY SYSTEMS		Soil Boring OB-11	Drilling Log
Project PG&E/O	akland	_ Owner	Pacific Gas & Electric Co	Sketch Map
			Number 203-799-2727	
Date Drilled	3 <u>/1</u> 7 <u>/88</u> _ Total Depi	n ol Hoie	15 ft. Diameter 8 in.	
Surface Elevation	Water Leve	ıl, İnilial	9.5 ft. 24-hrs.	
Screen: Dia	Length		Slot Size	
			Type	
Drilling Company	Pacific Gas &	_ Drilling	Method Hollow stem suger	Notes
Oriller R. Hend	dren	_ Log by	D. Higgins	
Depth (Feet) Well Construction	TIP (ppm) Sample Number	Graphic Log	Description/Sc	oil Classification
	1.5 2.0 B 1.4 L.7 2.0 L.4 1.3 G 1.3 G 1.3 L.3 L.3 L.3 L.3 L.3 L.3 L.3 L.3 L.3 L		Dark grey clayey sand (r product odor) Black silty clay (very r no product odor) (Grades hard) Greenish-grey, orange m	ard, moist, no product odor) medium dense, moist, no stiff, slightly moist, mottled, gravelly clay with i, moist, no product odor) 3/17/88 (1330hrs) gravel with sand and

	1	-	•	
	GROUND	WATER	Geologist / Engineer	#88fam License No. 43
		LOGY, INC.		-
	OIL RECOVERY	;	Soil Boring OB-12	Drilling Log
			Pacific Gas & Electric Co.	Skeich Map
			Number 203-799-2727	
			15 ft. Diameter 8 in	
			9.5 ft. 24-hvs	
			Slot Size	
			Method Hollow stem suger	Notes
	Flanteta	Ca	D. Higgins	
		11 - 11 - 11	1	
Dapih (Feei) Weii	g getig	Sample Number Graphic Log	Description/So	il Classification
Septh 18	TIP (ppm)	Sample Number raphic Lo		
	<u> </u>	- - -	`	
 - - 				
F 0 -		1088	Base course, <u>+</u> 12 inche	s
		Was Ho		ium dense, slightly moist,
- 2 -	2.0	A IZ BOOK	no product odor) Dark grey silty fine-to	-coarse sand (medium dense,
			moist, no product (odor) stiff, moist, no product
	0.8	B ii CL	odor)	
L 6-1		\$ <i> </i>	Dark grey, orange mottle	ed, gravelly clay with
	1.0	C II	sand and silt (hard	i, moist, no product odor)
- 8 -	1.2	D 4	(Grades orangish-b	rown)
 - 	"."	430		
-10-		_ 40	Encountered water 3/17 Orangish-brown clayey gr	7/88 (1430hrs) ravel with sand and silt
F -	1.5	E 18 F 32	(very dense, wet, r	no product odor)
-1 2-	0.8	31[] GC		
F 1		. <u>5</u> [
-1 4-	2.7	18	(Grades dense)	
		104/2022	End of boring	
16-]		
18-				.]
-20-				
F 4				
-2 2-				
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-24-		│		
02100144		<u> </u>		Page _ 1 _ of _ 1
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FIELD SOIL BORING LO		Job No.	-	,	_	ı	Borin	No.	Sheet
PGANSE DAKLAND GO	YARD	7 E S	36	47			OB-) 1
levation Type & Diemeter of Boring	STEM AUGERS	Location Colis	eu	n U	العال	, 0	Ta k	land	
d Hole Elevation Depth	Groundwater Depth	Dete		Date:	Starto	1			Finished 5/17 /88
Priller ,	NOT ENCOUNTERED		88	Backs	- 5-0-1				
PON HENDREN	DARRELL KLING	MAN		7	6-a	nd E		loeve	8-80
			Fa	١٥	TYPE	VERY IES)	3.0	LEVE	ON GROUNDWATER LS, WATER RETURN ,
	RIPTION		B.F.	88	SAMPLI	RECOVE	BLOWS/	METH	ACTER OF DRILLING, IOD OF ADVANCING NG, SIZE OF CASING
SURFACE: CONCRETE			10	-	3				eadings taken with
SILTY SAND with gravel-o	lark brown, moist, de	inse	d :	SM	,,,			Photo	me TIP 1
]		ス" 55 1-1	8/q"	4) 59/3° / B 36/3	-0 pp~	- 03.5. - 03.5. - 04.41T A BURIED F
SILTY GRAVEL with sand- tense, contains tar (tar way are angular and upto 1" ac	Sour PLOWY WOITE	recovered	1	6M		74.	36/1		
are angular and upon 1 ac	1022 (100-001)		15	•		i			u Terminiated () a Itered A Buried
<u></u>	•		‡ :	1				PIPE	P+1
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FIELD SOIL BORING LOG

		BORING LO	· * * * * * * * * * * * * * * * * * * *	Job No.				-	Borin	. No	Sheet		
oct	and E OAKLA	IND GC YA	ed .	TES	3	647	ſ			14A	/	i	1
	Elevation Type & D	lismeter of Boring		Location					2 L	1			· '
B -	8 "	Depth	OW-STEM HUVER	Dete Dete	seu		Starte		<i>) </i>	land	Finished		
		22'	~/0'	5/17	/88		//	' /	88		5/	<u> </u>	88
	n Hendren		Darrell Klin	ser				tractor J∈		RILE -	Finished 5 / 17 / 88 R-80 TES ON GROUNDWATER EVELS, WATER RETURN, ARACTER OF DRILLING, ETHOD OF ADVANCING DRING, SIZE OF CASING Treadings taken with otovac TIP 1		
h		_		1	T	1	Lui			-			ATER
		DES	CRIPTION		DEPTH	SOIL	PLE TY	RECOVERY (INCHES)	BLOWS/ 6 h		LS, WATE	ER RET F DRIL	URN, LING,
	SURFACE:	CONCRETE	£ (4")		10		30	=	ž				
Ì	SILTY SAND medium dense	with gravel	- dark brown, mo	st to wet,	1	sm				Ppm 1 Photo	vac 0	7 + 1 1 1 1 1 1 1 1 1 1 1	en with
J			1-dork brown wet		1	_ [ļ						
	Contains wood (moderate pil	fracidents	, sand is fine - to a	ocrse-grained	- - 5-	mı		4/24	5 7 7 23				
	CLAY with si	it, sand, and	gravel - medium	luich-areen	4	1,/	2" 55	l	23 3				
ł	04067 A		gravel - medium	-	=]c∟	1-1	13/ 24	24 40	-30 pp	n@7:		
İ	dense to very de	nse (free o	sand-medium gre oil in pockets)		1	GM	2 " 3 S	1/	75 70	- 22 bb	m e 8.	5 ′	
	SICTY GRAVEL O	t - medium c	sand-medium green tense (some free oil	(4) 944 (4) (4)	- 1/0-	۶W.	13:7	24	42				
ł]	3	3-3 3-2	29 24	28 30 24	- *	@U5	,	
1	green, satura	ted (along t	d-medium brown factures), dense, in ed (slight dieseli	and is	4 :	GM	2.5 4-3 4-2	29	27	- 17"	Q 11.5		
ł	_	•		1]		4-2	22	50/4"	- 1.8	bw ©	13.5	•
ľ	dense, sand is	medium +	o course-grained (no hydrocerten	-1/5-	- 3/				6. Luca	ad ka		
ŀ	CLAY with silt.	- light brown,	saturated, stiff, with rown with come you	tome pores	3	د ا	2" SS	29	54	B-1-01-61	Se verw	₩ -€ 3"}	
ľ	saturated, stiff	sand is fine	- Grained, contains 'so or Manganese ?) (no	me black "	1	SM CL CL	5-2	24	15	- ۱٬۱ ۱ ۴	m @ 17	.5'	
Ì	•		light bown, saturat		 _;	₹/			1		-0 L.		
I	(no odor)		1301 31000, 24 14161	3777	120-	إدر	25 6-2 6-1	23/ 24	4 9 /3	1.6pp	mæz	mmer .oʻ.)
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	FIELD SOIL BORING LOC		. •										
et 1	Di E Cara Lo	Vaca	Job No.	2/	47				ing No. Sheet				-
	PGandE OAKLAND GC	/AKO	TES Lecation							1		<u> </u>	_
ſ	8" O.D. House	-STEM AUGERS	Colis	eur	n U	Vay	1, 6	Oakland					
em	of Hale Elevation Depth	Groundwater Depth	Dete 5/17/		Date:	Starte				Finished 5		180	
-	Deliter	Name of Inspector Logger		-	Borto	e Cont	tractor						-
	RON HENDREN	DARREL KLING	MAN			>6-a	nd E	. //	10814	8-8	O		
	Dece	RIPTION		Fa	20 20 20 20 20 20 20 20 20 20 20 20 20 2	TYPE ABER	VERY	3.	LEVE	S ON GRO	ER RE	TURN,	
				8=	38	SAMPL B NUR	RECOVE	BLOWS/	METI	ACTER O 10D OF A ING, SIZE	DVAN	ICING	
	SURFACE: CONCRETE			0	╀	3-	-	-		radinas			•
٠	SILTY SAND with grave moist to wet, medium/dense	1 - dark grayish-br	οω ν ,	$\exists :$	1					vac Ti		n With	•
	ogot) B met) Wallaw Sens	to beate ising har injury	recorbon(1)	1 :	sm	2" 22	16/	28 50	-0.0	ppmæ:	2′		
] :	ISM	1-1	/17 5/5	57.7 50.5°	- 2 L	pm @ 4	,		
				5-	1				م	የጥ @ ዓ			
	CLAY with silt- medium b green mottling, moist, has	luish-green with a	live]	<u> </u>	55 2-1	13/ 24	7	40 PF	me6	•		
ļ	green mottling, moist, her	of (No hydrocerbon	040()	: :	CL	2" 55	13/	24 /5	⊢- *				
	CLAY with silt, sand, and a	aravel - modium blu	ish-green] :	 -	3-1	24	50 40	- 42 8	pm @	8′		
	CLAY with silt, sand and a with olive green mottling, if free oil in pockets)	moist to wet (?), ha	, rd ,	10-	CL	2." SS	اريخا	76 28	<u>≥</u> *				•
	Saturated @ 10'			‡ :		4-2	24	3	3.10	pm@1	0.5	•	
	SILTY SAND - light brow to dense, sand is medium-	n, saturated medi	undense] :	1 /				- ,				
	to dense, sand is medium-	to coarse-grained	(ne odor)] =					(e., k=	eged ho		د/	
			[:	V5-	MZ	ر 23″	20/	/8 32	- 2,7	pm @	15		
	LEAN CLAY- light brown, say	huraled, very stiff (no	(role	1	CL	5-2	24	20					
		,		3 3						16 TER			
		<u> </u>] =						o WA	TER	Enco	NTER
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FIELD SOIL BORING LOG	•	. • •						
PGANSE DAKLAND GC	YARD	JOO NO. TES	36.	47			OB-	· I . OT .
Elevation Type & Diameter of Boring 8 " O.D. Hollow		Colis	eun	n U	Uzy	, 6	Sa k	land
of Hole Elevation Depth	Groundwater Depth ~ 91/21	Dete 5/17/		Date !	Starton	1		Finished
PON HENDREN	DARRELL KLING	MAN		Borto.	Ga Ga	rector nd E	- 17	Noeve 8-80
DESCR SURFACE: CONCRETE (LIPTION		OEPTH (PT.)	SOIL	SAMPLE TYPE & NUMBER	RECOVERY (INCHES)	BLOWS/	NOTES ON GROUNDWATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, METHOD OF ADVANCING BORING, SIZE OF CASING
CLAYEY GRAVEL with sa greenish-gray, moist, dense (no start) SAND with gravel-dense (no odor) POORLY GRADED GRAVEL with said (no odor) CLAY with silt-dork gray stiff (no odor) CLAYEY GRAVEL with said (no odor) CLAYEY GRAVEL with said olive green mottling, moist, said said of a gravel-dense, sand is median-to compared dense, sand with said with interseds of sand with said with interseds of sand with said with interseds of sand with said with interseds of sand with said with interseds of sand with said	nd-medium gray as odork gray as odork grayish-brown with silt-dark gray wish-brown, moist to dense (no odors) medium brown, satur coarse-grained (no odors)	wet,	10	3 8 9 9 9 8	752-1 752 752 7554	44 4/5 29/24 1/24 1/24 1/23	50/5 50/5 121 120 172 254 150 150 150 150 150 150 150 150	Pfm readings taken with Photovac TIP 1 -4.4 fpm @ 2'. -5.0 fpm @ 6.5'. -4.6 fpm @ 6.5'.
			20					BACKFILLED WITH CEMENT/BENTONIE GROUT ** sample submitted for

