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MONITORING WELL MW4 INSTALLATION AND GEOPROBE SAMPLING

3925 Alameda Avenue
Oakland, California

12/16/96

for

Smooke and Sons Investment Co.

December 16, 1996

SEG File No. 90404
SEG Report No. 96-621

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EXECUTIVE SUMMARY

The site is a commercial property on the west side of Oakland, adjacent to and downgradient of the former Ekotek refinery facility. The vicinity contains several other LUST sites, including the Shell Oil station, the City of Oakland property, and Cobbledick-Kibbe site on High Street, and the Owens-Illinois and the Learner Company sites on Alameda Avenue. The shallow groundwater in this area is not used as a source of drinking water, and does not have a known exposure to the surface.

Two on-site underground storage tanks, one 10,000-gallon diesel and one 1,000-gallon gasoline, were removed from the subject property in March of 1988. Analytical evidence of a gasoline and a diesel release was found under the tanks at the time of their removal. Additional soil and water analyses in March of 1994 confirmed gasoline, diesel, kerosene, and BTEX in the shallow subsurface in the immediate vicinity of the former tank pit. The groundwater monitoring program has been in place since three wells were installed in the third quarter of 1995.

This investigation obtained characterization data on the hydrocarbon plume specific to the subject property by means of GeoProbes and installation of a fourth well. The plume related to the former onsite tanks was defined. An additional spike of hydrocarbons was located at the southeast corner of the property, bordering the 569 High Street LUST site. The additional spike is anomalous to the former onsite tanks, and is further supporting evidence of offsite-sourced impacts to the subject property.

Smith-Emery GeoServices will continue to monitor the onsite groundwater in preparation for a Tier 1 Risk-Based Corrective Action (RBCA) assessment of the site. The future work will be to confirm the plume dimensions, concentrations, and to document an ongoing trend of natural biodegradation of the hydrocarbons. The RBCA process is anticipated to result in classification of the benzene in groundwater at the site as low risk, thereby reducing the well monitoring schedule to annual frequency. Regulatory site closure is anticipated to proceed on the basis of passive hydrocarbon biodegradation and low-risk RBCA status, thereby precluding the need for potential options of active site remediation.

INTRODUCTION

This characterization report describes the well installation and the results of environmental sampling of the site located at 3925 Alameda Avenue in the city of Oakland, California. The current occupant of the site is Bobac Oakland C.F.S. Corporation. The location of the site in relationship to existing streets is shown on the Vicinity Map, Plate No. 1. The work was authorized by Mr. Paul Wren of Smooke and Sons Investment Co. on August 7, 1996, in Agreement Addendum No. 3. The following reports were reviewed in preparation for this project:

- Adjacent Easement Lot:
 - "Soil and Ground-Water Contamination Investigation, 569 High Street, Oakland, California" prepared by Harding Lawson Associates, HLA Job No. 9382,006/01, dated July 24, 1987.
- Subject Site:
 - "Well Installation and Environmental Sampling, 3925 Alameda Avenue, Oakland, California", prepared by Smith-Emery GeoServices, SEG File No. 90404, SEG Report No. 95-187, dated August 22, 1995.
 - "Site Characterization and Risk Assessment Workplan, 3925 Alameda Avenue, Oakland, California", prepared by Smith-Emery GeoServices, SEG Report No. SF 96-335, dated June 23, 1996.

PURPOSE

This environmental characterization of the subsurface soil and water within the subject site boundaries was intended to provide the data for a risk assessment of the benzene in the shallow groundwater. The focus of this study was the former underground storage tank area, which is shown on Plate 2. The distribution of the GeoProbe borings provided characterization data on the

boundaries of the petroleum hydrocarbon plume, from which the downgradient placement of the fourth monitoring well was chosen. Data from the GeoProbes and subsequent quarterly monitoring of the four wells will be used to complete a future Tier 1 Risk Based Corrective Action (RBCA) assessment for the site. This work has been executed in coordination with the Alameda County Department of Environmental Health (ACDEH), which provides regulatory oversight.

SCOPE OF SERVICES

The scope of our services were outlined in the site characterization workplan, SEG Report No. 96-335. This report includes the project's third quarter 1996 monitoring phase, which was reported separately as SEG Report 96-810. The services included: implementation of the OSHA-required Health and Safety Plan, well permit processing, drilling of a fourth monitoring well and eight GeoProbe borings, surveying of wellhead elevations to a mean sea level datum, development of the new well, sampling of groundwater and soil, analysis of the groundwater and soil samples, interpretation of the data obtained, and preparation of this report.

HEALTH AND SAFETY PLAN

A site-specific Health and Safety Plan (HSP) per OSHA guidelines, SEG Report No. 96-525, detailing field procedures and protocols was prepared as part of the workplan. The purpose of the HSP was to provide health and safety guidance at such times that elevated levels of petroleum hydrocarbons were encountered during the investigation. Smith-Emery GeoServices was responsible for implementing the provisions of this plan in the field.

FIELD EXPLORATION

Monitoring Well and GeoProbe Borings

On August 14, 1996, Smith-Emery GeoServices subcontracted a licensed driller to obtain eight GeoProbe borings surrounding the former tank locations, and on September 9, 1996 a four-inch diameter P.V.C. groundwater monitoring well was installed at the southeast corner of the front lot. The boring and well locations are shown on the Plot Plan, Plate No. 2A. The placement of the GeoProbe borings and Monitoring Well MW4 was based on the monitoring history of wells MW1 through MW3 for the past four quarters, and on discussions with Mr. Barney Chan of the Alameda County Health Care Services Agency, who is providing regulatory oversight.

An explanation of the symbols and notations used on the boring logs is presented on Plates No. 3 and 4. The details of well construction, and the boring log of the monitoring well appear on Plates No. 5 and 5A. Boring logs of the GeoProbe borings appear on Plate Nos. 6 through 13.

Soil Sampling

A registered geologist was present during the placement of the monitoring well and logged the boring using the Unified Soil Classification System. Environmental soil samples were obtained from the well boring using an 18-inch long Modified California split barrel sampler holding two and half inch diameter brass sleeves. The down-hole sampler was driven by a 140 pound hammer with a 30-inch cable drop. All drilling augers and down-hole sampling equipment was steam cleaned prior to use.

A registered geologist was present during the placement of the GeoProbe borings and logged the borings using the Unified Soil Classification System. Environmental soil samples were obtained from the GeoProbe borings using a 24-inch long GeoProbe sampler holding one inch diameter acetate sleeves. The sampler was driven by a 1,800 pound force created by the hydraulic ram of the truck-mounted GeoProbe. All drilling augers and down-hole equipment were steam-cleaned prior to use for each well boring.

All samples were sealed by a Teflon sheet before being closed with an air-tight plastic cap, labeled with sampling point identification, date and time sampled, then stored at approximately four degrees Celsius, and transported to the state-certified laboratory under chain-of-custody documentation. Proper environmental sampling protocol and decontamination procedures were observed in accord with applicable EPA regulations.

The sampling equipment was cleaned with an Alconox solution and double-rinsed in deionized water prior to taking each sample. Drill cuttings and sample tube splits were screened for volatile organics by a photo-ionization detector (PID) calibrated with zero gas and 49 ppm hexane. The results of the field PID screening are presented on the Boring Logs, Plates No. 5 - 13.

All soil cuttings generated during the excavation of the borings were placed in appropriately labeled 55-gallon drums and stored within the site's secured lot. Disposal of soil and groundwater will be arranged.

Subsurface Conditions

The monitoring well was installed to a depth of 20 feet and the GeoProbe borings were advanced to depths ranging from 16 to 22 feet. The surface condition in the area of the borings consists of a six inch thick section of asphaltic concrete (AC) pavement and aggregate base rock. The pavement section is underlain in areas by artificial fill up to 4.5 feet thick, composed primarily of silt, clay and sand mixtures. Borings MW 1-4 and G-3 through G-6, which comprise the central portion of the drilling area, are underlain by three to five feet of fill that consists of gravelly silts and sandy clays. A ballast of silt and gravel fill was used at the southeast edge of the front lot along the railroad tracks. Below the fill, the soil consists of olive green and black clay that is approximately 5 to 15 feet thick. A layer of silty or clayey sand ranging from 0.5 to 3 feet in thickness intersects the clay layer in some of the borings. This layer is 10.5 feet below the surface near the northern corner of the lot at boring G2, and is found at depths ranging from 15 and 17.5 feet throughout the rest of the lot.

Groundwater

Groundwater was encountered in the GeoProbe borings at depths ranging from 15 to 21 feet, with the exception of Boring G-1, which was advanced to a depth of 20 feet and encountered no groundwater. Groundwater in Monitoring Well MW4 was first encountered at a depth of 11.5 feet, and stabilized at a depth of 10.4 feet. The discrepancy in depth-to-groundwater findings between the GeoProbe and Monitoring Well borings is probably related to the differences in drilling processes used for each.

The first shallow groundwater at the site generally lies in the permeable silts and sands at the depths between 10 feet to 20 feet, interrupted by low-permeability deposits of clayey silt. The piezometric

groundwater surface was found to have stabilized at a depth of approximately 9.3 to 9.9 feet below ground, at the time of our last quarterly well measurement on September 20, 1996.

WELL CONSTRUCTION & DEVELOPMENT

The Zone 7 Water Agency of Alameda County authorized Drilling Permit No. 96583 for the installation of one groundwater monitoring well at the site. A copy of the completed permit is provided in Appendix A. Monitoring Well MW4 was constructed on September 9, 1996 in accordance with California DWR Bulletin 74-90 guidelines. The locations for the well is presented on the Plot Plan, Plate No. 2A. The elevation of the well and its water level are referenced to mean sea level surveyed from a City of Oakland benchmark, BM 19NW24, located at the nearby intersection of Eighth Street and Alameda Avenue. The USGS Oakland East Quadrangle topographic map indicates that local surface elevation is approximately 9 feet above mean sea level.

The construction materials of MW4 were similar to those used in the onsite wells MW1, MW2, and MW3. MW4 was constructed using a four-inch I.D. Schedule 40 PVC casing and slotted PVC screen (0.020 inch opening), set in a No. 2/12 clean washed filter sand. MW4 was screened over a 14.5 foot interval from 5 feet to 19.5 feet below ground surface. The screened zone was surged to settle the filter sand before placing a one-foot layer of bentonite chips as a seal. The remainder of the annular space was backfilled with a concrete slurry to the surface. The surface of the well was completed with a locking expansion plug and a water tight, traffic-rated housing in a concrete slurry. Groundwater monitoring well construction details are presented in the Boring Log on Plate No. 5.

Smith-Emery GeoServices observed well development of the monitoring well as performed by Blaine Tech Services on September 12, 1996. The well's concrete annular seals had been allowed to set over 72 hours prior to developing the well. The well was surged for at least five minutes over five foot intervals to remove fines and create a gradation between filter material and native soil. The well was then pumped with a Middleburg air-bladder pump during development to remove water and sediment.

Temperature, pH, conductivity, and turbidity were monitored periodically during well development. Development continued until temperature, pH, turbidity, and conductivity parameters stabilized. After approximately 18 well volumes were removed from the well, the well was recapped and allowed to recover.

All development water was drummed, labeled, and stored on site under the control of the owner pending disposal. Groundwater monitoring well development data recorded by Blaine Tech Services are included in Appendix B. The total volume of water removed and final Imhoff solids readings for each well is shown in Table 1, Well Development Results.

TABLE 1 - WELL DEVELOPMENT RESULTS

<u>Well I.D.</u>	<u>Volume Removed</u>	<u>One Well Volume</u>	<u>Final pH</u>	<u>Final Conductivity</u>	<u>Final Temperature</u>	<u>Final Turbidity</u>
MW-4	110 gallons	6.1 gal.	7.2	1000 μ mhos	70.6 F	124.7 ntu

Note: ntu = nephelometric turbidity units

WELL ELEVATION SURVEY

The top of the well head casing was surveyed at 8.44 feet above mean sea level (MSL) by Mr. Lutz Kunze, a California-licensed civil engineer, to determine the groundwater gradient. The City of Oakland survey monument BM19NW24, at the nearby intersection of Eighth Street and Alameda Avenue, was used as the benchmark. A level and rod were then used to determine the elevation of the well head with respect to the benchmark. A fiberglass tape was used to measure the horizontal distances of the well from the northeast corner of the main building on site.

WATER SAMPLING

Smith-Emery GeoServices returned on September 20, 1996 to purge and sample monitoring wells MW1 through MW4 according to established guidelines. Prior to sampling, the depth to water and to the bottom of the well were measured with respect to a reference point at the top of the casing using an electronic water level meter, accurate to the nearest one-hundredth of a foot. A transparent bailer was then used to sample the surface of the water table in the wells for the purpose of observing any free product. Slight petroleum odors were noticed in the well purge water from each well. Purging, which occurred a minimum of 24 hours after well development, was performed at a rate one gallon per minute. Three to four well volumes were removed from each well. Recharge rates in the well was relatively rapid. Measured levels of pH, temperature, and conductivity; and the visual level of turbidity were stabilized prior to taking samples. Detailed records of well purging and sampling data appear in Appendix B.

Each well's groundwater sample was obtained in a new disposable Teflon bailer equipped with a flow control valve. Water samples for volatiles analysis were placed in EPA-approved 40-ml vials capped with Teflon-backed septa. No air bubble or headspace was allowed in the samples taken. All samples were then labeled, placed in zip lock bags, preserved at approximately four degrees Celsius on blue ice, and transported with appropriate chain-of-custody documentation to a state-certified laboratory.

WELL MEASUREMENT

Groundwater level measurements were taken at the time that the monitoring wells were sampled on September 20, 1996. Static water levels and well depths were measured to the nearest one-hundredth of a foot using an electronic level indicator. Well measurement and survey data obtained for the four wells are presented in Table 2

TABLE 2 - WELL MEASUREMENT DATA

<u>Date of Well I.D.</u>	<u>Date of Measurement</u>	<u>Top of Casing Elevation MSL</u>	<u>Depth to Water from Top of Casing</u>	<u>Water Elevation MSL</u>
MW-1	9-20-96	8.73'	9.68'	-0.95'
MW-2	9-20-96	8.42'	9.34	-0.92'
MW-3	9-20-96	9.26'	9.88	-0.62'
MW-4	9-20-96	8.44'	9.78	-0.1.34'

Note: The benchmark elevation was set referenced to City of Oakland survey monument BM-19NW24 at elevation 9.664 feet above mean sea level. Per the USGS topographical map for the Oakland East Quadrangle, the ground surface elevation at the site is approximately 10 feet above mean sea level.

REGIONAL AND SITE HYDROGEOLOGY

The site is located in the East Bay Plain of the Coast Range physiographic province of northern California. The land survey for this project referenced city benchmark BM19NW24 at the corner of Alameda Avenue and Eighth Street, which has an elevation of 9.664 feet above mean sea level. The survey of the well casings indicate that the site's surface elevations range from approximately 9 feet above mean sea level along the Alameda Avenue frontage, to approximately 8 feet at the rear of the property. The surface in the general area slopes gently southwest toward the Tidal Canal of the Alameda Harbor, which lies 3/8ths of a mile to the southwest.

The East Bay Plain is comprised of flat alluvial lowlands with bay and tidal marshes, much of which have been overlain with artificial fill. The geologic units beneath the site consist of unconsolidated, permeable-to-impermeable interbeds of fine-to-coarse-grained sediments of Quaternary Age alluvial and estuarine deposits. These unconsolidated deposits are estimated to occur from the ground surface to a depth of approximately 1000 feet, according to USGS Professional Paper 943.

The major groundwater-bearing materials beneath the East Bay Plain occur at depth ranging from 50 feet to 1,000 feet below ground surface. Groundwater from these aquifers is presently used mostly for irrigation and industrial purposes.

