gettler — ryan inc.
general contractors

90 AUG 26 AM 11:10

September 4, 1990

Alameda County Health Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

Attention: Mr. Barney Chan

Reference: Unocal Service Station No. 5325
3220 Lakeshore Avenue
Oakland, California 94610

Gentlemen:

As requested by Mr. Ron Bock of Unocal Corporation, we are forwarding a copy of the Tank Replacement Report prepared for the above referenced location. The report documents the soil sampling and analyses conducted during the tank replacement project at the site. Recommendations for additional site investigation are also presented in the report.

Please do not hesitate to call should you have any questions or comments.

Sincerely,

John P. Werfal
Project Manager

enclosure

cc: Mr. Ron Bock, Unocal Corporation
Mr. Tom Callaghan, Regional Water Quality Control Board

1992 national avenue • hayward, california 94545-1787 • 783-7500

GeoStrategies Inc.

TANK REPLACEMENT REPORT

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

Report No. 7814-3

August 31, 1990

GeoStrategies Inc.
2140 WEST WINTON AVENUE
HAYWARD, CALIFORNIA 94545
(415) 352-4800

August 31, 1990

Gettler-Ryan Inc.
2150 West Winton Avenue
Hayward, California 94545

Attn: Mr. John Werfal

Re: TANK REPLACEMENT REPORT
UNOCAL Service Station No. 5325
3220 Lakeshore Avenue
Oakland, California

Gentlemen:

This Tank Replacement Report has been prepared for the above referenced site.

If you have any questions, please call.

GeoStrategies Inc. by,

Matthew J. Janowiak
Geologist

Jeffrey L. Peterson
Senior Hydrogeologist
R.E.A. 1021

REGISTERED GEOLOGIST
CHRISTOPHER M. PALMER
№ 1262
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

Christopher M. Palmer
C.E.G. 1262, R.E.A. 285

MJJ/JLP/kjj

Report No. 7814-3

1.0 EXECUTIVE SUMMARY

This report presents chemical analytical data from soil samples collected during the underground storage tank replacement at the UNOCAL Service Station No. 5325. The station is located at 3220 Lakeshore Avenue in Oakland, California. A scope of work outlining a subsurface investigation is also presented in this report.

- During June 1990, two 10,000 gallon underground storage tanks (UGSTs) were removed and replaced with new double-walled steel 12,000 gallon storage tanks. The 120 gallon waste oil tank was also replaced with a new double-walled steel 550 gallon tank.

- Soil samples were collected from the bottom and sidewalls of the UGST excavation and from the bottom of piping trenches. The soil samples were analyzed for TPH-Gasoline and BTEX to ascertain the extent of hydrocarbon contamination.

- Analytical results appear to indicate that the overexcavation of the UGST complex has removed soils with elevated levels of petroleum hydrocarbons.

- In response to Alameda County's July 16, 1990, letter to UNOCAL requesting additional site investigation, **GSI recommends the installation of three ground-water monitoring wells at the locations shown on Plate 2.** Subsurface data from the exploratory soil borings and ground-water chemical analytical data will be used to evaluate hydrocarbon levels in the shallow groundwater and residual hydrocarbons in the shallow soils.

2.0 INTRODUCTION

In June 1990, the underground fuel storage tanks were replaced at the UNOCAL Service Station No. 5325 located at 3220 Lakeshore Avenue in Oakland, California (Plate 1). A GSI geologist was present during excavation activities to collect soil samples for petroleum hydrocarbon analysis. This report describes the sampling methods and handling procedures and presents the results of the analyses. A proposed scope of work is also included in this report, as requested by the Alameda County Department of Environmental Health (Hazardous Materials Program) in a letter to UNOCAL dated July 16, 1990.

2.1 Site Description and History

The site is located at the intersection of Lake Shore Avenue and Lake Park Avenue near Highway 580. The site is situated on a slightly dipping area of filled wetlands along the eastern fringe of the Lake Merritt basin (USGS Topographic Map; Oakland East Quadrangle). Clay, silt, and sand underlie the site to depths of approximately 15 feet below grade. The soils typically contain abundant peat material (up to approximately 25%). Clay appears to be the primary lithology beneath the site and sand is typically disseminated within the clay and silt, however, several thin (<1.5 feet) silty sand lenses were encountered at depths of approximately 6 to 9 feet below grade. Groundwater, observed from partially saturated to saturated clay and silty sand lenses, occurs at a depth of approximately 7 to 8 feet below ground surface. The permeability of the underlying soils is surmised to be relatively low based on the fact that soils did not yield appreciable amounts of water into the open UGST excavation. The tank excavation was open for a total of three days and very little groundwater accumulated.

During June 1990, two existing 10,000 gallon single-walled steel UGSTs were replaced with two new 12,000 double-walled steel UGSTs. The existing 120 gallon waste oil tank was replaced with a 550 gallon double-walled steel tank. A GSI geologist was present on-site during the UGST removal and excavation of soils.

3.0 FIELD METHODS AND PROCEDURES

Soil samples were collected from the UGST excavation and piping trenches using a drive-hammer hand sampler fitted with precleaned brass tubes. Some of the samples were collected directly from freshly exposed excavation surfaces while other samples were collected from soil brought to the surface in the bucket of the excavator. Approximately two to four inches of soil was scraped from the exposed surface immediately prior to collecting the soil sample. Approximate soil sample locations are shown on Plates 3 and 4. The brass tubes were covered on both ends with aluminum foil, covered with plastic end caps, labeled, and placed in a cooler with blue ice. The samples were entered onto a Chain-of-Custody form and brought to an on-site mobile laboratory operated by National Environmental Testing (NET Pacific) of Santa Rosa, California. Selected samples were transported under Chain-of-Custody to International Technology (IT) Analytical Services of San Jose, California. All analyses were performed by State-certified environmental laboratories.

Soil samples were analyzed for Total Petroleum Hydrocarbons calculated as Gasoline (TPH-Gasoline) according to EPA Method 8015 (Modified) and Benzene, Toluene, Ethylbenzene, and Xylenes according to EPA Method 8020. Soil samples collected from around the waste oil tank were analyzed for TPH-Gasoline, BTEX, TPH-Diesel according to EPA Method 8015 (Modified) and Total Recoverable Petroleum Hydrocarbons according to EPA Method 418.1. The sample collected from underneath the waste oil tank was also analyzed for Volatile Organic Compounds (VOCs) according to EPA Method 8240.

The detection of TPH-Diesel in sample UWO-2 prompted additional analyses to be performed. These analyses included polychlorinated biphenyls (PCBs), Semi-Volatile Organics according to EPA Method 8270, lead according to EPA Method 7421, and cadmium, chromium, and zinc according to EPA Method 6010.

Excavated soils were stockpiled and covered with plastic visqueen sheets until soil could be removed from the site. Approximately 250 yards of sandy tank backfill material were aerated on-site to reduce hydrocarbon levels prior to disposal. Additional soil removal information will be provided in a separate report.