				Job No.				- 1	Borin	No.	Sheet		
PGand	E O	AKLAND G	C YARD	TES	36.	47			1 B-	·		<u> </u>	1
Elevation	Type & C	Mineter of Boring	W-STEM AUGERS	Colis	eur	n U	بيول	, 6	Da k	land			-
of Hole Ele		Depth	Groundwater Depth	Date		Date Started Finished							/
		17	~ 9	5/17/	88	Borto	na Contractor						788
Pon A	ENDIZE	EN .	DARREL KLING	MAN		7	60	ndE	- //	noeve	Z -8	₹0	
Sue	FACE		CRIPTION (9")		DEPTH (FT.)	SOIL	SAMPLE TYPE & NUMBER	RECOVERY (INCHES)	BLOWS/	CHAR. METH	S ON GR LS, WAT ACTER (NOD OF NG, SIZ	ER RE	TURN, LLING, ICING
SILTY MOIST, SILTY (100 00 CLAYE MOIST + Satura POORLY Jense TOORLY LEAN C	GRAVE SAND SON HOSIH OF THE GRAP THE GR	JEL with grave JEL with ending dense, sand is ng' ED GRAVEL JON ED SAND w ED SAND w Hed, dense ith minor s	a dark brownish a Kross (no edor) I - dark brown, moist, I - dark brown, moist, Nish - gray, moist, very and - medium greenish free - to medium-gro - medium gray, satura - yellowish - brown, satura ith silt - medium yel (no ador) and - light brown, satura organich! debris (no	Jense stiff yellow, med (no odo) ted, substanted, substanted, substanted	5	GM SM CL GC GP GM / SP-	2"55-2-1"55-2 2"55-2 2"55-2 2"55-2	24/ 24/ 15/17/ 24 15/24	3 6 9 29 29 29 20 22 20 40 34 34 36	-3.31 -3.60 -3.10 -3.10 BACK	popular of the service of the servic	17' 10' 12' MINHE E	in with
TES:										* sa	ngk s chem	submi	Hed for inalysis

FIELD SOIL BORING LOG Boring No. ADD No. PGAME DAKLAND GC YARD TES 3647 OB-18 Type & Dismeter of Boring Coliseum Way, Oakland 8" O.D. HOLLOW-STEM AUGERS Finished Groundwater Depth Date Started Depth of Hole Elevation 17' 5/18/88 5/18/88 5/18 /88 ~ 91/21 Boring Contractor Name of toppestor Logger of Oriller PrandE Mobile 8-80 RON HENDREN DARRELL KLINGMAN SOIL SOIL SAMPLE TYPE & NUMBER RECOVERY (INCHES) NOTES ON GROUNDWATER LEVELS, WATER RETURN. BLOWS/ CHARACTER OF DRILLING. DESCRIPTION METHOD OF ADVANCING BORING, SIZE OF CASING SURFACE: GRAVEL WELL GRADED GRAVEL-medium brown, dry to mout, dense Pfm readings taken with Photovac TIP 1 SANDY SILT with clay-dark brownish-gray, moist,
stiff (slight oily?) odor)
LEAN CLAY with silt- light greenish-gray, moist, stiff ML 13/ 24 SS EAN CLAY with silt - dark brownish- gray, moist to wet -2.2 ppm @4' stiff, with some organic debris (no odon) LEAN CLAY with sitt- medium greenish-gray, 2" SS -2.5 ppm @ 5' stiff (no odor) 2-2 z.z pp~@ 6' with some gravel 166! 2" SS 3-2 20 CLAYEY GRAVEL with sand-medium green moist dense recovered gravels to 2" across (no boor) SILTY SAND-medium greenish-gray, moist to u -2.5pm@9' 60 2″ کچ 拉 - 2.8ppm 又 @ 10' SM 24 dense (no odor) 4-1 2" 55 SILTY SAND - medium yellowish-brown saturated 24 23 SM lense, with some gravels ('10' and 12' (no odor) -3.0ppm@12' LEAN CLAY- light brown, saturated, hard (no odor) (submersed hammer) CL 2" 24 14 18 24 23 29 CLAYEY SAIND-light brown, saturated dense send 6.3 -3.2 ppm @ 17' is medium to coarse-grained (no odor) BORING TERMINATED @ 17' GROUND WATER ENCOUNTERED @~91/2' BACKFILLED WITH CEMENT/BENTON TE GROUT * songk submitted for

lab chemical analysis

	OUNDWATER	=	Coolerdon / Turk	Aoc)
I E	CHNOLOGY, ECOVERY SYSTEMS		_	neer 1882m License No. 43
Project PG&E/Oa	kland	•	Soil Boring OW-1 Pacific Gas & Flectric Co	Drilling Log
Location Oakland		_ Qwner	Number _203-799-2727	Sharith map
Date Onlied 3/1	7/88 Total Dept	h of Hole	15 ft : Diameter 8 in	
			9.5 ft. 24-Ma	
			FEET Stot Size	
			FEET Type PYC	
Drilling Company Pac Ele	ific Gas &	_ Drilling	Method Hollow stem auger	Notes
Oriller R. Hendi	en	. Log by	D. Higgins	
Depth (Feet) Well Construction	Sampte Number	Graphic Log	Description/So	if Classification
- 6 - - 10 - 12 - 12 - 1 2 - 1	22 2.5 3.1 3.0 2.8 3.3 G		Base course, ± 12 inches Brownish-orange sandy g dense, moist, no pr (Grades to dark grey Dark grey sandy gravel w dense, moist, no pr Encountered water 3/12 (Grades orangish-brownish) (Grades dense) End of boring, installed	ravel with silt (very oduct odor) yith clay and silt (very oduct odor) 7/88 (1515hrs) own, wet)

Page __1__ of __1__

FIELD SOIL BORING LOG

Project		·	····	-												
S	Oak!		GC Y		· 	<u> </u>	Job No.	<u>55</u>	3	64.		OW-2 1 1				
		8"	0.D. H	Porce	W-STE	M AUGER		OL	156		n 1	WA:	(, O	9 6 6	AND	
Bottom	of Male Ele	vation	Depth /	, G	Proundwater E	ew grade	Date			Starte	1,	18		Finished		
	ON H	ENDE	2E N	~		JoH			Borin	Cont	ractor	/ 			B-80	
ELEVATION				DESCRIP	***************************************			DEPTH (FT.)	Ι.	TYPE	RECOVERY (INCHES)	BLOWS/ 8 in	NOTES LEVEI CHARA METH	ON GRO	DUNDWATER ER RETURN F DRILLING DVANCING OF CASING	, ,
	L066	ED.	NO 5.0,	IL SI	HAPLES	AT &	TED.	5 6 5		SA.			Z"Dia 1 Sigtled Filter Line St No. 2/ Water traffic at gr	Prete sea Process of the sea Pro		The state of the s
						·		1								

Surface Elevation	Lengi	ol Depth (er Level, gth	Project : of Hole Initial	Pacific Gas & Electric Number 203 799 2727 14.5 ft Diameter 8 in 9 ft 24-hra EET Slot Size 010 FEET Type PVC Method Hollow Stem Auger. D. Higgins	Sketch Map
Depth (Feet) Well Construction T 1 P	(mdd)	Sample	Graphic Log	Description/So	il Classification
- 0 - 2 - 2 - 1 2	22 E 20 H	5691780 1780 2340 97		Encountered water 3/16 Brown sandy, fine to coa	e sand (medium dense, e oil odor) Wery moist, moderate y gravel (very dense, oil odor)(sheen on samples) /88 (0930 hrs.) rse gravel with silt and et, no product odor)

FIELD SOIL BORING LA	/U	!									
De of Davis of	C Vaca	Job No.	2/4	47			Sorini (2)//	1-4	Sheet	91	
PGandE DAKLAND G		TES							<u></u>		
	W-STEM AUGERS	Colis	eun	, 4	Uzy	, 6	Da k	land			
of Hole Elevation Depth	Groundwater Depth	Date	\neg	Dete 1	Started	1	18		Finished		
20'9".	Name of Inspector Logge	5/18/1		the ries	- Cast	****			<u> </u>	18/	
RON HENDIZEN	DARRELL KLIN	IGMAN		7	6a	nd E	- //	noeve	Z-8	٥	
DE	CRIPTION		DEPTH (FT.)	SYMBOL	SAMPLE TYPE & NUMBER	RECOVERY (INCHES)	BLOWS/ 0 hr	CHAR. METH	ON GRI LS, WAT ACTER O IOD OF A NG, SIZE	ER RET	URN, LING, ING
WELL GRADED GRAVEL+	(40 plot)	;		GW				PPM F	radings	take.	with
CLAT with silt, sand, c with brown mothing, moi seturated @ 21, secteasin moist @ 41, saturated @	ravel and debtis - 34, stiff FILL (no or 5 gravel content &	derk grav	5-	دد	2" 5532 2" 5532	19/ 24	M 40 3 3 1	-2.6 pp € 4′	$_{\omega}/_{B_{\Sigma}}$	CEMENT SENTONIT STROUT STROUTE 2" DIA.	بر الا عدم الدور
CLAYEY GRAVEL with so moist, dense (no odor)	5 4			<u>پر</u>	2-2 2" 35 3-1 2"	24	20 33 7 24 9/5°	一2.9pp 一2.3pp 一类	m@6 \5 ~ @ 7.5	OL13 (1	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
SILTY GRAVEL with sand to saturated (@9") dense SILTY SAND-medium yell sand is medium-gramed POORLY GRADED GRA	(no odor) owish-brown, satura (no odor) UEL with silt-medi	ted, dense,	10-	GM SM	14-2	24 16/ 24	330	-1.5pp~ -2.9pp	^@ /1' SAN	PACK	
CLAYEY SAND-light by medium - to coarse-gra	own Saturated, dense med (no odor)	sand is	/5	\$ 55 \ull	2" 55 6-1	10/21	B 7 11 22	9 و 2.7	13"D	TAR 2/1 A BORE	
Very stiff (no odor)	was saturated, 57:14	dt dt	20	CL	2" 55 7-2 7-1		- - - - - - - - - - - - - - - - - - -	-3.5pp. @18.	ScH. 4	A. PVC O SCRE T WIBE	scors
			25					Monu	FTERIORING G		
								* 501	ngk 5	chmitt al an	ed for alusis

APPENDIX B

Sampling data and laboratory data sheets

A division of Groundwater Technology, Inc.

