

Unocal Refining & Marketing Division
Unocal Corporation
2000 Crow Canyon Place, Suite 400
San Ramon, California 94583
Telephone (415) 277-2300

UNOCAL 

August 16, 1990

CERTIFIED P 461 775 473

Northern Division

Mr. Gil Wistar
Alameda County Health Care Services
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94261

UNOCAL SERVICE STATION NO. 0746
3943 Broadway
Oakland, California 94611

UNOCAL SERVICE STATION NO. 5269
2240 Mountain Blvd.
Oakland, California

Dear Mr. Wistar:

The purpose of this letter is to respond to two separate Notice of Violation (NOV) letters received from the Alameda County Health Care Services Agency (ACHCSA) regarding the above-mentioned sites. In each of your letters, you indicate that Unocal is in violation of Section 25298 of the California Health and Safety Code for improper closure of underground tanks. In both instances, you refer to deficiencies in reporting and in adhering to approved Work Plans submitted by our consultant, Kaprealian Engineering, Inc. (KEI).

Upon review of our files, we find that all reports you refer to have been previously submitted to all appropriate agencies, and that progress toward solution to both incidents is ongoing. It is possible that these reports were misdirected within your agency, since they were mailed to the general address of the ACHCSA, and not specifically to your attention. For convenience, all missing reports referred to in your letters have been enclosed for your review. In addition, I have directed KEI to submit all future reports concerning these two sites directly to your attention. I kindly ask that if any problems or concerns arise in the future that you please call me before issuing an unnecessary NOV. I would gladly discuss the status of any project with you, or re-submit any reports which are missing from your files.

Specific technical comments to your letters are given below:

Mr. Gil Wistar
Alameda County Health Care Services
August 16, 1990
Page two

UNOCAL SERVICE STATION NO. 0746 - 3943 BROADWAY

ACHCSA indicates that they have not received any well installation or quarterly monitoring reports since reviewing the Preliminary Groundwater Investigation Report and the related proposal for two additional wells dated November 30, 1989. Since then, the two additional wells proposed in that November 30, 1989 proposal have been installed, as documented in the Continuing Groundwater Investigation Report dated March 16, 1990. This report, along with a proposal to install four additional wells (two on-site and two off-site) was submitted to your office with a cover letter dated March 21, 1990.

To date, KEI has been actively seeking permission to install the recommended two off-site wells from the Fraternal Order of Eagles, Lodge #7. Permission to install these wells is anticipated to be granted within the upcoming few weeks. The four proposed wells will be installed as soon as formal off-site permission is granted and well permits are received from the Alameda County Flood Control and Water Conservation District.

In the interim, a monthly monitoring and quarterly sampling program has been initiated. The program began in June 1990, with sampling scheduled for August 1990. A quarterly monitoring report will be prepared and submitted to your attention by October 1990.

UNOCAL SERVICE STATION NO. 5269 - 2240 MOUNTAIN BLVD.

A report documenting monthly monitoring and quarterly sampling of the three monitoring wells (MW-1, MW-3, and MW-4) dated May 21, 1990 was submitted to ACHCSA and RWQCB with a cover letter dated June 19, 1990. Based on the monitoring data, the apparent groundwater flow direction is toward the south-southwest, which implies that well MW-3 is downgradient from the tank pit area. Therefore, installation of another well as requested in your letter is unnecessary.

This site is situated within the Hayward Fault and typical hydraulic communication between wells may not exist because of the possibility of faults interrupting normal groundwater flow, which would be expected in the flatland area around San Francisco Bay. Details of the complex geologic and hydrogeologic conditions underlying the site are discussed in detail in the May 21, 1990 report, and may be useful for your further evaluation of this site.

Analytical results of samples collected during the last quarter indicate non-detectable levels of all constituents analyzed, except for 160 ppb of TPH as diesel and 220 ppb chloroform in well MW-1. Based on these results, KEI recommended a continuation of the monitoring and sampling program. The next report is scheduled to be submitted by October 1990.

Mr. Gil Wistar
Alameda County Health Care Services
August 16, 1990
Page three

I trust this information satisfies any concerns you may have regarding these projects. I kindly request that you respond in writing to me verifying that you have received these reports and rescinding your NOV letters for both sites.

If there are any questions, please feel free to call me @ 277-2303.

Sincerely,



Ronald E. Bock
Environmental Engineer

enclosures

cc: Lester Feldman, RWQCB
Gil Jensen, Alameda County District Attorney, Consumer and
Environmental Protection Division
Rafat Shahid, Asst. Agency Director, ACHCSA
Ed Howell, Chief of Hazardous Materials Division, ACHCSA
Mardo Kaprealian, KEI
Roger Folda, Unocal



KAPREALIAN ENGINEERING, INC.
Consulting Engineers

PO. BOX 996 • BENICIA, CA 94510
(707) 746-6915 • (707) 746-6916 • FAX: (707) 746-5581

MAR 27 1990

RONALD E. BOCK

March 21, 1990

Alameda County Health Care Services
80 Swan Way, Room 200
Oakland, CA 94621

RE: Unocal Service Station #0746
3943 Broadway Street
Oakland, California

Gentlemen:

Per the request of Mr. Ron Bock of Unocal Corporation, enclosed please find our report and work plan/proposal, both dated March 16, 1990, for the above referenced site.