4.0 RESULTS

Soil samples collected from the base and sidewalls of the UGST excavation contained less than 100 ppm TPH-Gasoline (most of the samples were reported as none detected or ND) with the exception of UX-10 and UX-14 (Table 1). These two samples contained 1,300 and 2,800 ppm TPH-Gasoline, respectively. Due to the concentrations of TPH-Gasoline detected in samples UX-10 and UX-14 the sidewalls were overexcavated. The sidewalls were resampled (UX-13 and UX-15) and analyzed. UX-13 was reported as ND for TPH-Gasoline and UX-15 contained 12 ppm TPH-Gasoline.

Piping trench samples UT-4, UT-5, UT-6, and UT-9 contained TPH-Gasoline concentrations ranging from 12 to 60 ppm. Samples UT-7 and UT-8 did not contain detectable levels of TPH-Gasoline (Table 2).

Waste oil soil sample UWO-1 did not contain detectable levels of TPH-Gasoline, TPH-Diesel, BTEX, or Total Recoverable Petroleum Hydrocarbons. Sample UWO-2 contained TPH-Diesel at a concentration of 7 ppm. TPH-Gasoline and Total Recoverable Petroleum Hydrocarbons were not detected. Sample UWO-2 also contained acetone at a concentration of 0.025 ppm. PCBs, pentachlorophenol (PCP), and creosote were not detected in sample UWO-2. Cadmium, chromium, lead, and zinc were detected at concentrations of 5.6, 28, 7.9, and 33 ppm, respectively (Table 3).

Certified analytical reports, Chain-of-Custody documents are presented in Appendix A.

5.0 CONCLUSIONS

- The soil analytical results indicate that soils with elevated concentrations (>100 ppm) of TPH-Gasoline and BTEX appear to have been removed from the vicinity of the UGST. Soil samples collected from sidewalls and the bottom of the excavation did not contain concentrations of TPH-Gasoline greater than 100 ppm (Table 1).

- Piping trench soil sample analyses indicate that soils with greater than 100 ppm TPH-Gasoline were excavated in the piping trench vicinity.

- The fill material and sediments underlying the site did not yield appreciable amounts of groundwater into the excavation which suggests very low permeability soils exist beneath the site. Additional work is needed to evaluate the water quality in the uppermost water-bearing zone.

- Concentrations of cadmium, chromium, lead, and zinc are attributed to natural sources and appear at concentrations considered to be typical for this region.

6.0 RECOMMENDATIONS

As requested by Alameda County Department of Environmental Health, recommendations are presented to address potential hydrocarbons in the shallow groundwater.

- GSI recommends the installation of three groundwater monitoring wells at the locations shown on Plate 2 to obtain geologic and hydrogeologic information regarding the shallow aquifer, petroleum hydrocarbon distribution in the shallow aquifer, determination of ground-water flow direction, and calculation of hydraulic gradient. The locations of the proposed monitoring wells were selected based on the anticipated regional gradient and the UGSTs location. The wells should be installed, developed, and sampled for TPH-Gasoline (EPA Method 8015 Modified) and BTEX (EPA Method 8020).

TABLE 1

SOIL ANALYSIS DATA

SAMPLE NO	DEPTH	SAMPLE DATE	ANALYSIS DATE	TPH (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZENE (PPM)	XYLENES (PPM)
UX-5	9.5	19-Jun-90	20-Jun-90	<1	<0.005	<0.005	<0.005	<0.005
UX-6	14	20-Jun-90	20-Jun-90	<1	<0.005	<0.005	<0.005	0.013
UX-7	14	20-Jun-90	20-Jun-90	<1	0.008	0.006	<0.005	0.016
UX-8	7.0	20-Jun-90	20-Jun-90	<1	<0.005	<0.005	<0.005	0.022
UX-9	14	20-Jun-90	20-Jun-90	<1	<0.005	<0.005	<0.005	<0.005
UX-10	6.5	20-Jun-90	20-Jun-90	1300	1.7	26	2.1	100
UX-11	12.5	20-Jun-90	20-Jun-90	<1	<0.005	<0.005	<0.005	<0.005
UX-12	13	20-Jun-90	20-Jun-90	<1	0.044	0.008	<0.005	0.010
UX-13	6.5	20-Jun-90	20-Jun-90	<1	0.021	<0.005	<0.005	<0.005
UX-14	7.5	20-Jun-90	20-Jun-90	2800	11	63	11	320
UX-15	8.0	25-Jun-90	26-Jun-90	12	1.1	0.91	0.93	5.2

TPH = Total Petroleum Hydrocarbons as Gasoline
PPM = Parts Per Million

Note: 1) All data shown as <x are reported as ND (none detected)

Report No. 7814-3

TABLE 2

SOIL ANALYSES DATA

WELL NO	DEPTH	SAMPLE DATE	ANALYZED DATE	TPH (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZENE (PPM)	XYLENES (PPM)
UT-4	3.5	25-Jun-90	26-Jun-90	60	1.1	1.5	2.0	11
UT-5	3.5	25-Jun-90	26-Jun-90	28	1.7	0.76	1.3	4.4
UT-6	3.0	25-Jun-90	26-Jun-90	12	0.62	1.6	0.52	1.9
UT-7	3.5	25-Jun-90	26-Jun-90	<2.5	<0.025	<0.025	<0.025	<0.05
UT-8	3.5	25-Jun-90	26-Jun-90	<2.5	<0.025	<0.025	<0.025	<0.05
UT-9	4.0	25-Jun-90	27-Jun-90	14	<0.026	<0.026	<0.026	0.05

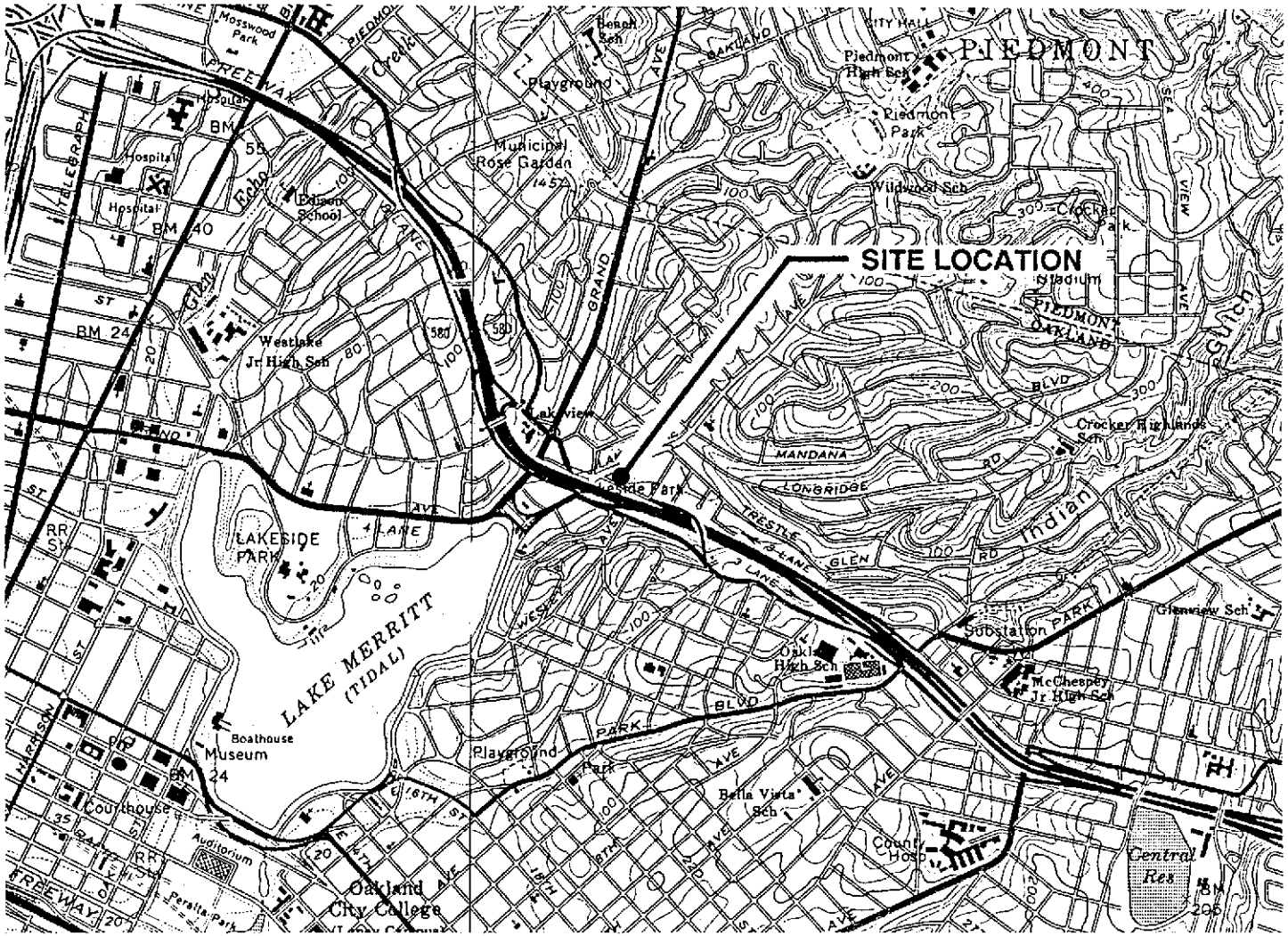
TPH = Total Petroleum Hydrocarbons as Gasoline
PPM = Parts Per Million