Western Region 4080-C Pike Lane, Concord, CA 94520 (415) 685-7852 (800) 544-3422 from inside California (800) 423-7143 from outside California

03/30/88 mh

Page 1 of 6

PROJECT MGR: Dave Higgins

Groundwater Technology, Inc.

4080-D Pike Lane Concord, CA 94520

PROJECT #:203-799-2727-3

LOCATION: Oakland, CA

SAMPLED: \$3/16,17/88 BY: D. Higgins RECEIVED: \$3/18/88 BY: J. Floro ANALYZED: \$3/24,28/88 BY: T. Alusi MATRIX: Soil E. Lapurga

R. Bly

UNITS:

ppm (mg/kg)

TEST RESULTS

Contract #: Z19-5-115-85

| | | LAB # | 18844C | 18845C | 18846C | 18847C | PARAMETER | MDL | I.D.# | SB-1C | SB-1F | SB-2C | SB-2E |

Total Dil and Grease (TDG)

3

630 (3 220

1100

MDL = Method Detection Limit. METHOD: TOG = EPA 413.2



Western Region
4080-C Pike Lane, Concert

4080-C Pike Lane, Concord, CA 94520 (415) 685-7852 (800) 544-3422 from Inside California (800) 423-7143 from outside California Page 2 of 6

PROJECT MSR: Dave Higgins PROJECT #:203-799-2727-3 LDCATION: Oakland, CA

MATRIX: Soil

UNITS: ppm (mg/kg)
Contract #: 219-5-115-85

TEST RESULTS

													_
PARAMETER	1	MDL	1	LAB #	•					188500			
	•	1156	*	1.0.4	•	00-20	ľ	05-3L	ľ	25-7L	1	5B-3H	ŧ

Total Cil and Grease (TOS)

3

(3

27

250

13

MDL = Method Detection Limit. METHOD: TOG = EPA 413.2



Western Region

4080-C Pike Lane, Concord, CA 94520

(415) 685-7852

(800) 544-3422 from inside California

(800) 423-7143 from outside California

Page 3 of 6

PROJECT MGR: Dave Higgins

PROJECT #:203-799-2727-3

LOCATION: Dakland, CA

MATRIX: Soil

UNITS: ppm (mg/kg)

Contract #: 719-5-115-85

TEST RESULTS

! | LAB # | 18852C | 18853C | 18854C | 18855C | PARAMETER | MDL | I.D.# | 68-46 | 88-5D | 88-7D | 88-68-A|

Total Dil and Grease (TDG)

3

29

{3

34

21

MDL = Method Detection Limit. METHOD: TOG = EPA 413.2



Western Region 4080-C Pike Lane, Concord, CA 94520 (415) 685-7852 (800) 544-3422 from inside California (800) 423-7143 from outside California Page 4 of 6

PROJECT MGR: Dave Higgins PROJECT #:203-799-2727-3 LOCATION: Dakland, CA

MATRIX: Soil

UNITS: ppm (mg/kg)

Contract #: 719-5-115-85

TEST RESULTS

Total Dil and Grease (TDG)

3

(3

52000

1000

(3

MDL = Method Detection Limit. METHOD: TOG = EPR 413.2



Western Region 4080-C Pike Lane, Concord, CA 94520 (415) 685-7852 (800) 544-3422 from inside California (800) 423-7143 from outside California Page 5 of 6

PROJECT MGR: Dave Higgins
PROJECT #:203-799-2727-3
LOCATION: Dakland, CA
MATRIX: Soil
UNITS: ppm (mg/kg)
Contract #: Z19-5-115-85

TEST REBULTS

	1		1	LAB #	1	18860C	18861C 1	18862C	18863C		
PARAMETER	ı	MDL	1	I.D.#	ĺ	SB-10H I	SB-11E I	5B-12E	SB-13E I		

Total Dil and Grease 3 (3 (3 (3 (3 (3 (706)

MDL = Method Detection Limit. METHOD: TOG = EPA 413.2



Western Region 4080-C Pike Lane, Concord, CA 94520 (415) 685-7852 (800) 544-3422 from inside California (800) 423-7143 from outside California

Page 6 of 6

PROJECT, MGR: Dave Higgins PROJECT #:203-799-2727-3 LOCATION: Oakland, CA

MATRIX: Soil

UNITS: ppm (mg/kg)

Contract #: Z19-5-115-85

TEST RESULTS

LAB . 18944B 1 18945B | PARAMETER I.D. # | SB-14A | 8B-14B I

Total Dil and Grease (TDG)

3

(3 (3

MDL = Method Detection Limit. METHOD: TOG = EPA 413.2



Western Region

4080-C Pike Lane, Concord, CA 94520

(415) 685-7852

(800) 544-3422 from inside California

(800) 423-7143 from outside California

83/29/88 mh

Page 1 of 5

PROJECT MGR: Dave Higgins

Groundwater Technology, Inc.

4080-D Pike Lane

Concord, CA 94520

PROJECT #:203-799-2727-1

LOCATION: 4930 Coliseum Way

Dakland, CA

SAMPLED: 03/16, 17, 21/88 BY: D. Higgins

RECEIVED: 03/18/88

BY: J. Floro

ANALYZED: 03/28/88

BY: P. Sra

MATRIX: Soil

UNITS: mg/kg (ppm)

Contract #: Z19-5-115-85

TEST RESULTS

COMPOUNDS	1	MDL	ILAB # II.D.#	 	18844A 6B-1C	l l	18645A 88-1F	1	18846A ! 5B-2C	18647A SB-2E	1	18648A 58-26	_
											÷		
Total Petroleum Hydrocarbons as Diesel		10			(16		(18		<18	(10		(10	
Total Petroleum Hydrocarbons as												110	
Mineral Spirits		10			54		(10		(10	9 8		(10	

MDL = Method Detection Limit; compound below this level would not be detected. Results rounded to two significant figures.

METHODS: Modified EPA 8015.

METHOD:

Modified EPA Method 5030/8020/8015



Page 2 of 5

Western Region 4080-C Pike Lane, Concord, CA 94520 (415) 685-7852

(800) 544-3422 from Inside California (800) 423-7143 from outside California PROJECT MGR: Dave Higgins
PROJECT #:203-799-2727-1
*LOCATION: 4930 Coliseum Way
Dakland, CA

MATRIX: Soil

UNITS: mg/kg (ppm)
Contract #: 219-5-115-85

TEST RESULTS

COMPOUNDS	1	MDL	ILAB # II.D.#	1	18849A SB-3C	1	18850A SB-3F	1	18851A SB-3H	! !	18852A SB-4G		18853A 60-5D
Total Petroleum													
Hydrocarbons as Diesel		10			210		(10		(10		(10		(10
Total Petroleum Hydrocarbons as Mineral Spirits		10			{10		30		(18		(10		(10

MDL \simeq Method Detection Limit; compound below this level would not be detected. Results rounded to two significant figures. METHODS: Modified EPA 8015.



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Western Region

4080-C Pike Lane, Concord, CA 94520

(415) 685-7852

(800) 544-3422 from inside California

(800) 423-7143 from outside California

PROJECT MGR: Dave Higgins PROJECT #:203-799-2727-1 LOCATION: 4930 Coliseum Way

Dakland, CR

MATRIX: Soil

UNITS: mg/kg (ppm)

TEST RESULTS Contract #: Z19-5-115-85

COMPOUNDS	1	MDL	ILAB # II.D.#	f į	18854A SB-7D	1	18855A SB-6B-A	18856A 68-8D	1	18857A 5B-9B	i I	18858A SB-9D
Total Petroleum Hydrocarbons as Diesel		10			(10		<10	(10		3900		400
Total Petroleum Hydrocarbons as Mineral Spirits		10			59		(10	(10		(10		(10

MDL = Method Detection Limit; compound below this level would not be detected. Results rounded to two significant figures. METHODS: Modified EPA 8015.



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Western Region

4080-C Pike Lane, Concord, CA 94520

(415) 685-7852

(800) 544-3422 from inside California

(800) 423-7143 from outside California

PROJECT MGR: Dave Higgins PROJECT #:203-799-2727-1 LOCATION: 4930 Coliseum Way

Dakland, CA

MATRIX: Soil

UNITS: mg/kg (ppm)

Contract #: Z19-5-115-85

COMPOUNDS	1	MDL	ILAB #	1	18859A 5B-9G	1	18850A SB-10H	18861A SB-11E	18862A 58-12E	18863A SB-13E
* # T O D D D D D D D D D D D D D D D D D D		+ +			*************************************			· * 		
Total Petroleum Hydrocarbons as Diesel		10			(10		<10	(18	(10	(10
Total Petroleum Hydrocarbons as Mineral Spirits		10			(10		(10	(10	(10	(10

TEST RESULTS

MDL = Method Detection Limit; compound below this level would not be detected. Results rounded to two significant figures. METHODS: Modified EPA 8015.



A DIVISION OF GENERALDE SECURDIC

Western Region 4080-C Pike Lane, Concord, CA 94520 (415) 685-7852 (800) 544-3422 from inside California (800) 423-7143 from outside California Page 5 of 5

PROJECT MGR: Dave Higgins PROJECT 4:203-799-2727-1 LUCATION: 4930 Coliseum Way

Dakland, CA

MATRIX: Soil

UNITS: mg/kg (ppm)

Contract #: 219-5-115-85

TEST RESULTS

										
	1		1	LAB #	18944A I	18945A	1	l	1	ı
PARAMETER	ı	MDL	i	I.D.#	6B-14A I	6B-14B	I	I	ŧ	ī

Total Petroleum Hydrocarbons as Diesel

10

(10 (10

Total Petroleum Hydrocarbons as Mineral Spirits

10

(10 (10

MDL = Method Detection limit; compound below this level would not be detected. Results rounded to two significant figures. METHODS: Modified EPA 8015.

SAFY KHALIFA, Ph.D., Director



Western Region 4080-C Pike Lane Concord, CA 94520

(415) 685-7852

(800) 544-3422 from inside California (800) 423-7143 from outside California

84/22/88 mh

Page 1 of 6

PROJECT MGR: Dave Higgins

Sroundwater Technology, Inc.