Should you have any questions, please feel free to call our office at (707) 746-6915.

Sincerely,

Kaprealian Engineering, Inc.

Judy A. Dewey

jad\82

Enclosure

cc: Ron Bock, Unocal Corporation ✓



KAPREALIAN ENGINEERING, INC.
Consulting Engineers

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(707) 746-6915 • (707) 746-6916 • FAX: (707) 746-5581

MAR 16 1990

RONALD E. BOCK

KEI-P89-0805.R5
March 16, 1990

Unocal Corporation
2175 N. California Blvd., Suite #650
Walnut Creek, CA 94596

Attention: Mr. Ron Bock

RE: Continuing Ground Water Investigation at
Unocal Service Station #0746
3943 Broadway Street
Oakland, California

Dear Mr. Bock:

This report presents the results of our soil and ground water investigation for the referenced site in accordance with proposal KEI-P89-0805.P3 dated November 30, 1989. The purpose of the investigation was to further define the ground water flow direction, and to begin to further define the degree and extent of the subsurface soil and ground water contamination at the site. The work performed consisted of the following:

Coordination with regulatory agencies.

Drilling, installation and development of two monitoring wells.

Soil sampling.

Ground water monitoring, purging and sampling.

Laboratory analyses.

Data analysis, interpretation and report preparation.

SITE DESCRIPTION AND BACKGROUND

The subject site is presently used as a gasoline station. A Site Location Map and detailed Site Plan are attached to this report.

KEI's work at the site began on August 16, 1989 when KEI was asked to collect soil samples following the removal of two underground fuel storage tanks and one waste oil tank at the site. No apparent holes or cracks were observed in any of the tanks. Water was encountered in the fuel tank pit at a depth of about 10 feet, thus prohibiting the collection of any soil

samples from immediately beneath the tanks. Six soil samples, designated as SW1 through SW6, were collected from the sidewalls of the gasoline tank pit approximately six inches above the water table. One soil sample was collected from the bottom of the waste oil tank excavation at a depth of 8 feet.

On August 17, 1989, approximately 1,500 gallons of ground water was pumped from the fuel tank pit. One sample of water, labeled W1, was then collected from the fuel tank pit.

To accommodate the installation of new, larger tanks, additional soil was excavated approximately 14 feet laterally along the north wall of the tank pit, in the vicinity of sample points SW1 and SW2. On August 18, 1989, KEI returned to the site to collect additional soil samples. One soil sample, labeled SW2(R), was collected from the north sidewall of the fuel tank pit after additional excavation at a depth of 9.5 feet. Also, on August 18, 1989, four samples of native soil were collected from the product pipe trenches at depths ranging from 5.0 to 6.5 feet. After soil sampling, the pipe trenches were excavated to the sample depths.

KEI again returned to the site on August 24, 1989 to collect an additional ground water sample. After approximately 5,000 gallons of contaminated ground water was pumped from the fuel tank pit, one ground water sample, labeled W2, was collected.

All soil and water samples were analyzed by Sequoia Analytical Laboratory in Redwood City, California, for total petroleum hydrocarbons (TPH) as gasoline, and benzene, toluene, xylenes and ethylbenzene (BTX&E). The soil sample from beneath the waste oil tank was analyzed for TPH as gasoline, BTX&E, TPH as diesel, total oil and grease, and EPA method 8010 constituents.

Soil sample analyses from the fuel tank pit indicate non-detectable levels of TPH as gasoline and BTX&E for all samples except samples SW1 and SW2, which showed levels of TPH as gasoline at 13 ppm and 290 ppm, respectively. However, the entire area of sample points SW1 and SW2 was excavated as described above, and the new sample SW2(R) showed non-detectable levels of TPH as gasoline and BTX&E. The soil sample from the waste oil tank pit showed non-detectable levels of all constituents analyzed, except for TPH as gasoline at 1.6 ppm and toluene at 1.3 ppm. The soil samples, collected from pipe trenches, showed levels of TPH as gasoline ranging from 3.8 to 36 ppm, and benzene ranging from non-detectable to 0.52 ppm. However, the ground water sample analyses from the tank pit showed 4,700 ppb TPH as gasoline and 180 ppb as benzene (after purging 1,500 gallons), and 1,200 ppb TPH as gasoline, and 12 ppb of benzene (after purging 5,000

gallons). Documentation of soil sample collection and sample analytical results are presented in KEI's report (KEI-J89-0805.R1) dated August 30, 1989. To comply with the requirements of the regulatory agencies and based on the analytical results, KEI proposed installation of three monitoring wells.

On October 17, 1989, three two-inch diameter monitoring wells, designated as MW1, MW2 and MW3 on the attached Site Plan, were installed at the site. The wells were sampled on November 1, 1989. Based on analytical results of the soil and ground water samples, KEI recommended the installation of three additional monitoring wells to further define the extent of contamination.