Note: 1. All data shown as <x are reported as ND (none detected)

TABLE 3

SOIL ANALYSIS DATA

SAMPLE NO	SAMPLE DATE	ANALYSIS DATE	TPH (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZENE (PPM)	XYLENES (PPM)	TRPH (PPM)	TPH-D (PPM)	PCB (PPM)	PCP (PPM)	Cd (PPM)	Cr (PPM)	Pb (PPM)	Zn (PPM)
UWO-1	22-Jun-90	09-Jul-90	<2.5	<0.026	<0.026	<0.026	<0.05	<50	<2	NA	NA	NA	NA	NA	NA
UWO-2	22-Jun-90	09-Jul-90	<2.5	<0.006	<0.0006	<0.006	<0.006	<50	7	ND	ND	5.6	28	7.9	33



N

Base Map: USGS Topographic Map

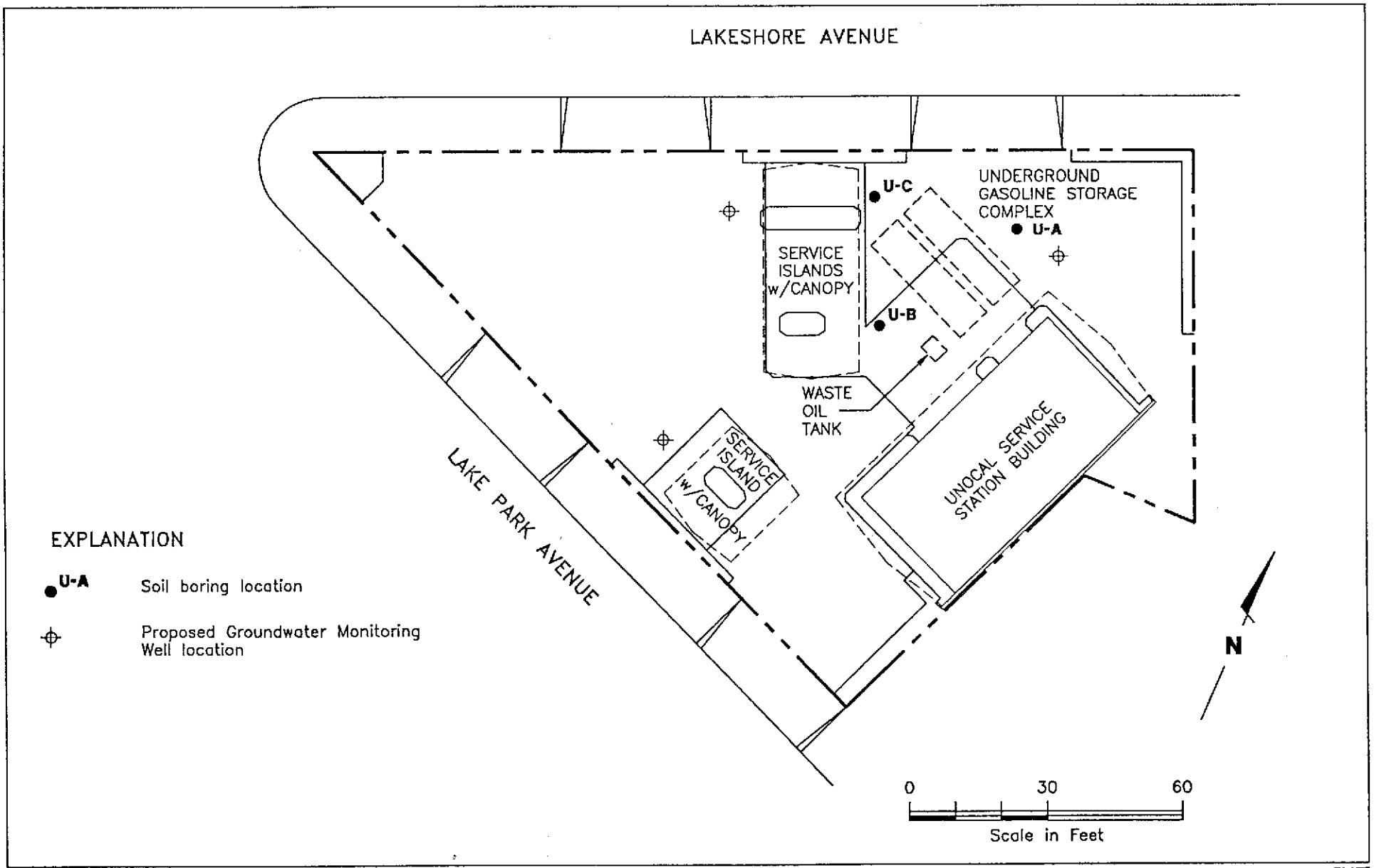
Approximate Scale: 1" = 2000'