4858-D Pike Lane

Concord, CA \$4528

PROJECT #:203-799-2727-2 LOCATION: Bakland, CR

SAMPLED: 3/16,17/88

BY: D. Higgins BY: J. Floro

RECEIVED: 03/18/88 ANALYZED: 84/20/68 BY: P. Sra

MATRIX: Soil

TEST RESULTS			UNITS:	M	g/kg (p	Pm')				
COMPOUND	}	MDL	ILAB *	 	18844B 88-1C	1	18845B SB-1F	 	18846B 89-2C	1	18847B 69-2E
Benzena		0.5			(0.5		(0.5		(8.5		(0. 5
Toluene		0.5			(8.5		(0.5		(8.5		(0.5
Ethylbenzene		6. 5			(8. 5		(6.5		(0.5		(0.5
Xylenes		2.5			(0.5		(0.5		(6. 5		(0.5
Chlorobenzene		8.5			(8. 5		(0.5		(6.5		(8. 5
1,4 Dichlorobenzeme		0.5			(0.5		(0.5		(0.5		⟨€. 5
1,3 Dichlorobenzene		6.5			(0. 5		(0.5		(0.5		(0.5
1,2 Dichlorobenzene		8.5			(8.5		(0.5		(8.5		40. 5

MDL = Method Detection Limit. METHOD: EPA 8020.



Western Region 4080-C Pike Lane, Concord, CA 94520 (415) 685-7852 (800) 544-3422 from Inside California (800) 423-7143 from outside California

Page 2 of 5

PROJECT MGR: Dave Hippins PROJECT #:203-799-2727-2

LOCATION: Dakland, CA

MATRIX: Soil

UNITS: mg/kg (ppm)

TEST RESULTS

COMPOUND	MDL	ILAB #	18848B 58-2G	18849B 8B-3C	18850B SB-3F	1 18851B 1 59-3H
Benzene	0.5		⟨∅.5	(0.5	(0.5	(0,5
Toluene	9.5		(0.5	(0.5	(0.5	⟨ 0. 5
Ethy1benzene	0.5		(0.5	(0.5	(0.5	(0. 5
Xylenes	0. 5		(0.5	(0, 5	(0.5	(0.5
Chlorobenzene	e. 5		⟨₡.5	(0.5	(0.5	(0.5
1,4 Dichlorobenzene	0.5		⟨∅.5	(0.5	(0.5	(0.5
1,3 Dichlorobenzene	0.5		(0.5	(0.5	(0.5	(0.5
1,2 Dichlorobenzene	0.5		⟨€.5	(0.5	(0.5	(0.5

MDL = Method Detection Limit. METHOD: EPA 8020.



Western Region 4080-C Pike Lane, Concord, CA 94520 (415) 685-7852 (600) 544-3422 from Inside California (800) 423-7143 from outside California

Page 3 of 5

PROJECT MGR: Dave Higgins PROJECT #:203-799-2727-2 LDCATION: Dakland, CA

MATRIX: Soil

UNITS: mg/kg (ppm)

TEST RESULTS

COMPOUND		MDŁ	!LAB #		18852B SB~46		18853B SB-5D	1	18854B SB-7D	18855B SB-68/A
Benzene							**		P#44	
· -		0.5			(0.5		(0.5		(0.5	(0. 5
Toluene		0. 5			(0.5		⟨€, 5		(0.5	_
Ethyl be nzene		ø. 5					-			(0.5
(ylenes					⟨0.5		(0. 5		(0.5	(0.5
-		0. 5			(0.5		(0. 5		(0. 5	(0.5
Chlorobenzene		0.5			(0,5		(0.5		(0.5	(0.5
4 Dichlorobenzeng		0.5			(0.5		(8. 5		(0.5	
,3 Dichlorobenzene		9. 5							16.2	(0. 5
.2 Dichlorobenzene					(0, 5		(0.5		(9. 5	(0.5
1		0. 5			(0.5		(0.5		(0.5	(0. 5

MDL = Method Detection Limit. METHOD: EPA 8020.



Western Region
4080-C Pike Lane, Concord, CA 94520
(415) 685-7852
(800) 544-3422 from inside California
(800) 423-7143 from outside California

Page 4 of 5

PROJECT MGR: Dave Higgins PROJECT #:283-799-2727-2 LOCATION: Dakland, CA

MATRIX: Soil

UNITS: mg/kg (ppm)