Groundwater-bearing soil layers within a shallow aquifer were encountered at a depth of approximately 5 feet and greater. The groundwater gradient in the third quarter 1996 was calculated from well measurements to be 0.68 feet per foot in a flow direction of South 38° West, with depths-

to-water in the range of ten feet. The flow direction is shown on, Plate No. 14. Depth to groundwater data and wellhead elevations are presented in Table 2.

ANALYTICAL PROGRAM

Analytical tests on the samples for this project were performed by North State Environmental, a state-certified laboratory. The detailed results of all analytical work are contained in Appendix C, Analytical Data and Chain-of-Custody. A site schematic of the wells showing summarized analytical data is presented on Plate No. 2A.

Soil Samples

Selected soil samples obtained from the Monitoring Well MW4 boring was analyzed for gasoline and diesel by Method EPA 8015M, for Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) gasoline constituents by Method EPA 8020, and for the gasoline constituent methyl tertiary butyl ether (MTBE) by EPA Method 8020. A summary of the analytical results is presented in Table 3 - Analytical Results of Soil Samples, Monitoring Well MW-4.

Selected soil samples obtained from the GeoProbe borings were analyzed for gasoline and diesel by Method EPA 8015M, for BTEX by Method EPA 8020, and for MTBE by EPA Method 8020. A summary of the analytical results is presented in Table 4 - Analytical Results of Soil Samples, GeoProbe Borings.

Groundwater Samples

Grab groundwater samples were obtained at the time of drilling from the Monitoring Well MW4 boring and from the GeoProbe borings, with the exception of G-1 that did not yield groundwater. These samples were analyzed for gasoline and diesel by Method EPA 8015M, for BTEX by Method EPA 8020, and for MTBE by EPA Method 8020. Summaries of these analytical results are presented in Table 5 - Analytical Results of Groundwater Samples, Monitoring Well MW-4; and in Table 6 - Analytical Results of Groundwater Samples, GeoProbe Borings.

Quarterly monitoring, which included Monitoring Well MW-4, was conducted on September 20, 1996. The groundwater samples obtained from wells MW1, MW2, MW3, and MW4 were analyzed for gasoline by Method EPA 8015M, for BTEX gasoline constituents by Method EPA 8020, and for MTBE by EPA Method 8020.

A summary of the well measurement and analytical data for all readings for the monitoring wells at the site, including the first reading for Monitoring Well MW4 is presented in the Table 7 - Summary of Well Measurement and Analytical Data.

**TABLE 3 - ANALYTICAL RESULTS OF SOIL SAMPLES
MONITORING WELL MW-4**

Sample Name	TPH-G (ppm)	TPH-D (ppm)	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	Xylenes (ppm)	MBTE (ppm)
MW4-1-6'	0.950	ND	0.011	0.020	0.010	0.025	0.060
MW4-2-10'	0.66	ND	0.033	0.028	0.024	0.061	0.065
MW4-3-11'	1.1	ND	0.012	0.013	0.026	0.016	0.080
MW4-4-16'	0.560	ND	0.020	0.005	0.008	0.018	0.028
MW4-5-19'	18	ND	0.065	0.050	0.42	0.84	0.11

Note: ND - Not Detected
Date sampled 9/6/96, Date analyzed 9/12/96

**TABLE 4 - ANALYTICAL RESULTS FOR SOIL SAMPLES
GEOPROBE BORINGS**

Sample Name	TPH-G (ppm)	TPH-D (ppm)	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	Xylenes (ppm)	MBTE (ppm)
G1-5-16	0.150	1	ND	ND	ND	0.020	0.024
G2-4-16	ND	ND	ND	ND	ND	ND	ND
G3-4-17	0.660	ND	ND	ND	ND	0.018	0.013
G4-4-17	ND	ND	ND	0.006	ND	0.041	0.021
G5-2-9	46.0	21.0	1.3	0.21	0.24	0.34	0.15
G5-4-16.5	0.59	ND	ND	ND	ND	0.015	ND
G6-3-15	ND	ND	ND	ND	ND	ND	ND
G7-3-14.5	ND	ND	ND	ND	ND	ND	ND
G8-2-14	ND	ND	ND	ND	ND	ND	ND

Note: ND - Not Detected

Date sampled 8/14/96, Date analyzed 8/19/96

**TABLE 5 - ANALYTICAL RESULTS OF ~~GRAB GROUNDWATER~~ SAMPLE
INSTALLATION OF MONITORING WELL MW4**

Sample Name	TPH-G (ppm)	TPH-D (ppm)	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	Xylenes (ppm)	MBTE (ppm)
MW4-W-12'	11	330	0.31	0.053	0.47	1.1	0.170

Note: ND - Not Detected

Date sampled 9/6/96, Date analyzed 9/12/96

**TABLE 6 - ANALYTICAL RESULTS OF GRAB GROUNDWATER SAMPLES
GEOPROBE BORINGS**

Sample Name	TPH-G (ppm)	TPH-D (ppm)	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	Xylenes (ppm)	MBTE (ppm)
G1 (no sample *)							
G2-WATER	0.15	ND	ND	0.002	ND	0.010	0.003
G3-WATER	0.670	5.0	0.017	0.015	0.020	0.035	0.013
G4-WATER	4.1	11.0	0.25	0.16	0.35	0.30	0.370
G5-WATER	1.5	6.0	0.12	0.023	0.10	0.25	0.11
G6-WATER	4,200	1,800	15	27	70	191	96
G7-WATER	3.0	3.0	0.29	0.032	0.094	0.085	0.070
G8-WATER	3.8	6.0	0.005	0.007	0.016	0.021	0.041

Note: ND - Not Detected

Date sampled 8/14/96, Date analyzed 8/19/96

* GeoProbe G1 did not yield groundwater.

**TABLE 7 - ANALYTICAL RESULTS OF GROUNDWATER SAMPLES
MONITORING WELLS MW-1 THROUGH MW-4**

Sample Name	TPH-G (ppm)	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	Xylenes (ppm)	MBTE (ppm)
MW-1-QTR-3	2.20	0.570	0.030	0.110	0.080	0.070
MW-2-QTR-3	11.0	2.700	0.600	0.500	1.500	0.370
MW-3-QTR-3	0.370	0.004	ND	0.026	0.013	0.006
MW-4-QTR-3	12.0	0.890	0.120	1.100	2.000	0.260

Note: ND - Not Detected

Date sampled 9/20/96, Date analyzed 9/26/96

TABLE 8 - WELL MONITORING HISTORY, 1995-1996

Well I.D.	Date of Meas.	Elevation (MSL)	Flow Gradient	Flow Direction	TPH-G (mg/L)	Diesel (mg/L)	Kerosene (mg/L)	Mtr Oil (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	MTBE (mg/L)
Q3 96 ROUTINE QUARTERLY MONITORING													
MW-1	9-20-96	-0.95'	0.68%	S36°W	2.2	---	---	---	0.570	0.030	0.110	0.800	0.070
MW-2	9-20-96	-0.92'			11.0	---	---	---	2.7	0.600	0.500	1.500	0.370
MW-3	9-20-96	-0.67'			0.37	---	---	---	0.004	ND	0.026	0.013	0.006
MW-4	9-20-96	-1.34'			12.0	---	---	---	0.890	0.120	1.100	2.000	0.260
Q2 96 ROUTINE QUARTERLY MONITORING													
MW-1	6-26-96	-1.23'	1.3%	S46°W	7	ND	3	ND	2.3	0.062	0.230	0.160	0.093
MW-2	6-26-96	-1.15'			5	ND	1	ND	1.0	0.170	0.150	0.290	0.120
MW-3	6-26-96	-1.59'			0.4	ND	0.6	ND	0.004	0.004	0.025	0.012	0.009
Q1 96 ROUTINE QUARTERLY MONITORING													
MW-1	3-29-96	-0.85'	0.3%	S4°W	12	ND	4	ND	0.730	0.089	0.300	0.180	0.270
MW-2	3-29-96	-0.78'			6	ND	2	ND	0.640	0.300	0.190	0.490	0.078
MW-3	3-29-96	-0.69'			0.3	ND	0.2	ND	0.002	0.002	0.015	0.009	0.006
Q4 95 ROUTINE QUARTERLY MONITORING													
MW-1	12-7-95	-1.59'	0.6%	S37°E	6	ND	ND	ND	0.343	0.032	0.133	0.184	---
MW-2	12-7-95	-1.41'			8	ND	ND	ND	0.240	0.200	0.108	0.402	---
MW-3	12-7-95	-1.38'			ND	ND	ND	ND	ND	ND	0.013	0.013	---
Q3 95 ROUTINE QUARTERLY MONITORING													
MW-1	9-22-95	-1.78'	2.2%	S8°W	11.0	5	3	ND	2.3	0.081	0.390	0.560	---
MW-2	9-22-95	-1.27'			7.2	3.5	2	ND	1.2	0.560	0.250	1.0	---
MW-3	9-22-95	-0.62'			0.130	1.9	ND	ND	0.001	0.001	0.012	0.013	---
SOIL BORINGS, (Engeo, Inc.)													
B1-2	3/7/94	---	---	---	22	26	ND	---	0.034	ND	0.680	0.110	---
B2-3	3/7/94	---	---	---	150	19	ND	---	ND	ND	0.970	1.400	---
B3-1	3/7/94	---	---	---	ND	ND	ND	---	0.029	ND	ND	0.007	---
B4-2	3/7/94	---	---	---	370	150	150	---	0.180	ND	0.800	2.500	---
B2-W	3/7/94	---	---	---	52	2.30	0.410	---	2.30	2.1	0.710	3.00	---
B2-W	3/7/94	---	---	---	9.8	2.40	3.20	---	2.40	0.045	0.100	0.082	---
TANK REMOVAL, (Engeo, Inc.)													
1 Soil	3/18/88	---	---	---	---	210	---	---	0.42	0.33	---	0.840	---
2 Soil	3/18/88	---	---	---	---	450	---	---	ND	3.3	---	79	---
3 Soil	3/18/88	---	---	---	720	---	---	---	6.6	110	---	150	---
4 Soil	3/18/88	---	---	---	190	---	---	---	0.24	9.6	---	32	---
5 Water	3/18/88	---	---	---	---	150	---	---	---	---	---	---	---

---Notes:ND = not detected above the method detection limit.
--- = not applicable

SMITH-EMERY GEOSERVICES

RESULTS

GeoProbes

Soil: Gasoline was detected in soil samples in GeoProbe Borings G-1, G-3, and G-5 at concentrations ranging from 0.15 to 46 ppm. Diesel was detected in GeoProbe Borings G-1 and G-5 at concentrations of 1.0 and 21.0, respectively. Boring G-5 was the only GeoProbe boring to contain all of the BTEX components, including a benzene concentration of 1.3 ppm. Low levels of toluene, xylenes, and MTBE were detected in G-4, and low levels of xylenes and MBTE were detected in Borings G-1 and G-3. GeoProbes G-6, G-7, and G-8 had ND results for the analyses of the soil samples tested. It should be noted that all GeoProbe water samples were positive for hydrocarbons.

Groundwater: The GeoProbe grab groundwater samples all contained gasoline, diesel, BTEX components, and MBTE, with the exceptions that G-2 did not contain detectable amounts of diesel, benzene, or ethylbenzene, and G-1 did not yield a water sample. The highest concentrations of hydrocarbons were found in G-6, with gasoline at 4,200 ppm, benzene at 15 ppm, and elevated levels of BTEX components and MBTE. The remaining grab water samples of the GeoProbes had much lower concentrations than G-6, containing 11 ppm diesel or less, 4.1 ppm gasoline or less, and BTEX components and MBTE each at less than one ppm.

MW4 Boring

Soil and Groundwater: The Monitoring Well MW4 installation soil samples contained elevated concentrations of gasoline, BTEX components, and MBTE; and did not contain detectable concentrations of diesel. Concentrations of gasoline ranged from 0.56 to 18 mg/kg, or parts per

million (ppm), and benzene ranged from 0.065 to 0.11 ppm. The grab sample of groundwater from Monitoring Well MW4 taken during well installation contained gasoline at 11 ppm, diesel at 330 ppm, and detectable amounts of BTEX and MBTE.

Third Quarter 1996 Groundwater Monitoring

Gasoline and all of the BTEX components were found in detectable amounts in all of the monitoring well samples for the third quarter of 1996, with the exception that toluene was not detected in Monitoring Well 3. The results for the third quarter 1996 monitoring well samples show that all but one of the petroleum hydrocarbon concentrations in Monitoring Well 1 decreased from the previous quarter's result, all of the concentrations in Monitoring Well 2 increased from the previous quarter's result, and the concentrations in Monitoring Well 3 had very slight changes from the previous quarter with gasoline and toluene decreasing, ethylbenzene and xylenes increasing, and benzene remaining the same. For Monitoring Well 4, the gasoline concentration was 12 ppm and the benzene concentration was 0.89 ppm, while the remaining BTEX and MBTE components ranged from 0.26 to 2.0 ppm. Diesel and kerosene in groundwater were not tested in this sampling event, but will be tested in the fourth quarter of 1996.

Groundwater Gradient

The groundwater gradients have been measured at the site for the past five quarters. A history of the measurements, gradients, and flow direction was presented in Table 8, in the previous section.

The measured groundwater gradient and flow direction have experienced moderate shifts during the past five quarters, but have remained generally at a low slope to the southwest. This variation is

typically the result of changes in the regional groundwater gradients surrounding the project due to seasonal geohydrological cycles, subsurface recharge zones, subsurface geology, tidal basin influences, or groundwater extraction wells. The elevation of the piezometric surface has reached its seasonal high levels in the fourth and first quarters of the year, corresponding with the greatest seasonal recharge of the shallow aquifer. Review of the prior five quarters of data indicate that measured hydrocarbon concentrations also peak during the seasonal high water recharge and piezometric surface elevation.

At the time of the measurement in the third quarter of 1996, the gradient was approximately 0.68 vertical feet over 100 horizontal feet at a direction of South38°West. A map showing the flow direction for these measurements is included as Plate 2, Quarterly Monitoring. The direction has been toward the southwest for the first three quarters of 1996.

SITE CHARACTERIZATION

Background

The shallow groundwater in the industrial district containing the site has been impacted by several intermixed hydrocarbon plumes identified with several former hydrocarbon storage operations. The vicinity contains several other LUST sites, including the Shell Oil station, the City of Oakland property, and Cobble Dick-Kibbe site on High Street, and the Owens-Illinois and the Learner Company sites on Alameda Avenue. The shallow groundwater in this area is not a source of drinking water, and does not have a known route of surface expression.

The intermixing of the locality's groundwater plumes may be caused by a combination of local factors, including tidal influences, low gradients, and shifting flow direction of the groundwater. The direction of groundwater flow in the area has been reported as experiencing significant shifts depending upon the amount of seasonal rainfall.

Two on-site underground storage tanks, one 10,000-gallon diesel and one 1,000-gallon gasoline, were removed from the subject property in March of 1988. Analytical evidence of a gasoline and a diesel release was found under the tanks at the time of their removal. Additional soil and water analyses in March of 1994 confirmed gasoline, diesel, kerosene, and BTEX in the shallow subsurface in the immediate vicinity of the former tank pit. The groundwater monitoring program has continued since the third quarter of 1995.

The intent of this investigation was to obtain characterization data on the hydrocarbon plume specific to the subject property by means of GeoProbes and an additional fourth well. Smith-Emery will continue to monitor the groundwater in preparation for a Tier 1 Risk-Based Corrective Action (RBCA) assessment of the site. The future work will be to confirm plume dimensions, and to document ongoing natural biodegradation of the hydrocarbons. The RBCA data is anticipated to result in classification of the benzene in groundwater at the site as low risk, thereby reducing the well monitoring schedule to annual frequency. Regulatory site closure is anticipated to proceed on the basis of passive biodegradation and low-risk RBCA status, thereby precluding the need for potential options of active site remediation.

