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ENVIRONMENTAL PROTECTION
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SOIL BORING AND WELL INSTALLATION REPORT

at

Unocal Station No. 5325
3220 Lakeshore Avenue
Oakland, California

Report No. 7814.21-2

Prepared for:

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August 4, 1997

TABLE OF CONTENTS

FIGURES

APPENDICES

SOIL BORING AND WELL INSTALLATION REPORT

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Unocal Service Station No. 5325
3220 Lakeshore Avenue
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Report No. 7814.21-2

INTRODUCTION

This report summarizes field activities performed by GeoStrategies (GSI) on June 23, 1997, at the above referenced location. The work performed included: hand augering two soil borings; collecting soil samples for description and chemical analysis; analyzing the soil samples for site specific physical parameters; installing one underground storage tank (UST) backfill observation well; and preparing this report. This work was performed at the request of Tosco Marketing Company and in response to letters from the Alameda County Health Care Services Agency (ACHSCA) dated March 7 and April 7, 1997. This work was originally proposed in GSI Report No. 7814.21-1, *Work Plan for Limited Subsurface Investigation*, dated May 5, 1997. The Work Plan was accepted in a letter from ACHSCA dated June 2, 1997.

This subsurface investigation was undertaken to further evaluate the extent of hydrocarbon-impacted soil beneath the north side of the subject site. Soil samples collected and analyzed for site specific physical parameters will be retained for future use in a Risk Based Corrective Action (RBCA) evaluation. The scope of work described in this report is intended to comply with State of California and ACHSCA guidelines.

SITE DESCRIPTION

The subject site is an operating Unocal Service Station situated on the southeast corner of the intersection of Lakeshore Avenue and Lake Park Avenue in Oakland, California. The site is bounded to the north by Lakeshore Avenue, to the west and southwest by Lake Park Avenue, to the southeast by a Lucky Supermarket parking lot and to the east by a Boston Market restaurant. Properties in the immediate site vicinity are used for commercial purposes that include grocery stores, restaurants and shopping facilities. Interstate 580 is located on the west side of Lake Park Avenue.

Current site facilities consist of the service station building with three service bays (currently used for storage), three product dispenser islands, and two 12,000-gallon double-wall fiberglass

gasoline USTs. Six groundwater monitoring wells (U-1 through U-6) have been installed at the site. Locations of the pertinent site features are shown on the Site Plan (Figure 2).

PREVIOUS ENVIRONMENTAL WORK

In May 1990, three exploratory soil borings were drilled adjacent to the UST complex to depths ranging from 10 to 12.5 feet below ground surface (bgs). Soil samples collected from the soil borings were analyzed for total petroleum hydrocarbons calculated as gasoline (TPHg) and benzene, toluene, ethylbenzene, and xylenes (BTEX). The samples contained TPHg concentrations ranging from 2 to 7,500 parts per million (ppm) and benzene concentrations ranging from 0.14 to 13 ppm (GSI; *Soil Boring Report,* dated June 12, 1990).

Two 10,000-gallon gasoline USTs, one 550-gallon waste oil UST, and related product dispensers were replaced in June 1990. Soil samples collected from the UST excavation sidewalls and bottom and product line trenches were reported to contain TPHg and benzene at concentrations ranging from 12 to 2,800 ppm and 0.008 to 11 ppm, respectively. Approximately 850 cubic yards of soil and imported backfill were aerated on-site to less than 100 ppm TPHg and then transported to an appropriate soil disposal facility. Groundwater was encountered at approximately 7.5 feet bgs (GSI, *Tank Replacement Report,* dated August 31, 1990).

Groundwater wells U-1, U-2 and U-3 were installed on September 24, 1990. TPHg was detected in soil samples collected from the capillary fringe in wells U-1 and U-2 in concentrations of 110 and 480 ppm, respectively. Benzene was detected in the soil sample from well U-1 at a concentration of 4.5 ppm. Well U-3 was reported as not detected (ND) for petroleum hydrocarbons in soil or groundwater samples. Groundwater samples collected from wells U-1 and U-2 were reported to contain 690 and 38 parts per billion (ppb) TPHg and 780 and 27 ppb benzene, respectively (GSI; *Monitoring Well Installation Report,* dated December 19, 1990).

Groundwater wells U-4, U-5, and U-6 were installed on June 2, 1994. TPHg and benzene concentrations were detected in the capillary fringe soil sample collected from well U-5 at 400 and 1.9 ppm, respectively. TPHg and benzene were not detected in soil samples collected from wells U-4 and U-6. Groundwater levels stabilized at depths between 8.8 and 9.2 feet bgs (GSI; *Monitoring Well Installation Report,* dated August 8, 1994).

One 550-gallon waste oil UST was removed and the product lines and dispensers were replaced in November 1996. A sample collected from the sidewall of the waste oil UST excavation was reported to contain 1.5 ppm total petroleum hydrocarbons calculated as diesel (TPHd) and 78 ppm total oil and grease (TOG). TPHg, benzene, methyl tertiary butyl ether (MtBE), halogenated volatile organics (HVOs), and semivolatile organics (SVOs) were not detected in

the sample. Product line trench excavation and overexcavation samples were reported to contain petroleum hydrocarbon concentrations ranging from ND to 880 ppm TPHg, ND to 3.6 ppm benzene, and ND to 23 ppm MtBE. A total of 276 tons of excavated soil was transported to an appropriate disposal facility (GSI; *Waste Oil Tank Removal and Product Line Replacement Report,* dated January 24, 1997).

Quarterly groundwater monitoring has been performed on the above wells since their installation. Well U-1 (crossgradient from the UST complex) contained floating product (0.01 to 0.55) for seven of the last nine monitoring events. Well U-2 contained 0.03 feet of floating product during the last monitoring event (March 14, 1997) and has historically contained elevated concentrations of dissolved petroleum hydrocarbons (MPDS; *First Quarter 1997 Quarterly Data Report,* dated April 7, 1997). Historically, upgradient wells U-3 and U-4 have not contained dissolved petroleum hydrocarbons. Groundwater flow has been predominantly toward the northwest with a hydraulic gradient ranging from 0.002 to 0.02.

REGIONAL GEOLOGY

The subject site is situated on estuarine deposits northeast of the Lake Merritt basin and southwest of the Piedmonts Hills at an elevation of approximately 7 to 11 feet (City of Oakland datum). These deposits consist primarily of unconsolidated, water-saturated, dark plastic clay and silty clay rich in organic material (GSI; *Work Plan,* dated March 22, 1994).

Based on previous subsurface investigations, the site is underlain by clay and silt to depths of approximately 25 feet bgs. Minor amounts of sand and occasionally gravel are noted, but are not continuous across the site. Silt and sand fill were observed in the vadose zone to depths up to 10 feet bgs. The water-bearing zone is composed of sand and silty sand, and is encountered at depths of 6 to 17 feet bgs. This water-bearing zone is underlain by silt, clay, and gravel to a total explored depth of 25 feet bgs. The well borings all terminate in clay or silt, which appear to be laterally continuous beneath the site.

Groundwater is first encountered at depths of 6 to 10 feet bgs. Water levels stabilize at depths of 6 to 12 feet bgs, indicating unconfined aquifer conditions.

FIELD ACTIVITIES

Field work was performed in accordance with the GSI Site Safety Plan No. 6792.02, dated May 29, 1997. GSI Field Methods and Procedures are included in Appendix A. Underground Service Alert (USA) was notified prior to beginning drilling activities. Well construction was performed under Water Resources Management Zone 7 Permit No. 97344. A copy of the well installation permit is included in Appendix B.