TEST RESULTS

			~~~~~~			
COMPOUND	i MDL	ILAB # II.D.#	18856B   SB-8D	1 18857B 1 SB-9B	18858B   88-9D	18859B   88-9G
Benzene	0.5		<b>(0.</b> 5	<b>(0.</b> 5	(0.5	(0.5
Toluene	<b>0.</b> 5		(0.5	(0.5	(0.5	(0.5
Ethylbenzene	0.5		(0.5	1.1	(0.5	(0.5
Xylenes	6.5		(0.5	(0.5	(8.5	(0.5
Chlorobenzene	0.5		<b>48.</b> 5	(0.5	(0.5	(0.5
1,4 Dichlorobenzene	0.5		(8.5	<b>(0.</b> 5	(0.5	(0.5
1,3 Dichlorobenzene	0.5		(0.5	(0.5	(0.5	(0.5
1,2 Dichlorobenzene	<b>9.</b> 5		<b>(Ø.</b> 5	(0.5	(0.5	(0.5

MDL = Method Detection Limit. METHOD: EPA 8020.



Western Region 4080-C Pike Lane, Concord, CA 94520 (415) 685-7852 (800) 544-3422 from Inside California (800) 423-7143 from outside California Page 5 of 6

PROJECT MGR: Dave Higgins PROJECT #:203-799-2727-2 LOCATION: Dakland, CA

MATRIX: Soil

UNITS: mg/kg (ppm)

# TEST RESULTS

COMPOUND	i MDL	ILAB # II.D.#	1 18860B 1 SB-10H	188619   58-11E	18862B   5B-12E	18863B   88-13E
Benzene	0.5		(0.5	<b>(0.</b> 5	(0.5	(0.5
Toluene	<b>0.</b> 5		(0.5	(0.5	(0.5	<b>(0.</b> 5
Ethylbenzene	0.5		(0.5	(0.5	(0.5	(0.5
Xylenes	<b>0.</b> 5		(0.5	(0.5	(0.5	(0.5
Chlorobenzene	9.5		(0.5	(0.5	(0.5	<b>(0.</b> 5
1,4 Dichlorobenzene	0.5		(0.5	(0.5	(0.5	(6.5
1,3 Dichlorobenzene	<b>0.</b> 5		(0.5	(0.5	(0.5	(0.5
1,2 Dichlorobenzene	0.5		(0.5	(0.5	(0.5	⟨∅.5

MDL = Method Detection Limit.

METHOD: EPA 8020.

SAFY KHALIFA, Ph.D., Director



Western Region 4080-C Pike Lane Concord, CA 94520

(415) 685-7852 (800) 544-3422 from Inside California (800) 423-7143 from outside California Page 6 of 6

PROJECT MOR: Dave Higgins PROJECT 4:203-799-2727-2 LOCATION: Dakland, CA

MATRIX: Soil

UNITS: mg/kg (ppm)

# TEST RESULTS

COMPOUND	) MDL	ILAB #   1894 		-
Benzene	6.5	⟨€.	5 (9.5	<b>;</b>
Toluene	<b>6.</b> 5	(0.	5 (8.5	<b>;</b>
Ethylbenzene	<b>6.</b> 5	(8.	5 (0.5	
Xylenes	6.5	⟨€,	5 <b>(e.</b> 5	;
Chlorobenzene	0.5	(0.	5 (0.5	}
1,4 Dichlorobenzene	0.5	<b>(6</b> .	5 (0.5	}
1,3 Dichlorobenzene	0.5	(6.	5 (8. 2	ļ
1,2 Dichlorobenzene	6.5	(0.	5 (8.5	i

MDL = Method Detection Limit.

METHOD: EPR 8020.

Enna P. Poper_ BAFY KHALIFA, Ph.D., Director

Western Region 4080-C Pike Lane Concord, CA 94520 (415) 685-7852 (800) 544-3422 from Inside California (800) 423-7143 from outside California

TEST RESULTS

64/22/88 mh

Page 1 of 6

PROJECT MGR: Dave Higgins

Groundwater Technology, Inc.

4080-D Pike Lane Concord, CA 94520

PROJECT #:203-799-2727-2 LOCATION: Dakland, CA

SAMPLED: 3/16, 17/88 BY: D. Higgins RECEIVED: 03/18/88 BY: J. Floro ANALYZED: 84/29/88 BY: P. Sra

MATRIX: Boil

UNITE: mg/kg (ppm)

	1	MDL	ILAB #	1	18844B	1	18845B	1	18845B	1	18847B
COMPOUND	1		11.D.#		6B-1C	İ	- 1 - 1 -		68-5C	1	88-2E
Bromodichloromethane		6.5			(8.5		(0.5		(0.5		(0.5
Bromoform		0,5			(0.5		⟨8.5		(0.5		(6.5
Bromomethane		0.5			(8.5		(0.5		(8.5		(0.5
Carbon tetrachloride		0.5			(8.5		(0.5		(8.5		(0.5
Chlorobenzene		8.5			(8.5		(0.5		(0.5		(0.5
Chloroethane		6. 5			(8.5		(0.5		(0.5		(0.5
2-Chloroethylvinyl ether		1.8			<1.8		(1.6		(1.0		(1.0
Chloroform		8.5			(0.5		(0.5		(0.5		(0.5
Chloromethane		6.5			(0.5		(0.5		(0.5		(8.5
Dibromochloromethane		0.5			<b>(0.</b> 5		(8.5		(0.5		(0.5
1,2-Dichlorobenzene		0.5			(0.5		(6.5		⟨6.5		(0.5
1,3-Dichlorobenzene		8.5			(0.5		(0.5		(9.5		(0.5
1,4-Dichlorobenzene		0.5			<b>(0.</b> 5		(6.5		(0.5		(0.5
Dichlorodifluoromethane		0.5			(9.5		(9.5		(0.5		₹0.5
1, 1-Dichlorosthans		8.5			(0.5		(0.5		(0.5		(8.5
1,2-Dichloroethane		4.5			⟨0.5		(8.5		(0.5		(0.5
1,1-Dichlorosthene		0.2			(0.2		(0.2		(0.2		(0.2
trans-1,2-Dichloroethene		8.5			(8.5		(0.5		(6.5		(8.5
1,2-Dichloropropane		9.5			(0.5		(6.5		(0.5		(0.5
cis-1,3-Dichloropropene		9.5			(8.5		(0.5		(8.5		(0.5
trans-1,3-Dichloropropene		0.5			(0.5		⟨€. 5		(8.5		(6.5
Methylene chloride		3.0			(3.6		(3.0		(3.0		(3.0
1, 1, 2, 2-Tetrachloroethane		8.5			(8.5		⟨€. 5		(8.5		(8.5
Tetrachlorouthune		0.5			(8.5		(0.5		(0.5		(6.5
1,1,1-Trichlorosthane		0.5			(8.5		(0.5		(8, 5		(0.3
1, 1, 2-Trichloroethane		0.5			(8.5		(8.5		(0.5		(8.5
Trichloroethene		0.5			(8.5		(9.5		(8.5		(0.5
Trichlorofluoromethane		8.5			(8, 5		(0.5		(8.5		(0.5
Vinyl Chloride		1.0			(1.0		(1.0		(1.0		(1.0

MDL = Method Detection Limit. METHOD: EPA 8818.



Western Region 4080-C Pike Lane Concord, GA 94520 (415) 585-7852 (800) 544-3422 from Inside California (800) 423-7143 from outside California Page 2 of 6

PROJECT MSR: Dave Higgins PROJECT #:203-799-2727-2

LOCATION: Oakland, CA

MATRIX: Soil

UNITS: mg/kg (ppm)

### TEST RESULTS

COMPOUND	l t	MDL	ilab #	1	18848B 8B- <b>2</b> 6	1	18849B 8B-3C	1	16850B 88-3F	i	16851B 6B-3H
Browdichloromethane		8.5			⟨₽, 5		⟨8.5		(8, 5		<b>(8.</b> 5
Bromoform		0.5			₹8.5		(6.5		(0.5		(6.5
Bromomethane		8.5			(0.5		(8.5		(0.5		(8.5
Carbon tetrachloride		0.5			(6.5		(8. 5		(0.5		(0.5
Chlorobenzene		8.5			(0.5		(0.5		⟨€. 5		(0.5
Chloroethane		8.5			(0.5		(0.5		(6.5		(0.5
2-Chloroethylvinyl ether		1.0			(1.0		(1.0		(1.0		(1.0
Chloroform		0.5			(0.5		(8.5		(8.5		(0.5
Chloromethane		0.5			(0.5		(8.5		(0.5		(8.5
Dibromochloromethane		8.5			(0.5		⟨€.5		(8.5		(0.5
1.2-Dichlorobenzene		8.5			(0.5		(8.5		(0.5		(0.5
1,3-Dichlorobenzene		0.5			(0.5		(0.5		(0.5		(0.5
1.4-Dichlorobenzene		8.5			(0.5		(0.5		(8.5		(0.5
Dichlorodifluoromethane		0.5			(0.5		(8.5		(0.5		<b>49.</b> 5
1.1-Dichlorosthame		0.5			<b>48.</b> 5		(0.5		(8.5		⟨8.5
1,2-Dichloroethane		0.5			(6.5		(8.5		(8.5		(6. 5
1.1-Dichloroethene		8.2			(8. 2		⟨0.2		(8. 2		(0.2
trans-1, 2-Dichloroethene		8.5			(0.5		(8.5		(8.5		⟨€. 5
1,2-Dichloropropane		0.5			<b>(6.</b> 5		<b>(8.</b> 5		(8.5		(8.5
cis-1,3-Dichloropropene		0.5			⟨0.5		(0.5		(8.5		(0.5
trans-1,3-Dichloropropene		0.5			(6. 5		(0.5		(8.5		⟨€.5
Methylene chloride		3. 0			(3. 8		(3.0		(3. 0		⟨3. €
1, 1, 2, 2-Tetrachloroethane		8.5			(0.5		(0.5		(8. 5		⟨€. 5
Tetrachloroethene		6.5			(6.5		(0.5		(0.5		(0. 5
1, 1, 1-Trichloroethane		8.5			(0.5		(8.5		(8.5		(9. 5
1, 1, 2-Trichloroethane		0.5			(0.5		(8. 5		(9.5		(9.5
Trichloroethene		0.5			(6.5		(8.5		(0.5		(0, 5
Trichlorofluoromethane		0.5			(0.5		(8.5		(9.5		(0.5
Vinyl Chloride		1.0			⟨1.0		(1.8		(1.6		⟨1.€

MDL = Method Detection Limit. METHOD: EPA 8010.



**Western Region** 4080-C Pike Lane Concord, CA 94520 (415) 685-7852 (800) 544-3422 from Inside California (600) 423-7143 from outside California Page 3 of 6

PROJECT MGR: Dave Higgins PROJECT #:203-799-2727-2 LOCATION: Dakland, CA

MATRIX Soil

UNITS: mg/kg (ppm)

### TEST RESULTS

COMPOUND	l MEDI,	ILAB #	i 16852 i 89-4			
Bromodichloromethane	8. 5		(B.	5 (8.)	5 (0.5	(8.5
Brostoform	6, 5	}	(8.			
Bronomethane	8.5	;	(0.		. ,	
Carbon tetrachloride	0. 5	j	(8,			
Chlorobenzene	0.5		(0.			
Chlorosthans	8. 5		⟨ø.	,	–	
2-Chloroethylvinyl ether	1. 6		(1.			
Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform Chloroform	8, 5		⟨€.			
Chloromethane	6.5		(8.			
Dibromochloromethane	0.5		<b>(8.</b>			
1,2-Dichlorobenzene	0.5		⟨0.			
1,3-Dichlorobenzene	0.5		(8.			
1,4-Dichlorobenzene	0.5		<b>(6.</b> )			
Dichlorodifluoromethane	0. 5		⟨8,:	***		
i, 1-Dichloroethane	0.5		(8.			
1,2-Dichloroethane	0.5		(8.			
1,1-Dichloroethene	8. 2		(8. i			
trens-1,2-Dichloroethene	8. 5		(e.:			
1,2-Dichloropropane	9. 5		(0. :			=
ris-1,3-Dichloropropene	8.5					
trans-1.3-Dichloropropens	8.5		(8.			
Methylene chloride	3. 0		⟨0.1			
1, 1, 2, 2-Tetrachloroethane	9. 5		(3.1	••		
Tetrachloroethene	e. 5		(0.			
1, 1, 1-Trichloroethane			(8.			
1, 1, 2-Trichloroethane	8.5		(Ø. :			
richloroethene	9.5		(0.	_ ,,		
Trichlorofluoromethane	8.5		(8.			
/inyl Chloride	8.5 1.0		<b>(0.</b> !	- ,		

MDL = Method Detection Limit.

METHOD: EPA 6010.



Western Region 4080-C Pike Lane Concord, CA 94520 (415) 685-7852 (800) 544-3422 from inside California (800) 423-7143 from outside California Page 4 of 5

PROJECT MGR: Dave Higgins PROJECT #:203-799-2727-2 LOCATION: Dakland, CA MATRIX: Soil UNITS: mg/kg (ppm)

### TEST RESULTS

COMPOUND	   	MDL	!LAB #	1	188569 SB-8D	18857B SB-9B	186589 88-9D	   	18859B 88-96
Bromodichloromethane		<b>8.</b> 5	- <del> </del>	<del></del>	<b>(0.</b> 5	 (0.5	 (e. 5		
Bromoform		0.5			(0.5	(9.5	(0.5		(0.5
Bromomethane		<b>0</b> . 5			(8.5	(0.5	(8.5		(0.5
Carbon tetrachloride		0.5			(0.5	(0.5	(8.5		(0.5
Chlorobenzene		6.5			(8.5	(8.5	(0.5		(0.5
Chloroethane		<b>6.</b> 5			(0.5	(0.5			(8.5
2-Chlorosthylvinyl ether		1.0			(1.0	(1.0	(8.5		(0.5
Chloroform		8.5			(0.5	(8.5	(1.0		(1.0
Chloromethane		0.5			(8.5	(0.5	<b>(8.</b> 5		(0.5
Dibromochloromethane		6. 5			(0.5	(8.5	(8.5		<b>(8.</b> 5