Current Investigation

The results of this investigation confirm the previous identifications of petroleum hydrocarbons at the top of the shallow groundwater aquifer, distributed to the southwest of the former tank zone in the local downgradient direction. Further definition of the onsite hydrocarbon concentration gradients indicates that there are two centers of hydrocarbon (HC) concentration, intermixing in a plume extending south from the former tanks location. The first HC center is the former tank zone, from which migration has proceeded downgradient and crossgradient relative to the measured direction of groundwater flow. The map of the hydrocarbon concentration gradient indicates that a second and more concentrated center of hydrocarbons is located downgradient and slightly east of the plume. The relationship of the two centers of hydrocarbon concentration is illustrated in Plate 2C, Benzene Concentration Gradient, which diagrams the results of the characterization sample analyses. In addition, previous site monitoring confirmed that kerosene and other hydrocarbons from the upgradient Ekotek facility's site are flowing through the subject site.

As shown in Plate 2C, MW2 appears to be located near the center of the former onsite tank plume, with 2.7 ppm benzene. The data indicate that the plume concentration gradient decreases to nondetectable levels very quickly in the upgradient direction from the former onsite USTs location. The benzene concentration gradient in the downgradient direction of the former USTs decreased to 0.890 ppm benzene at MW4, before rising steeply again to 15 ppm benzene in Geoprobe G-6, the second center observed. The diesel concentration gradient is similar to the benzene gradient, and was measured at ND at MW2, at 330 ppm diesel at MW4, and peaked at 1,800 ppm diesel in G-6.

The concentrations of diesel, gasoline, and BTEX found during the original tank removal in 1988, summarized below in Table 9, were significantly lower than concentrations found in GeoProbe G-6.

TABLE 9 - TANK REMOVAL SAMPLE ANALYSIS, 3/18/88

Sample Name	TPH-D (ppm)	TPH-G (ppm)	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	Xylenes (ppm)
1 Soil	210	---	0.42	0.33	---	0.840
2 Soil	450	---	ND	3.3	---	79
3 Soil	---	720	6.6	110	---	150
4 Soil	---	190	0.24	9.6	---	32
5 Water	150	---	---	---	---	---

Source: Engeo, Incorporated; Project 3614 Report, 3925 Alameda Avenue, Oakland, Ca., March 24, 1994

Note: ND - Not Detected

--- = Not Analyzed

The second center of HC concentrations near G-6 is about 60 feet downgradient of and slightly crossgradient of the original onsite tank location. The G-6 reported HC concentrations are more concentrated than any of those in the monitoring history of HC findings for the onsite former tank location and plume.

The specifics regarding the two centers of hydrocarbon concentrations indicate that formerly two fuel sources have impacted the two locations. The onsite fuel source was the two former fuel tanks, centered in the vicinity of Monitoring Well No. 2, which resulted in the first concentration center observed. A second, unknown source is responsible for the anomalously high HC concentration centered at GeoProbe G-6. GeoProbe G-6 is located where no onsite tank installations existed, but is physically contiguous with the hydrocarbon impact documented for the 569 High Street LUST site, which is the most probable offsite source of the observed impact due to the observed location and hydrocarbon concentrations.

I don't agree

CONCLUSIONS

The primary focus of this characterization was to evaluate the onsite plume in terms of benzene concentrations and extent of plume migration. The characterization data indicates that the onsite plume starts at the former tank location and decreases downgradient toward the southeast property boundary, where it merges with a second and higher concentration of hydrocarbons that relate to an offsite impact.

Concentrations of hydrocarbons in soil samples were used to evaluate the vertical extents of the hydrocarbon plume. The upper vertical limit of the plume appears correlated with the piezometric groundwater surface at approximately ten feet below ground surface (bgs). Seasonal variations of the depth-to-groundwater and direction of groundwater flow have resulted in a smear zone of water-saturated soil containing the plume. The lower limit of the plume appears to be about 14 feet bgs in the area directly below the former onsite fuel tanks.

The horizontal limits of the petroleum hydrocarbon plume were evaluated using hydrocarbon concentrations obtained from grab water samples and monitoring wells. The characterization sampling did not extend beyond the property boundaries. In plan view, the plume in the former tank zone has assumed an oval shape centered near MW1 and MW2 (2.7 ppm benzene, 11 ppm gasoline). Concentrations decrease laterally to nondetect levels in the upgradient and crossgradient directions, and decrease to about 0.89 ppm benzene and 12 ppm gasoline in the downgradient direction at MW4. The concentrations rapidly increase again south of MW4, about 60 feet downgradient of the former tank zone, reaching peaks of gasoline at 4,200 ppm, benzene at 15 ppm, and diesel at 1,800 ppm in a

grab sample of groundwater at GeoProbe G-6 on the property line. The concentrations of hydrocarbons found in G-6 were the highest found thus far on the subject site, exceeding the gasoline and diesel test results of original tank removal samples by sevenfold and threefold, respectively. GeoProbe G-6 is adjacent to the surface staining and subsurface impacts of hydrocarbons documented for the adjoining City of Oakland property at 569 High Street.

In conclusion, this study used soil and groundwater analyses to provide a characterization of the petroleum hydrocarbons at the subject site. The hydrocarbons centered in the area of the former onsite USTs are defined in a plume which decreases in the downgradient (southwest) direction, before merging with a second center of hydrocarbons at the southeast property border. Previously, impact to the site by migration of kerosene in a hydrocarbon plume from the upgradient Ekotek site has been demonstrated. The dimensions, hydrocarbon constituents, and shape of the plume were thus characterized within the subject site property boundaries. Near-term work at the subject site will include quarterly monitoring of the four monitoring wells, documentation of natural hydrocarbon attenuation, and preparation of a Tier 1 Risk-Based Corrective Action (RBCA) assessment toward site closure. It is anticipated that the outcome of the RBCA process will be classification of the site as a low risk case that will not require remedial action. After site classification as a low-risk case, the monitoring frequency at the site should be downgraded to semi-annual or annual frequency, with case closure following sufficient demonstration of a continued trend of hydrocarbon degradation by natural processes.

LIMITS OF LIABILITY

The findings, conclusions and recommendations contained in this report are based on site conditions as they existed at the time of our investigation, and we further assume the explorations to be representative of the subsurface conditions throughout the site.

The factual data and interpretations pertain to the specific project described in this report and are solely for the use of **Smooke and Sons Investment Company** and are not applicable to any other project or site. Any reliance on this document by any other person or entity shall be at that party's sole risk.

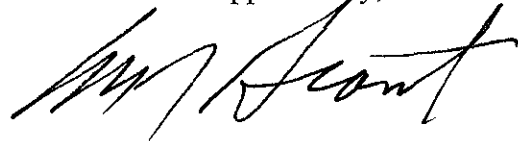
Our investigation was performed using the standard of care level of skill ordinarily exercise under similar circumstances by reputable Environmental Assessors and Geologists currently practicing in these or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

Respectfully submitted,
SMITH-EMERY GEOSERVICES



RICK WIDEBROOK, R.E.A.
Registered Environmental Assessor No. 6603
Project Geologist

Reviewed and approved by,



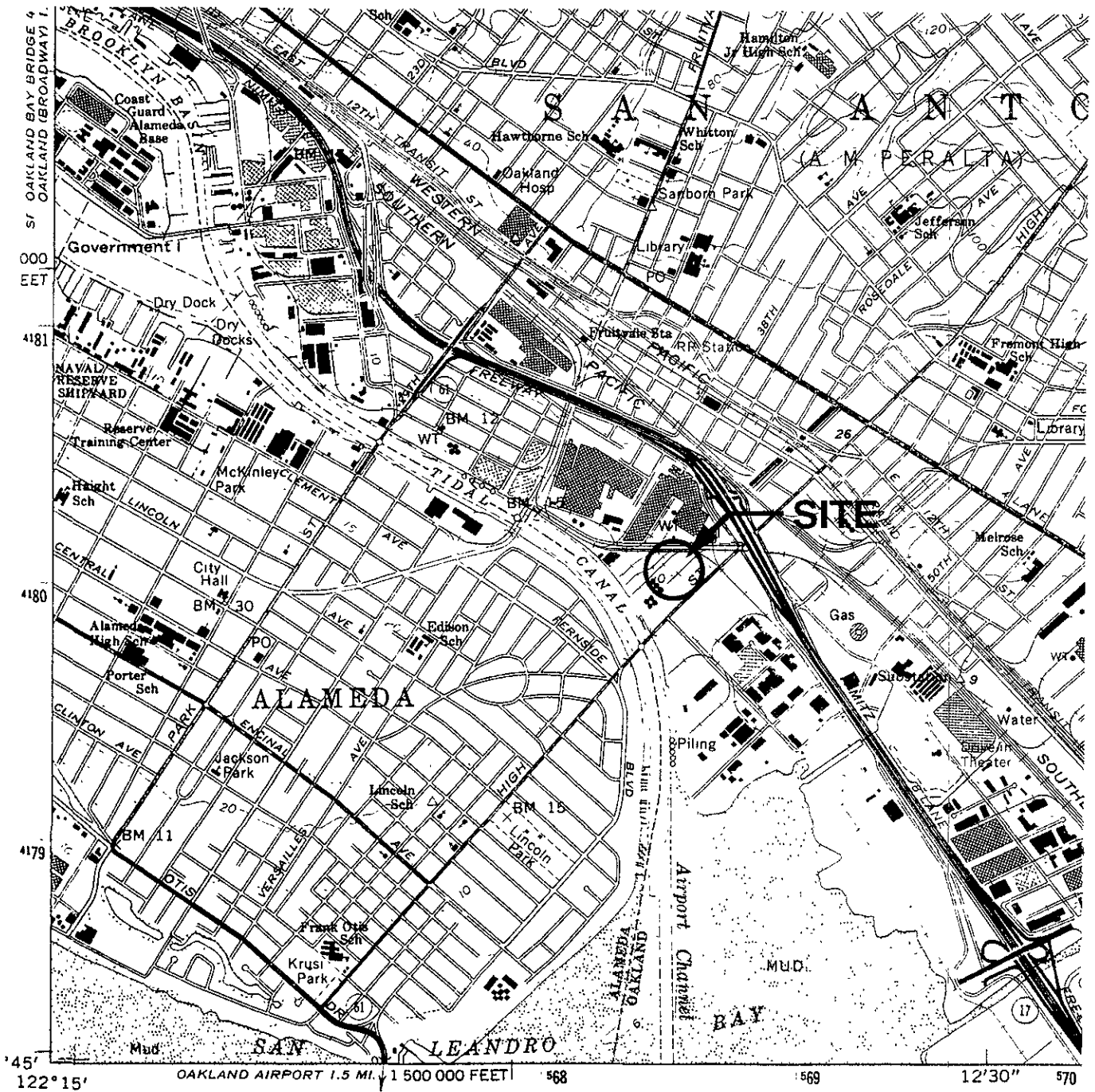
MILES GRANT, R.G.
Registered Geologist No. 5367
Project Geologist

SMITH-EMERY GEOSERVICES

PLATES



SCALE: 1" = 2000'



REFERENCE:
 U.S.D.I. - GEOLOGICAL SURVEY
 OAKLAND EAST QUADRANGLE
 ALAMEDA COUNTY, CALIFORNIA

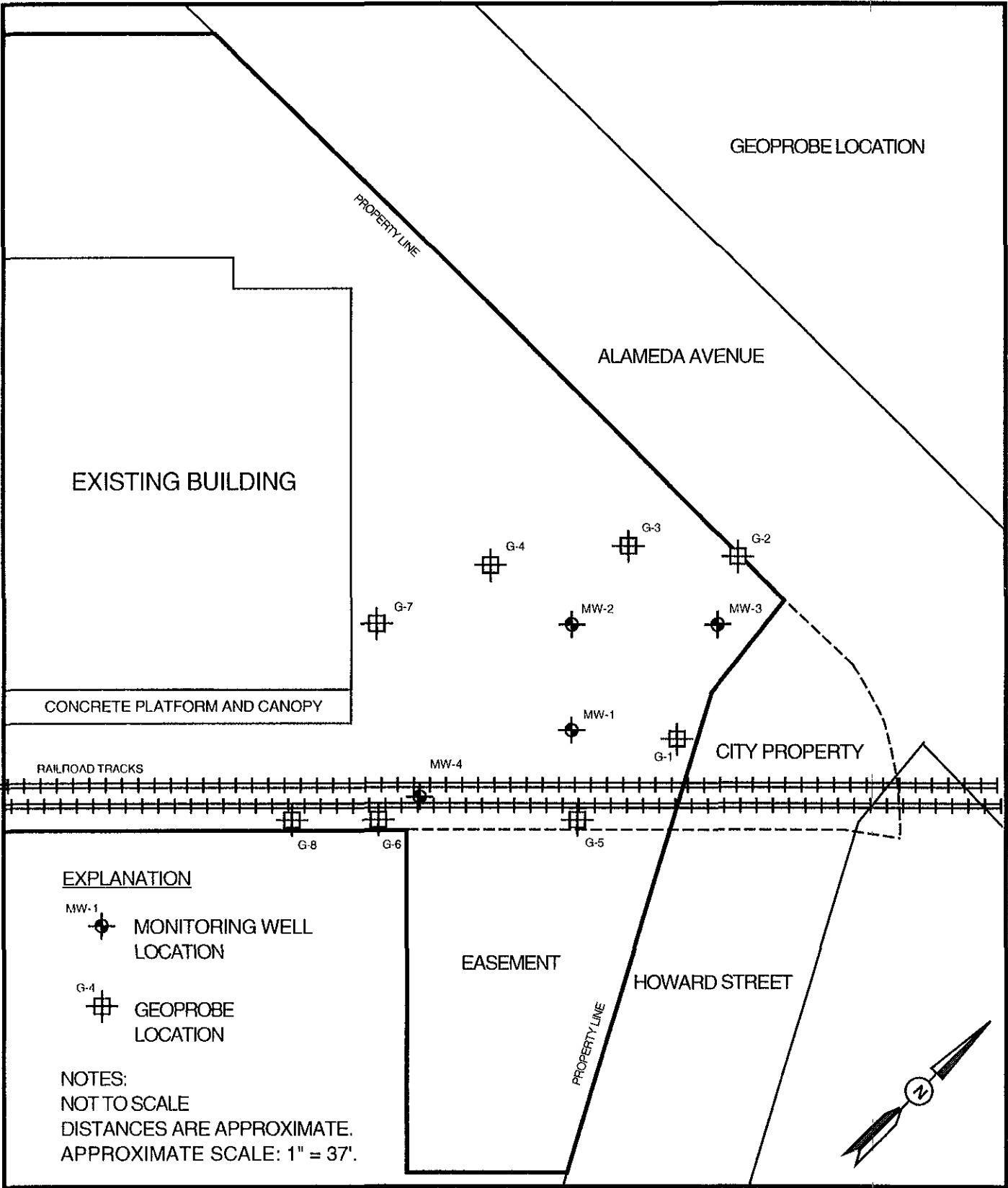
VICINITY MAP
 FILE NO. 90404

SMOOKE & SONS
 3925 ALAMEDA AVENUE
 OAKLAND, CALIFORNIA



SMITH-EMERY GEOSERVICES

TECHNICAL ILLUSTRATION BY P.M.

PLATE 1



EXPLANATION

- MW-1  MONITORING WELL LOCATION
- G-4  GEOPROBE LOCATION



NOTES:
 NOT TO SCALE
 DISTANCES ARE APPROXIMATE.
 APPROXIMATE SCALE: 1" = 37'.