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	

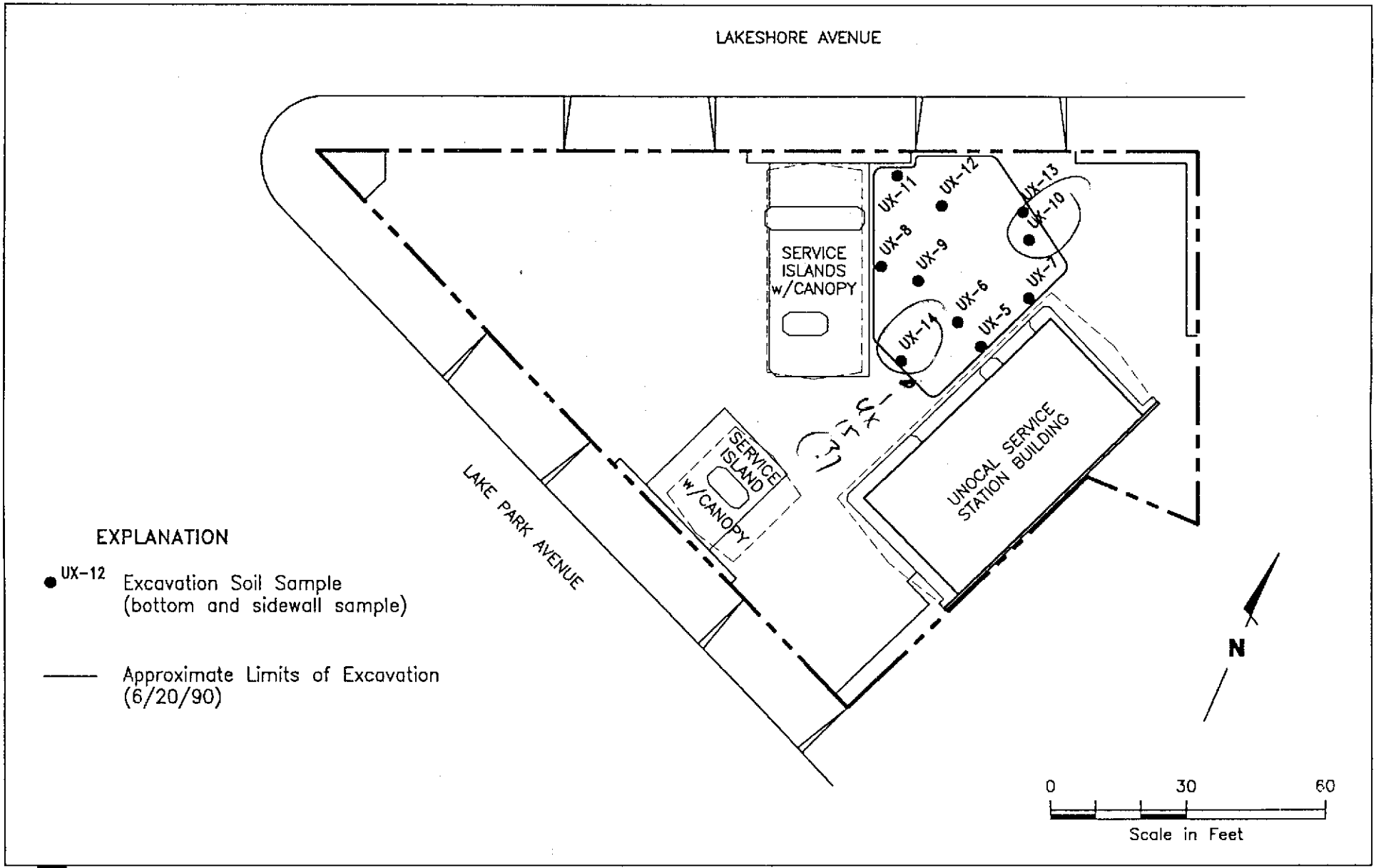


GeoStrategies Inc.

Site Plan
UNOCAL Service Station #5325
3220 Lakeshore Avenue
Oakland, California

PLATE
2

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE
7814	CWP CEG 1262	8/90	

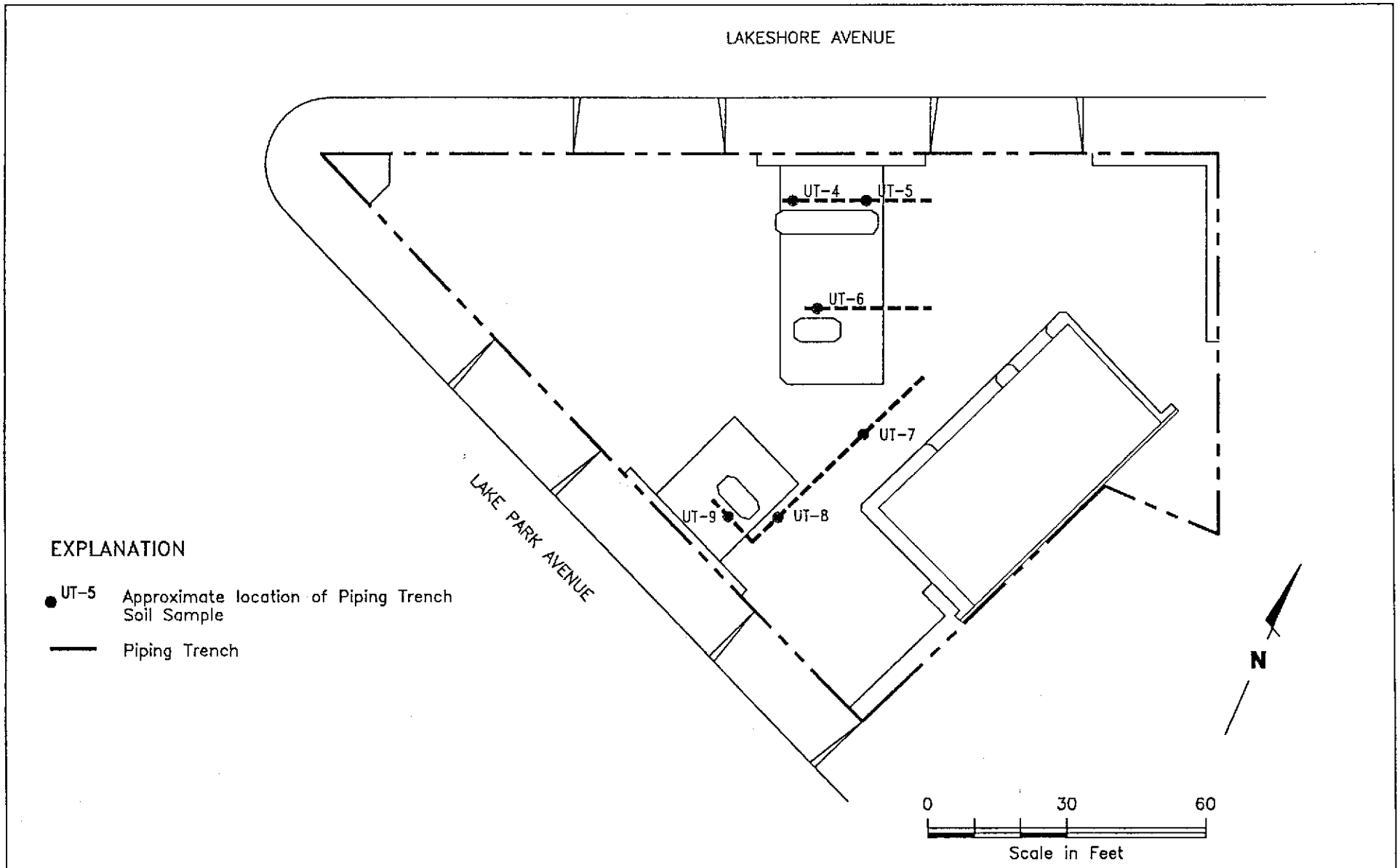


GeoStrategies Inc.