1,2-Dichlorobenzene		0.5			(8.5	(0.5	(0.5		(0.5
1,3-Dichlorobenzene		0.5			(8.5	(0.5	(0.5 (0.5		(0.5
1,4-Dichlorobenzene		0.5			(0.5	(0.5	-		(0.5
Dichlorodifluoromethane		6.5			(0.5	(8.5	(8.5		(0.5
1,1-Dichlorosthams		e. 5			(0.5	(8. 5	(6.5		(0.5
1,2-Dichloroethane		8.5			(8.5	(8.5	(8.5	•	(0.5
1,1-Dichlorosthene		<b>9.</b> 2			<b>(6.</b> 2	(8.2	(0.5		(0.5
trans-1, 2-Dichlorosthens		<b>0.</b> 5			⟨€, 5		⟨€. 2		(8.2
1,2-Dichloropropane		8.5				(0.5	(0.5		(0.5
cis-i,3-Dichloropropene		6. 5			(0.5	(8.5	⟨8.5		(0.5
trans-1,3-Dichloropropens		D. 5			(8.5	(0.5	(0.5		(0.5
Mathylene chloride		3. 8			(9.5	(8.5	(9.5		(0.5
1, 1, 2, 2-Tetrachlorosthane		D. 5			33.0	(3. 0	(3.0		(3. 6
Tetrachioroethene		D. 5			(8.5	(0.5	(8.5		<b>(9.</b> 5
1, 1, 1-Trichloroethane		B. 5			(8.5	(8.5	(0.5		(0.5
1, 1, 2-Trichloroethane		D. 5			(9.5	(8.5	(6. 5		<b>(0.</b> 5
Trichloroethene		D. 5			<b>(0.</b> 5	(0.5	(0.5		(8.5
Trichlorofluoromethane	·-				(9.5	<b>(0,</b> 5	<b>(8.</b> 5		<b>(0.</b> 5
Vinyl Chloride		D. 5			(0.5	<b>(8.</b> 5	(0.5		<b>(0.</b> 5
selle mitaline		1.0			(1.0	(1.8	<b>{1.8</b>		(1.0

MDL = Method Detection Limit. METHOD: EPA 8010.



**Western Region** 4080-C Pike Lane Concord, CA 94520 (415) 885-7852 (800) 544-3422 from Inside California (800) 423-7143 from outside California Page 5 of 6

PROJECT MGR: Dave Higgins PROJECT #:203-799-2727-2 LOCATION: Dakland, CA Soil

MATRIX:

UNITE mg/kg (ppm)

### TEST RESULTS

COMPOUND	ŧ	MDL.	ILAB #	-	18860B SB-1 <b>6</b> H	18861B 59-11E	18862B SB-12E	18863B 38-13E
Bromodichloromethane	<del></del> ,	6.5			(6.5	 (0.5	 <8. 5	 (0.5
Bromo form		6.5			(8.5	(9.5	(8.5	(8.5
Bromomethane		8.5			(0.5	⟨€, 5	(0.5	(0.5
Carbon tetrachloride		0.5			(0.5	(0.5	(0.5	(8.5
Chlorobenze <del>ne</del>		0.5			(8.5	(0.5	(8.5	(8.5
Chloroethane		6. 5			(0.5	(0.5	( <b>0.</b> 5	(0.5
2-Chlorosthylvinyl ether		1.6			(1.6	(1.0	(1.0	(1.0
Chloroform		8.5			(0.5	(8.5	(8.5	(0.5
Chloromethane		9.5			(8.5	⟨8.5	⟨0.5	(6.5
Dibromochloromethane		6.5			(0.5	⟨€.5	⟨€.5	(8.5
1,2-Dichlorobenzene		8.5			⟨0.5	(0.5	( <b>0.</b> 5	(8.5
1,3-Dichlorobenzene		0.5			(6.5	(8.5	₹8.5	(8.5
1,4-Dichlorobenzene		0.5			(0.5	(8.5	(8. 5	(9.5
Dichlorodifluoromethane		0.5	•		(0.5	(0.5	(8.5	(8.5
1,1-Dichloroethane		8.5			(8.5	<b>(8.</b> 5	(0.5	(6.5
1,2-Dichlorosthane		6.5			(6.5	(8.5	(8.5	(9.5
1,1-Dichlorosthens		9.2			(8.2	(6.2	(9.2	(9.2
trans-1,2-Dichloroethene		0.5			(0.5	(0.5	⟨8.5	(0.5
1,2-Dichloropropane		9.5			(0.5	(0.5	(8. 5	(8.5
cis-1,3-Dichloropropane		6.5			(8.5	(0.5	(0. 5	(8.5
trans-1,3-Dichloropropene		6.5			(8.5	(6.5	(8. 5	(0.5
Methylene chloride		3. 9			(3. 8	(3.0	(3.0	(3.6
1, 1, 2, 2-Tetrachloroethane		8.5			(0.5	(0.5	(8.5	(8.5
Tetrachloroethene		<b>6.</b> 5			(0.5	(8.5	(0. 5	(8.5
1,1,1-Trichloroethane		8.5			(0.5	(0.5	⟨₽.5	(8.5
1, 1, 2-Trichlorosthans		0.5			(8.5	⟨8.5	⟨8.5	(8.5
Trichloroethene		6. S			(0.5	(0.5	(9.5	(6. 5
Trichlorofluoromethane		<b>6.</b> 5			(8.5	(8.5	(8.5	(0.5
Vinyl Chloride		1.0			(1.0	(1.6	(1.0	(1.0

MDL = Method Detection Limit. METHOD: EPA 8818.

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A division of Groundwater Technology, Inc.

Western Region 4080-C Pike Lane Concord, CA 94520

(415) 685-7852 (800) 544-3422 from Inside California (800) 423-7143 from outside California Page 6 of 6

PROJECT MGR: Dave Higgins PROJECT 0:283-799-2727-2 LOCATION: Dakland, CA MATRIX: Soil UNITS: ag/kg (ppm)

# TEST RESULTS

COMPOUND	I MDL I	ILAB #	18944C   SB-14A		† 
Bromodichloromethane	<b>6.</b> 5		(8.5	⟨€, 5	***************************************
Bromoform	6.5		(0.5	(0.5	
Bromomethane	<b>8.</b> 5		(0.5	₹ <b>8.</b> 5	
Carbon tetrachloride	0.5		(0.5	(0. 5	
Chlorobenzene	6, 5		(0.5	(0.5	
Chloroethane	0.5		(8.5	(0, 5	
2-Chloroethylvinyl ether	1.0		(1.0		
Chloroform	0.5		(8.5	(1.8	
Chloromethane Chloromethane	<b>8.</b> 5		(0.5	(8.5 (8.5	
Dibromochloromethane	8.5		⟨€.5		
1, 2-Dichlorobenzene	0.5		(8.5	(8.5	
1,3-Dichlorobenzene	0.5		(8. 5	(8. 5 (9. 5	
1,4-Dichlorobenzene	8.5		⟨€. 5	(8. 5	
Dichlorodifluoromethane	9.5		(8.5	(8.5	
1,1-Dichloroethane	0.5		<b>(6.</b> 5	(0. 5	
1,2-Dichloroethane	6.5		(8. 5	(0.5	
1,1-Dichloroethene	6.2		(0.2		
trans-1,2-Dichloroethene	8.5		(8. 5	<b>(8.</b> 2	
1,2-Bichloropropane	<b>8.</b> 5		_	(0.5	
cis-1,3-Dichleropropene	6.5		(8.5	(8.5	
trans-1, 3-Dichloropropens	6.5		(0.5	<b>(8.</b> 5	
Methylene chloride	3. 0		(0.5	(8.5	
1, 1, 2, 2-Tetrachloroethane	6. 5		⟨3.€	(3. 0	
Tetrachloroethene	<b>9.</b> 5		(0.5	(8. 5	
1, 1, 1-Trichlorouthane	<b>6.</b> 5		(0.5	(8.5	
1, 1, 2-Trichloroethane	<b>6.</b> 5		(8. 5	(0.5	
Trichlorosthene	0. 5 0. 5		⟨€. 5	(0.5	
Trichlorofluoromethane	0. 5		<b>48.</b> 5	(8.5	
Vinyl Chloride	1.0		(0.5 (1.0	. (0.5 (1.0	

MDL = Method Detection Limit. METHOD: EPA 8010.

> Enunca P. Popler BAFY KHALIFA, Ph.D., Director



Page 1 of 3

06/14/88 rw

PROJECT MGR: Eric Johnson

Pacific Gas & Electric 3400 Crow Canyon Rd.

San Ramon, CA 94583

PROJECT #: 203-799-2727-4A

(415) 685-7852

Western Region

4080-C Pike Lane

Concord, CA 94520

(800) 544-3422 from Inside California (800) 423-7143 from outside California SAMPLED: 05/17/88

BY: E. Johnson

RECEIVED: 05/19/88 ANALYZED: 06/09/88 BY: M. Huth

MOTOIV. 00/03/1

BY: E. Popek

MATRIX: Soil

UNITS: mg/ki

UNITS: mg/kg (ppm) CONTRACT #: Z19-5-115-85

TEST RESULTS

COMPOUNDS | MDL | LAB # | 23329A | 23330A | 23331A | 23332A | 23333A | 23333A | 23332A | 23332A | 23333A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 23332A | 2333

Total Petroleum Hydrocarbons as Kerosene

10

260

(10

340

(10

(10

MDL = Method Detection Limit; compound below this level would not be detected. Results rounded to two significant figures.

#### METHOD:

Modified EPA Method 8015

* No indication of diesel or mineral spirits present.



Page 2 of 3

Western Region 4080-C Pike Lane Concord, CA 94520

(415) 685-7852

(800) 544-3422 from Inside California (800) 423-7143 from outside California PROJECT MGR: Eric Johnson

PROJECT #: 203-799-2727-4A

MATRIX:

Soil

TEST RESULTS

UNITS:

mg/kg (ppm)

COMPOUNDS	1	MDL ILAB #			23337A   18-3-2	

Total Petroleum Hydrocarbons as Kerosene

10

(10

(10

(10

(10

(10

MDL = Method Detection Limit; compound below this level would not be detected. Results rounded to two significant figures.

METHOD:

Modified EPA Method 8015

* No indication of diesel or mineral spirits present.



Page 3 of 3

Western Region 4080-C Pike Lane Concord, CA 94520

(415) 685-7852 (800) 544-3422 from inside California (800) 423-7143 from outside California

PROJECT MGR: Eric Johnson
PROJECT #: 203-799-2727-4A

MATRIX:

Soil

TEST RESULTS

UNITS:

mg/kg (ppm)

Total Petroleum Hydrocarbons as Kerosene

10

(10

(10

MDL = Method Detection Limit; compound below this level would not be detected. Results rounded to two significant figures.

METHOD:

Modified EPA Method 8015

* No indication of diesel or mineral spirits present.

SAFY KHALIFA. Ph.D. Tirector

cc: Dave Higgins

Page 1 of 4

Western Region

4080-C Pike Lane, Concord, CA 94520

(415) 685-7852

(800) 544-3422 from inside California

(800) 423-7143 from outside California

05/24/88 rw

PROJECT MGR: Dave Higgins

Groundwater Technology, Inc.

4080-D Pike Lane

Concord, CA 94520

PROJECT #:203-799-2727-5

SAMPLED: 05/17, 18/88

BY: E. Johnson BY: M. Huth

RECEIVED: 05/19/88

ANALYZED: 05/23/88

BY: T. Alusi

MATRIX: Soil

UNITS:

mg/kg (ppm)

TEST RESULTS

I LAB # 1 23329B 1 23330B 1 23331B 1 | MDL | I.D.# | 14A-1-1 14A-3-2| 15-2-1 | PARAMETER

Total Dil and Grease

5

1200

(5

4800

MDL = Method Detection Limit. METHOD:

T06 = EPA 413.2



**Western Region** 

4080-C Pike Lane, Concord, CA 94520 (415) 685-7852

(800) 544-3422 from inside California

(800) 423-7143 from outside California

Page 2 of 4

PROJECT MGR: Dave Higgins PROJECT #:203-799-2727-5

MATRIX: Soil

UNITS: mg/kg (ppm)

TEST RESULTS

| LAB # | 23332B | 23333B | 23334B | PARAMETER | MDL | 1.D.# | 15-4-2 | 16-2-2 | 16-3-2 |

Total Oil and Grease

5

5

100

(5

MDL = Method Detection Limit. METHOD:

TDG = EPA 413.2



Western Region 4080-C Pike Lane, Concord, CA 94520 (415) 685-7852 (800) 544-3422 from inside California (800) 423-7143 from outside California

Page 3 of 4

PROJECT MGR: Dave Higgins PROJECT #:203-799-2727-5

MATRIX: Soil

UNITS: mg/kg (ppm)

TEST RESULTS

| LAP # | 23335B | 23336B | 23337B | | MDL | I.D.# | 17-2-2 | 17-3-2 | 18-3-2 | PARAMETER

Total Dil and Grease

5

9