Drilling and Sampling

Two exploratory soil borings (U-D and U-E) were advanced using a 4-inch diameter hand auger on June 23, 1997. One observation well was installed in the UST backfill to a total depth of approximately 15 feet bgs by Woodward Drilling Company (#C57 581639). This well was installed within the UST excavation, and did not encounter native sediments. A GSI geologist observed the drilling and well installation activities, described the encountered lithology, and prepared a log of each boring. Logs of the soil borings are included in Appendix B. Locations of the wells and borings are shown on Figure 2.

Soil cuttings generated during drilling were placed in one 55-gallon drum and stored at the site pending disposal. Stockpile composite sample US-1A-D was collected from the stockpiled soil cuttings and submitted to the laboratory to be composited and analyzed as one sample. Stockpile sampling procedures are presented in Appendix A.

UST Observation Well Installation

The observation well was constructed using 4-inch diameter Schedule 40 polyvinyl chloride (PVC) casing and 0.02-inch machine-slotted well screen. The annular space around the well screen in the well boring was allowed to refill with pea gravel from the surrounding UST backfill area. The top of the well is protected by a vault box placed in concrete, a locking well cap, and a lock. Well construction details are included in Appendix B.

Subsurface Conditions

In the vicinity of boring U-D, the unsaturated zone consisted of base rock, silt, and sand fill material to 4 feet bgs, overlying sand (SP) and silt (ML) to a depth of 6 to 6.5 feet bgs. In boring U-E, the unsaturated zone consisted of silt to 3 feet bgs, overlying sand. Sand (SP) and silt (ML) were encountered in the saturated zone to a total explored depth of 7 feet bgs. A thin (approximately 3 inch) zone of gravel (GW) was encountered in boring U-E at a depth of 6.5 feet bgs. Groundwater was encountered at depths of 6 to 6.5 feet bgs.

LABORATORY RESULTS

A total of two soil samples from the soil borings and one soil sample from the stockpiled soil cuttings were submitted for chemical analysis. Analyses were performed by Sequoia Analytical of Redwood City, California (ELAP #1210). In addition, two soil samples were collected from boring U-D and submitted for site specific physical parameters for future use in a RBCA evaluation. These analyses were performed by PTS Laboratories, Inc. of Santa Fe Springs, California. Copies of the laboratory reports and chain-of-custody forms are included in Appendix C.

Laboratory Analytical Procedures

Selected soil samples from the hand borings were analyzed for TPHg, benzene, toluene, ethylbenzene and xylenes (BTEX), and MtBE according to Environmental Protection Agency (EPA) Method 5030/8015/8020. The soil stockpile sample was analyzed for TPHg, BTEX, and total lead by EPA Method 6010. Soil chemical analytical data are summarized in Table 1.

Two soil samples selected from boring U-D were composited in the laboratory (PTS) and then analyzed for moisture content according to American Standard Testing Method (ASTM) D2216, porosity according to American Petroleum Institute (API) Method RP40, bulk density according to ASTM D2937, soil pH according to EPA Method 9045, grain size according to ASTM D4464M, total organic carbon (TOC) according to Walkley-Black, and permeability according to ASTM D5084. Soil analytical data are presented in Appendix C.

Laboratory Analytical Results

Soil sample U-D-5.5, collected in the capillary fringe of boring U-D at 5.5 feet bgs, contained 450 ppm TPHg, 1.1 ppm MtBE, and was reported as ND for benzene. Soil sample U-E-6.5, collected at the capillary fringe of boring U-E at 6.5 feet bgs, contained 29 ppm TPHg, 0.16 ppm benzene, and was reported as ND for MtBE.

Laboratory results for the site specific physical tests are included in Appendix C.

Stockpile Chemical Analytical Results

Soil stockpile sample US-1A-D contained 7.6 ppm TPHg, 0.042 ppm benzene, and 6.4 ppm total lead.

WASTE DISPOSAL

Approximately 1 drum of soil (drill cuttings) was removed from the site on June 27, 1997 by Denbeste Transportation, Inc. of Windsor, California and transported to the Forward Incorporated facility in Manteca, California for disposal. A copy of the Forward disposal confirmation form is included in Appendix D .

WATER PURGING/DISPOSAL

On June 24, 1997, approximately 13,000 gallons of water were purged from the UST excavation backfill using the newly installed UST observation well. Water purging and transportation was performed by RUST Industrial Cleaning Services of Benicia, California. The purged water was transported by RUST to the Unocal Refinery in Rodeo, California for treatment and disposal. The newly installed UST observation well will be used to monitor groundwater levels and the potential presence of separate phase product, and to allow access for additional groundwater purging activities.

DISTRIBUTION

GSI recommends that a copy of this report be forwarded to Mr. Barney Chan of Alameda County Health Care Services Agency at 1131 Harbor Bay Parkway, Suite 250, Alameda, California, 94502-6577.

TABLE 1 - SOIL CHEMICAL ANALYTICAL DATA

Unocal Service Station No. 5325
3220 Lakeshore Avenue
Oakland, California

Sample No.	Sample Depth (ft.)	Sample Date	TPHg (ppm)	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	Xylenes (ppm)	MtBE (ppm)	Total Lead (ppm)
Boring U-D									
U-D-5.5	5.5	6/23/97	450	ND	1.2	9.8	35	1.1	NA
Boring U-E									
U-E-6.5	6.5	6/23/97	29	0.16	0.034	ND	0.050	ND	NA
Stockpile									
US-1A-D	--	6/23/97	7.6	0.042	ND	0.0086	0.067	NA	6.4

EXPLANATION:

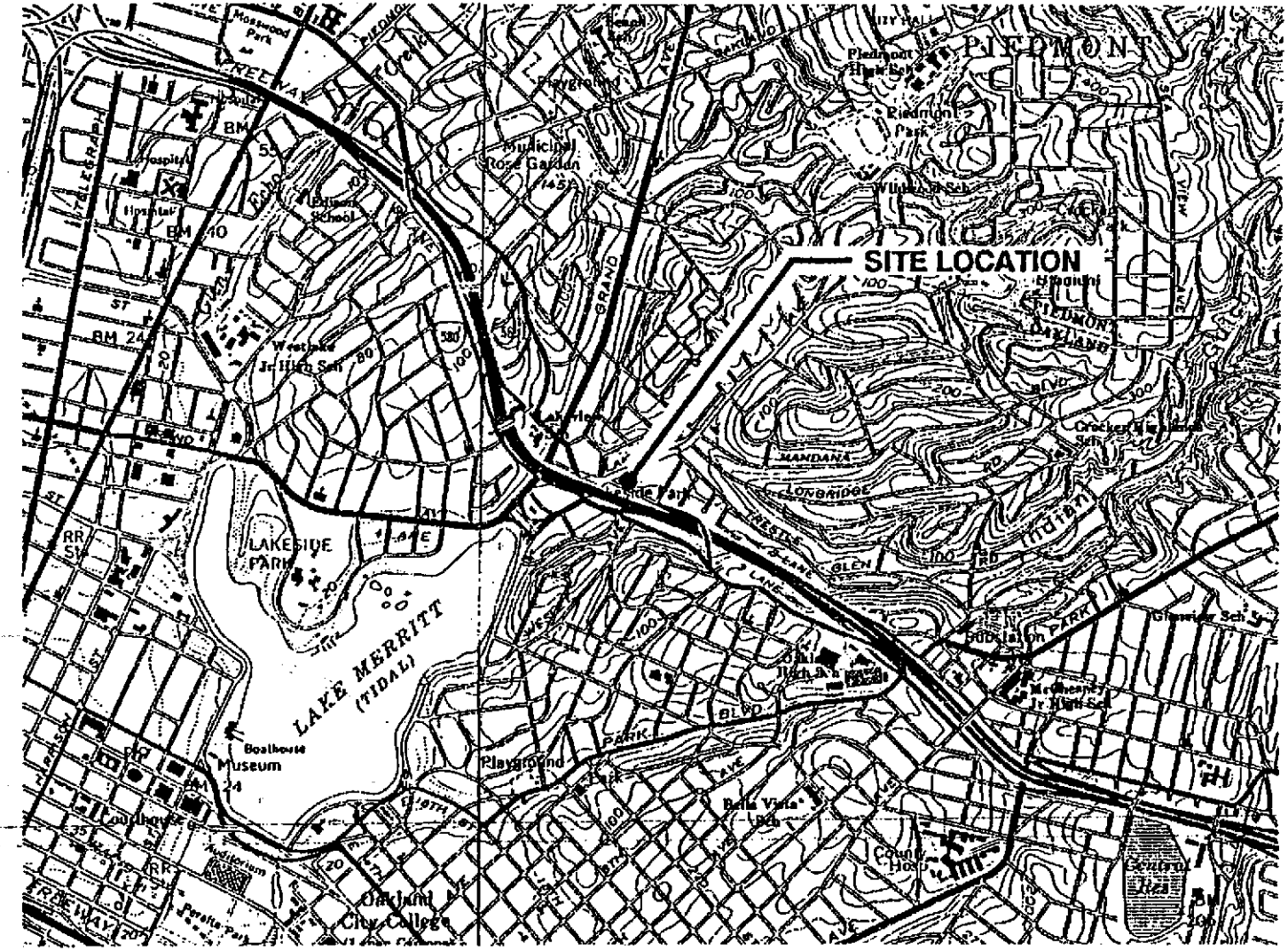
ft. = feet
ppm = parts per million
-- = not applicable
NA = not analyzed for this constituent
ND = Not detected. See laboratory analytical data for detection limits.