SOIL SAMPLE LOCATION MAP
UNOCAL Service Station #5325
3220 Lakeshore Avenue
Oakland, California

PLATE 3

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE
7814	CEG 1262	6/90	



GeoStrategies Inc.

PIPE TRENCH SOIL SAMPLE LOCATIONS
UNOCAL Service Station #5325
3220 Lakeshore Avenue
Oakland, California

PLATE
4

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE
7814	CMP CEG 1262	8/90	

NATIONAL
ENVIRONMENTAL
TESTING, INC.

NET Pacific, Inc.
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

John Werfal
Gettler-Ryan Inc.
2150 Winton Ave.
Hayward, CA 94545

Date: 06-28-90
NET Client Acct No: 679
NET Pacific Log No: 2521
Received: 06-21-90 0800

Client Reference Information

UNOCAL, 3220 Lake Shore Ave

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Approved by:

Jules Skamarack
Laboratory Manager

Enclosure(s)

Client Acct: 679
Client Name: Gettler-Ryan Inc.
NET Log No: 2521

Date: 06-28-90
Page: 2

Ref: UNOCAL, 3220 Lake Shore Ave

		Descriptor, Lab No. and Results			
		UX-5 06-19-90	UX-6 06-20-90	UX-7 06-20-90	
Parameter	Reporting Limit	56066	56067	56068	Units
PETROLEUM HYDROCARBONS		--	--	--	
VOLATILE (SOIL)		--	--	--	
DILUTION FACTOR *		1	1	1	
DATE ANALYZED		06-20-90	06-20-90	06-20-90	
METHOD GC FID/5030		--	--	--	
as Gasoline	1	ND	ND	ND	mg/Kg
METHOD 8020		--	--	--	
Benzene	5	ND	ND	8.0	ug/Kg
Ethylbenzene	5	ND	ND	6.0	ug/Kg
Toluene	5	ND	ND	ND	ug/Kg
Xylenes	5	ND	13	16	ug/Kg

Client Acct: 679
Client Name: Gettler-Ryan Inc.
NET Log No: 2521

Date: 06-28-90
Page: 3

Ref: UNOCAL, 3220 Lake Shore Ave

		Descriptor, Lab No. and Results			
		UX-8 06-20-90	UX-9 06-20-90	UX-10 06-20-90	
Parameter	Reporting Limit	56069	56070	56071	Units
PETROLEUM HYDROCARBONS		--	--	--	
VOLATILE (SOIL)		--	--	--	
DILUTION FACTOR *		1	1	428	
DATE ANALYZED		06-20-90	06-20-90	06-20-90	
METHOD GC FID/5030		--	--	--	
as Gasoline	1	ND	ND	1,300	mg/Kg
METHOD 8020		--	--	--	
Benzene	5	ND	ND	1,700	ug/Kg
Ethylbenzene	5	ND	ND	26,000	ug/Kg
Toluene	5	ND	ND	2,100	ug/Kg
Xylenes	5	22	ND	100,000	ug/Kg

Client Acct: 679
Client Name: Gettler-Ryan Inc.
NET Log No: 2521

Date: 06-28-90
Page: 4

Ref: UNOCAL, 3220 Lake Shore Ave

Parameter	Reporting Limit	Descriptor, Lab No. and Results UX-11 06-20-90 56072	 UX-12 06-20-90 56073	 UX-13 06-20-90 56074	Units
PETROLEUM HYDROCARBONS		--	--	--	
VOLATILE (SOIL)		--	--	--	
DILUTION FACTOR *		1	1	1	
DATE ANALYZED		06-20-90	06-20-90	06-20-90	
METHOD GC FID/5030		--	--	--	
as Gasoline	1	ND	ND	ND	mg/Kg
METHOD 8020		--	--	--	
Benzene	5	ND	44	21	ug/Kg
Ethylbenzene	5	ND	8.0	ND	ug/Kg
Toluene	5	ND	ND	ND	ug/Kg
Xylenes	5	ND	10	ND	ug/Kg

Client Acct: 679
Client Name: Gettler-Ryan Inc.
NET Log No: 2521

Date: 06-28-90
Page: 5

Ref: UNOCAL, 3220 Lake Shore Ave

Parameter	Reporting Limit	Descriptor, Lab No. and Results UX-14 06-20-90 56075	Units
PETROLEUM HYDROCARBONS		--	
VOLATILE (SOIL)		--	
DILUTION FACTOR *		750	
DATE ANALYZED		06-20-90	
METHOD GC FID/5030		--	
as Gasoline	1	2,800	mg/Kg
METHOD 8020		--	
Benzene	5	11,000	ug/Kg
Ethylbenzene	5	63,000	ug/Kg
Toluene	5	11,000	ug/Kg
Xylenes	5	320,000	ug/Kg

KEY TO ABBREVIATIONS and METHOD REFERENCES

<	:	Less than; When appearing in results column indicates analyte not detected at the value following. This datum supercedes the listed Reporting Limit.
*	:	Reporting Limits are a function of the dilution factor for any given sample. To obtain the actual reporting limits for this sample, multiply the stated Reporting Limits by the dilution factor (but do not multiply reported values).
ICVS	:	Initial Calibration Verification Standard (External Standard).
mean	:	Average; sum of measurements divided by number of measurements.
mg/Kg (ppm)	:	Concentration in units of milligrams of analyte per kilogram of sample, wet-weight basis (parts per million).
mg/L	:	Concentration in units of milligrams of analyte per liter of sample.
mL/L/hr	:	Milliliters per liter per hour.
MPN/100 mL	:	Most probable number of bacteria per one hundred milliliters of sample.
N/A	:	Not applicable.
NA	:	Not analyzed.
ND	:	Not detected; the analyte concentration is less than applicable listed reporting limit.
NTU	:	Nephelometric turbidity units.
RPD	:	Relative percent difference, 100 [Value 1 - Value 2]/mean value.
SNA	:	Standard not available.
ug/Kg (ppb)	:	Concentration in units of micrograms of analyte per kilogram of sample, wet-weight basis (parts per billion).
ug/L	:	Concentration in units of micrograms of analyte per liter of sample.
umhos/cm	:	Micromhos per centimeter.

Method References

Methods 100 through 493: see "Methods for Chemical Analysis of Water & Wastes", U.S. EPA, 600/4-79-020, rev. 1983.

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

SM: see "Standard Methods for the Examination of Water & Wastewater, 16th Edition, APHA, 1985.

Gettler - Ryan Inc. ENVIRONMENTAL DIVISION — 1351 **Chain of Custody**

COMPANY UNOCAL — JOB NO. 7814

JOB LOCATION 3220 Lake Shore Ave

CITY Oakland — PHONE NO.

AUTHORIZED J. Wenfal — DATE 6-20-90 — P.O. NO.