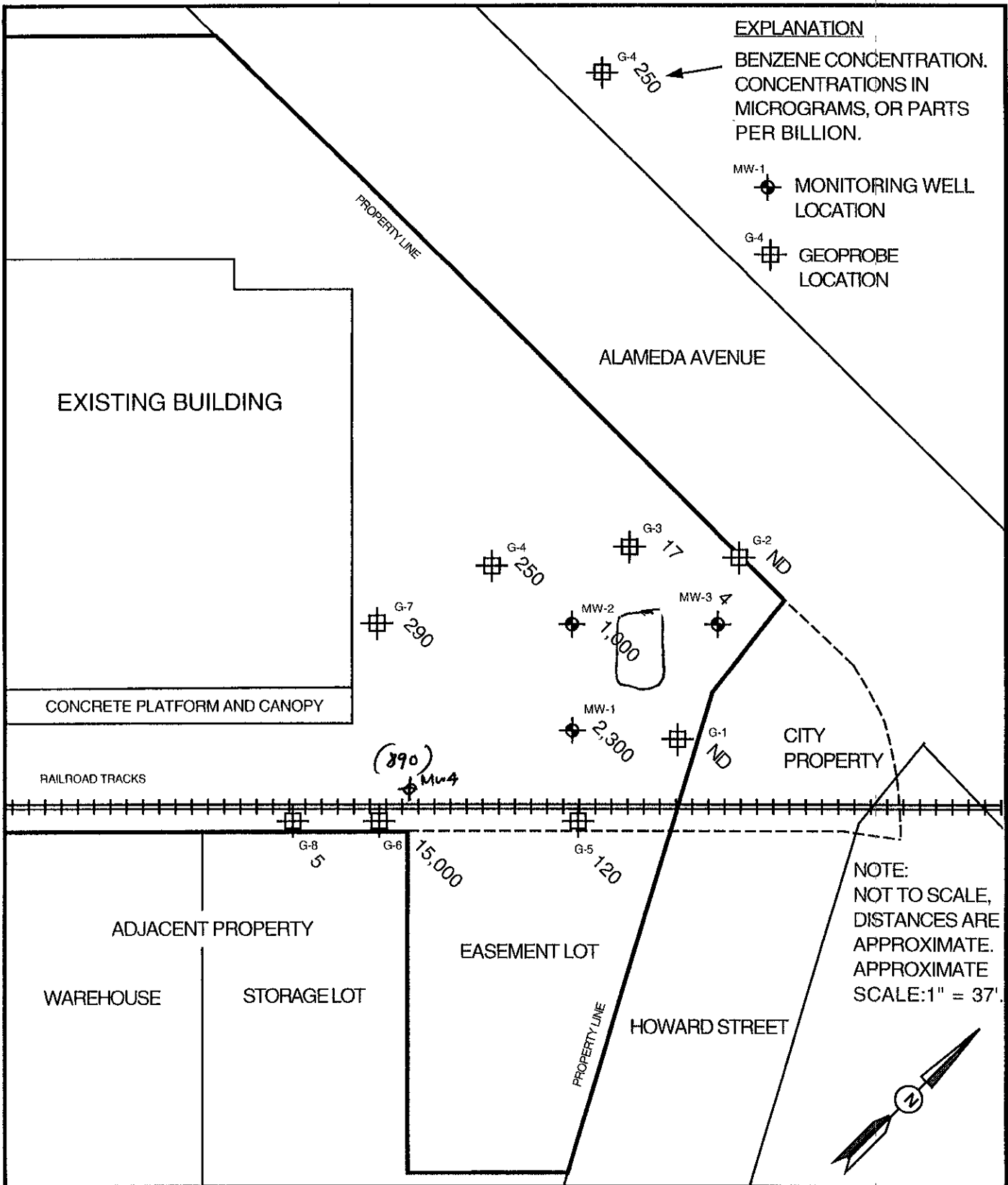
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 OAKLAND, CALIFORNIA

PLOT PLAN
SMITH-EMERY GEOSERVICES
 SEG JOB NO. 90404 PLATE 2A

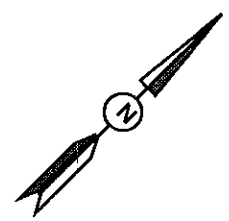
EXPLANATION

BENZENE CONCENTRATION.
CONCENTRATIONS IN
MICROGRAMS, OR PARTS
PER BILLION.

- MW-1  MONITORING WELL LOCATION
- G-4  GEOPROBE LOCATION



NOTE:
NOT TO SCALE,
DISTANCES ARE
APPROXIMATE.
APPROXIMATE
SCALE: 1" = 37'




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BENZENE CONCENTRATIONS, ug/L
Third Quarter 1996 Data
SMITH-EMERY GEOSERVICES
SEG JOB NO. 90404 PLATE 2B

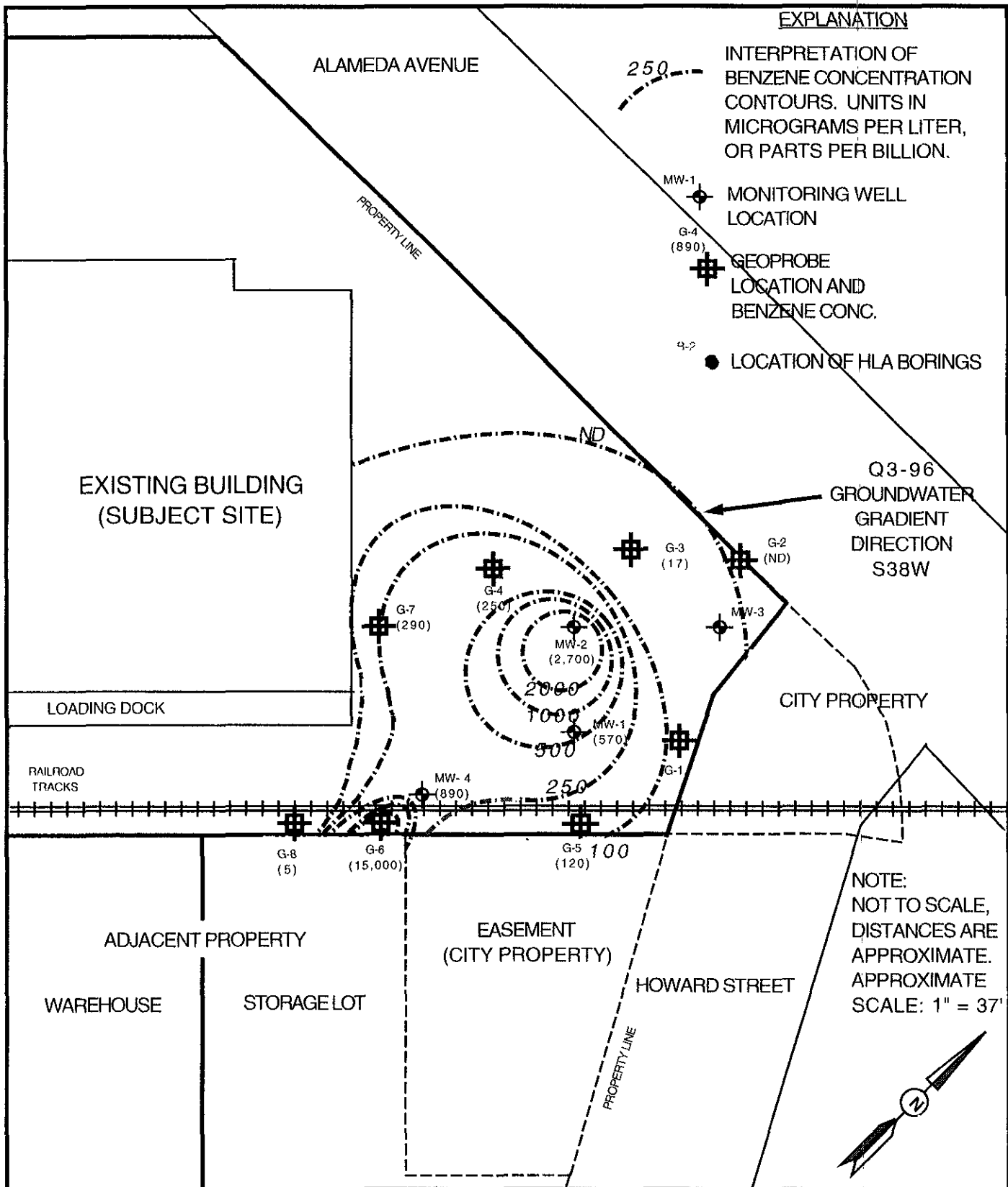
EXPLANATION

INTERPRETATION OF BENZENE CONCENTRATION CONTOURS. UNITS IN MICROGRAMS PER LITER, OR PARTS PER BILLION.

MW-1
 MONITORING WELL LOCATION

G-4 (890)
 GEOPROBE LOCATION AND BENZENE CONC.

Q-2
 LOCATION OF HLA BORINGS



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BENZENE CONCENTRATION GRADIENT
 UG/L IN WATER, Q2-96 DATA

SMITH-EMERY GEOSERVICES

SEG JOB NO. 90404

PLATE 2C

MAJOR SUBDIVISIONS			GROUP SYMBOL	TYPICAL DESCRIPTIONS	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES.	
				GP POORLY GRADED GRAVELS, OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES.	
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES.	
				GC CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES.	
	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES.	
				SP POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES.	
	MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	MORE THAN 50% OF COARSE FRACTION PASSING A NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM SILTY SANDS, SAND-SILT MIXTURES.
					SC CLAYEY SANDS, SAND-CLAY MIXTURES.
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50.		ML INORGANIC SILTS, SANDY SILTS, AND CLAYEY SILTS OF LOW PLASTICITY.	
				CL INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY; GRAVELLY, SANDY OR SILTY CLAYS, LEAN CLAYS.	
				OL ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY.	
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50.		MH INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS. ELASTIC SILTS.	
				CH INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS.	
				OH ORGANIC CLAYS AND SILTY CLAYS OF MEDIUM TO HIGH PLASTICITY.	
HIGHLY ORGANIC SOILS				PT PEAT AND OTHER HIGHLY ORGANIC SOILS.	

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE CLASSIFICATIONS

SOIL CLASSIFICATION CHART







UNIFIED SOIL CLASSIFICATION SYSTEM
SMITH-EMERY GEOSERVICES
PLATE 3

KEY TO LOG OF BORINGS

SYMBOL TYPE OF TEST

COMP	COMPACTION CHARACTERISTICS
TX	TRIAxIAL COMPRESSION TEST
DS	DIRECT SHEAR TEST
UC	UNCONFINED COMPRESSION TEST
C	CONSOLIDATION TEST
EXP	PERCENT EXPANSION
EI	EXPANSION INDEX
SA	SIEVE ANALYSIS (+ #200 ONLY)
-200	% PASSING #200 SIEVE
HA	HYDROMETER ANALYSIS (- #200 ONLY)
AL	ATTERBERG LIMITS
SE	SAND EQUIVALENT
P	PERMEABILITY
R	R-VALUE
Gs	SPECIFIC GRAVITY
S	SOLUBLE SULFATES
pH	HYDROGEN ION CONTENT
RE	RESISTIVITY
CL	CHLORIDE
COLL	COLLAPSE TEST

KEY TO SAMPLES

	INDICATES DEPTH OF UNDISTURBED SAMPLE
	INDICATES DEPTH OF BULK SAMPLE
	INDICATES DEPTH OF SAMPLING ATTEMPT WITH NO RECOVERY
	INDICATES DEPTH OF STANDARD PENETRATION TEST (SPT)
	FIRST ENCOUNTERED GROUNDWATER
	PIEZOMETRIC HEAD

NOTE ON SAMPLERS

Undisturbed samples are obtained with a sampler having an O.D. of 3.25 inches and an I.D. of 2.5 inches. The SPT sampler is 2 inches O.D.; the bit has an I.D. of 1.4 inches and the split barrel has an I.D. of 1.5 inches. Unless practical refusal is encountered, the samplers are driven 18 inches into the soil using a 140 pound weight falling 30 inches. The blow count for the final 12 inches is recorded on the boring logs.

NOTES:

The descriptions on the boring logs apply only at the specific boring location and at the time the borings were made. They are not warranted to be representative of subsurface conditions. Soil and rock descriptions are based on commonly accepted geotechnical methods of identification and classification and are based on our professional judgement and experience. Field descriptions have been modified where appropriate to reflect laboratory test results. The stratification of soil layers is represented with approximate boundaries and the transition between soil types may be gradual.

KEY TO LOG OF BORINGS

SMITH-EMERY GEOSERVICES

PLATE 4

WELL INFORMATION

REFERENCE: MEAN SEA LEVEL

TOP OF CASING ELEVATION (ft): +8.44 FT

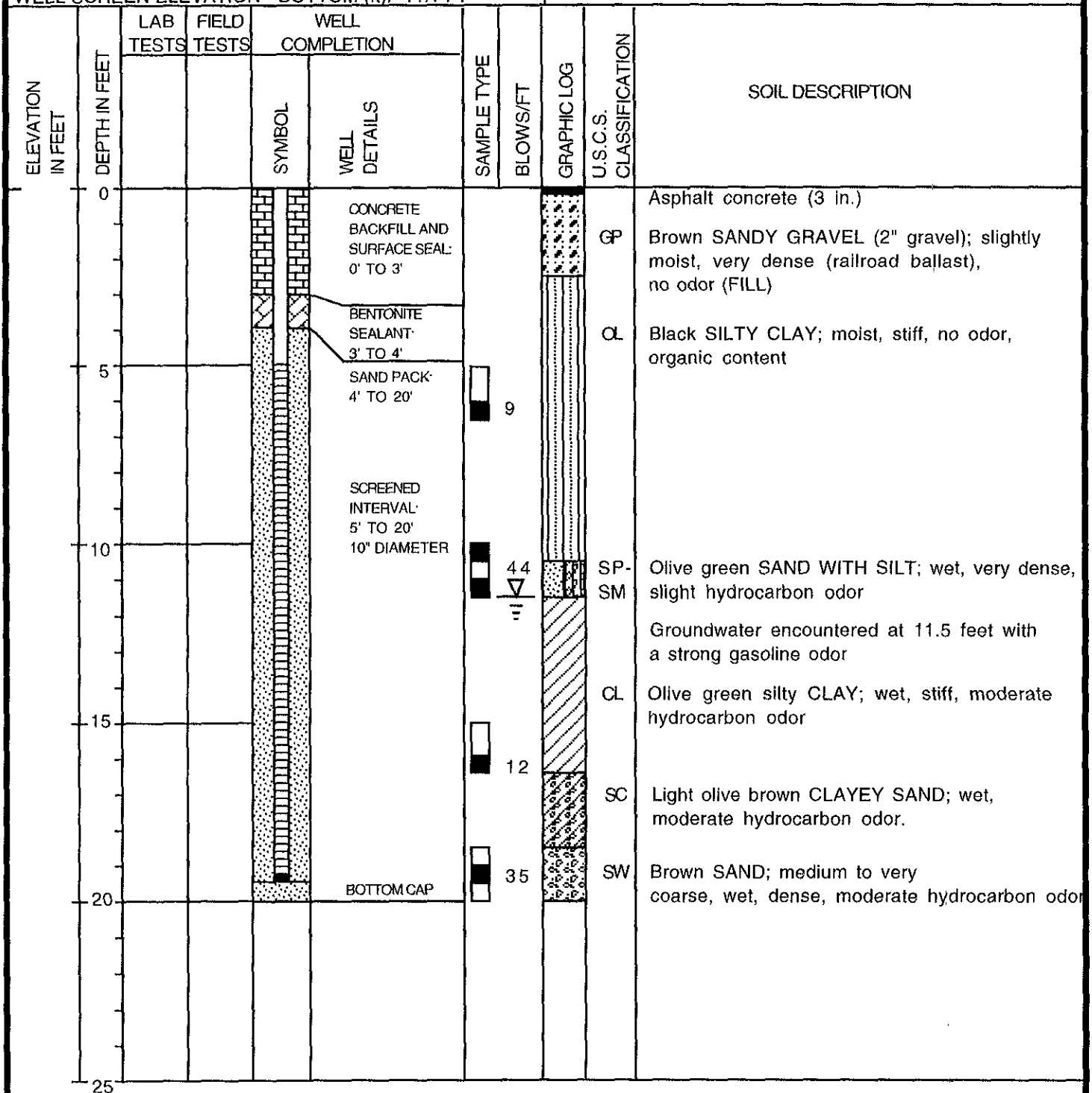
WELL SCREEN ELEVATION - TOP (ft): +3.4 FT

WELL SCREEN ELEVATION - BOTTOM (ft): -11.1 FT

WELL MW-4

TOP OF CASING ELEVATION: 8.44 FEET

DATUM: MSL, CITY MONUMENT BM 19NW24



WELL TERMINATED @ 20.0 FEET ON 9/9/96.