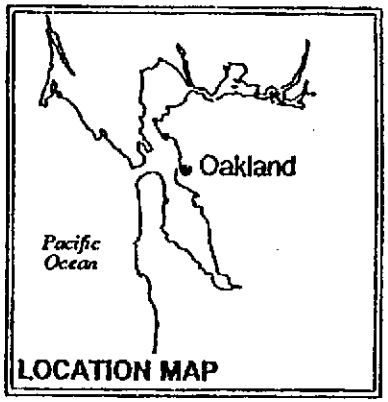
ANALYTICAL LABORATORY:

Sequoia Analytical (ELAP #1210)

ANALYTICAL DATA:

TPHg = Total Petroleum Hydrocarbons as gasoline according to EPA Method 8015 Modified
MtBE = Methyl tertiary butyl ether according to EPA Method 8020





Base Map: USGS Topographic Map

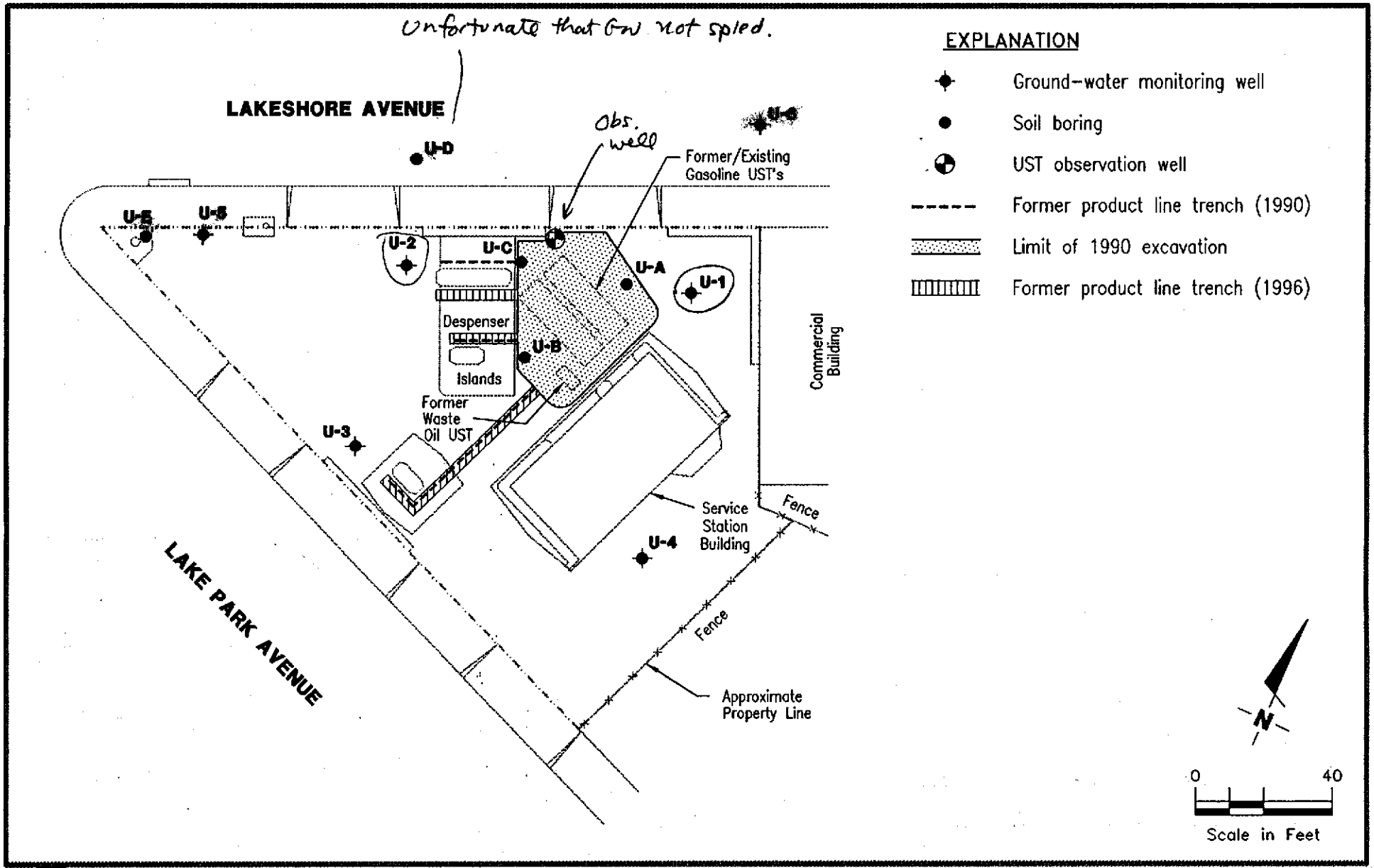
Approximate Scale: 1" = 2000'

GeoStrategies Inc.

Vicinity Map
UNOCAL Service Station #5325
3220 Lakeshore Avenue
Oakland, California

PLATE **1**

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE
7814		6/90	



GeoStrategies Inc.

SITE PLAN
UNOCAL Service Station NO. 5325
3220 Lakeshore Avenue
Oakland, California

FIGURE
2

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
7814.21		June, 1997	

APPENDIX A

GSI Field Methods and Procedures

GEOSTRATEGIES

FIELD METHODS AND PROCEDURES

Site Safety Plan

Field work performed by GeoStrategies (GSI) is conducted in accordance with GSI's Health and Safety Plan and the Site Safety Plan. GSI personnel and subcontractors who perform work at the site are briefed on the contents of these plans prior to initiating site work. The GSI geologist or engineer at the site when the work is performed acts as the Site Safety Officer. GSI utilizes a photoionization detector (PID) to monitor ambient conditions as part of the Health and Safety Plan.