FIELD ACTIVITIES

Two two-inch diameter monitoring wells (designated as MW4 and MW5 on the attached Site Plan) were installed at the site on January 26, 1990. A third proposed monitoring well could not be installed because of underground utilities and an on-site storage shed. The wells were drilled, constructed and completed in accordance with the guidelines of the Regional Water Quality Control Board (RWQCB) and the County well standards.

The subsurface materials penetrated and details of the construction of the wells are described in the attached Boring Logs.

The two wells were drilled and completed to total depths each of 20 feet. Ground water was encountered at depths of approximately 12.5 feet beneath the surface during drilling. Soil samples were taken at a minimum of 2-1/2 foot intervals, at changes in lithology and at the ground water/soil interface beginning at a depth of approximately 5 feet below grade until ground water was encountered. The undisturbed soil samples were taken by driving a California-modified split-spoon sampler lined with brass liners ahead of the drilling augers. The two-inch diameter brass liners holding the samples were sealed with aluminum foil, plastic caps and tape, and stored in a cooled ice chest for delivery to a certified laboratory. Each well casing was installed with a watertight cap and padlock. A round, watertight, flush-mounted well cover was cemented in place over each well casing.

The new wells were developed on February 9, 1990. Prior to development, all of the wells were checked for depth to the water table using an electronic sounder, presence of free product (using paste tape) and sheen. No free product or sheen was noted in any of the wells. After recording the monitoring data, the wells were developed with a surface pump until the evacuated water was clear and free of suspended sediment. Monitoring and well development data are summarized in Table 1.

All of the wells were sampled on February 15, 1990. Prior to sampling, monitoring data were collected and the wells were purged of between 8 and 15 gallons using a Teflon bailer. Water samples were then collected using a clean Teflon bailer. The samples were decanted into clean glass VOA vials, sealed with Teflon lined screw caps, and labeled and stored on ice until delivery to a state-certified laboratory.

ANALYTICAL RESULTS

Water and soil samples were analyzed at Sequoia Analytical Laboratory in Redwood City, California. All samples were accompanied by properly executed Chain of Custody documentation. Samples were analyzed for TPH as gasoline by EPA method 5030 in conjunction with modified 8015 and BTX&E by EPA method 8020.

Analytical results of the soil samples, collected from borings MW4 and MW5, indicate levels of TPH as gasoline ranging from 2.5 to 370 ppm. Benzene was detected at concentrations ranging from non-detectable to 1.8 ppm. The water sample analyses show non-detectable levels of all constituents in well MW2. In wells MW1 and MW4, TPH as gasoline was detected at 170 and 150 ppb, respectively, and benzene was detected at 7.9 and 8.0 ppb, respectively. In wells MW3 and MW5, TPH as gasoline was detected at 20,000 and 24,000 ppb, respectively, and benzene was detected at 1,700 and 1,500 ppb, respectively. Results of the soil analyses are summarized in Table 2, and the water analyses on Table 3. Copies of the laboratory analyses and Chain of Custody documentation are attached to this report.

HYDROLOGY AND GEOLOGY

The water table stabilized in the new monitoring wells at depths of 9.50 and 9.71 feet below the surface. The ground water flow direction appeared to be toward the south-southwest on February 15, 1990, (based on water level data collected from the five monitoring wells prior to purging).

Based on review of regional geologic maps (U.S. Geological Survey Miscellaneous Geologic Investigations Map I-239 "Areal and Engineering Geology of the Oakland West Quadrangle, California" by D.H. Radbruch, 1957), the site is underlain by Quaternary-age alluvium fan deposits (Temescal Formation), which typically consists of lenses of clayey gravel, sandy silty clay and sand-clay-silt mixtures. Specifically, the subsurface earth materials at the site, based on our present subsurface exploration activities, consist predominantly of clayey silt and clay (silty to gravelly) with lenses of well graded sand or gravel, and clayey sand or gravel. The lenses of coarse grained soils are generally

less than about 2 feet thick. Artificial fill materials were encountered at the surface of this site varying from about 2 to 2-1/2 feet thick in the vicinity of wells MW4 and MW5. Detailed descriptions of the soil materials encountered in our subsurface exploration are provided on the attached Boring Logs.

DISCUSSION AND RECOMMENDATIONS

Based on the analytical results, KEI recommends the installation of four additional monitoring wells (two on-site, and two off-site), designated as MW6, MW7, MW8 and MW9, to further define the extent of detected contamination. The proposed locations for the additional monitoring wells are shown on the attached Site Vicinity Map. In addition, KEI recommends continuation of the monthly monitoring and quarterly sampling program. Our proposal for this work is attached for your review and consideration.

DISTRIBUTION

Copies of this report should be sent to Mr. Gil Wistar of the Alameda County Health Care Services, the Alameda County Flood Control and Water Conservation District, and to the RWQCB, San Francisco Bay Region.

LIMITATIONS

Soil deposits and rock formations may vary in thickness, lithology, saturation, strength and other properties across any site. In addition, environmental changes, either naturally-occurring or artificially-induced, may cause changes in the extent and concentration of any contaminants. Our studies assume that the field and laboratory data are reasonably representative of the site as a whole, and assume that subsurface conditions are reasonably conducive to interpolation and extrapolation.