SAMPLE ID	NO. OF CONTAINERS	SAMPLE MATRIX	DATE/TIME SAMPLED	ANALYSIS REQUIRED	SAMPLE CONDITION LAB ID
UX-5	1	Soil	6-19	Gas, BTEX	analyzed by mobile lab
UX-6	1		6-20		
UX-7	1		6-20		
UX-8	1		6/20		
UX-9	1		6/20		
UX-10	1		6/20		
UX-11	1		6/20		
UX-12	1		6/20		
UX-13	1		6/20		
UX-14	1		6/20		

RELINQUISHED BY: Matt Janowicki 6/20/90 — RECEIVED BY: John C. Pruden 6/20/90

RELINQUISHED BY: — RECEIVED BY:

RELINQUISHED BY: — RECEIVED BY LAB:

DESIGNATED LABORATORY: N.E.T Pacific — DHS #:

REMARKS: on ice

DATE COMPLETED — FOREMAN

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

Date: 06/29/90

Gettler-Ryan
2150 West Winton
Hayward, CA 94545
John Werfal

Work Order: TO-06-253 P.O. Number: 7814

This is the Certificate of Analysis for the following samples:

Client Work ID: GR7814, Unocal SS# 5325
Date Received: 06/25/90
Number of Samples: 7
Sample Type: solid

TABLE OF CONTENTS FOR ANALYTICAL RESULTS

Reviewed and Approved:

Suzanne Veaudry
Project Manager

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Gettler-Ryan
Date: 06/29/90
Client Work ID: GR7814, Unocal SS# 532'

Work Order: TO-06-253

TEST NAME: **Petroleum Hydrocarbons**

SAMPLE ID: **UT-4**
SAMPLE DATE: **06/25/90**
LAB SAMPLE ID: **T006253-01**
SAMPLE MATRIX: **solid**
RECEIPT CONDITION: **Cool**

RESULTS in Milligrams per Kilogram:

	METHOD	EXTRACTION DATE	ANALYSIS DATE
BTEX	8020		06/26/90
Low Boiling Hydrocarbons	Mod.8015		06/26/90

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons calculated as Gasoline	9.	60.
BTEX		
Benzene	0.09	1.1
Toluene	0.09	1.5
Ethylbenzene	0.09	2.0
Xylenes (total)	0.2	11.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Gettler-Ryan
Date: 06/29/90
Client Work ID: GR7814, Unocal SS# 5325

Work Order: TO-06-253

TEST NAME: **Petroleum Hydrocarbons**

SAMPLE ID: **UT-5**
SAMPLE DATE: **06/25/90**
LAB SAMPLE ID: **TO06253-02**
SAMPLE MATRIX: **solid**
RECEIPT CONDITION: **Cool**

RESULTS in Milligrams per Kilogram:

	METHOD	EXTRACTION DATE	ANALYSIS DATE
BTEX	8020		06/26/90
Low Boiling Hydrocarbons	Mod.8015		06/26/90

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons calculated as Gasoline	4.9	28.
BTEX		
Benzene	0.05	1.7
Toluene	0.05	0.76
Ethylbenzene	0.05	1.3
Xylenes (total)	0.1	4.4

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Gettler-Ryan
Date: 06/29/90
Client Work ID: GR7814, Unocal SS# 5325

Work Order: TO-06-253

TEST NAME: Petroleum Hydrocarbons

SAMPLE ID: UT-6
SAMPLE DATE: 06/25/90
LAB SAMPLE ID: TO06253-03
SAMPLE MATRIX: solid
RECEIPT CONDITION: Cool

RESULTS in Milligrams per Kilogram:

	METHOD	EXTRACTION DATE	ANALYSIS DATE
BTEX	8020		06/26/90
Low Boiling Hydrocarbons	Mod.8015		06/26/90

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons calculated as Gasoline	4.5	12.
BTEX		
Benzene	0.04	0.62
Toluene	0.04	1.6
Ethylbenzene	0.04	0.52
Xylenes (total)	0.08	1.9

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Gettler-Ryan
Date: 06/29/90
Client Work ID: GR7814, Unocal SS# 5325

Work Order: TO-06-253

TEST NAME: Petroleum Hydrocarbons

SAMPLE ID: UT-7
SAMPLE DATE: 06/25/90
LAB SAMPLE ID: TO06253-04
SAMPLE MATRIX: solid
RECEIPT CONDITION: Cool

RESULTS in Milligrams per Kilogram:

	METHOD	EXTRACTION DATE	ANALYSIS DATE
BTEX	8020		06/26/90
Low Boiling Hydrocarbons	Mod.8015		06/26/90

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons calculated as Gasoline	2.5	None
BTEX		
Benzene	0.025	None
Toluene	0.025	None
Ethylbenzene	0.025	None
Xylenes (total)	0.05	None

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Gettler-Ryan
Date: 06/29/90
Client Work ID: GR7814, Unocal SS# 5325

Work Order: TO-06-253

TEST NAME: Petroleum Hydrocarbons

SAMPLE ID: UT-8
SAMPLE DATE: 06/25/90
LAB SAMPLE ID: T006253-05
SAMPLE MATRIX: solid
RECEIPT CONDITION: Cool

RESULTS in Milligrams per Kilogram:

	METHOD	EXTRACTION DATE	ANALYSIS DATE
BTEX	8020		06/26/90
Low Boiling Hydrocarbons	Mod.8015		06/26/90

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons calculated as Gasoline	2.5	None
BTEX		
Benzene	0.025	None
Toluene	0.025	None
Ethylbenzene	0.025	None
Xylenes (total)	0.05	None

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Gettler-Ryan
Date: 06/29/90
Client Work ID: GR7814, Unocal SS# 5325

Work Order: TO-06-253

TEST NAME: Petroleum Hydrocarbons

SAMPLE ID: UT-9
SAMPLE DATE: 06/25/90
LAB SAMPLE ID: T006253-06
SAMPLE MATRIX: solid
RECEIPT CONDITION: Cool

RESULTS in Milligrams per Kilogram:

	METHOD	EXTRACTION DATE	ANALYSIS DATE
BTEX	8020		06/27/90
Low Boiling Hydrocarbons	Mod.8015		06/27/90

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons calculated as Gasoline	2.6	14.
BTEX		
Benzene	0.026	None
Toluene	0.026	None
Ethylbenzene	0.026	None
Xylenes (total)	0.05	None

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Gettler-Ryan
Date: 06/29/90
Client Work ID: GR7814, Unocal SS# 5325

Work Order: TO-06-253

TEST NAME: Petroleum Hydrocarbons

SAMPLE ID: UX-15
SAMPLE DATE: 06/25/90
LAB SAMPLE ID: TO06253-07
SAMPLE MATRIX: solid
RECEIPT CONDITION: Cool

RESULTS in Milligrams per Kilogram:

	METHOD	EXTRACTION DATE	ANALYSIS DATE
BTEX	8020		06/26/90
Low Boiling Hydrocarbons	Mod.8015		06/26/90

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons calculated as Gasoline	4.4	12.
BTEX		
Benzene	0.044	1.1
Toluene	0.044	0.91
Ethylbenzene	0.044	0.93
Xylenes (total)	0.09	5.2

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Gettler-Ryan
Date: 06/29/90
Client Work ID: GR7814, Unocal SS# 5325

Work Order: TO-06-253

CODE **TPHVB** TEST NAME **TPH Gas,BTEX by 8015/8020**

The method of analysis for low boiling hydrocarbons is taken from EPA Methods 8015, 8020 and 5030. The sample is examined using the purge and trap technique. Final detection is by gas chromatography using a flame ionization detector as well as a photoionization detector. The result for total low boiling hydrocarbons is calculated as gasoline and includes benzene, toluene, ethylbenzene and xylenes.