Collection of Soil Samples

Soil borings are drilled by a California-licensed well driller. A GSI geologist is present to observe the drilling, collect soil samples for description, physical testing, and chemical analysis, and prepare a log of the exploratory soil boring. Soil samples are collected from the soil boring with a split-barrel sampling device fitted with 2-inch-diameter, clean brass tube or stainless steel liners. The sampling device is driven approximately 18 inches with a 140-pound hammer falling 30 inches. The number of blows required to advance the sampler each successive 6 inches is recorded on the boring log. The encountered soils are described using the Unified Soil Classification System (ASTM 2488-84) and the Munsell Soil Color Chart.

After removal from the sampling device, soil samples for chemical analysis are covered on both ends with teflon sheeting or aluminum foil, capped, labeled, and place in a cooler with blue ice for preservation. A chain-of-custody form is initiated in the field and accompanies the selected soil samples to the analytical laboratory. Samples are selected for chemical analysis based in part on:

a. depth relative to underground storage tanks and existing ground surface
b. depth relative to known or suspected groundwater
c. depth relative to areas of known hydrocarbon impact at the site
d. presence or absence of contaminant migration pathways
e. presence or absence of discoloration or staining
f. presence or absence of obvious gasoline hydrocarbon odors
g. presence or absence of organic vapors detected by headspace analysis

Field Screening of Soil Samples

A PID is used to perform head-space analysis in the field for the presence of organic

vapors from the soil sample. This test procedure involves removing some soil from one of the sample tubes not retained for chemical analysis and immediately covering the end of the tube with a plastic cap. The PID probe is inserted into the headspace inside the tube through a hole in the plastic cap. Head-space screening results are recorded on the boring log. Head-space screening procedures are performed and results recorded as reconnaissance data. GSI does not consider field screening techniques to be verification of the presence or absence of hydrocarbons.

Construction of Monitoring Wells

Monitoring wells are constructed in the exploratory soil borings with Schedule 40 polyvinyl chloride (PVC) casing. All joints are thread-joined; no glues, cements, or solvents are used in well construction. The screened interval is constructed of machine-slotted PVC well screen which generally extends from the total well depth to a point above the groundwater. An appropriately-sized sorted sand is placed in the annular space adjacent to the entire screened interval. A bentonite transition seal is placed in the annular space above the sand, and the remaining annular space is sealed with neat cement or cement grout.

Wellheads are protected with water-resistant traffic-rated vault boxes placed flush with the ground surface. The top of the well casing is sealed with a locking waterproof cap. A lock is placed on the well cap to prevent vandalism and unintentional introduction of materials into the well.

Measurement of Water Levels

The top of the newly-installed well casing is surveyed by a California-licensed Land Surveyor to mean sea level (MSL). Depth-to-groundwater in the well is measured from the top of the well casing with an electronic water-level indicator. Depth-to-groundwater is measured to the nearest 0.01-foot, and referenced to MSL.

Well Development and Sampling

The purpose of well development is to improve hydraulic communication between the well and the surrounding aquifer. Prior to development, each well is monitored for the presence of floating product and the depth-to-water is recorded. Wells are then developed by alternately surging the well with a vented surge block, then purging the well with a pump or bailer to remove accumulated sediments and draw groundwater into the well. Development continues until the groundwater parameters (temperature, pH, and conductivity) have stabilized. Well development is performed by Gettler-Ryan Inc. of Dublin, California. Wells are monitored and sampled on a quarterly basis by Unocal Corporation's monitoring and sampling contractor.

Storing and Sampling of Drill Cuttings

Drill cuttings are stockpiled on and covered with plastic sheeting or stored in drums depending on site conditions and regulatory requirements. Stockpile samples are collected and analyzed for disposal classification on the basis of one composite sample per 100 cubic yards of soil. Stockpile samples are composed of four discrete soil samples, each collected from an arbitrary location on the stockpile. The four discrete samples are then composited in the laboratory prior to analysis.

Each discrete stockpile sample is collected by removing the upper 3 to 6 inches of soil, and them driving the stainless steel or brass sample tube into the stockpiled material with a hand, mallet, or drive sampler. The sample tubes are then covered on both ends with teflon sheeting or aluminum foil, capped, labeled, and placed in a cooler with blue ice for preservation. A chain-of-custody form is initiated in the field and accompanies the selected soil samples to the analytical laboratory. Stockpiled soils are covered with plastic sheeting after completion of sampling.

APPENDIX B

Permits, Boring Logs, and Well Construction Details

ZONE 7 WATER AGENCY

5997 PARKSIDE DRIVE PLEASANTON, CALIFORNIA 94588 VOICE (510) 484-2600
FAX (510) 462-3914

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT Unocal Service Station #5325
3220 Lakeshore Ave / Lake Park Ave.
Oakland CA

CLIENT
Name Tosco Marketing Co. (Unocal
Address 200 Crow Canyon Pl Suite 280 Voice (510) 277-2321
City San Ramon CA Zip 94583

APPLICANT
Name GeoStrategies
Clyde Galantine Fax (510) 551-7888
Address 6747 Sierra Ct, Suite J Voice (510) 551-7555
City Dublin CA Zip 94568

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection	___	General	___
Water Supply	___	Contamination	___
Monitoring/Recovery	X	Well Destruction	___

PROPOSED WATER SUPPLY WELL USE
Domestic ___ Industrial ___ Other Environmental/Recovery
Municipal ___ Irrigation ___

DRILLING METHOD:
Mud Rotary ___ Air Rotary ___ Auger X
Cable ___ Other ___

DRILLER'S LICENSE NO. 581639 (Woodward Drilling)

WELL PROJECTS
Drill Hole Diameter 10 in. Maximum
Casing Diameter 4 in. Depth 16 ft.
Surface Seal Depth / ft. Number 1

GEOTECHNICAL PROJECTS
Number of Borings 2 Maximum
Hole Diameter 4 in. Depth 7 ft.
Hand Auger

ESTIMATED STARTING DATE 6/13/97
ESTIMATED COMPLETION DATE 6/13/97

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

APPLICANT'S SIGNATURE Clyde Galantine Date 5/29/97

FOR OFFICE USE

PERMIT NUMBER 97344
LOCATION NUMBER

PERMIT CONDITIONS

Circled Permit Requirements Apply

(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 60 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.

Approved Wyman Hong Date 11 Jun 97
Wyman Hong

91992

MAJOR DIVISIONS					TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
			GP		POORLY GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
		GRAVELS WITH OVER 15% FINES	GM		SILTY GRAVELS, SILTY GRAVELS WITH SAND
			GC		CLAYEY GRAVELS, CLAYEY GRAVELS WITH SAND
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
			SP		POORLY GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
		SANDS WITH OVER 15% FINES	SM		SILTY SANDS WITH OR WITHOUT GRAVEL
			SC		CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTS WITH SANDS AND GRAVELS
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY CLAYS WITH SANDS AND GRAVELS, LEAN CLAYS
			OL		ORGANIC SILTS OR CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS, FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH		ORGANIC SILTS OR CLAYS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT		PEAT AND OTHER HIGHLY ORGANIC SOILS

LL - Liquid Limit (%)

PI - Plastic Index (%)

PID - Volatile Vapors in ppm

MA - Particle Size Analysis

2.5 YR 6/2 - Soil Color according to Munsell Soil Color Charts (1975 Edition)

5 GY 5/2 - GSA Rock Color Chart

☒ - No Soil Sample Recovered

■ - "Undisturbed" Sample

⊠ - Bulk or Classification Sample

▽ - First Encountered Ground Water Level

▼ - Piezometric Ground Water Level

Penetration - Sample drive hammer weight - 140 pounds falling 30 inches. Blows required to drive sampler 1 foot are indicated on the logs