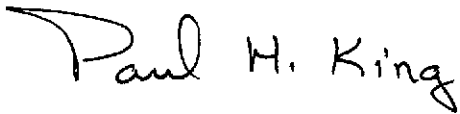
The results of this study are based on the data obtained from the field and laboratory analyses obtained from a state certified laboratory. We have analyzed this data using what we believe to be currently applicable engineering techniques and principles in the Northern California region. We make no warranty, either expressed or implied, regarding the above, including laboratory analyses, except that our services have been performed in accordance with generally accepted professional principles and practices existing for such work.

KEI-P89-0805.R5
March 16, 1990
Page 6

Should you have any questions regarding this report, please do not hesitate to call me at (707) 746-6915.

Sincerely,

Kaprealian Engineering, Inc.



Paul H. King
Hydrogeologist



Don R. Braun
Certified Engineering Geologist

License No. 1310
Exp. Date 6/30/90



Mardo Kaprealian
President

jad

Attachments: Tables 1, 2 & 3
Location Map
Site Plan
Boring Logs
Laboratory Results
Chain of Custody documentation
Proposal

KEI-P89-0805.R5
March 16, 1990

TABLE 1

SUMMARY OF GROUND WATER MONITORING AND DEVELOPMENT DATA

<u>Well #</u>	<u>Depth to Water (feet)</u>	<u>Product Thickness</u>	<u>Sheen</u>	<u>Gallons Pumped</u>
(Monitored and Sampled on February 15, 1990)				
MW1	8.23	0	None	15
MW2	9.38	0	None	11
MW3	10.00	0	None	15
MW4	9.50	0	None	8
MW5	9.71	0	None	15

(Monitored and Developed on October 26, 1989)

MW1*	9.14	0	None	0
MW2*	7.98	0	None	0
MW3*	9.66	0	None	0
MW4	9.43	0	None	16
MW5	9.37	0	None	190

* Monitored only.

KEI-P89-0805.R5
March 16, 1990

TABLE 2

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected on January 26, 1990)

<u>Sample Number</u>	<u>Depth (feet)</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethylbenzene</u>
MW4 (5)	5	22	0.059	ND	ND	ND
MW4 (7)	7	2.5	ND	ND	ND	ND
MW4 (10)	10	250	1.2	0.66	20	1.4
MW4 (11)	11	280	1.0	4.0	36	7.6
MW5 (5)	5	25	0.21	ND	ND	ND
MW5 (7.5)	7.5	46	0.25	0.28	0.20	0.46
MW5 (10)	10	140	1.5	1.7	10	4.0
MW5 (11.5)	11.5	370	1.8	14	51	11
Detection Limits		1.0	0.05	0.1	0.1	0.1

ND = Non-detectable.

Results in parts per million (ppm), unless otherwise indicated.

KEI-P89-0805.R5
March 16, 1990

TABLE 3

SUMMARY OF LABORATORY ANALYSES
WATER

<u>Sample Number</u>	<u>Depth to Water (feet)</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethyl-benzene</u>
(Collected on February 15, 1990)						
MW1	8.23	170	7.9	ND	2.8	2.2
MW2	9.38	ND	ND	ND	ND	ND
MW3	10.00	20,000	1,700	2,100	3,100	750
MW4	9.50	150	8.0	8.0	45	10
MW5	9.71	24,000	1,500	1,700	3,600	260
(Collected on November 1, 1989)						
MW1	8.45	ND	ND	ND	0.30	ND
MW2	9.57	200	ND	ND	1.2	3.0
MW3	10.35	13,000	57	48	120	1.7
Detection Limits		30	0.3	0.3	0.3	0.3

ND = Non-detectable.

Results in parts per billion (ppb), unless otherwise indicated.



KAPREALIAN ENGINEERING, INC.
Consulting Engineers

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LOCATION MAP

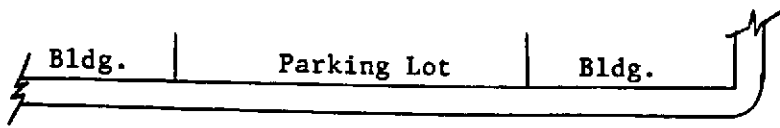
Unocal Service Station #0746
3943 Broadway Street
Oakland, California