WELL INSTALLED ON 9/9/96.

GROUNDWATER ENCOUNTERED AT A DEPTH OF 11.5 FEET

LOG OF WELL

SMOOKE & SONS INVESTMENT COMPANY

FILE NO. 90404

LOGGED BY M.G.

SMITH-EMERY GEOSERVICES

PLATE 5

LABORATORY TEST DATA					
TESTS REPORTED ELSEWHERE (PPB)				P.I.D. METER (PPM)	DEPTH IN FEET
ND = NOT DETECTED					
H2O		SOIL			
BENZENE	TPH-GAS	BENZENE			
				0.0	5
				31	10
	150	ND		2	15
				0.0	20
				0.0	25

BORING G-1

GEOPROBE SAMPLES, 8/14/96

SAMPLE



SYMBOL



USCS

DESCRIPTION

PAVEMENT

CL

Gray, silty CLAY; moist, soft, no hydrocarbon odor

CL

Grades to olive green silty CLAY, moist, firm, very slight hydrocarbon odor

CL

Light tan silty CLAY; moist, firm, no hydrocarbon odor

SM

Brown clayey SAND, dense, saturated, no hydrocarbon odor

CL

Brown silty CLAY, with some sand and fine gravel, very moist, firm, no hydrocarbon odor

BORING COMPLETED AT A DEPTH OF 22 FEET ON 8/14/96.
 NO GROUNDWATER ENCOUNTERED.
 BACKFILLED WITH HYDRATED BENTONITE.
 LOGGED BY R. WIDEBROOK

CHARACTERIZATION STUDY
 3925 ALAMEDA AVENUE
 OAKLAND, CALIFORNIA

LOG OF BORING

SMITH-EMERY GEOSERVICES

SEG Job No. 90404

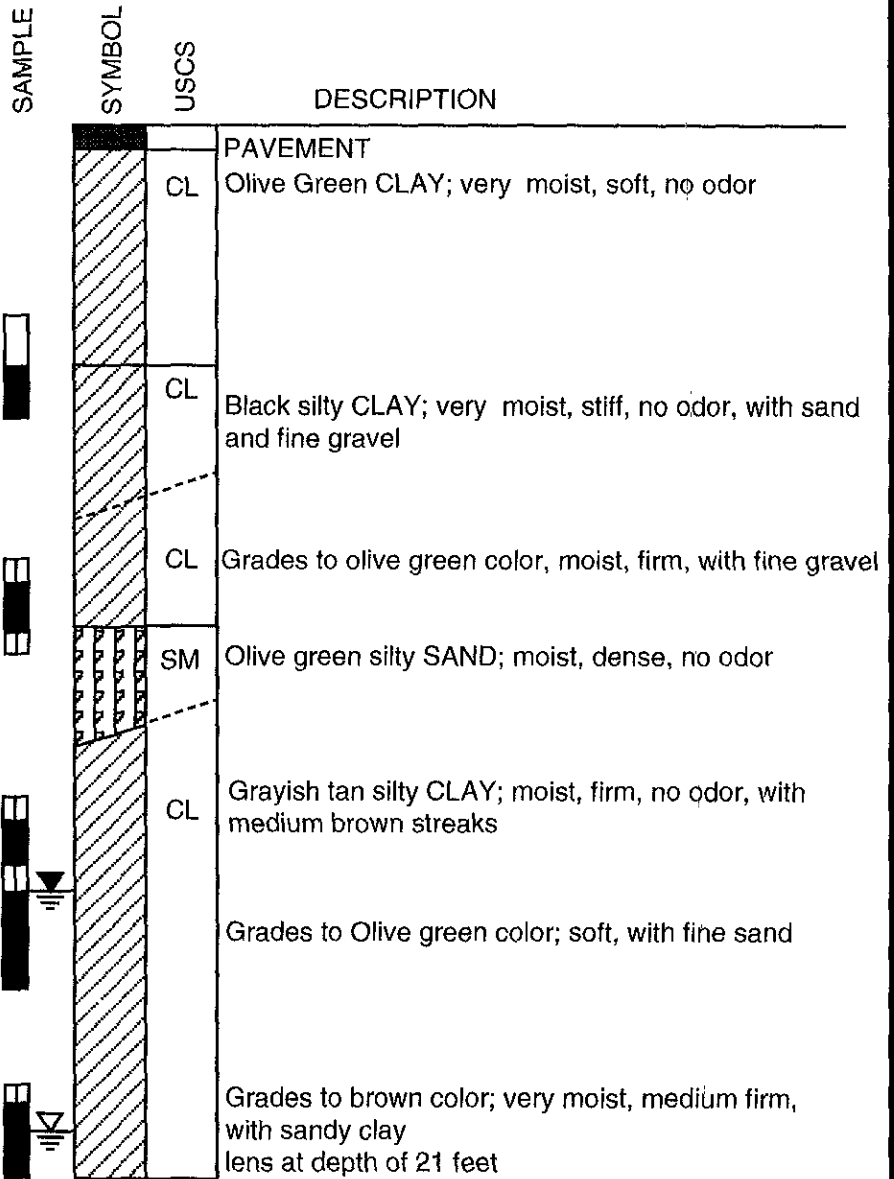
PLATE 6

LABORATORY TEST DATA

TESTS REPORTED ELSEWHERE (PPB)			P.I.D. METER (PPM)	DEPTH IN FEET
H2O		SOIL		
BENZENE	TPH-GAS	BENZENE		
				0.0
			0.0	5
			0.0	10
			0.0	15
ND	ND	ND		20
			0.0	22

BORING G-2

GEOPROBE SAMPLES, 8/14/96



BORING COMPLETED AT A DEPTH OF 22 FEET ON 8/14/96.
 GROUNDWATER MEASURED AT A DEPTH OF 15 TO 16 FEET.
 BACKFILLED WITH HYDRATED BENTONITE
 LOGGED BY R. WIDEBROOK

CHARACTERIZATION STUDY
 3925 ALAMEDA AVENUE
 OAKLAND, CALIFORNIA

LOG OF BORING

SMITH-EMERY GEOSERVICES

SEG Job No. 90404

PLATE 7

LABORATORY TEST DATA

TESTS REPORTED ELSEWHERE (PPB) ND = NOT DETECTED			P.I.D. METER (PPM)	DEPTH IN FEET
H2O	SOIL			
BENZENE	TPH-GAS	BENZENE		
				0
17			5	5
			0.0	10
			0.0	15
	18	ND	0.0	18

BORING G-3

GEOPROBE SAMPLES, 8/14/96

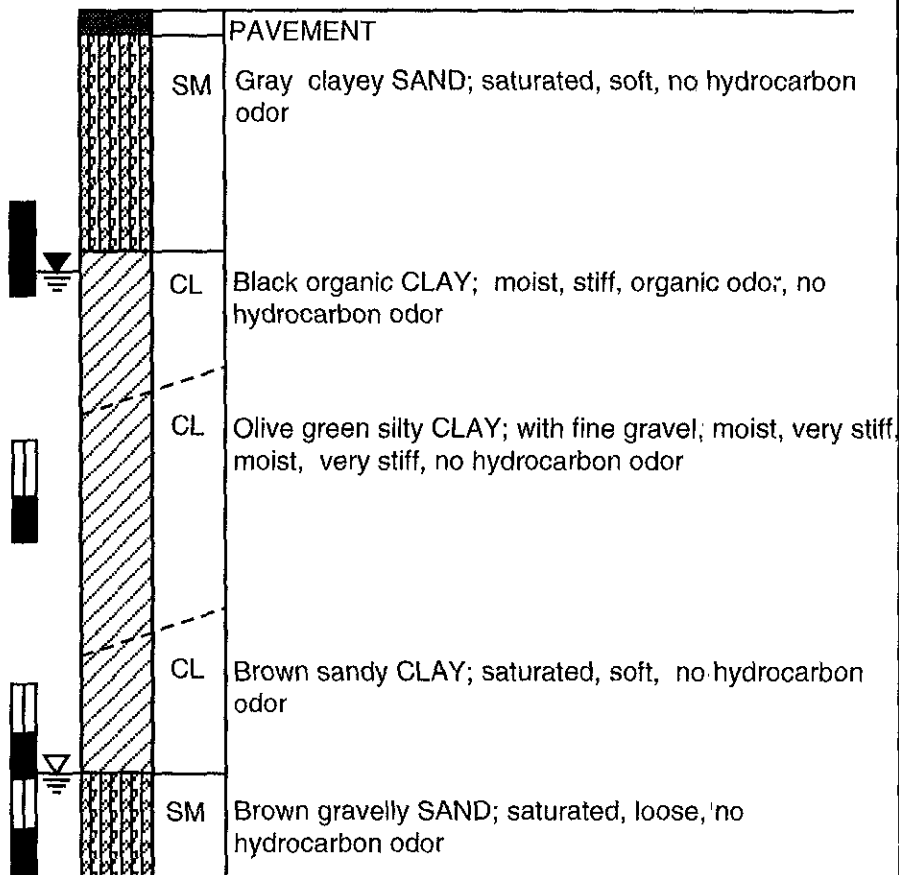
BLOWS/FT

SAMPLE

SYMBOL

USCS

DESCRIPTION



BORING COMPLETED AT A DEPTH OF 18 FEET ON 8/14/96. GROUNDWATER ENCOUNTERED AT A DEPTH OF 16 FEET, STABILIZING TO A DEPTH OF 6 FEET. BACKFILLED WITH HYDRATED BENTONITE.

LOGGED BY R. WIDEBROOK

SMOOKE & SONS INVESTMENT CO.
3925 ALAMEDA AVENUE
OAKLAND, CALIFORNIA

LOG OF BORING

SMITH-EMERY GEOSERVICES

SEG Job No. 90404

PLATE 8

LABORATORY TEST DATA					
TESTS REPORTED ELSEWHERE (PPB)			P.I.D. METER (PPM)	DEPTH IN FEET	SAMPLE
H2O		SOIL			
BENZENE	TPH-GAS	BENZENE			
			3	5	
250			21	10	
			0.0	15	
		ND	ND		

BORING G-4

GEOPROBE SAMPLES, 8/14/96

SYMBOL	USCS	DESCRIPTION
		PAVEMENT
	SC	Olive green CLAYEY SAND; soft to loose, saturated, no hydrocarbon odor
	CL	Black, silty, organic CLAY; moist, firm, organic odor, no hydrocarbon odor
	CL	Olive green CLAY; moist, hard, no hydrocarbon odor
	CL	Olive green, silty CLAY; moist, firm, slight hydrocarbon odor
	CL	Medium brown, sandy CLAY; moist, firm, very slight hydrocarbon odor
	SC	Medium brown, CLAYEY SAND; very moist, firm, slight hydrocarbon odor
		Grades to loose, no hydrocarbon odor

BORING COMPLETED AT A DEPTH OF 22 FEET ON 8/14/96.
 GROUNDWATER ENCOUNTERED AT A DEPTH OF 15.5 FEET.
 BACKFILLED WITH HYDRATED BENTONITE.

LOGGED BY R. WIDEBROOK

CHARACTERIZATION STUDY
 3925 ALAMEDA AVENUE
 OAKLAND, CALIFORNIA

LOG OF BORING

SMITH-EMERY GEOSERVICES

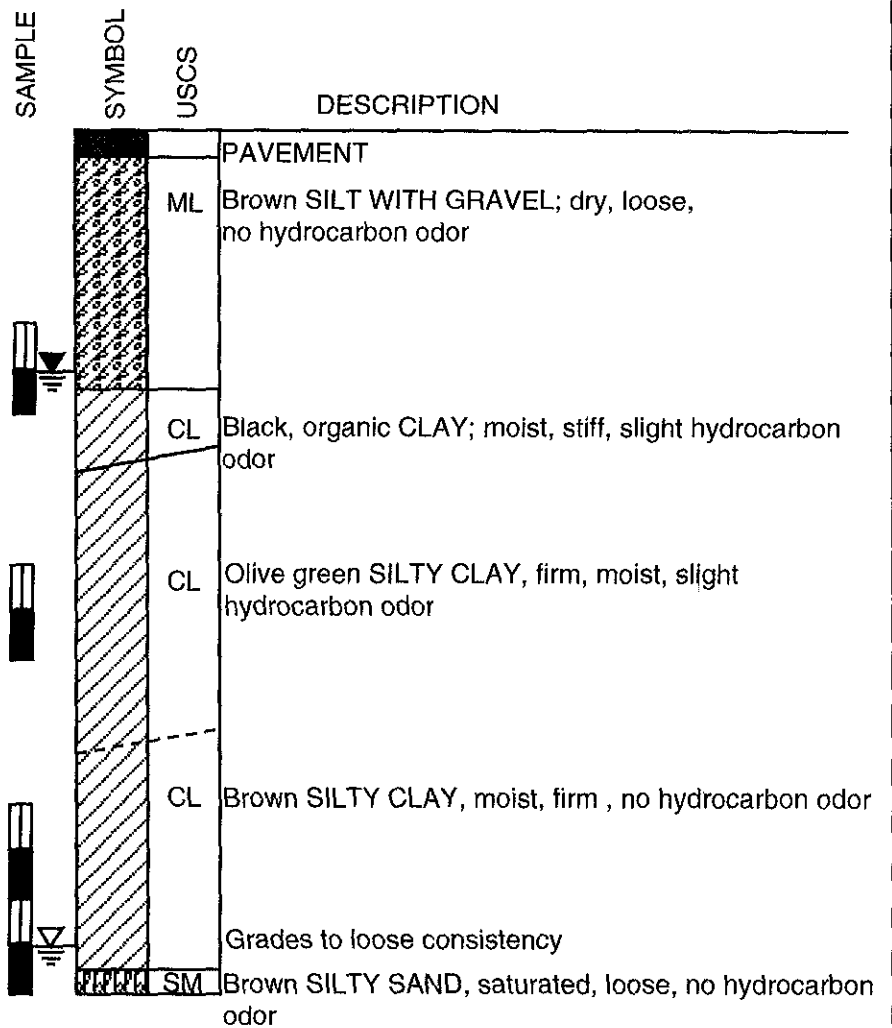
SEG Job No. 90404

PLATE 9

LABORATORY TEST DATA					
TESTS REPORTED ELSEWHERE (PPB)	H2O			P.I.D. METER (PPM)	DEPTH IN FEET
	SOIL				
	BENZENE	TPH-GAS	BENZENE		
					5
	120			12	10
		46,000	1,300	230	15
					18
		590	ND	0.0	

BORING G-5

GEOPROBE SAMPLES, 8/14/96



BORING COMPLETED AT A DEPTH OF 18 FEET ON 8/14/96.
 GROUNDWATER ENCOUNTERED AT A DEPTH OF 17 FEET.
 GROUNDWATER STABILIZED AT A DEPTH OF 5 FEET.
 BACKFILLED WITH HYDRATED BENTONITE.