Unified Soil Classification - ASTM D 2488-85 and Key to Test Data

GeoStrategies

Log of Boring U-D

PROJECT: *Unocal Station No. 5325*	LOCATION: *3220 Lakeshore Avenue, Oakland, CA*
GSI PROJECT NO.: *7814.21*	CASING ELEVATION:
DATE STARTED: *06/23/97*	WL (ft. bgs): *6* DATE: *06/23/97* TIME: *10:50 am*
DATE FINISHED: *06/23/97*	WL (ft. bgs): DATE: TIME:
DRILLING METHOD: *Hand auger*	TOTAL DEPTH: *6 Feet*
DRILLING COMPANY: *Gettler-Ryan*	GEOLOGIST: *Clyde Galantine*

DEPTH feet	PID (ppm)	BLOWS/FT. *	SAMPLE NUMBER	SAMPLE INT.	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	REMARKS
							Asphalt and concrete.	
						GW	Gravel with clay and sand (GW); fill material.	
						SP	SAND (SP) - dark gray (5Y 4/1), moist, medium dense, 100% fine to medium sand, angular to rounded.	
	8		U-D-4.5			ML	SILT (ML) - dark gray (5Y 4/1), moist, stiff, 100% fines, non-plastic.	
5	112		U-D-5					
	103		U-D-5.5			SP	SAND (SP) - dark gray (5Y 4/1), saturated, loose, 95% fine to medium sand, 5% fines, silt stratum.	
			U-D-6				Bottom of boring = 6 feet.	
10								

JOB NUMBER: *7814.21*

GeoStrategies

Log of Boring U-E

PROJECT: *Unocal Station No. 5325*	LOCATION: *3220 Lakeshore Avenue, Oakland, CA*
GSI PROJECT NO. : *7814.21*	CASING ELEVATION:
DATE STARTED: *06/23/97*	WL (ft. bgs): *6.5* DATE: *06/23/97* TIME: *12:50 pm*
DATE FINISHED: *06/23/97*	WL (ft. bgs): DATE: TIME:
DRILLING METHOD: *Hand auger*	TOTAL DEPTH: *7 Feet*
DRILLING COMPANY: *Gettler-Ryan*	GEOLOGIST: *Clyde Galantine*

DEPTH feet	PID (ppm)	BLOWS/FT. *	SAMPLE NUMBER	SAMPLE INT.	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	REMARKS
						ML	Silt (ML), backfill material for planter, brick fragments; fill.	
						SP	SAND (SP) - yellowish brown (10YR 5/4), moist, medium dense, 100% fine with medium sand, subangular to rounded.	
							Color change to dark gray (5Y 4/1), silt stratum, size increases to coarse with depth.	
5			U-E-5.5					
	8		U-E-6.5			GW	GRAVEL WITH SAND (GW) - very dark gray (2.5Y N3/), saturated, medium dense, 65% fine gravel, 35% fine to coarse sand, subangular to rounded.	
	11		U-E-7			ML	SILT (ML) - dark gray (5Y 4/1), wet, stiff, 100% fines, non-plastic.	
							Bottom of boring = 7 feet.	
10								

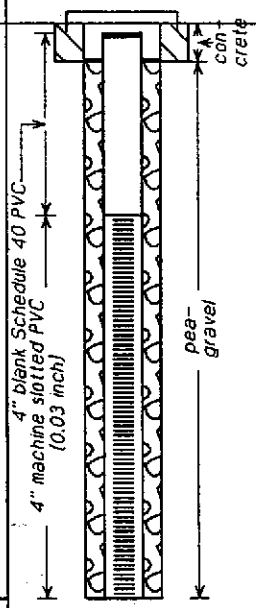
JOB NUMBER: *7814.21*

GeoStrategies

Log of UST Observation Well

PROJECT: *Unocal Station No. 5325*	LOCATION: *3220 Lakeshore Avenue, Oakland, CA*
GSI PROJECT NO.: *7814.21*	CASING ELEVATION:
DATE STARTED: *06/23/97*	WL (ft. bgs): DATE: TIME:
DATE FINISHED: *06/23/97*	WL (ft. bgs): DATE: TIME:
DRILLING METHOD: *10 in. hollow-stem auger*	TOTAL DEPTH: *15 Feet*
DRILLING COMPANY: *Woodward Drilling*	GEOLOGIST: *Clyde Galantine*

DEPTH feet	PID (ppm)	BLOWS/FT. *	SAMPLE NUMBER	SAMPLE INT.	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	WELL DIAGRAM
0							Pea gravel (fill material).	
5								
10								
15								
20								
25								
30								
35								



JOB NUMBER: *7814.21*

APPENDIX C

Laboratory Reports and Chain-of-Custody Forms

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (510) 988-9600, FAX (510) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Gettler Ryan/Geostrategies
6747 Sierra Court Suite G
Dublin, CA 94568

Attention: Clyde Galantine

Client Proj. ID: Unocal #5325

Lab Proj. ID: 9706D93

Sampled: 06/23/97
Received: 06/24/97
Analyzed: see below

Reported: 07/03/97

LABORATORY ANALYSIS

Analyte	Units	Date Analyzed	Detection Limit	Sample Results
Lab No: 9706D93-03				
Sample Desc : **SOLID,US-1(A-D)COMP**				
Lead	**mg/Kg**	**07/01/97**	**5.0**	**6.4**

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Mike Gregory
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Gettler Ryan/Geostrategies	Client Proj. ID: Unocal #5325	Sampled: 06/23/97
6747 Sierra Court Suite G	Sample Descript: U-D-5.5	Received: 06/24/97
Dublin, CA 94568	Matrix: SOLID	Extracted: 06/28/97
	Analysis Method: 8015Mod/8020	Analyzed: 06/30/97
Attention: Clyde Galantine	Lab Number: 9706D93-01	Reported: 07/03/97

QC Batch Number: GC062897BTEXEXA
Instrument ID: GCHP18

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit mg/Kg	Sample Results mg/Kg
TPPH as Gas	**25**	**450**
Methyl t-Butyl Ether	**0.62**	**1.1**
Benzene	0.12	N.D.
Toluene	**0.12**	**1.2**
Ethyl Benzene	**0.12**	**9.8**
Xylenes (Total)	**0.12**	**35**
Chromatogram Pattern:		**Gas**

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	200 Q
4-Bromofluorobenzene	60	140	525 Q

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Mike Gregory
Project Manager

Sequoia Analytical

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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Gettler Ryan/Geostrategies	Client Proj. ID: Unocal #5325	Sampled: 06/23/97
6747 Sierra Court Suite G	Sample Descript: U-E-6.5	Received: 06/24/97
Dublin, CA 94568	Matrix: SOLID	Extracted: 06/28/97
	Analysis Method: 8015Mod/8020	Analyzed: 07/01/97
Attention: Clyde Galantine	Lab Number: 9706D93-02	Reported: 07/03/97

QC Batch Number: GC062897BTEXEXA
Instrument ID: GCHP18

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit mg/Kg	Sample Results mg/Kg
TPPH as Gas	**5.0**	**29**
Methyl t-Butyl Ether	0.12	N.D.
Benzene	**0.025**	**0.16**
Toluene	**0.025**	**0.034**
Ethyl Benzene	0.025	N.D.
Xylenes (Total)	**0.025**	**0.050**
Chromatogram Pattern:		**Gas**

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	145 Q
4-Bromofluorobenzene	60	140	145 Q

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Mike Gregory
Project Manager