**(5** 

**<**5

MDL = Method Detection Limit. METHOD:

TOG = EPA 413.2



Western Region 4080-C Pike Lane, Concord, CA 94520 (415) 685-7852 (800) 544-3422 from inside California

(800) 423-7143 from outside California

Page 4 of 4

PROJECT MGR: Dave Higgins PROJECT #:203-799-2727-5

MATRIX:

Soil

UNITS:

mg/kg (ppm)

TEST RESULTS

| | LAB # | 23338B | 23339B | 23340B | PARAMETER | MDL | I.D.# | 18-4-1 | OW4-3-1 | OW4-5-21

Total Dil and Grease

5

(5

**(5** 

₹5

MDL = Method Detection Limit.

METHOD:

TOG = EPA 413.2

SAFY KHALIFA, Ph.D. Director



**Western Region** 

06/07/88 rw

PROJECT MGR: Dave Higgins

4080-D Pike Lane

Page 1 of 3

Concord, CA 94520

4080-C Pike Lane Concord, CA 94520

(415) 685-7852

(800) 544-3422 from inside California (800) 423-7143 from outside California

SAMPLED: 05/17/88

BY: E. Johnson

RECEIVED: 05/19/88

BY: M. Huth

ANALYZED: 06/03/88

BY: E. Popek

MATRIX:

Soil

PROJECT #: 203-799-2727-4

UNITS:

mg/kg (ppm) CONTRACT #: Z19-5-115-85

TEST	RESULTS
------	---------

COMPOUNDS		ILAB #	1	23329A   14A-1-11	23330A   14A-3-21	23331A   15-2-1	23332A   15-4-2	23333A   16-2-2
Benzene	0.5			( <b>0.</b> 5	(0.5	(Ø. 5	<0.5	<0.5
Toluene	0.5			(0.5	(0.5	(0.5	(0.5	(0.5
Ethylbenzene	0.5			(0.5	(0.5	(0.5	(0.5	(0.5
Xylenes	0.5			<b>(0.</b> 5	(0.5	i	(0.5	(0.5
Total BTEX	ø.5			(0.5	(0.5	1	(0.5	(0.5
Misc. Hydrocarbons (C4-C12)	1.0			80	(1	130	<b>(1</b>	(1
Total Petroleum Hydrocarbons as Gasoline	1.0			80	<b>(1</b>	130	(1	(1

MDL = Method Detection Limit; compound below this level would not be detected. Results rounded to two significant figures.

Modified EPA Method 5030/8020/8015



Western Region 4080-C Pike Lane Concord, CA 94520

(415) 685-7852

(800) 544-3422 from inside California (800) 423-7143 from outside California Page 2 of 3

PROJECT MGR: Dave Higgins PROJECT #: 203-799-2727-4

MATRIX:

Soil

TEST RESULTS

UNITS: mg/kg (ppm)

COMPOUNDS	i I	MDL	ILAB # II.D.#	l I	23334A   16-3-2	23335A   17-2-2	23336A   17-3-2	23337A   18-3-2	23338A   18-4-1
Benzene		0.5			(0.5	(0.5	(0.5	(0.5	(0.5
Toluene		0.5			(0.5	(0.5	(0.5	(0.5	(0.5
Ethylbenzene		<b>0.</b> 5			(0.5	(0.5	<b>(0.</b> 5	(0.5	(0.5
Xylenes		<b>0.</b> 5			(0.5	(0.5	(0.5	<b>(0.</b> 5	(0.5
Total PTEX		0.5			(0.5	(0.5	(0.5	(0.5	(0.5
Misc. Hydrocarbons (C4-C12)		1.0			(1	<b>(1</b>	<b>(1</b>	<b>(1</b>	<b>(1</b>
Total Petroleum Hydrocarbons as Basoline		1.0			(1	(1	a	(1	(1

 $\mathtt{MDL} = \mathtt{Method}$  Detection Limit; compound below this level would not be detected. Results rounded to two significant figures.

METHOD:

Modified EPA Method 5030/8020/8015



Page 3 of 3

Western Region 4080-C Pike Lane Concord, CA 94520

(415) 685-7852

(800) 544-3422 from inside California (800) 423-7143 from outside California PROJECT MGR: Dave Higgins PROJECT #: 203-799-2727-4

MATRIX:

Soil

TEST RESULTS

UNITS: mg/kg (ppm)

COMPOUNDS	1	MDL	ILAB #	l l	23339A   OW4-3-1	23340A   DW4-5-2	
Benzene		0.5			(0.5	(0.5	
Toluene		0.5			(0.5	<b>(0.</b> 5	
Ethylbenzene		0.5			(0.5	(0.5	
Xylenes		0.5			(0.5	(0.5	
Total BTEX		0.5			(0.5	(0.5	
Misc. Hydrocarbons (C4-C12)		1.0			<b>(1</b>	<1	
Total Petroleum Hydrocarbons as Basoline		1.0			<b>(1</b>	(1	

MDL = Method Detection Limit; compound below this level would not be detected. Results rounded to two significant figures.

METHOD:

Modified EPA Method 5030/8020/8015

Enma P. Popen
SAFY KHALIFA, Ph.D., Director



# **BROWN AND CALDWELL LABORATORIES**

# **ANALYTICAL REPORT**

1255 POWELL STREET EMERYVILLE, CA 94606 * (415) 428-2300

LOG NO: E88-04-198

Received: 11 APR 88

Reported: 29 APR 88

Mr. Eric Johnson
PG&E Technical & Eco. Services
3400 Crow Canyon Road
San Ramon, California 94583

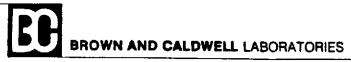
Purchase Order: A047516

Requisition: 219-5-046-83

REPORT OF	ANALYTICAL	RESULTS
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Page 1

LOG NO	SAMPLE DESCRIPTION, GROUNI	D WATER SAMPLES		DΑ	TE SAMPLED
04-198-1 04-198-2 04-198-3 04-198-4	OW-0 (OW-3 replicate) OW-1 OW-2 OW-3				11 APR 88 11 APR 88 11 APR 88 11 APR 88
PARAMETER		04-198-1	04-198-2	04-198-3	04-198-4
Oil & Grea Total Fuel	se by Infrared, mg/L Hydrocarbons, mg/L	<5 <1.0	<5 <1.0	<5 <1.0	<5 <1.0



1255 POWELL STREET EMERYVILLE, CA 94608 * (415) 428-2300

LOG NO: E88-04-198

Received: 11 APR 88 Reported: 29 APR 88

Mr. Eric Johnson
PG&E Technical & Eco. Services
3400 Crow Canyon Road
San Ramon, California 94583

Purchase Order: A047516

Requisition: Z19-5-046-83

### REPORT OF ANALYTICAL RESULTS

Page 2

04-198-1 OV-0 (OW-3 replicate)				
04-198-2				11 APR 88 11 APR 88 11 APR 88 11 APR 88
PARAMETER	04-198-1	04-198-2	04-198-3	04-198-4
Purgeable Priority Pollutants Date Extracted 1,1,1-Trichloroethane, ug/L 1,1,2,2-Tetrachloroethane, ug/L 1,1-Dichloroethane, ug/L 1,1-Dichloroethane, ug/L 1,1-Dichloroethylene, ug/L 1,2-Dichloroethane, ug/L 1,2-Dichloropropane, ug/L 1,3-Dichloropropane, ug/L 2-Chloroethylvinylether, ug/L Acrolein, ug/L Acrylonitrile, ug/L Bromodichloromethane, ug/L Bromomethane, ug/L Chlorobenzene, ug/L Chloroethane, ug/L Bromoform, ug/L Chloroform, ug/L Chloroform, ug/L Chloromethane, ug/L Dibromochloromethane, ug/L Ethylbenzene, ug/L	04.22.88 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	04.22.88 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	04.22.88 <1 <1 <1 <1 <1 <1 <1 <10 <10 <10 <10 <1	04.22.88 <1 <1 <1 <1 <1 <1 <10 <10 <10 <11 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1

1255 POWELL STREET EMERYVILLE, CA 94608 * (415) 428-2300

LOG NO: E88-04-198

Received: 11 APR 88 Reported: 29 APR 88

Mr. Eric Johnson
PG&E Technical & Eco. Services
3400 Crow Canyon Road
San Ramon, California 94583

Purchase Order: A047516

Requisition: Z19-5-046-83

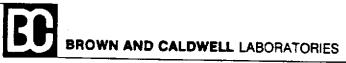
### REPORT OF ANALYTICAL RESULTS

Page 3

LOG NO	SAMPLE DESCRIPTION, GROUND	WATER SAMPLES		DA	TE SAMPLED
04-198-1 04-198-2 04-198-3 04-198-4	0W-0 (OW-3 replicate) 0W-1 0W-2 0W-3				11 APR 88 11 APR 88 11 APR 88 11 APR 88
PARAMETER		04-198-1	04-198-2	04-198-3	04-198-4
Tetrachlo Trichloro Trichloro Toluene, Vinyl chl trans-1,2	chloride, ug/L roethylene, ug/L ethylene, ug/L fluoromethane, ug/L ug/L oride, ug/L -Dichloroethylene, ug/L -Dichloropropene, ug/L	<1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <	(1 (1 (1 (1 (1 (1 (1 (1	41 41 41 41 41 41 41	<1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1
C6H140 (	tified Results ** Ether), ug/L chlorobenzenes, ug/L	20	5 4		10

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

Steve Fisher, Laboratory Director



(4·5) 62 (2)

1255 POWELL STREET EMERYVILLE, CA 94608 * (415) 428-2300

LOG NO: B88-06-439

Received: 16 JUN 88 Reported: 30 JUN 88

Mr. Eric Johnson
PG&B Technical & Bco. Services
3400 Crow Canyon Road
San Ramon, California 94583

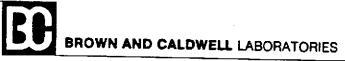
Purchase Order: A047517

Requisition: 219-5-046-83

## REPORT OF ANALYTICAL RESULTS

TPage 1 TS

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES		DA	TE SAMPLED	Message
06-439-1 06-439-2	OW-3-2 OW-4-1			16 JUN 88 16 JUN 88	
PARAMETER	•••••••••••••••	06-439-1	06-439-2	2 <u>##5.</u> E5 <u>#</u> *	06-
Total Fuel	se by Infrared, mg/L Bydrocarbons	<5	<b>(5</b>		űö.
	yzed L Hydrocarbons, mg/L tal Fuel Hydrocarbons	06.29.88 <1.0	06.29.88 <1.0		<b>00</b> .



1255 POWELL STREET EMERYVILLE, CA 94606 * (415) 428-2300

LOG NO: B88-06-439

Received: 16 JUN 88 Reported: 30 JUN 88

Mr. Bric Johnson
PG&E Technical & Eco. Services
3400 Crow Canyon Road
San Ramon, California 94583

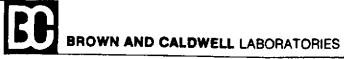
Purchase Order: A047517

Requisition: Z19-5-046-83

### REPORT OF ANALYTICAL RESULTS

Page 2

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPL	ES	D	ATE SAMPLED
06-439-1 06-439-2	·			16 JUN 88 16 JUN 88
PARAMETER		06_430_1	06-439-2	
Purgeable	Priority Pollutants			
Date Extr		06.21.88	06.21.88	
1,1,1-Tri	chloroethane, ug/L	<b>&lt;</b> 1	<b>&lt;</b> 1	
1,1,2,2-T	etrachloroethane, ug/L	<1	<1	
1,1,2-Tri	chloroethane, ug/L	<1	<1	
1,1-Dichl	oroethane, ug/L	5	<1	
1,1-Dichle	oroethylene, ug/L	<1	<1	
1,2-Dichle	oroethane, ug/L	<1	<1	
	oropropane, ug/L	<1	<1	
	oropropene, ug/L	<1	<1	
	thylvinylether, ug/L	<1	<1	
Acrolein,		<10	<10	
Acrylonit	rile, ug/L	<10	<10	
	loromethane, ug/L	<1	<1	
Bromometha		<1	<1	
Benzene, u		<b>&lt;</b> 1	<1	٠
	zene, ug/L	1	<1	
	trachloride, ug/L	<1	<1	
Chloroetha		<b>&lt;</b> 1	<1	
Bromoform,		<1	<1	
Chloroform		<1	<1	