Gettler - Ryan Inc. TO-06-253 ENVIRONMENTAL DIVISION 0611 **Chain of Custody**

COMPANY UNOCAL JOB NO. 7814

JOB LOCATION 3220 Lake Shore

CITY Oakland PHONE NO.

AUTHORIZED John Werfal DATE 6-25 P.O. NO.

SAMPLE ID	NO. OF CONTAINERS	SAMPLE MATRIX	DATE/TIME SAMPLED	ANALYSIS REQUIRED	SAMPLE CONDITION LAB ID
UT-4	1	Soil	6-25	Gas, BTEX	Cool (G)
UT-5					
UT-6					
UT-7					
UT-8					
UT-9					
UX-15					

RELINQUISHED BY: Matt Janowick 6-25-90

RECEIVED BY: Stephanie Carter 6-25-90 16:31

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY: Stephanie Carter 6-25-90 17:16

RECEIVED BY LAB: [illegible] 6/25/90 17:16

DESIGNATED LABORATORY: ET San Jose DHS #:

REMARKS: 24-48 TAT

Verbals to John W. ASAP

DATE COMPLETED 6-25-90 FOREMAN Matt Janowick

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

Date: 07/13/90

Gettler-Ryan
2150 West Winton
Hayward, CA 94545
John Werfal

Work Order: TO-06-255 P.O. Number: 7814

This is the Certificate of Analysis for the following samples:

Client Work ID: GR7814, Unocal SS# 5325
Date Received: 06/25/90
Number of Samples: 2
Sample Type: solid

TABLE OF CONTENTS FOR ANALYTICAL RESULTS

Reviewed and Approved:

Suzanne Veaudry
Project Manager

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Gettler-Ryan
Date: 07/13/90
Client Work ID: GR7814, Unocal SS# 5325

Work Order: TO-06-255

TEST NAME: Petroleum Hydrocarbons

SAMPLE ID: UWO-1
SAMPLE DATE: 06/22/90
LAB SAMPLE ID: TO06255-01
SAMPLE MATRIX: solid
RECEIPT CONDITION: Cool

RESULTS in Milligrams per Kilogram:

	METHOD	EXTRACTION DATE	ANALYSIS DATE
BTEX	8020	06/28/90	07/09/90
Low Boiling Hydrocarbons	Mod.8015	06/28/90	07/09/90
High Boiling Hydrocarbons	Mod.8015	07/05/90	07/09/90
Recoverable Hydrocarbons	418.1	07/04/90	07/09/90

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons calculated as Gasoline	2.5	None
BTEX		
Benzene	0.026	None
Toluene	0.026	None
Ethylbenzene	0.026	None
Xylenes (total)	0.05	None
High Boiling Hydrocarbons calculated as Diesel	2.	None
Total Recoverable Petroleum Hydrocarbons	50.	None

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Gettler-Ryan
Date: 07/13/90
Client Work ID: GR7814, Unocal SS# 5325

Work Order: TO-06-255

TEST NAME: Vol. Organics EPA 624/8240

SAMPLE ID: UWO-2
SAMPLE DATE: 06/22/90
LAB SAMPLE ID: T006255-02
SAMPLE MATRIX: solid
RECEIPT CONDITION: Cool
EXTRACTION DATE: N/A
ANALYSIS DATE: 06/30/90

RESULTS in Milligrams per Kilogram:

PARAMETER	DETECTION LIMIT	DETECTED	PARAMETER	DETECTION LIMIT	DETECTED
Chloromethane	0.012	None	cis-1,3-Dichloropropene	0.006	None
Bromomethane	0.012	None	Trichloroethene	0.006	None
Vinyl Chloride	0.012	None	Chlorodibromomethane	0.006	None
Chloroethane	0.012	None	1,1,2-Trichloroethane	0.006	None
Dichloromethane	0.006	None	Benzene	0.006	None
Acetone	0.012	0.025	trans-1,3-Dichloropropene	0.006	None
Carbon Disulfide	0.006	None	Bromoform	0.006	None
1,1-Dichloroethene	0.006	None	4-Methyl-2-Pentanone	0.012	None
1,1-Dichloroethane	0.006	None	2-Hexanone	0.012	None
1,2-Dichloroethene (total)	0.006	None	Tetrachloroethene	0.006	None
Chloroform	0.006	None	1,1,2,2-Tetrachloroethane	0.006	None
1,2-Dichloroethane	0.006	None	Toluene	0.006	None
2-Butanone	0.012	None	Chlorobenzene	0.006	None
1,1,1-Trichloroethane	0.006	None	Ethylbenzene	0.006	None
Carbon Tetrachloride	0.006	None	Styrene	0.006	None
Vinyl Acetate	0.012	None	Xylenes (total)	0.006	None
Bromodichloromethane	0.006	None	Acrolein	0.012	None
1,2-Dichloropropane	0.006	None	Acrylonitrile	0.012	None

SURROGATES	LIMITS	% REC
1,2-Dichloroethane-d4	70-121	79.
Toluene-d8	81-117	103.
4-Bromofluorobenzene	74-121	99.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Gettler-Ryan
Date: 07/13/90
Client Work ID: GR7814 Unocal SS# 5325

Work Order: TO-06-255

TEST NAME: Petroleum Hydrocarbons

SAMPLE ID: UWO-2
SAMPLE DATE: 06/22/90
LAB SAMPLE ID: T006255-02
SAMPLE MATRIX: solid
RECEIPT CONDITION: Cool

RESULTS in Milligrams per Kilogram:

	METHOD	EXTRACTION DATE	ANALYSIS DATE
Low Boiling Hydrocarbons	Mod.8015	06/28/90	07/06/90
High Boiling Hydrocarbons	Mod.8015	07/05/90	07/09/90
Recoverable Hydrocarbons	418.1	07/04/90	07/04/90

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons calculated as Gasoline	2.5	None
High Boiling Hydrocarbons calculated as Diesel	2.	7.
Total Recoverable Petroleum Hydrocarbons	50.	None

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Gettler-Ryan
Date: 07/13/90
Client Work ID: GR7814, Unocal SS# 5325

Work Order: TO-06-255

TEST CODE 8240 TEST NAME Vol. Organics EPA 624/8240

The method of analysis for volatile organics is taken from E.P.A. Methods 624 and 8240. Water samples and low-level soil samples are analyzed directly using the purge and trap technique. Medium-level soil samples are extracted with methanol and a portion of the extract is analyzed using the purge and trap technique. Final detection is by gas chromatography/mass spectrometry.

Results for organic chemical parameters in soils have been corrected for moisture content and are reported on a dry soil basis unless noted otherwise. Results for inorganic chemical parameters have not been corrected for moisture content.

TEST CODE TPHIRS TEST NAME EPA 418.1 in Soil

The method of analysis for total recoverable petroleum hydrocarbons is taken from E.P.A. Method 418.1. The sample is extracted with repeated portions of solvent and the extract is treated with silica gel to remove polar compounds. The extract is examined using infrared spectroscopy.