Sequoia Analytical

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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Gettler Ryan/Geostrategies	Client Proj. ID: Unocal #5325	Sampled: 06/23/97
6747 Sierra Court Suite G	Sample Descript: US-1(A-D)COMP	Received: 06/24/97
Dublin, CA 94568	Matrix: SOLID	Extracted: 06/28/97
	Analysis Method: 8015Mod/8020	Analyzed: 06/30/97
Attention: Clyde Galantine	Lab Number: 9706D93-03	Reported: 07/03/97

QC Batch Number: GC062897BTEXEXA
Instrument ID: GCHP22

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX

Analyte	Detection Limit mg/Kg	Sample Results mg/Kg
TPPH as Gas	**1.0**	**7.6**
Benzene	**0.0050**	**0.042**
Toluene	0.0050	N.D.
Ethyl Benzene	**0.0050**	**0.0086**
Xylenes (Total)	**0.0050**	**0.067**
Chromatogram Pattern:		**Gas**

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	140 Q
4-Bromofluorobenzene	60	140	80

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Mike Gregory
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
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Gettler Ryan/Geostrategies
6747 Sierra Court Suite G
Dublin, CA 94568
Attention: Clyde Galantine

Client Proj. ID: Unocal #5325
Lab Proj. ID: 9706D93

Received: 06/24/97
Reported: 07/03/97

LABORATORY NARRATIVE

In order to properly interpret this report, it must be reproduced in its entirety. This report contains a total of 4 pages including the laboratory narrative, sample results, quality control, and related documents as required (cover page, COC, raw data, etc.).

#Q - Surrogate coelution was confirmed.

SEQUOIA ANALYTICAL

Mike Gregory
Project Manager

Sequoia Analytical

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819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Gettler Ryan/Geostrategies	Client Project ID:	Unocal #5325	
6747 Sierra Court, Ste J	Matrix:	Solid	
Dublin, CA 94568			
Attention: Clyde Galantine	Work Order #:	9706D93 -01-03	Reported: Jul 7, 1997

QUALITY CONTROL DATA REPORT

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes	Gas
QC Batch#:	GC062897BTEXEXA	GC062897BTEXEXA	GC062897BTEXEXA	GC062897BTEXEXA	GC062897BTEXEXA
Analy. Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020	EPA 8015M
Prep. Method:	EPA 5030	EPA 5030	EPA 5030	EPA 5030	EPA 5030
Analyst:	A. Porter	A. Porter	A. Porter	A. Porter	A. Porter
MS/MSD #:	9706C8901	9706C8901	9706C8901	9706C8901	9706C8901
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.
Prepared Date:	6/28/97	6/28/97	6/28/97	6/28/97	6/28/97
Analyzed Date:	6/30/97	6/30/97	6/30/97	6/30/97	6/30/97
Instrument I.D.#:	GCHP7	GCHP7	GCHP7	GCHP7	GCHP7
Conc. Spiked:	0.20 mg/Kg	0.20 mg/Kg	0.20 mg/Kg	0.60 mg/Kg	1.2 mg/Kg
Result:	0.14	0.17	0.18	0.56	1.1
MS % Recovery:	70	85	90	93	92
Dup. Result:	0.14	0.17	0.18	0.55	1.1
MSD % Recov.:	70	85	90	92	92
RPD:	0.0	0.0	0.0	1.8	0.0
RPD Limit:	0-25	0-25	0-25	0-25	0-25
LCS #:	BLK062897	BLK062897	BLK062897	BLK062897	BLK062897
Prepared Date:	6/28/97	6/28/97	6/28/97	6/28/97	6/28/97
Analyzed Date:	6/30/97	6/30/97	6/30/97	6/30/97	6/30/97
Instrument I.D.#:	GCHP7	GCHP7	GCHP7	GCHP7	GCHP7
Conc. Spiked:	0.20 mg/Kg	0.20 mg/Kg	0.20 mg/Kg	0.60 mg/Kg	1.2 mg/Kg
LCS Result:	0.16	0.19	0.21	0.63	1.3
LCS % Recov.:	80	95	105	105	108
MS/MSD Control Limits	60-140	60-140	60-140	60-140	60-140
LCS Control Limits	70-130	70-130	70-130	70-130	70-130

SEQUOIA ANALYTICAL

Mike Gregory
Project Manager

Please Note:
The LCS is a control sample of known, interferent-free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

** MS = Matrix Spike, MSD = MS Duplicate, RPD = Relative % Difference

Sequoia Analytical

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Gettler Ryan/Geostrategies
6747 Sierra Court, Ste J
Dublin, CA 94568
Attention: Clyde Galantine

Client Project ID: Unocal #5325
Matrix: Solid
Work Order #: 9706D93-03
Reported: Jul 7, 1997

QUALITY CONTROL DATA REPORT

Analyte:	Beryllium	Cadmium	Chromium	Nickel
QC Batch#:	GC0627976010MDE	GC0627976010MDE	GC0627976010MDE	GC0627976010MDE
Analy. Method:	EPA 6010	EPA 6010	EPA 6010	EPA 6010
Prep. Method:	EPA 3050	EPA 3050	EPA 3050	EPA 3050
Analyst:	R. Butler	R. Butler	R. Butler	R. Butler
MS/MSD #:	9706D3501	9706D3501	9706D3501	9706D3501
Sample Conc.:	N.D.	N.D.	37	35
Prepared Date:	7/1/97	7/1/97	7/1/97	7/1/97
Analyzed Date:	7/1/97	7/1/97	7/1/97	7/1/97
Instrument I.D.#:	MTJA2	MTJA2	MTJA2	MTJA2
Conc. Spiked:	50 mg/Kg	50 mg/Kg	50 mg/Kg	50 mg/Kg
Result:	44	47	81	75
MS % Recovery:	88	94	88	80
Dup. Result:	46	50	79	91
MSD % Recov.:	92	100	84	112
RPD:	4.4	6.2	2.5	19
RPD Limit:	0-20	0-20	0-20	0-20
LCS #:	BLK062797	BLK062797	BLK062797	BLK062797
Prepared Date:	6/27/97	6/27/97	6/27/97	6/27/97
Analyzed Date:	6/30/97	6/30/97	6/30/97	6/30/97
Instrument I.D.#:	MTJA2	MTJA2	MTJA2	MTJA2
Conc. Spiked:	50 mg/Kg	50 mg/Kg	50 mg/Kg	50 mg/Kg
LCS Result:	53	53	55	54
LCS % Recov.:	100	100	110	110
MS/MSD Control Limits	80-120	80-120	80-120	80-120
LCS Control Limits	80-120	80-120	80-120	80-120

SEQUOIA ANALYTICAL

Mike Gregory
Project Manager

Please Note:
The LCS is a control sample of known, interferent-free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

** MS = Matrix Spike, MSD = MS Duplicate, RPD = Relative % Difference

UNOCAL 76

☒ 680 Chesapeake Drive • Redwood City, CA 94063 • (415) 364-9600
☐ 819 Striker Ave., Suite 8 • Sacramento, CA 95834 • (916) 921-9600
☐ 1900 Bates Ave., Suite LM • Concord, CA 94520 • (510) 686-9600
☐ 18939 120th Ave., N.E., Suite 101 • Bothell, WA 98011 • (206) 481-9200
☐ East 11115 Montgomery, Suite B • Spokane, WA 99206 • (509) 924-9200
☐ 15055 S.W. Sequoia Pkwy, Suite 110 • Portland, OR 97222 • (503) 624-9800