Chlorometh		<1	<1	
	oromethane, ug/L	<b>(1</b>	<1	
Ethylbenze	ene, ug/L	<1	<1	
	chloride, ug/L	<1	<1	
Tetrachlor	oethylene, ug/L	<1	<1	



1255 POWELL STREET EMERYVILLE, CA 94608 * (415) 428-2300

LOG NO: E88-06-439

Received: 16 JUN 88 Reported: 30 JUN 88

Mr. Eric Johnson PG&E Technical & Eco. Services 3400 Crow Canyon Road San Ramon, California 94583

Purchase Order: A047517

Requisition: Z19-5-046-83

### REPORT OF ANALYTICAL RESULTS

Page 3

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES		DAT	E SAMPLED
06-439-1 06-439-2	OW-3-2 OW-4-1			16 JUN 88 16 JUN 88
PARAMETER		06-439-1	06-439-2	
Trichloroe	ethylene, ug/L	<1	<1	*****
Trichloroi	fluoromethane, ug/L	<b>&lt;1</b>	<1	
Toluene, u	ng/L	<1	<1	
Vinyl chlo	oride, ug/L	<1	<1	
•	Dichloroethylene, ug/L	2	<1	
•	Dichloropropene, ug/L	<1	<1	
Semi-Quant	ified Results **			
C6H14O (E	Sther), ug/L	30	7	
** Ouanti	fication based upon comparison of total	ion count of	the compound	with

that of the nearest internal standard.

Sim D. Lessley, Ph.D., Laboratory Director

SITE & SAMPL PURGE	ONCEAN ING DA DATE	12 1- com 6 JC TE 41-15.	DB ID	3647 (104-615		WELL WEAT	NO OW. 1 THER: <u>elear</u> , het
WATER	ELEVA	TION/VOLUME C	ALCULAT	CIONS			
Total Depth Total Measu PURGE	depth (from water rement  VOLUM  ft Cas	of well: MP) to Water depth: 12 method: 50  E CALCULATION water * casin ing Factor: rcle one)	IS S.10 Line 4 2,17 g facto For 2" For 3"	ft Scre ft Hydr Hydr	en interval ocarbons pre ocarbons thi ing vol. *ft	sent: cknes	3 ft to 18 ft.  Yes No X  Total  clumes= 6.7 gals purged.
DRAWD	OWN DE	TERMINATION	ror 4	ula + 0.00 gal/	IL		
	level level		time _time:	:time	pump on ump off		-
Start	ime End	Cumulative Discharge (gal)	•	Conductivity µmho/cm	Turbidity	°C Temp	Comments
1206		3	6.7	1080	N. E. (5 1000)	्रा	Very turked
		10	6.6	990	,	19	
		14	8.6	1000	•)	19	
		19	6.8	1000	10	80	
1212		24	6.8	1005	1/	20	Recharge liable in organic
	1217	29	7,0	1000	7500 NT4	22	Slow recharge
Method Method Pump 1	of pull of cl	erging/sampling eaning baileng ailer ropes (	rg c/pump:_ new, cle	eaned or dedicat	ed? (circle	e one	
pH met temp c	er <u>PS@</u> orrect	ed? No	ed <u>\\</u>	conductivit	y meter <u>sew</u>	<u>~~</u>	calibrated
SAMPLE	<u>s</u>						
		- CV. V	100				
Remark	s Ri	chapt r	ate d	worked off	af = 4	60 C	1. Better than
2965a/	capA14	29 gal	205 e	= 13 well	اه (سیدج		

# PG&E WATER PURGING & SAMPLING LOG

SITE SAMPL PURGE	Colina DA  DATE	+100 GC Ges ) <u>&gt; + 100 (</u> JC TE <u>4/11/88</u> <u>4/11/88</u>	/e ( > OB ID , by _ , by _	3647 (m·· E p)		WELL WEAT	NO DUN 12. HER: Control Control
		TION/VOLUME (					
Total Depth	depth (from	of well: MP) to Water	: 3.7	(MP): Toc  ft  ft Scre  ft Hydr  Hydr	en interval	from sent:	4 ft to 19 ft.  YesNo _X
PURGE	VOLUM	E CALCULATION	<u>[</u>			4	
10	ft Cas (ci	water * casin ing Factor: rcle one)	g facto For 2" For 3" For 4"	r = 2.32 gal/cas dia = 0.17 gal/ dia = 0.38 gal/ dia = 0.66 gal/	ing vol. *_ ft ft ft	3_ vo	Total lumes= Zgals purged.
DRAWD	OWN DE	TERMINATION				•	
Water Water	level level	begin	time	: time	pump on		
PURGI	NG						
Start	ime End	Cumulative Discharge (gal)	pН	Conductivity umho/cm	Turbidity	°C Temp	Comments
1137					high Brown		hote very Tarled
		55-C	7.3	1485	red.	45	2
1:40		9	5.1	1740	high.	22.	Restaro Food of 1,98
		12	8.6	1640	med	ر دور دور	)9376
		15	8.7	1650	£ 20 NT4	_	Beter tubility
	1155	16	-				
Method Method	of pu of cl	eaning pailer	g <u>ce</u> :/pump:	Nt. Pumb/	3/ / DT	one)	
pH met temp c	er <u>DS</u> orrect	바울 calibrat ed? <u>NO</u>	ed /E	<u></u> conductivit	y meter DS/	건 6	alibrated /ES
SAMPLE	<u>s</u>						
Lab an Labora	alyses tory _	to be perfor	med	EPA modific	ed 8015,	413,	2,624
Remark	5 Wa	iler got w	Orner	as reclained	e alovad,	du	ofter 9 give.
20652/	nnn 1 4		279 1	oor (trick)	e) reclia	GO.	ofter 9 gar.

SAMPL	SITE ON GO JOB ID 3647  SAMPLING DATE 6-16-88, by 6-65  PURGE DATE 6-15-88, by 6-65  WEATHER: Clear Con									
WATER	WATER ELEVATION/VOLUME CALCULATIONS									
Description of Measuring Point (MP): Toc PVC  Total depth of well: 2 ft  Depth (from MP) to Water: 4,0 ft Screen interval from ft to ft.  Total water depth: 17,0 ft Hydrocarbons present: Yes No Hydrocarbons thickness:										
		E CALCULATION	'							
<u> </u>	ft water * casing factor = 2.9 gal/casing vol. * 3 volumes = 9 gals purged.  Casing Factor: For 2" dia = 0.17 gal/ft (circle one) For 3" dia = 0.38 gal/ft For 4" dia = 0.66 gal/ft  DRAWDOWN DETERMINATION  Water level basin									
DRAWDO	OWN DE	TERMINATION			1/	19				
Water Water	level level	begin	time:	time p	pump on	87 —				
PURGI	<u>NG</u>									
T: Start	ime End	Cumulative Discharge (gal)	рН	Conductivity µmho/cm	Turbidity	°C Temp	Comments			
1740		3	6.7	990	2200	?	Tuyb much better			
		5	6.8	1085	2 100		(when diveloped)			
		8	7,4	1210	2500		Turb worse			
		10	7.5	1160	2/00		Two better			
		12	7.5	1140	2100		Turb better			
	1757	13	eno							
Method of discharge disposal pumped to bit  Method of purging/sampling central force force / becker  Method of cleaning bailer/pump: Alconor / DI  Pump lines/bailer ropes new cleaned or dedicated? (circle one)  14/3 = 1270										
pH meter Orion calibrated 7.00=7.00 conductivity meter DSP//3 calibrated temp corrected? 4.00=4.17										
SAMPLE	<u>s</u>			^						
Lab analyses to be performed Modified 8015, 413,2,624 Laboratory Brown & Caldwell										
Remarks 1413 EC 5td reads 1270. Allowed to recharge aremite failed add 2-3 gallons before sampling in banker.										
	2965a/capA14 -1.00 13 gallons = 4,5 well volumes									

SITE ( SAMPL: PURGE	ING DA DATE	7 (20) Yang 30 TE (4) (18)	B ID	3647 " E15		WELL WEAT	NO OW.3 HER: <u>Cooch-Calm</u>
WATER	ELEVA	TION/VOLUME C	ALCULAT	IONS			
Total Depth	depth (from	of well: MP) to Water	17:53	(MP): TOC P  ft  ft Scre  ft Hydr  Hydr	en interval	from sent:	3.5ft to 18.5ft.  Yes No ?. +H; P ; KA  s: D 0.7 5.085 Se.
PURGE	VOLUM	E CALCULATION	•				Unknown SUBS!
10	Cas (ci:	ing Factor: : rcle one)	For 2" of For 3" of	r = ?. ? gal/cas dia = 0.17 gal/: dia = 0.38 gal/: dia = 0.66 gal/:	ft ft	<u>v</u> o	Total lumes= <u>7.2</u> gals purged.
Water Water	level level	beginend	time:	time time	pump on		
PURGIN	<u>IG</u>						
Ti Start	me End	Cumulative Discharge (gal)		Conductivity µmho/cm	Turbidity	°C Temp	Comments
227		4	7.6	1780	bronders to	20	
		9	80	1665	1)	19	hackanga fate to trickle
1235		100	7.2	15-91	1)	23	
		10	5 5 22	1511	N)	<u>9</u> 7.	
1251		21	ي. <u>ب</u>	1505	1)	30	
Method Method	of di	scharge dispo	osal <u>င</u>	mand Man / bath			
Method	of cl	eaning bailer	/pump:	<u> </u>	1.25	e one	)
pH met temp c	er <u>PS</u> orrect	calibrat	ted	conductivit	ty meter <u>S</u>	<u> </u>	calibrated
SAMPLE Lab an Labora	- alyses	to be perfor	rmed durado	EPA Modi	Fied 8019	5) L	113.2,624
Remark	s	21 galle	W. 6 *	8.8 we	المحالات ال	<u>L 9</u>	

		· :	PG&E	WATER PURGING &	SAMPLING LO	)G			
SITE SAMPL PURGE	Oo K ING DA DATE	10nd 10 TE 6/16/88	B ID	3647 ERJ ERJ		WELL WEAT	NO OW-3 HER: Clear, cocl		
WATER	ELEVA	TION/VOLUME C	ALCULAT	<del></del>	,				
Total Depth Total	depth (from water	of Measuring of well: MP) to Water depth: method: Sol	18.	ft ft Scre ft Hydr	Toc / F en interval ocarbons pre ocarbons thi	from sent:	3.5 ft to 18.5 ft. Yes No		
		E CALCULATION	•						
	(ci:	rcle one)	For 3"	r = 2.26 gal/cas dia = 0.17 gal/ dia = 0.38 gal/ dia = 0.66 gal/	ft	3 vo 3	lumes= Total gals purged.  3 2.26 6.78		
Water	level	begin	time time:	: time	pump onump off	-22	51		
PURGIN	<u>1G</u>								
Ti Start	End	Cumulative Discharge (gal)	pН	Conductivity µmho/cm	Turbidity	°C Temp	Comments		
1800		3	63	1000	<100		Rupine sold		
<u> </u>		4)	6.9	980	200		10		
		8	6,9	980	200		Still purpus well		
-		11	7,05	7000	7,500				
		13	7.4	1000	1000		Internation to pred.		
	1820	14	7.65	950			u the		
Method Method Pump 1	Method of discharge disposal  Method of purging/sampling  Method of cleaning bailer/pump:  Pump lines/bailer ropes new cleaned or dedicated? (circle one)  PH meter (c) calibrated 4,0:4,3conductivity meter 150H3 calibrated 165								
pH met temp c	er <u>//</u> (	<u>č∽</u> calibrat ed? <u>N∂</u>	.ed <u>4.0</u>	:4.3conductivit	y meter 150	H 3 0	calibrated es		
SAMPLE	<u>s</u>								
				od 8015,					
Remark	Remarks Allowed well to replace overnite. Bailed add 2-3 gallons before sampling it built should								
	2965a/capA14   5 gal 7.8 470 7500 15 galcons = 6.6 well volumes								