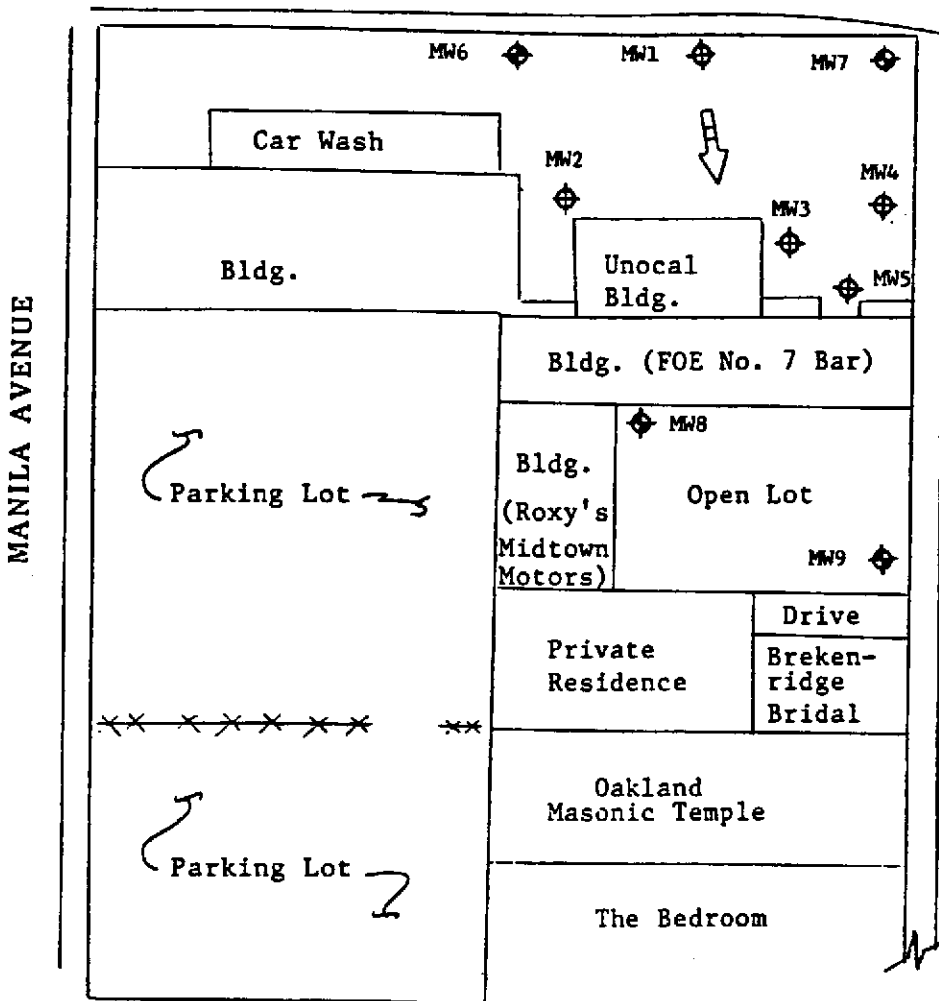
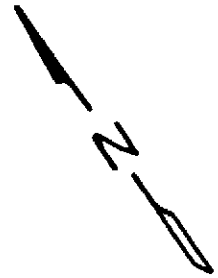
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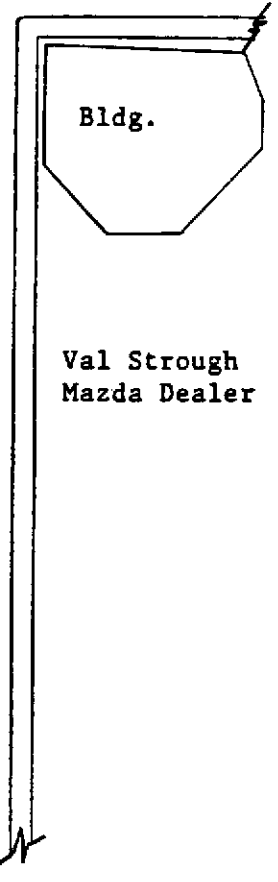
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40th STREET



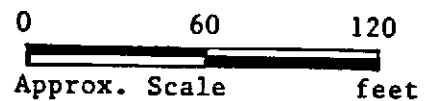
BROADWAY



SITE VICINITY MAP

LEGEND

- Monitoring Well (existing)
- Monitoring Well (proposed)
- Direction of Ground Water Flow