Company Name: Geo Strategies 7814.21	Project Name: Unocal # 5325
Address: 6747 Sierra Ct Suite J	UNOCAL Project Manager: Tina Berry
City: Dublin State: CA Zip Code: 94568	Release #:
Telephone: (510) 551-7555 FAX #: 510 551-7888	Site #: 5325, 3220 Lakeshore Ave, Oakland
Report To: Clyde Galantine Sampler: Clyde Galantine	QC Data: ☐ Level D (Standard) ☐ Level C ☐ Level B ☐ Level A

Turnaround Time: ☒ 10 Work Days ☐ 5 Work Days ☐ 3 Work Days ☐ 2 Work Days ☐ 1 Work Day ☐ 2-8 Hours

☐ Drinking Water ☐ Waste Water ☐ Other

CODE: ☐ Misc. ☒ Detect. ☐ Eval. ☐ Remed. ☐ Demol. ☐ Closure

Analyses Requested

Client Sample I.D.	Date/Time Sampled	Matrix Desc.	# of Cont.	Cont. Type	Laboratory Sample #	TPHg (BTEX, MTBE)	TPHg BTEX	Total Pb	Comments
1. U-D-5.5	6/23/97 11:35	Soil	1	tube		X			Normal TAT
2. U-E-6.5	6/23/97 12:45	Soil	1	Tube		X			
3.									
4. US-1A-D	6/28/97	Soil	4	tube		X	X	Composite	
5. [illegible]	1:25pm	[illegible]			No26				
6.									
7.									
8.									
9.									
10.									

Relinquished By: Clyde Galantine	Date: 6/23/97	Time: 16:45	Received By: [signature]	Date: 6/24/97	Time: 9:04
Relinquished By: [signature]	Date: 6/24/97	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By Lab: [signature]	Date: [illegible]	Time: 1456

Were Samples Received in Good Condition? ☐ Yes ☐ No Samples on Ice? ☐ Yes ☐ No Method of Shipment_____ Page __ of __

To be completed upon receipt of report:

1. Were the analyses requested on the Chain of Custody reported? ☐ Yes ☐ No If no, what analyses are still needed? _____
2. Was the report issued within the requested turnaround time? ☐ Yes ☐ No If no, what was the turnaround time? _____

Approved by: _____ Signature: _____ Company: _____ Date: _____

Pink - Client
Yellow - Laboratory
White - Laboratory

PTS Laboratories, Inc.

Geotechnical Services

8100 Secura Way • Santa Fe Springs • CA 90670
Phone (562) 907-3607 • Fax (562) 907-3610

July 7, 1997

Dave Vossler
Geostrategies
6747 Sierra Court #5
Dublin, CA 94568

GETTLER-RYAN INC.
GENERAL CONTRACTORS

Re: Unocal 5325
PTS File: 27194

Dear Mr. Vossler:

Enclosed are final data for samples submitted from your 7814.21 Project. All analyses were performed by applicable ASTM, EPA or API methodology. Samples will be retained for 30 days before disposal unless prior arrangements are made.

We appreciate the opportunity to be of service and trust these data will prove beneficial in the development of this project. Please feel free to call myself or Larry Kunkel, District Manager, should you have any questions or require additional information.

Sincerely,

PTS Laboratories, Inc.

Rick Young
Project Manager

RY:vk
encl

PHYSICAL PROPERTIES DATA

(METHODOLOGY: ASTM D2216, API RP40, ASTM D5084, Walkley-Black, EPA 9045)

PROJECT NAME: Unocal #5325
PROJECT NO: 7814.21

SAMPLE ID.	DEPTH, ft.	SAMPLE ORIENT. (1)	SOIL pH	MOISTURE CONTENT (% wt)	DENSITY		EFFECTIVE POROSITY, % Vb	TOTAL ORGANIC CARBON, mg/kg	25.0 PSI CONFINING STRESS	
					BULK (g/cc)	GRAIN (g/cc)			SPECIFIC PERMEABILITY TO WATER (millidarcy)	SPECIFIC WATER CONDUCTIVITY (cm/s)
U-D-4.5 and U-D-5 composite	4.5-5	V	7.20	30.7	1.52	2.61	41.7	7400	6.81	6.99E-06

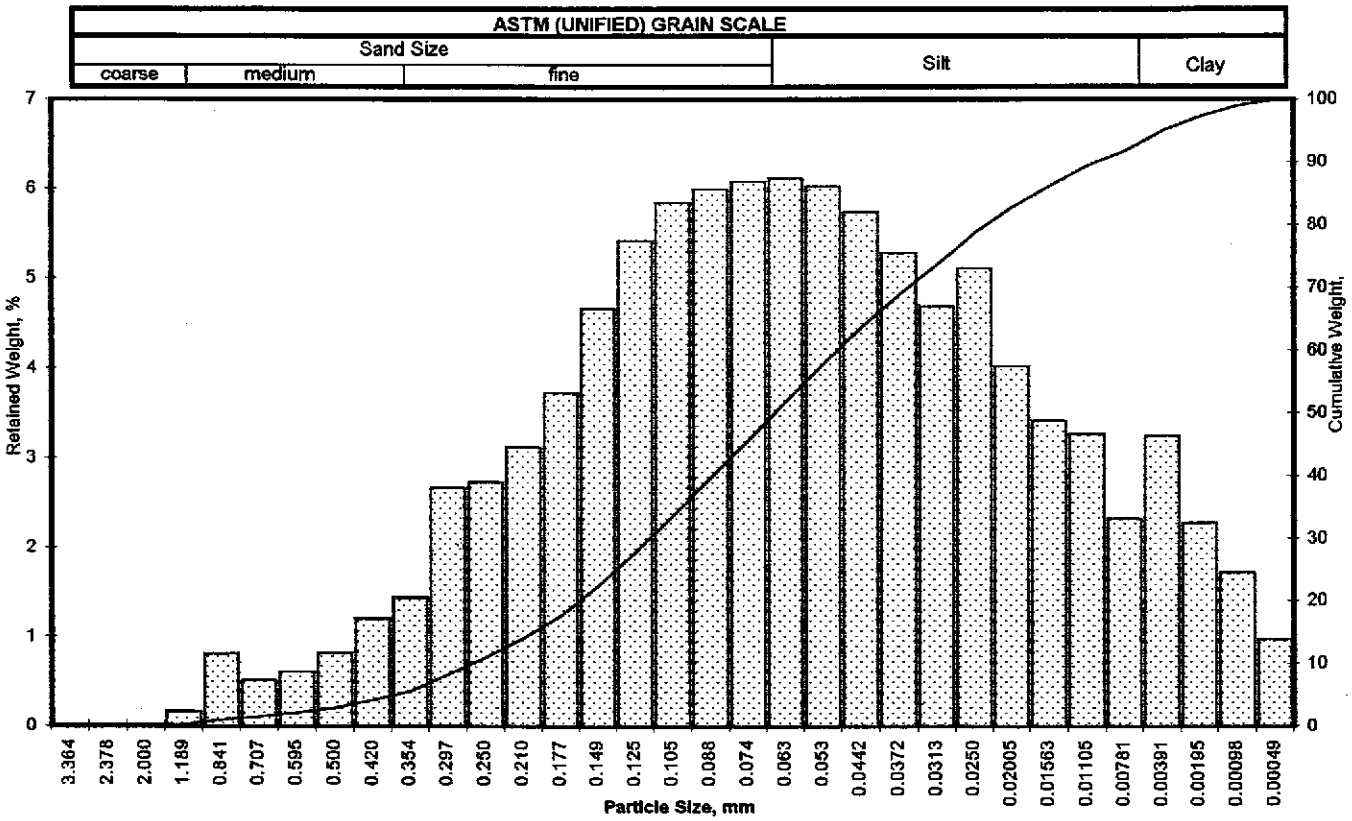
(1) Sample Orientation: H = Horizontal; V = Vertical