LOGGED BY R. WIDEBROOK

CHARACTERIZATION STUDY
 3925 ALAMEDA AVENUE
 OAKLAND, CALIFORNIA

LOG OF BORING

SMITH-EMERY GEOSERVICES

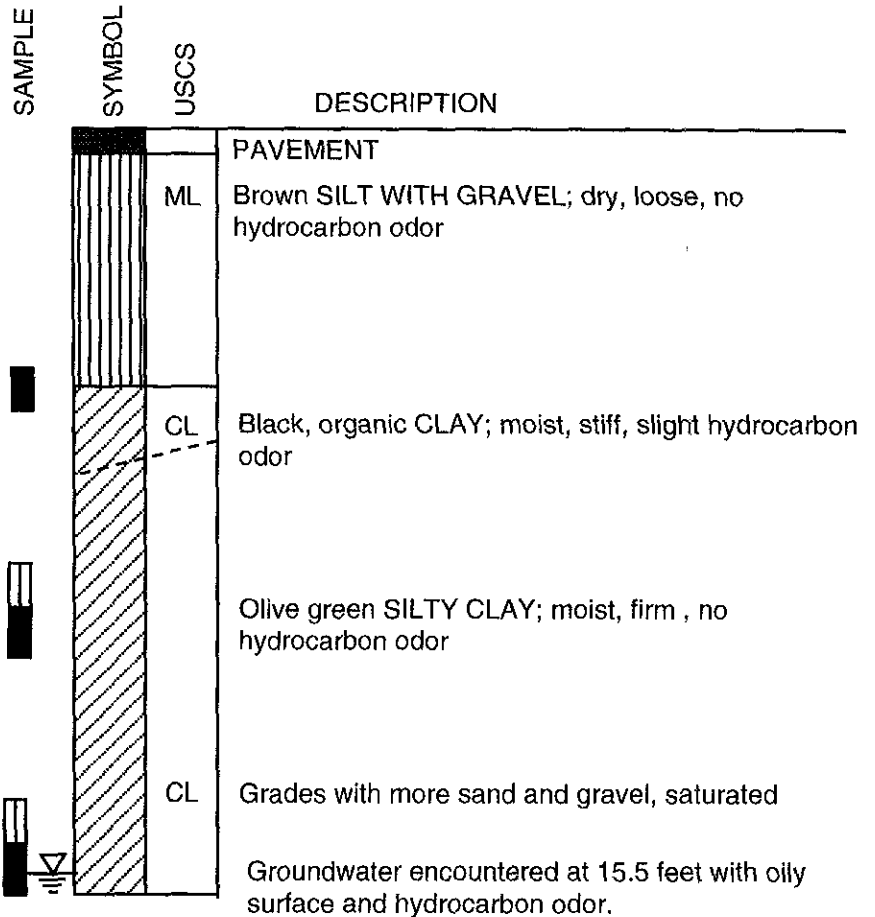
SEG Job No. 90404

PLATE 10

LABORATORY TEST DATA				
TESTS REPORTED ELSEWHERE (PPB)			P.I.D. METER (PPM)	DEPTH IN FEET
ND = NOT DETECTED				
H2O	SOIL			
BENZENE	TPH-GAS	BENZENE		
			23	5
			3	10
15,000	ND	ND	15	15

BORING G-6

GEOPROBE SAMPLES, 8/14/96



BORING COMPLETED AT A DEPTH OF 16 FEET ON 8/14/96.
 GROUNDWATER ENCOUNTERED AT A DEPTH OF 15.5 FEET.
 BACKFILLED WITH HYDRATED BENTONITE.

LOGGED BY R. WIDEBROOK

CHARACTERIZATION STUDY
 3925 ALAMEDA AVENUE
 OAKLAND, CALIFORNIA

LOG OF BORING

SMITH-EMERY GEOSERVICES

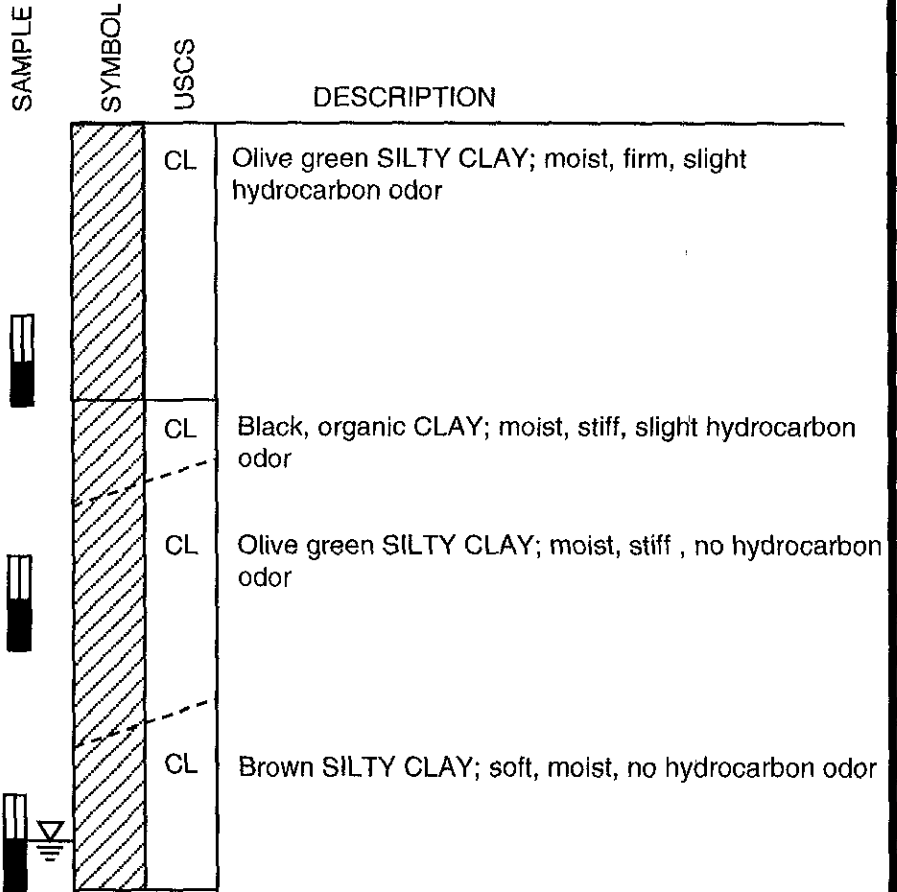
SEG Job No. 90404

PLATE 11

LABORATORY TEST DATA				
TESTS REPORTED ELSEWHERE (PPB) ND = NOT DETECTED	P.I.D. METER (PPM)		DEPTH IN FEET	
	H2O	SOIL		
			20	
			11	
290	ND	ND	0.0	

BORING G-7

GEOPROBE SAMPLES, 8/14/96



BORING COMPLETED AT A DEPTH OF 16 FEET ON 8/14/96.
GROUNDWATER ENCOUNTERED AT A DEPTH OF 15 FEET.
BACKFILLED WITH HYDRATED BENTONITE.

LOGGED BY R. WIDEBROOK

CHARACTERIZATION STUDY
3925 ALAMEDA AVENUE
OAKLAND, CALIFORNIA

LOG OF BORING

SMITH-EMERY GEOSERVICES

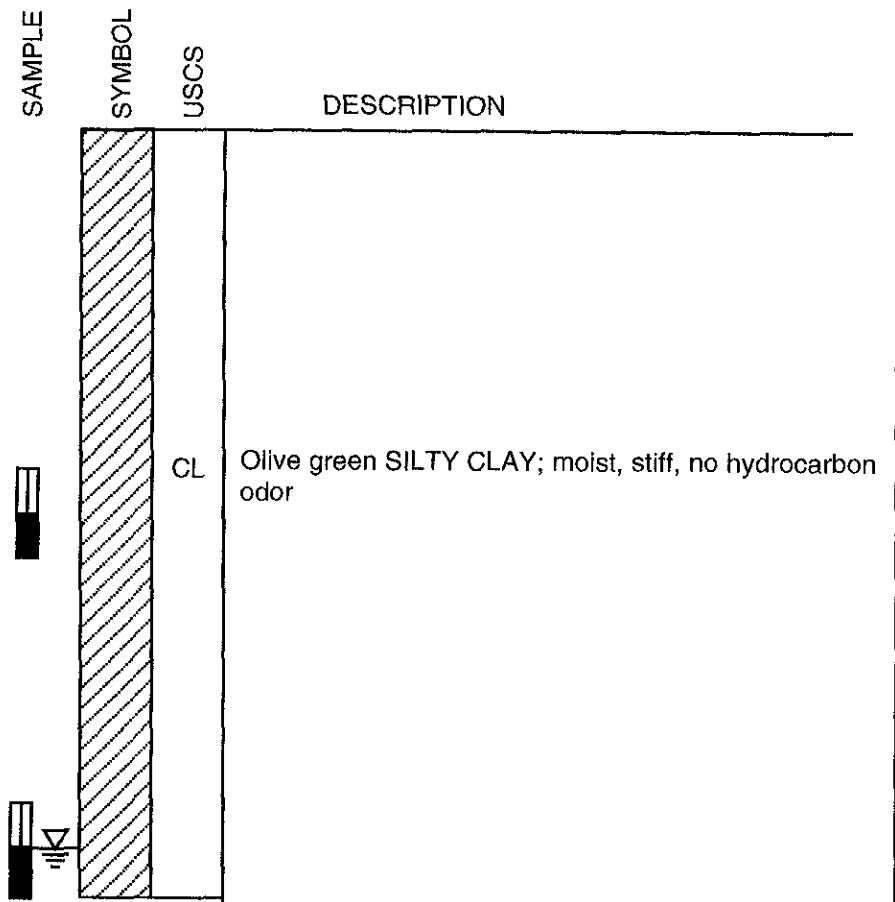
SEG Job No. 90404

PLATE 12

LABORATORY TEST DATA				
TESTS REPORTED ELSEWHERE (PPB) ND = NOT DETECTED			P.I.D. METER (PPM)	DEPTH IN FEET
H2O	SOIL			
BENZENE	TPH-GAS	BENZENE		
			0.0	5
			0.0	10
5	ND	ND	0.0	15

BORING G-8

GEOPROBE SAMPLES, 8/14/96



BORING COMPLETED AT A DEPTH OF 16 FEET ON 8/14/96.
GROUNDWATER ENCOUNTERED AT A DEPTH OF 15 FEET.
BACKFILLED WITH HYDRATED BENTONITE.

LOGGED BY R. WIDEBROOK

CHARACTERIZATION STUDY
3925 ALAMEDA AVENUE
OAKLAND, CALIFORNIA

LOG OF BORING

SMITH-EMERY GEOSERVICES

SEG Job No. 90404

PLATE 13

SMITH-EMERY GEOSERVICES

APPENDIX A

WELL PERMIT and WATER QUALITY DATA

TEL :

Sep 03, 96

14:48 No. 004 P. 01



ZONE 7 WATER AGENCY

5997 PARKSIDE DRIVE PLEASANTON, CALIFORNIA 94588

VOICE (510) 484-2800
FAX (510) 482-3914

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

LOCATION OF PROJECT 3925 Alameda Avenue
Oakland, CA 94602

PERMIT NUMBER 96647
LOCATION NUMBER _____

CLIENT
Name Smooke and Sons Investment Co.
Address P.O. Box 1311 Voice (213) 624-8361
City Los Angeles Zip 90057

PERMIT CONDITIONS

Circled Permit Requirements Apply

APPLICANT
Name Smith - Emery Geoservices Fax (415) 330-3030
Address P.O. Box 884550 Voice (415) 530-3000 x126
City San Francisco, CA Zip 94188-0550

A. GENERAL

1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 90 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

B. WATER WELLS, INCLUDING PIEZOMETERS

1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

E. WELL DESTRUCTION. See attached.

TYPE OF PROJECT

Well Construction	_____	Geotechnical Investigation	_____
Cathodic Protection	_____	General	_____
Water Supply	_____	Contamination	_____
Monitoring	<u>X</u>	Well Destruction	_____

PROPOSED WATER SUPPLY WELL USE

Domestic	_____	Industrial	_____	Other	_____
Municipal	_____	Irrigation	_____		

DRILLING METHOD:

Mud Rotary	_____	Air Rotary	_____	Auger	<u>X</u>
Cable	_____	Other	_____		

DRILLER'S LICENSE NO. 374 152

WELL PROJECTS

Drill Hole Diameter	<u>8</u> in.	Maximum Depth	<u>20</u> ft.
Casing Diameter	<u>4</u> in.	Number	<u>1</u>
Surface Seal Depth	<u>4</u> ft.		

GEOTECHNICAL PROJECTS

Number of Borings	_____	Maximum Depth	_____ ft.
Hole Diameter	_____ in.		

ESTIMATED STARTING DATE 9/9/96
ESTIMATED COMPLETION DATE 9/9/96

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

Approved Wyman Hong Date 11 Sep 96
Wyman Hong

APPLICANT'S SIGNATURE [Signature] Date 9/3/96

WELL DEVELOPMENT DATA SHEET

Project #: <u>960912-D1</u>	Client: <u>SMITH + BENER</u>
Developer: <u>MD</u>	Date Developed: <u>9-12</u>
Well I.D.: <u>2 3/4</u>	Well Diameter: (circle one) 2 3 <u>4</u> 6
Total Well Depth: Before <u>19.51</u> After <u>19.52</u>	Depth to Water: Before <u>10.05</u> After <u>10.34</u>
Reason not developed:	If Free Product, thickness:
Additional Notations:	

Volume Conversion Factor (VCF):

$$VCF = (d^2/4) \times \pi / 33.8$$

where

d = dia/ins
 A = diameter (in.)
 π = 3.1416
 33.8 = 33.8 gal

Well dia. VCF

1"	0.34
2"	0.37
4"	0.34
6"	0.37
8"	0.34
10"	0.37
12"	0.34

<u>6.1</u>	x	<u>18</u>	=	<u>110</u>	gallons
1 Case Volume		Specified Volume			

Purging Device: Bailor Electric Submersible
 Middiamburg Suction Pump

Type of Installed Pump _____

Other equipment used SURGE-BLOCK

TIME	TEMP. (F)	pH	COND. (umohs)	TURBID-ITY (NTU)	VOLUME REMOVED: (GAL)	NOTATIONS:
8:49	69.4	7.1	1700	> 200	6	GPM → 2 M.B.
8:52	68.6	7.25 7.2	1500	> 200	12	SILTY / CLEARING
8:56	69.4	7.3	1700	> 200	18	HARD BOTTOM
9:02	68.6	7.3	1500	> 200	24	DTW @ 10.34
9:08	69.0	7.4	1600	> 200	30	SURGED 15 min
9:32	69.6	7.4	1500	> 200	37	MIDDLE-BERG / SILTY
9:36	69.4	7.4	1400	> 200	43	
9:46	69.2	7.6	1300	> 200	49	CLEARING
9:51	68.8	7.5	1200	> 200	55	STOP MID-BERG
9:57	70.8	7.4	1400	> 200	62	START Elec. SUB 7 GPM
9:59	70.2	7.3	1200	> 200	68	GOOD RECHARGE
10:00	70.2	7.3	1100	> 200	74	
10:01	70.2	7.2	1000	> 200	80	

Did Well Dewater? If yes, note above. Gallons Actually Evacuated: _____

SMITH-EMERY GEOSERVICES

APPENDIX B

ANALYTICAL DATA AND CHAIN-OF-CUSTODY



North State Environmental
Chemical Waste Disposal • Trucking • Consulting

CERTIFICATE OF ANALYSIS

Lab No:	96-648	Date Sampled:	09-06-96
Client:	Smith-Finery Geoservices	Date Analyzed:	09-10-96
Project:	3925 Alameda Ave. Oakland # 90404	Date Reported:	09-12-96

Gasoline Range Hydrocarbons by Method 8015 M
MTBE Benzene, Toluene, Ethylbenzene and Xylenes by Method 8020
Diesel Range Hydrocarbons by Method 8015 M