Unocal S/S #0746
3943 Broadway
Oakland, California

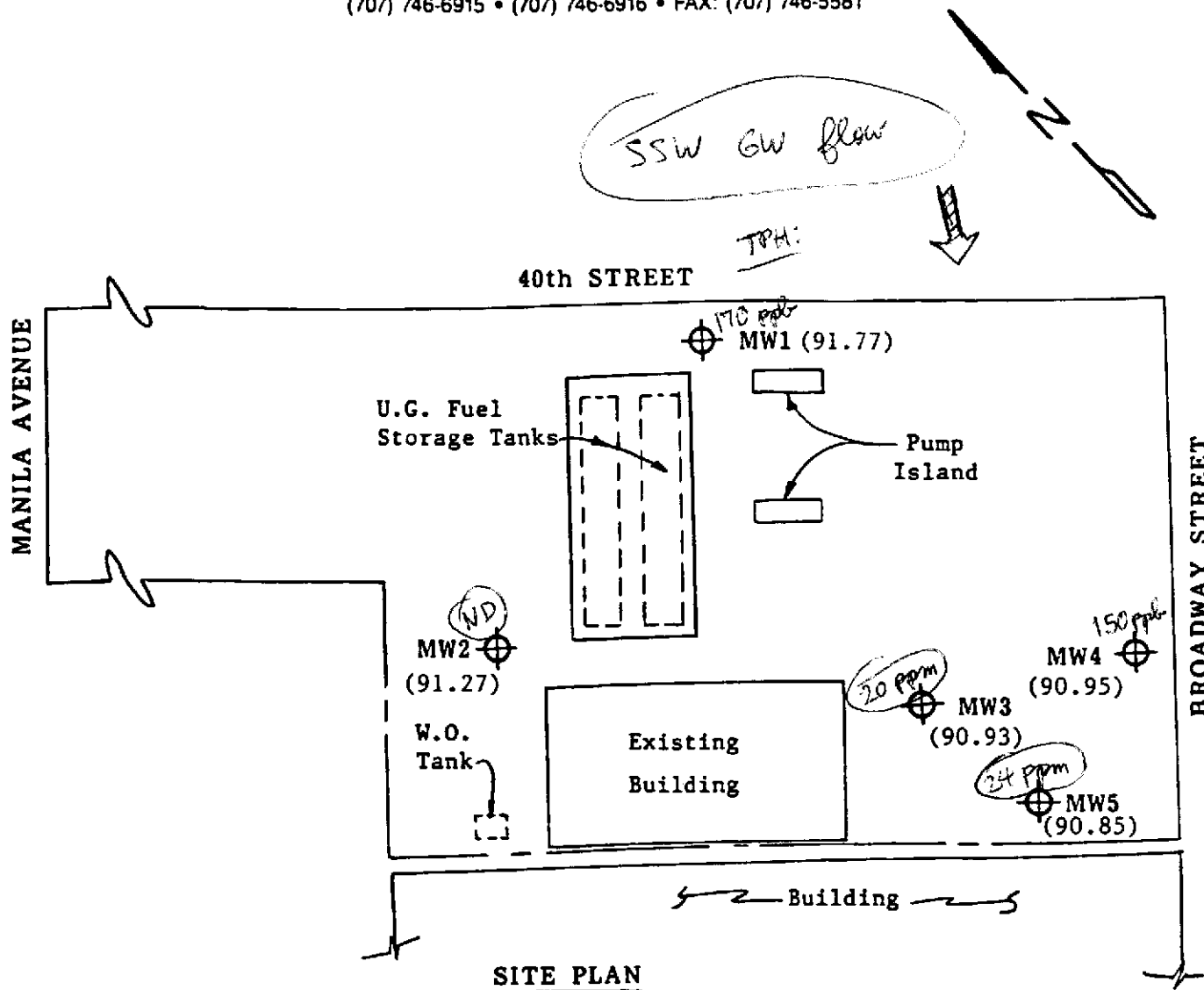


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LEGEND



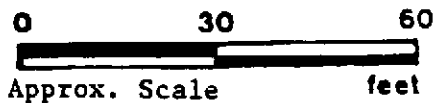
Monitoring Well (Existing)



Ground water surface elevation on 2/15/90. Top of MW1 well cover assumed 100.00 feet as datum.



Direction of ground water flow



Unocal Service Station #0746
3943 Broadway Street
Oakland, California

B O R I N G L O G

Project No. KEI-P89-0805	Boring & Casing Diameter 9" 2"	Logged By D.L. <i>D.P. Brown</i> CEG 1310
Project Name Unocal Oakland - Broadway	Well Head Elevation N/A	Date Drilled 1-26-90
Boring No. MW4	Drilling Method Hollow-stem Auger	Drilling Company EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description
		0		A.C. Pavement. Sand and gravel: Fill Clay
			SW- SC	Well graded sand with clay and silt medium dense, moist, dark greenish gray.
6/5/11		5	MH	Clayey elastic silt, 5-10% sand, stiff, moist, black.
16/21/24			CH	Clay, with gravel, 10-15% sand gravel to 1/4", very stiff, moist, very dark grayish brown and black, mottled with root holes.
15/24/28		10	GC	Clayey gravel with sand, 15-20% clay, gravel to 3/4", medium dense, moist, dark greenish gray.
8/10/11	▼		CH	Clay, olive brown and dark greenish gray, mottled.
8/7/14			GC	Clayey gravel with with sand, olive brown and dark greenish gray.
10/16/21		15	CH	Clay high plasticity, with silt, 5-10% sand, very stiff, moist, dark yellowish brown and light olive brown, mottled.
10/10/14				Silty clay, high plasticity, 5-10% sand stiff, moist, light olive brown.
		20		TOTAL DEPTH: 20'