Vb = Bulk Volume, cc
Pv = Pore Volume, cc
ND = Not Detected

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client:	GeoStrategies	**PTS File No:**	27194
Project:	Unocal #5325	**Sample ID:**	U-D-5
Project No:	7814.21	**Depth, ft:**	5.00



Opening		Phi of	U.S.	Incremental	Cumulative
Inches	Millimeters	Screen	No.	Weight, percent	Weight, percent
0.1324	3.364	-1.75	6	0.00	0.00
0.0936	2.378	-1.25	8	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00
0.0468	1.189	-0.25	16	0.16	0.16
0.0331	0.841	0.25	20	0.81	0.96
0.0278	0.707	0.50	25	0.51	1.47
0.0234	0.595	0.75	30	0.60	2.07
0.0197	0.500	1.00	35	0.81	2.88
0.0166	0.420	1.25	40	1.20	4.08
0.0139	0.354	1.50	45	1.44	5.52
0.0117	0.297	1.75	50	2.66	8.18
0.0098	0.250	2.00	60	2.72	10.90
0.0083	0.210	2.25	70	3.11	14.01
0.0070	0.177	2.50	80	3.72	17.73
0.0059	0.149	2.75	100	4.66	22.39
0.0049	0.125	3.00	120	5.42	27.81
0.0041	0.105	3.25	140	5.84	33.65
0.0035	0.088	3.50	170	5.99	39.64
0.0029	0.074	3.75	200	6.08	45.72
0.0025	0.063	4.00	230	6.11	51.83
0.0021	0.053	4.25	270	6.03	57.86
0.00174	0.0442	4.50	325	5.74	63.60
0.00146	0.0372	4.75	400	5.28	68.88
0.00123	0.0313	5.00	450	4.69	73.57
0.000986	0.0250	5.32	500	5.11	78.68
0.000790	0.02005	5.64	635	4.02	82.70
0.000615	0.01563	6.00		3.41	86.11
0.000435	0.01105	6.50		3.27	89.38
0.000308	0.00781	7.00		2.32	91.70
0.000154	0.00391	8.00		3.24	94.94
0.000077	0.00195	9.00		2.27	97.21
0.000038	0.00098	10.00		1.72	98.93
0.000019	0.00049	11.00		0.97	99.90
0.000015	0.00038	11.38		0.10	100.00
TOTALS				100.00	100.00

Cumulative Weight, percent	Phi Values	Inches	Millimeters
5	1.41	0.0148	0.376
10	1.92	0.0104	0.265
16	2.38	0.0075	0.192
30	3.09	0.0046	0.117
40	3.51	0.0034	0.087
50	3.93	0.0026	0.066
60	4.34	0.0019	0.049
70	4.81	0.0014	0.036
84	5.78	0.0007	0.018
90	6.63	0.0004	0.010
95	8.03	0.0002	0.004

Measure	Trask	Inman	Folk-Ward
Median, phi	3.93	3.93	3.93
Median, in.	0.0026	0.0026	0.0026
Median, mm	0.066	0.066	0.066
Mean, phi	3.71	4.08	4.03
Mean, in.	0.0030	0.0023	0.0024
Mean, mm	0.076	0.059	0.061
Sorting	0.552	1.697	1.851
Skewness	0.982	0.092	0.166
Kurtosis	0.160	0.950	1.580
Grain Size Description (Wentworth scale)			Very fine sand (based on Mean from Trask)

Description	Sieve	Percent
Coarse Sand	10	0.00
Medium Sand	40	4.08
Fine Sand	200	41.64
Silt	.00391 mm	49.22
Clay	<.00391 mm	5.06
	Total	100

DATE 6/27/97 PTS FILE # 27194 **CHAIN OF CUSTODY RECORD** PAGE 1 OF 1

PTS Laboratories, Inc.
8100 Secura Way
Santa Fe Springs, CA 90670
Ph: (310) 907-3607 • Fax: (310) 907-3610

COMPANY: GeoStrategies
PROJECT MANAGER: Dave Vossler
PROJECT NAME: Unocal #5325
FAX NUMBER: (510) 551-7888
PROJECT NUMBER: 7814.21
PHONE NUMBER: (510) 551-7555
SITE LOCATION: 3220 Lakeshore Avenue, Oakland, CA
ADDRESS:
SAMPLER SIGNATURE: Clyde Goddard

ANALYSIS REQUEST

SAMPLE ID NUMBER	DATE	TIME	DEPTH, FT	PHYSICAL PROPERTIES PACKAGE, API RP40	MOISTURE CONTENT, ASTM D2216 ✓	POROSITY, API RP40 computed ✓	GRAIN DENSITY, API RP40	BULK DENSITY, ~~API RP40~~ ASTM D2937 ✓	AIR PERMEABILITY, API RP40	SPECIFIC RETENTION/YEILD ASTM D425	CATION EXCHANGE CAPACITY, EPA 9080 ✓	SOIL pH, EPA 9045	GRAIN SIZE: DRY, 400 MESH	GRAIN SIZE: WET/DRY, 20 MICRON D4464M ✓	GRAIN SIZE: LASER, 1 MICRON + Sieve ✓	HYDRAULIC CONDUCTIVITY, EPA 9100, API RP40	TOC: ~~EPA 9060~~ WALKLEY-BLACK ✓	PERMEABILITY V- ASTM D5084 ✓	NUMBER OF SAMPLES
U-D-4.5	6/23/97	11:10	4.5		X	X		X				X			X		X	X	2 Composite as 1
U-D-5	6/23/97	11:25	5.0		X	X		X				X			X		X	X	

PO#

SPECIAL HANDLING
24 HOURS ~~5 DAYS~~
72 HOURS NORMAL
OTHER

SAMPLE CONDITIONS
RECEIVED ON ICE YES/NO
SEALED YES/NO
OTHER YES/NO

COMMENTS

1. RELINQUISHED BY	2. RECEIVED BY	3. RELINQUISHED BY	4. RECEIVED BY
Clyde Goddard			
COMPANY: GeoStrategies	COMPANY: PTS Laboratories, Inc	COMPANY	COMPANY
DATE: 6/26/97 TIME: 8:00	DATE: 6/27/97 TIME: 12:18	DATE TIME	DATE TIME

Delivered by FED-EX

APPENDIX D

Waste Disposal Confirmation Forms

FORWARD
INCORPORATED

P.O. Box 6336
1145 W. Charter Way • Stockton, CA 95206
(209) 466-4482 • (800) 204-4242 • FAX (209) 466-1067

July 31, 1997

GETTLER-RYAN INC.
GENERAL CONTRACTORS

Gettler-Ryan
6947 Sierra Court, Suite 3
Dublin, California 94583

Attention: Clyde Galantine

Re: ***FORWARD, INC.*** Approval No. 606522
Gasoline Contaminated Soil from
Service Station No. 5325
3220 Lakeshore Ave., Oakland, CA

Dear Mr. Galantine:

FORWARD, INC. is pleased to confirm the disposal of 1 drum of material as referenced above. The material was received at our Manteca, California facility for disposal on June 27, 1997. The material was placed in a Class 2 waste management unit.

Approval for this material was based on the information provided in the waste profile and associated materials submitted on behalf of Tosco Marketing Company (Generator). Acceptance of the waste is subject to the "Terms and Conditions" agreed to and signed by the Generator on the Waste Profile Form.

Thank you for the opportunity to be of service. Should you have any questions regarding this matter, please contact myself or customer service at (800) 204-4242.

Sincerely,

FORWARD, INC.

Brad J. Bonner

Brad J. Bonner
Senior Account Manager