TEST CODE TPHN TEST NAME TPH High Boiling by 8015

The method of analysis for high boiling hydrocarbons involves extracting the samples with solvent and examining the extracts by gas chromatography using a flame ionization detector.

TEST CODE TPHV TEST NAME TPH Gasoline by 8015

The method of analysis for low boiling hydrocarbons is taken from E.P.A. Methods 8015, 8020 and 5030. The sample is examined using the purge and trap technique. Final detection is by gas chromatography using a flame ionization detector as well as a photoionization detector. The result for total low boiling hydrocarbons is calculated as gasoline.

TEST CODE TPHVB TEST NAME TPH Gas,BTEX by 8015/8020

The method of analysis for low boiling hydrocarbons is taken from E.P.A. Methods 8015, 8020 and 5030. The sample is examined using the purge and trap technique. Final detection is by gas chromatograhy using a flame ionization detector as well as a photoionization detector. The result for total low boiling hydrocarbons is calculated as gasoline and includes benzene, toluene, ethylbenzene and xylenes.

Gettler - Ryan Inc. TO-06-255 ENVIRONMENTAL DIVISION 0613 **Chain of Custody**

COMPANY UNOCAL JOB NO. 7814

JOB LOCATION 3220 Lake Shore

CITY Oakland PHONE NO.

AUTHORIZED John Uberfal DATE 6-25 P.O. NO.

SAMPLE ID	NO. OF CONTAINERS	SAMPLE MATRIX	DATE/TIME SAMPLED	ANALYSIS REQUIRED	SAMPLE CONDITION LAB ID
UWO-1	1	Soil	6-22-90	TPH(gas), BTEX, TPH(diesel), 418.1	Cool
UWO-2	1	Soil	6-22-90	TPH(gas, diesel), 8240, 418.1	

For UWO-2: If any of the above are detected, analyse sample for Cd, Cr, Pb, Zn, and 8270 (PCB, PNA, PCP, Creosote)

RELINQUISHED BY: Matt Jandrick 6-25-90

RECEIVED BY: Stephen Carter 6-25-90 16:31

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY: Stephen Carter 6-25-90 17:16

RECEIVED BY LAB: 6/25/90 17:16

DESIGNATED LABORATORY: DHS #:

REMARKS: Normal TAT

DATE COMPLETED FOREMAN

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

Date: 07/23/90

Gettler-Ryan
2150 West Winton
Hayward, CA 94545
John Werfal

Work Order: TO-06-255 P.O. Number: 7814

This is the Certificate of Analysis for the following samples:

Client Work ID: GR7814, Unocal SS# 5325 ADDITIONAL ANALYSIS
Date Received: 06/25/90
Number of Samples: 2
Sample Type: solid

TABLE OF CONTENTS FOR ANALYTICAL RESULTS

Reviewed and Approved:

Suzanne Veaudry
Project Manager

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Gettler-Ryan
Date: 07/23/90
Client Work ID: GR7814, Unocal SS# 5325

ADDITIONAL ANALYSIS

Work Order: TO-06-255

TEST NAME: **EPA 8270**

SAMPLE ID: **UWO-2**
SAMPLE DATE: **06/22/90**
LAB SAMPLE ID: **TO06255-02**
SAMPLE MATRIX: **solid**
RECEIPT CONDITION: **Cool**
EXTRACTION DATE: **07/16/90**
ANALYSIS DATE: **07/19/90**

RESULTS in Milligrams per Kilogram:

PARAMETER	DETECTION LIMIT	DETECTED
Naphthalene	0.43	None
2-Methylnaphthalene	0.43	None
Acenaphthylene	0.43	None
Acenaphthene	0.43	None
Fluorene	0.43	None
Pentachlorophenol	2.2	None
Phenanthrene	0.43	None
Anthracene	0.43	None
Fluoranthene	0.43	None
Pyrene	0.43	None
Benzo(a)anthracene	0.43	None
Chrysene	0.43	None
Benzo(b)fluoranthene	0.43	None
Benzo(k)fluoranthene	0.43	None
Benzo(a)pyrene	0.43	None
Indeno(1,2,3-cd)pyrene	0.43	None
Dibenzo(a,h)anthracene	0.43	None
Benzo(g,h,i)perylene	0.43	None
Creosote	4.3	None

SURROGATES	LIMITS	% REC
Nitrobenzene-d5	23-120	83.
2-Fluorobiphenyl	30-115	68.
Terphenyl-d14	18-137	71.
Phenol-d5	24-113	95.
2-Fluorophenol	25-121	91.
2,4,6-Tribromophenol	19-122	98.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Gettler-Ryan
Date: 07/23/90 ADDITIONAL ANALYSIS
Client Work ID: GR7814, Unocal SS# 5325 Work Order: TO-06-255

TEST NAME: **Metals Analysis**

SAMPLE ID: **UWO-2**
SAMPLE DATE: **06/22/90**
LAB SAMPLE ID: **T006255-02**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **Cool**

RESULTS in Milligrams per Liter:

PARAMETER	METHOD	DETECTION LIMIT	DETECTED
Cadmium	6010	0.2	5.6
Chromium	6010	0.5	28.
Lead	7421	0.2	7.9
Zinc	6010	0.5	33.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Gettler-Ryan
Date: 07/23/90 ADDITIONAL ANALYSIS
Client Work ID: GR7814, Unocal SS# 5325

Work Order: TO-06-255

TEST NAME: PCB

SAMPLE ID: UWO-2
SAMPLE DATE: 06/22/90
LAB SAMPLE ID: T006255-02
SAMPLE MATRIX: solid
RECEIPT CONDITION: Cool
EXTRACTION DATE: 07/13/90
ANALYSIS DATE: 07/13/90

RESULTS in Milligrams per Kilogram:

PARAMETER	DETECTION LIMIT	DETECTED
PCB 1016	0.03	None
PCB 1221	0.03	None
PCB 1232	0.03	None
PCB 1242	0.03	None
PCB 1248	0.03	None
PCB 1254	0.03	None
PCB 1260	0.03	None
PCB 1262	0.03	None
PCB 1268	0.03	None

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Gettler-Ryan
Date: 07/23/90 ADDITIONAL ANALYSIS
Client Work ID: GR7814, Unocal SS# 5325 Work Order: TO-06-255

TEST CODE **8270** TEST NAME **EPA 8270**

The method of analysis for semi-volatile organics is taken from E.P.A. Methods 625 and 8270. The samples are extracted with solvent and concentrated. Final detection is by gas chromatography/mass spectrometry.

Results for organic chemical parameters in soils have been corrected for moisture content and are reported on a dry soil basis unless noted otherwise. Results for inorganic chemical parameters have not been corrected for moisture content.

TEST CODE **METALS** TEST NAME **Metals Analysis**

The methods of analysis for metals are taken from E.P.A. protocol, using methods from SW-846, 3rd Edition or Methods for Chemical Analysis of Water and Wastes, 600/4-79-020. The method used is listed adjacent to the parameter in in the table.

TEST CODE **PCB** TEST NAME **PCB**

The method of analysis for polychlorinated biphenyl mixtures involves diluting or extracting the sample with solvent. The resulting extract is cleaned-up to remove interferences and examined by gas chromatography using an electron capture detector.