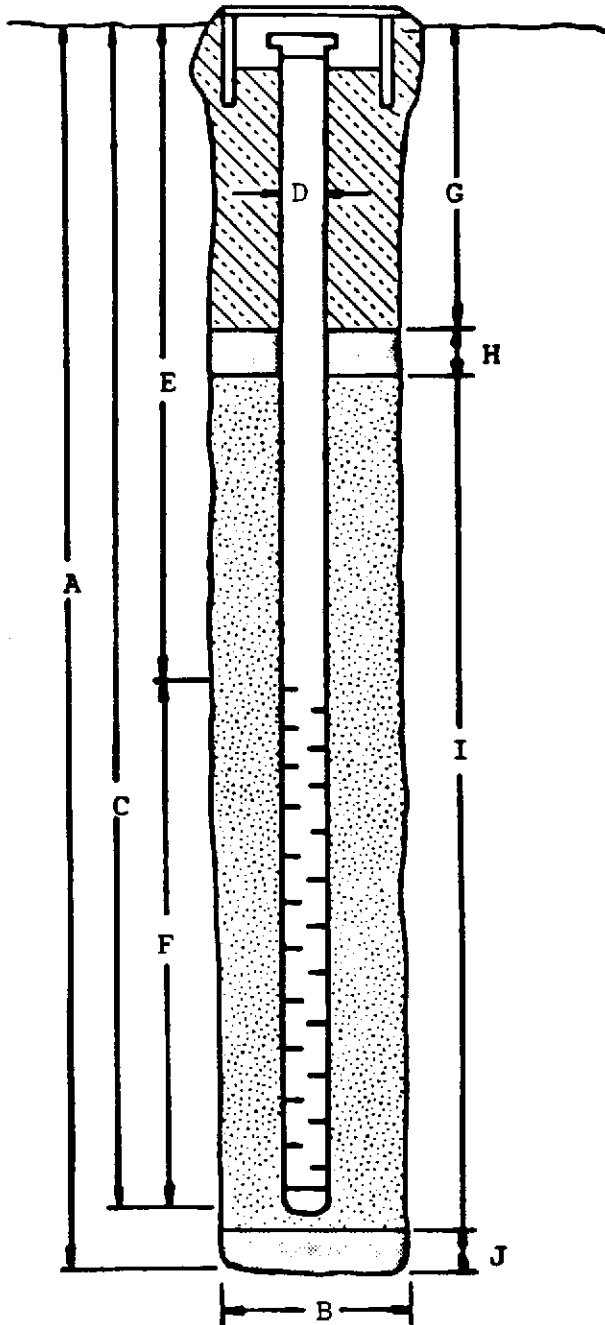
W E L L C O M P L E T I O N D I A G R A M

PROJECT NAME: Unocal - Oakland - Broadway BORING/WELL NO. MW4

PROJECT NUMBER: KEI-P89-0805

WELL PERMIT NO.: _____

Flush-mounted Well Cover



A. Total Depth: 20'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem
Auger

C. Casing Length: 20'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 5'

F. Perforated Length: 15'

Machined
Perforation Type: Slot

Perforation Size: 0.020"

G. Surface Seal: 2'

Seal Material: Neat Cement

H. Seal: 2'

Seal Material: Bentonite

I. Gravel Pack: 16'

RMC Lonestar
Pack Material: Sand

Size: #3

J. Bottom Seal: None

Seal Material: N/A

*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

BORING LOG

Project No. KEI-P89-0805	Boring & Casing Diameter 9" 2"	Logged By D.L. <i>John Shaw</i> <i>CEG 1310</i>
Project Name Unocal Oakland - Broadway	Well Head Elevation N/A	Date Drilled 1-26-90
Boring No. MW5	Drilling Method Hollow-stem Auger	Drilling Company EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description
		0		A.C. Pavement. Sand and gravel to 9": Fill
			CH	Silty clay, high plasticity, 5-15% sand stiff, moist, dark greenish gray and black, mottled.
5/4/5		5	MH	Clayey elastic silt, 5-10% sand, firm, very moist black.
			CH	Silty clay, high plasticity 10-15% sand stiff, moist, dark olive gray.
8/17/24				Clay, high plasticity, with gravel, 15-30% gravel to 1/2", trace silt, very stiff, moist, dark brown and black, mottled, with root holes.
8/15/23		10		Sandy below 10 feet, olive gray grades to clayey sand.
7/10/12			SC	Clayey sand, 10-15% silt, dense, moist to very moist, dark greenish gray and olive gray, mottled with gravel below 13'.
6/10/18	▽			
6/10/11		15	GW- GC	Well graded gravel with clay and sand, medium dense, wet, dark greenish gray, gravel to >2" diameter.
8/15/18			CH	Clay, high plasticity, trace silt, stiff, moist, dark greenish gray and light olive brown, mottled, dark greenish gray in voids/fissures. Silty clay, high plasticity, stiff, moist to wet, light olive brown and dark greenish gray, mottled, olive greenish gray below 19.5 feet.
		20		TOTAL DEPTH: 20'