SAMPLE NO	CLIENT ID	ANALYTE	METHOD	RESULT
96-648-01	MW4-1-6' SOIL	MTBE	8020	0.060 mg/Kg
		Benzene	8020	0.011 mg/Kg
		Toluene	8020	0.020 mg/Kg
		Ethylbenzene	8020	0.010 mg/Kg
		Xylenes	8020	0.025 mg/Kg
		Gasoline	8015M	0.950 mg/Kg
		Diesel	8015M	ND
96-648-02	MW4-2-10' SOIL	MTBE	8020	0.065 mg/Kg
		Benzene	8020	0.033 mg/Kg
		Toluene	8020	0.028 mg/Kg
		Ethylbenzene	8020	0.024 mg/Kg
		Xylenes	8020	0.061 mg/Kg
		Gasoline	8015M	0.66 mg/Kg
		Diesel	8015M	ND
96-648-03	MW4-3-11' SOIL	MTBE	8020	0.080 mg/Kg
		Benzene	8020	0.012 mg/Kg
		Toluene	8020	0.013 mg/Kg
		Ethylbenzene	8020	0.026 mg/Kg
		Xylenes	8020	0.016 mg/Kg
		Gasoline	8015M	1.1 mg/Kg
		Diesel	8015M	ND



North State Environmental
Chemical Waste Disposal · Trucking · Consulting

CERTIFICATE OF ANALYSIS

Lab No:	96-648	Date Sampled:	09-06-96
Client:	Smith-Emery Geoservices	Date Analyzed:	09-10-96
Project:	3925 Alameda Ave. Oakland # 90404	Date Reported:	09-12-96

Gasoline Range Hydrocarbons by Method 8015 M
MTBE Benzene, Toluene, Ethylbenzene and Xylenes by Method 8020
Diesel Range Hydrocarbons by Method 8015 M

SAMPLE NO	CLIENT ID	ANALYTE	METHOD	RESULT
96-648-04	MW4-4-16' SOIL	MTBE	8020	0.028 mg/Kg
		Benzene	8020	0.020 mg/Kg
		Toluene	8020	0.005 mg/Kg
		Ethylbenzene	8020	0.008 mg/Kg
		Xylenes	8020	0.018 mg/Kg
		Gasoline	8015M	0.560 mg/Kg
		Diesel	8015M	ND
96-648-05	MW4-5-19' SOIL	MTBE	8020	0.11 mg/Kg
		Benzene	8020	0.065 mg/Kg
		Toluene	8020	0.050 mg/Kg
		Ethylbenzene	8020	0.42 mg/Kg
		Xylenes	8020	0.84 mg/Kg
		Gasoline	8015M	18 mg/Kg
		Diesel	8015M	ND
96-648-06	MW4-W-12' SOIL	MTBE	8020	0.170 mg/Kg
		Benzene	8020	0.31 mg/Kg
		Toluene	8020	0.053 mg/Kg
		Ethylbenzene	8020	0.47 mg/Kg
		Xylenes	8020	1.1 mg/Kg
		Gasoline	8015M	11 mg/Kg
		Diesel	8015M	330 mg/Kg



North State Environmental
 Chemical Waste Disposal • Trucking • Consulting

CERTIFICATE OF ANALYSIS

Lab No:	96-648	Date Sampled:	09-06-96
Client:	Smith-Emery Geoservices	Date Analyzed:	09-10-96
Project:	3925 Alameda Ave. Oakland # 90404	Date Reported:	09-12-96

Gasoline Range Hydrocarbons by Method 8015 M
 MTBE Benzene, Toluene, Ethylbenzene and Xylenes by Method 8020
 Diesel Range Hydrocarbons by Method 8015 M

Quality Control/Quality Assurance Summary-Soil

Analyte	Method	Reporting Limit	Blank	MS/MSD Recovery	RPD
MTBE	8020	0.005 mg/Kg	ND	108	27
Benzene	8020	0.005 mg/Kg	ND	94	31
Toluene	8020	0.005 mg/Kg	ND	110	26
Ethylbenzene	8020	0.005 mg/Kg	ND	119	23
Xylenes	8020	0.010 mg/Kg	ND	119	16
Gasoline	8015M	0.5 mg/Kg	ND	71	12
Diesel	8015M	1.0 mg/Kg	ND	84	2

ELAP Certificate NO: 1753

Reviewed and Approved:

John A. Murphy, Laboratory Director



North State Environmental Analytical Laboratory

Chain of Custody/Request for Analysis

(415) 588-9652

Client: SMITH-EMERT GEOSERVICES		Phone: 415-330-3000		Report to: Rick Widebrook			Turnaround Time NORMAL				
Mailing Address:		9x7 126		Billing to: RICHARD SMOOKE SMOOKIE & SONS INVEST. CO. 405 MATEO ST. LOS ANGELES, CA 90013			8 Hr	24 Hr			
Site Address: 3925 Alameda Ave., Oakland		PO # / Billing Reference:			40 Hr		5 Days				
Sampler: Miles Grant		Date: 9/9/96		Job Number 90404					Other		
Sample ID.	Sample Description	Container # / type	Sampling Time/Date	ANALYSIS REQUESTED							
				TPH-D	TPH-G	BTEX	O+G				Remarks
-1	MW4-1-6'	Bags	9:30 9/6	EPA	3015/3020	(Full Screen of BTEX & MBT(S))					
-2	MW4-2-10'	"	9:45 "								
-3	MW4-3-11'	"	10:05 "								
-4	MW4-4-16'	"	10:20 "								
-5	MW4-5-19'	"	10:30 "								
-6	MW4-W-12'	1-liter	10:15 "								
		2-VOAS									
	* Analyze sand portion of sample					1 LABEL, 2 VOAS, 5 SD UT-89					
						COO					
Relinquished by: <i>Miles Grant</i>		Date: 9/9/96 Time:		Received by: <i>[Signature]</i>			Yes No				
Relinquished by: _____		Date: _____ Time: _____		Received by: _____			Were samples Preserved ?				
Relinquished by: _____		Date: _____ Time: _____		Received in lab by: <i>[Signature]</i>			In good condition ?				



CERTIFICATE OF ANALYSIS

Lab No: 96-586 Date Sampled: 08-14-96
Client: SMITH-EMERY Date Extracted: 08-19-96
Project: 3925 Alameda Ave. Oakland Date analyzed: 08-19-96
 90404: Geoprobes

Gasoline Range Hydrocarbons by Method 8015 M
MTBE Benzene, Toluene, Ethylbenzene and Xylenes by Method 8020
Diesel range hydrocarbons by EPA method 8015M

SAMPLE NO	CLIENT ID	ANALYTE	METHOD	RESULT
96-586-01	G2-WATER WATER	MTBE	8020	3 ug/L
		Benzene	8020	ND
		Toluene	8020	2 ug/L
		Ethylbenzene	8020	ND
		Xylenes	8020	10 ug/L
		Gasoline	8015M	150 ug/L
		Diesel	8015M	ND
96-586-02	G3-WATER WATER	MTBE	8020	13 ug/L
		Benzene	8020	17
		Toluene	8020	15 ug/L
		Ethylbenzene	8020	20 ug/L
		Xylenes	8020	35 ug/L
		Gasoline	8015M	670 ug/L
		Diesel	8015M	5 mg/L



CERTIFICATE OF ANALYSIS

Lab No: 96-586 Date Sampled: 08-14-96
Client: SMITH-EMERY Date Extracted: 08-19-96
Project: 3925 Alameda Ave. Oakland Date analyzed: 08-19-96
90404: Geoprobes

Gasoline Range Hydrocarbons by Method 8015 M
MTBE Benzene, Toluene, Ethylbenzene and Xylenes by Method 8020
Diesel range hydrocarbons by EPA method 8015M

SAMPLE NO	CLIENT ID	ANALYTE	METHOD	RESULT
96-586-03	G4-WATER WATER	MTBE	8020	370 ug/L
		Benzene	8020	250 ug/L
		Toluene	8020	160 ug/L
		Ethylbenzene	8020	350 ug/L
		Xylenes	8020	300 ug/L
		Gasoline	8015M	4100 ug/L
		Diesel	8015M	11 mg/L
96-586-04	G5-WATER WATER	MTBE	8020	110 ug/L
		Benzene	8020	120 ug/L
		Toluene	8020	23 ug/L
		Ethylbenzene	8020	100 ug/L
		Xylenes	8020	250 ug/L
		Gasoline	8015M	1500 ug/L
		Diesel	8015M	6 mg/L
96-586-05	G6-WATER WATER	MTBE	8020	96000 ug/L
		Benzene	8020	15000 ug/L
		Toluene	8020	27000 ug/L
		Ethylbenzene	8020	70000 ug/L
		Xylenes	8020	191000ug/L
		Gasoline	8015M	*4200 mg/L
		Diesel	8015M	1800 mg/L



CERTIFICATE OF ANALYSIS

Lab No: 96-586 Date Sampled: 08-14-96
Client: SMITH-EMERY Date Extracted: 08-19-96
Project: 3925 Alameda Ave. Oakland Date analyzed: 08-19-96
90404: Geoprobes

Gasoline Range Hydrocarbons by Method 8015 M
MTBE Benzene, Toluene, Ethylbenzene and Xylenes by Method 8020
Diesel range hydrocarbons by EPA method 8015M

SAMPLE NO	CLIENT ID	ANALYTE	METHOD	RESULT
96-586-06	G7-WATER WATER	MTBE	8020	70 ug/L
		Benzene	8020	290 ug/L
		Toluene	8020	32 ug/L
		Ethylbenzene	8020	94 ug/L
		Xylenes	8020	85 ug/L
		Gasoline	8015M	3000 ug/L
		Diesel	8015M	3 mg/L
96-586-07	G8-WATER WATER	MTBE	8020	41 ug/L
		Benzene	8020	5 ug/L
		Toluene	8020	7 ug/L
		Ethylbenzene	8020	16 ug/L
		Xylenes	8020	21 ug/L
		Gasoline	8015M	3800 ug/L
		Diesel	8015M	6 mg/L
96-586-08	G5-3-14 SOIL	MTBE	8020	HOLD
		Benzene	8020	HOLD
		Toluene	8020	HOLD
		Ethylbenzene	8020	HOLD
		Xylenes	8020	HOLD
		Gasoline	8015M	HOLD
		Diesel	8015M	HOLD



CERTIFICATE OF ANALYSIS

Lab No: 96-586 Date Sampled: 08-14-96
 Client: SMITH-EMERY Date Extracted: 08-19-96
 Project: 3925 Alameda Ave. Oakland Date analyzed: 08-19-96
 90404: Geoprobes

Gasoline Range Hydrocarbons by Method 8015 M
 MTBE Benzene, Toluene, Ethylbenzene and Xylenes by Method 8020
 Diesel range hydrocarbons by EPA method 8015M

SAMPLE NO	CLIENT ID	ANALYTE	METHOD	RESULT
96-586-09	G6-2-9 SOIL	MTBE	8020	HOLD
		Benzene	8020	HOLD
		Toluene	8020	HOLD
		Ethylbenzene	8020	HOLD
		Xylenes	8020	HOLD
		Gasoline	8015M	HOLD
		Diesel	8015M	HOLD
96-586-10	G1-5-16 SOIL	MTBE	8020	24 ug/Kg
		Benzene	8020	ND
		Toluene	8020	ND
		Ethylbenzene	8020	ND
		Xylenes	8020	20 ug/Kg
		Gasoline	8015M	150 ug/Kg
		Diesel	8015M	1 mg/Kg
96-586-11	G2-4-16 SOIL	MTBE	8020	ND
		Benzene	8020	ND
		Toluene	8020	ND
		Ethylbenzene	8020	ND
		Xylenes	8020	ND
		Gasoline	8015M	ND
		Diesel	8015M	ND



CERTIFICATE OF ANALYSIS

Lab No: 96-586 Date Sampled: 08-14-96
Client: SMITH-EMERY Date Extracted: 08-19-96
Project: 3925 Alameda Ave. Oakland Date analyzed: 08-19-96
90404: Geoprobes

Gasoline Range Hydrocarbons by Method 8015 M
MTBE Benzene, Toluene, Ethylbenzene and Xylenes by Method 8020
Diesel range hydrocarbons by EPA method 8015M

SAMPLE NO	CLIENT ID	ANALYTE	METHOD	RESULT
96-586-12	G3-4-17 SOIL	MTBE	8020	13 ug/Kg
		Benzene	8020	ND
		Toluene	8020	ND
		Ethylbenzene	8020	ND
		Xylenes	8020	18 ug/Kg
		Gasoline	8015M	660 ug/Kg
		Diesel	8015M	ND
96-586-13	G4-4-17 SOIL	MTBE	8020	21 ug/Kg
		Benzene	8020	ND
		Toluene	8020	6 ug/Kg
		Ethylbenzene	8020	ND
		Xylenes	8020	41 ug/Kg
		Gasoline	8015M	ND
		Diesel	8015M	ND
96-586-14	G5-2-9 SOIL	MTBE	8020	150 ug/Kg
		Benzene	8020	1300 ug/Kg
		Toluene	8020	210 ug/Kg
		Ethylbenzene	8020	240 ug/Kg
		Xylenes	8020	340 ug/Kg
		Gasoline	8015M	46000 ug/Kg
		Diesel	8015M	21 mg/Kg



CERTIFICATE OF ANALYSIS

Lab No: 96-586 Date Sampled: 08-14-96
Client: SMITH-EMERY Date Extracted: 08-19-96
Project: 3925 Alameda Ave. Oakland Date analyzed: 08-19-96
90404: Geoprobes

Gasoline Range Hydrocarbons by Method 8015 M
MTBE Benzene, Toluene, Ethylbenzene and Xylenes by Method 8020
Diesel range hydrocarbons by EPA method 8015M

SAMPLE NO	CLIENT ID	ANALYTE	METHOD	RESULT
96-586-15	G5-4-16.5 SOIL	MTBE	8020	ND
		Benzene	8020	ND
		Toluene	8020	ND
		Ethylbenzene	8020	ND
		Xylenes	8020	15 ug/Kg
		Gasoline	8015M	590 ug/Kg
		Diesel	8015M	ND
96-586-16	G6-3-15 SOIL	MTBE	8020	ND
		Benzene	8020	ND
		Toluene	8020	ND
		Ethylbenzene	8020	ND
		Xylenes	8020	ND
		Gasoline	8015M	ND
		Diesel	8015M	ND
96-586-17	G7-3-14.5 SOIL	MTBE	8020	ND
		Benzene	8020	ND
		Toluene	8020	ND
		Ethylbenzene	8020	ND
		Xylenes	8020	ND
		Gasoline	8015M	ND
		Diesel	8015M	ND



CERTIFICATE OF ANALYSIS

Lab No:	96-586	Date Sampled:	08-14-96
Client:	SMITH-EMERY	Date Extracted:	08-19-96
Project:	3925 Alameda Ave. Oakland 90404: Geoprobes	Date analyzed:	08-19-96

Gasoline Range Hydrocarbons by Method 8015 M
 MTBE Benzene, Toluene, Ethylbenzene and Xylenes by Method 8020
 Diesel range hydrocarbons by EPA method 8015M

SAMPLE NO	CLIENT ID	ANALYTE	METHOD	RESULT
96-586-18	G8-2-14 SOIL	MTBE	8020	ND
		Benzene	8020	ND
		Toluene	8020	ND
		Ethylbenzene	8020	ND
		Xylenes	8020	ND
		Gasoline	8015M	ND
		Diesel	8015M	ND

Quality Control/Quality Assurance Summary- WATER

Analyte	Method	Reporting Limit	Blank	MS/MSD Recovery	RPD
MTBE	8020	0.5 ug/L	ND	78	14
Benzene	8020	0.5 ug/L	ND	115	6
Toluene	8020	0.5 ug/L	ND	116	6
Ethylbenzene	8020	0.5 ug/L	ND	120	4
Xylenes	8020	1.0 ug/L	ND	114	6
Gasoline	8015M	0.05 ug/L	ND	89	4
Diesel	8015M	0.05 mg/L	ND	84	3



CERTIFICATE OF ANALYSIS

Lab No: 96-586 Date Sampled: 08-14-96
Client: SMITH-EMERY Date Extracted: 08-19-96
Project: 3925 Alameda Ave. Oakland Date analyzed: 08-19-96
90404: Geoprobes

Gasoline Range Hydrocarbons by Method 8015 M
MTBE Benzene, Toluene, Ethylbenzene and Xylenes by Method 8020
Diesel range hydrocarbons by EPA method 8015M

Quality Control/Quality Assurance Summary- SOIL

Analyte	Method	Reporting Limit	Blank	MS/MSD Recovery	RPD
MTBE	8020	5 ug/Kg	ND	78	14
Benzene	8020	5 ug/Kg	ND	115	6
Toluene	8020	5 ug/Kg	ND	116	6
Ethylbenzene	8020	5 ug/Kg	ND	120	4
Xylenes	8020	10 ug/Kg	ND	114	6
Gasoline	8015M	500 ug/Kg	ND	89	4
Diesel	8015M	1 mg/Kg	ND	84	3

*Please note that the result is reported in ppm(mg/Kg).

ELAP Certificate NO: 1753

Reviewed and Approved:


John A. Murphy, Laboratory Director



NISE

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

1921 Ringwood Ave. San Jose, CA 95131 • (408) 437-2400, FAX (408) 437-9356

96-586

DATE 8/15/96 PAGE 1 OF 1

PROJECT NAME SITE C#2: C60PR05 90404
 PROJECT MNGR RICK WIDEBROOK
 COMPANY/ADDRESS SMITH - EMERY
 SAMPLERS SIGNATURE Rick Widbrook PHONE 330-3000

NUMBER OF CONTAINERS	ANALYSIS REQUESTED												REMARKS	
	Base/Non-Acid Organics GC/MS 624/8220	Volatile Organics GC/MS 624/8240	Halogenated or Aromatic Volatiles 801/8010	TPH as Gas/BTEX 802/8020	TPH as Diesel/BHC 802/8020	TPH - 418.1	Oil and Grease Method	Metals (Total or Dissolved) List Below	PH Cond, Cl, SO ₄ , PO ₄ , F, NO ₂ , Alk, TDS, TSS (circle)	NP-H, COP, Total-P, TKN (circle)	Total Organic Carbon 415/8060	Total Phenols		

-10
-11
-12
-13
-14
-15
-16
-17
-18

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX
G1-5-16	8/14/96	830		801L
G2-4-16	"	900		"
G3-4-17	"	930		"
G4-4-17	"	1000		"
G5-2-9	"	1030		"
G5-4-16.5	"	1100		"
G6-3-15	"	1200		"
G7-3-14.5	"	1230		"
G8-2-14	"	130		"

RELINQUISHED BY:
 Signature Rick Widbrook
 Printed Name Rick Widbrook
 Firm SEA
 Date/Time 8/15/96 11:54a

RECEIVED BY:
 Signature John A. Murphy
 Printed Name John A. Murphy
 Firm NISE LABS
 Date/Time 8/15/96 11:54a

TURNAROUND REQUIREMENTS:
 STD
 24 hr ___ 48 hr ___ 5 day ___
 Standard (~ 10-15 working days)
 Provide Verbal Preliminary Results
 Provide FAX Preliminary Results
 Requested Report Date _____

REPORT REQUIREMENTS
 I. Routine Report
 II. Report (includes DUP,MS, MSD, as required, may be charged as samples)
 III. Data Validation Report (includes All Raw Data)
 IV. CLP Deliverable Report

INVOICE INFORMATION:
 P.O. # _____
 Bill to: _____

SAMPLE RECEIPT:
 Shipping VIA: _____
 Shipping #: _____
 Condition: _____
 Lab No.: _____

RELINQUISHED BY:
 Signature _____
 Printed Name _____
 Firm _____
 Date/Time _____

RECEIVED BY:
 Signature _____
 Printed Name _____
 Firm _____
 Date/Time _____

SPECIAL INSTRUCTIONS/COMMENTS:
RUN FUEL SCAN WITH BTEX AND MBTE



North State Environmental Analytical Laboratory

Chain of Custody/Request for Analysis

96-586
Page 1 of 2 (415) 588-9652

Client: SMITH-EMERY		Phone: 330 3000		Report to: RICK WIDEBROOK			Turnaround Time STD		
Mailing Address:				Billing to: SEA			8 Hr	24 Hr	
Site Address: 3925 ALAMEDA AVENUE, OAKLAND				PO# / Billing Reference: 90404: GEOPROBES			40 Hr	5 Days	
Sampler: RICK WIDEBROOK			Date: 8/14/96		Other				
Sample ID:	Sample Description	Container # / type	Sampling Time/Date	ANALYSIS REQUESTED					Remarks
				TPH-D	TPH-G	BTEX	O+G	FUEL SCAN WITH BTEX AND METS	
1 G2-WATER	WATER	3: 2 YCA 1 QL	8/14/96					/	
2 G3- "	"	" "	"					/	
3 G4- "	"	" "	"					/	
4 G5- "	"	" "	"					/	
5 G6- "	"	" "	"					/	
6 G7- "	"	" "	"					/	
7 G8- "	"	" "	"					/	
8 G5-3-14	SOIL	1 TUBE	"					HOLD	HOLD
9 G6-2-9	SOIL	1 TUBE	"					HOLD	HOLD
Relinquished by: <i>Rick Widbrook</i>		Date: 8/15/96 Time: 11:57		Received by: <i>[Signature]</i> NSE			Yes No		
Relinquished by:		Date: Time:		Received by:			Were samples Preserved ? <input checked="" type="checkbox"/>		
Relinquished by:		Date: Time:		Received in lab by: <i>[Signature]</i>			In good condition ? <input checked="" type="checkbox"/>		



CERTIFICATE OF ANALYSIS

Lab No: 96-693 Date Sampled: 09-20-96
Client: SFG Date Extracted: 09-24-96
Project: 3925 Alameda Avenue Date Analyzed: 09-26-96
 Smooke #90404

MTBE, Benzene, Toluene, Ethylbenzene and Xylenes by Method 8020
Gasoline range hydrocarbons by EPA method 8015M

SAMPLE NO	CLIENT ID	ANALYTE	METHOD	RESULT
96-693-01	MW-1-QTR-3 WATER	MTBE	8020	70 ug/l.
		Benzene	8020	570 ug/L
		Toluene	8020	30 ug/L
		Ethylbenzene	8020	110 ug/l.
		Xylenes	8020	80 ug/l.
		Gasoline	8015M	2200 ug/L
96-693-02	MW-2-QTR-3 WATER	MTBE	8020	370 ug/L
		Benzene	8020	2700 ug/L
		Toluene	8020	600 ug/L
		Ethylbenzene	8020	500 ug/l.
		Xylenes	8020	1500 ug/L
		Gasoline	8015M	11000 ug/L
96-693-03	MW-3-QTR-3 WATER	MTBE	8020	6 ug/l.
		Benzene	8020	4 ug/L
		Toluene	8020	ND
		Ethylbenzene	8020	26 ug/l.
		Xylenes	8020	13 ug/L
		Gasoline	8015M	370 ug/L
96-693-04	MW-4-QTR-3 WATER	MTBE	8020	260 ug/l.
		Benzene	8020	890 ug/l.
		Toluene	8020	120 ug/l.
		Ethylbenzene	8020	1100 ug/L
		Xylenes	8020	2000 ug/l.
		Gasoline	8015M	12000 ug/l.



CERTIFICATE OF ANALYSIS

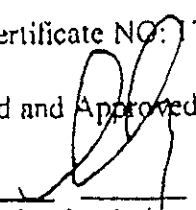
Lab No:	96-693	Date Sampled:	09-20-96
Client:	SEG	Date Extracted:	09-24-96
Project:	3925 Alameda Avenue Smooke #90404	Date Analyzed:	09-26-96

Quality Control/Quality Assurance Summary- WATER

Analyte	Method	Reporting Limit	Blank	MS/MSD Recovery	RPD
MTBE	8020	0.5 ug/l.	ND	84	61
Benzene	8020	0.5 ug/l.	ND	103	48
Toluene	8020	0.5 ug/L	ND	103	7
Ethylbenzene	8020	0.5 ug/L	ND	102	16
Xylenes	8020	1.0 ug/l.	ND	97	10
Gasoline	8015M	0.05 ug/l.	ND	136	8

ELAP Certificate NO: 1753

Reviewed and Approved:


 John A. Murphy, Laboratory Director



North State Environmental Analytical Laboratory

Chain of Custody/Request for Analysis 06-603

(415) 588-9652

Client: SEG		Phone: 415 330-3000		Report to: Rick Whitebrook			Turnaround Time NORMAL				
Mailing Address:				Billing to: SEG			8 Hr <input type="checkbox"/>		24 Hr <input type="checkbox"/>		
Site Address: 3925 Alameda Av, Oakland				PO # / Billing Reference: Smooke # 904/04			40 Hr <input type="checkbox"/>		5 Days <input type="checkbox"/>		
Sampler: Miles Grant		Date: 9-20-96		Other <input type="checkbox"/>							
Sample ID.	Sample Description	Container # / type	Sampling Time/Date	ANALYSIS REQUESTED							Remarks
				TPH-D	TPH-C	BTEX	O+C	MBT			
MW1	MW1-QTR-3	2/VUA	9-20-96		X	X		X			
	MW2-ATR-3	"	"		X	X		X			
	MW3-QTR-3	"	"		X	X		X			
	MW4-ATR-3	"	"		X	X		X			
8 VOA'S Cool											
Relinquished by: Miles Grant		Date: 9/20/96 Time: 2:40		Received by: Edward P. Luvant			Yes <input type="checkbox"/>		No <input type="checkbox"/>		
Relinquished by:		Date: Time:		Received by:			Were samples Preserved ? yes		<input checked="" type="checkbox"/>		
Relinquished by:		Date: Time:		Received in lab by:			In good condition ? <input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		



North State Environmental Analytical Laboratory

Chain of Custody/Request for Analysis

(415) 588-9652

Client: SEG		Phone: 415 330-3000		Report to: Rick Widebrook				Turnaround Time NORMAL			
Mailing Address:				Billing to: SEG				8 Hr <input type="checkbox"/>	24 Hr <input type="checkbox"/>		
Site Address: 3925 Alameda Av, Oakland				PO# / Billing Reference: Smooke # 90404				40 Hr <input type="checkbox"/>	5 Days <input type="checkbox"/>		
Sampler: Miles Grant		Date: 9-20-96							Other <input type="checkbox"/>		
Sample ID:	Sample Description	Container # / type	Sampling Time/Date	ANALYSIS REQUESTED							Remarks
				TPH-D	TPH-G	BTEX	O+G	MBT			
MW1	MW1-QTR-3	2/VOA	9-20-96		X	X		X			
	MW2-ATR-3	"	"		X	X		X			
	MW3-QTR-3	"	"		X	X		X			
	MW4-ATR-3	"	"		X	X		X			
Relinquished by: Jim Dant		Date: 9/20/96 Time: 2:40		Received by: Edward P. Luont					Yes	No	
Relinquished by:		Date: Time:		Received by:				Were samples Preserved ?	yes		
Relinquished by:		Date: Time:		Received in lab by:				In good condition ?	✓		

5 VOA's
Cool

SMITH-EMERY GEOSERVICES

APPENDIX C

FIELD EXPLORATION PROCEDURES

SMITH-EMERY GEOSERVICES

FIELD EXPLORATION PROCEDURES

SMITH-EMERY GEOSERVICES ENVIRONMENTAL INVESTIGATION FIELD EXPLORATION PROCEDURES

3925 Alameda Avenue
Oakland, California

A.1 SOIL SAMPLING PROCEDURES

1. Soil core samples are routinely obtained at every 5 foot interval. Additional samples are taken whenever a change in lithology occurs or if any other reason suggests that they may be useful.
2. When the hollow stem auger reaches the sampling depth, a split spoon sampler (2.5" outer diameter California) equipped with six three-inch brass tubes is driven 1.5 feet into the formation by repeatedly dropping a 140 pound weight a distance of 2.5 feet onto the sampler rods. The number of blows each for three consecutive 0.5 foot increments is recorded on the boring logs.
3. Soils brought up by the auger flights during drilling, and soil recovered by the split spoon sampler are described and recorded on a standard boring log form according to the Unified Soil Classification System (USCS) by a project geologist under the direct supervision of a State Registered Geologist or Geotechnical Engineer. In addition to the USCS classification, the soil is described by color, moisture content, mechanical strength, odor, and any other notable characteristics.
4. Soil from the driving tip and upper tube is inspected for the soil description. The middle tube is typically retained for screening for volatile organic vapors by head space analysis. Unless otherwise noted, the lower tube is designated for chemical analysis.
5. Any indication of odor from the fresh soil samples as they are removed from the split spoon sampler is recorded on the boring log.
6. All samples designated for analysis are sealed at each end with Teflon and plastic caps. Care is taken to retain the samples with a minimum of disturbance and flush with the ends of the tube if possible.
7. All sampling equipment is decontaminated after each sampling interval by complete disassembly of the sampler and brush cleaning of all parts in a nonphosphate solution bath, followed by a clear water rinse and a final deionized or distilled water rinse. The hollow stem auger flights and bits are steam cleaned before arrival on site and between borings.
8. All soil cuttings generated during the drilling of the borings were added to the existing stockpile of contaminated material and disposed of.
9. Upon completion of drilling activities, all borings were back-filled with hydrated bentonite chips.
10. Hand samples are obtained by driving a six-inch long clean brass tube into the formation and capping each end with Teflon sheets and plastic caps.

SMITH-EMERY GEOSERVICES

A.2 SAMPLE HANDLING AND ANALYSIS

1. After retrieval all samples are immediately labeled and placed in a chilled cooler with ice to 4 degrees centigrade. Care is taken to prevent freezing of samples.
2. If a mobile laboratory is being utilized on the site, the samples are immediately brought to the laboratory after they are sealed and placed in the laboratory refrigerator and maintained at 4 degrees centigrade.
3. Chain-of-Custody documentation is maintained from the sampler through the laboratory. The samples are kept in the custody of the sampler of record until he signs them over to the next custodian of record. The samples are either kept within sight of the custodian, or in a locked place. Samples are delivered to the laboratory within 24 hours of collection.
4. The number of samples designated for analysis is dictated by the job specifications, field observations and agency involvement. All samples collected are held in refrigeration at 4 degrees centigrade by the lab for further analysis if initial test results indicate that more analyses may be useful.
5. The laboratory is instructed to analyzed the samples according to the needs of the job. Usually, the analysis is carried out by a method certified by a federal or state agency. Routine quality assurance/quality control (QA/QC) procedures include matrix spikes, matrix spike duplicates, equipment blanks, and surrogate recoveries.

SMITH-EMERY GEOSERVICES

APPENDIX D

REFERENCES

SMITH-EMERY GEOSERVICES

REFERENCES

Helley, E.J. and Lajoie, K.R., 1979. *Flatland deposits of the San Francisco Bay Region, California*. USGS Professional Paper No. 943. Washington, D.C.

California Department of Water Resources Bulletin 74-90, *California Well Standards*.

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SEG Report No. 95-154, Tank/Groundwater Monitoring Workplan, 3925 Alameda Avenue, Oakland, California

SEG Health & Safety Plan, 3925 Alameda Avenue, Oakland, California

"Soil and Ground-Water Contamination Investigation, 569 High Street, Oakland, California" prepared by Harding Lawson Associates, HLA Job No. 9382,006/01, dated July 24, 1987.