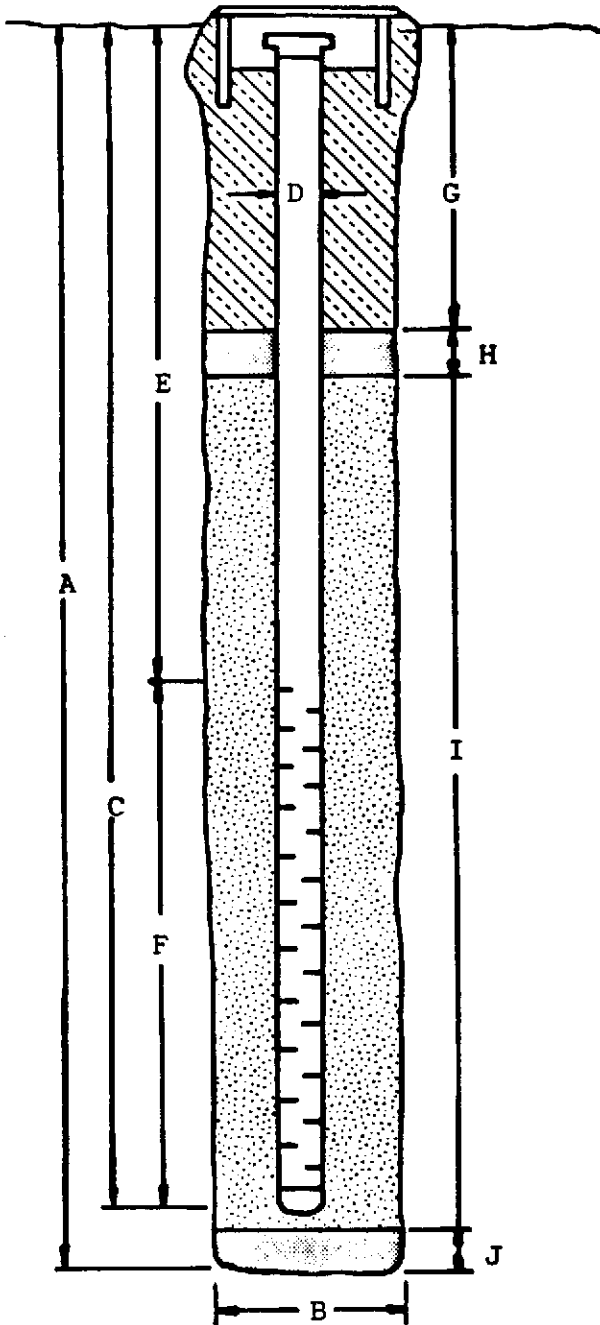
W E L L C O M P L E T I O N D I A G R A M

PROJECT NAME: Unocal - Oakland - Broadway BORING/WELL NO. MW5

PROJECT NUMBER: KEI-P89-0805

WELL PERMIT NO.: _____

Flush-mounted Well Cover



- A. Total Depth: 20'
- B. Boring Diameter*: 9"
 Drilling Method: Hollow Stem
 Auger
- C. Casing Length: 20'
 Material: Schedule 40 PVC
- D. Casing Diameter: OD = 2.375"
 ID = 2.067"
- E. Depth to Perforations: 5'
- F. Perforated Length: 15'
 Perforation Type: Machined Slot
 Perforation Size: 0.020"
- G. Surface Seal: 2'
 Seal Material: Neat Cement
- H. Seal: 2'
 Seal Material: Bentonite
- I. Gravel Pack: 16'
 Pack Material: RMC Lonestar Sand
 Size: #3
- J. Bottom Seal: None
 Seal Material: N/A

*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.



SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Kaprealian Engineering, Inc. P.O. Box 996 Benicia, CA 94510 Attention: Mardo Kaprealian, P.E.	Client Project ID: Unocal, Oakland, Broadway/40th St. Matrix Descript: Soil Analysis Method: EPA 5030/8015/8020 First Sample #: 001-3595	Sampled: Jan 26, 1990 Received: Jan 26, 1990 Analyzed: Feb 8, 1990 Reported: Feb 12, 1990
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TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
001-3595	MW4- (5)	22	0.059	N.D.	N.D.	N.D.
001-3596	MW4- (7)	2.5	N.D.	N.D.	N.D.	N.D.
001-3597	MW4- (10)	250	1.2	0.66	1.4	20
001-3598	MW4- (11)	280	1.0	4.0	7.6	36
001-3599	MW5- (5)	25	0.21	N.D.	N.D.	N.D.
001-3600	MW5- (7.5)	46	0.25	0.28	0.46	0.20
001-3601	MW5- (10)	140	1.5	1.7	4.0	10
001-3602	MW5- (11.5)	370	1.8	14	11	51

Detection Limits:**1.0****0.05****0.1****0.1****0.1**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL


Belinda C. Vega
Project Manager



KAPREALIAN ENGINEERING, INC.

CHAIN OF CUSTODY

SAMPLER		SITE NAME & ADDRESS					ANALYSES REQUESTED		TURN AROUND TIME:
<i>[Signature]</i>		LOCAL OAKLAND BOULVARD AND 40TH STREET							REGULAR
WITNESSING AGENCY									
SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION	REMARKS
MW4-(5)	1-26-90		X	X			1	SEE SAMPLE ID NO.	0013595
MW4-(7)	1-26-90		X	X			1		0013596
MW4-(10)	1-26-90		X	X			1		0013597 - HOLD
MW4-(11)	1-26-90		X	X			1		0013598
MW5-(5)	1-26-90		X	X			1		0013599
MW5-(7.5)	1-26-90		X	X			1		0013600
MW5-(10)	1-26-90		X	X			1		0013601 - HOLD
MW5-(11.5)	1-26-90		X	X			1		0013602

Relinquished by: (Signature) <i>[Signature]</i>	Date/Time 1-26-90/5:30PM	Received by: (Signature) <i>[Signature]</i>
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time 1/26/90 7:15	Received by: (Signature) Brenda Oh

The following MUST BE completed by the laboratory accepting samples for analysis:

- Have all samples received for analysis been stored in ice?
YES
- Will samples remain refrigerated until analyzed?
YES
- Did any samples received for analysis have head space?
NO
- Were samples in appropriate containers and properly packaged?
YES

Signature: _____ Title: _____ Date: _____

[Handwritten note]
see for
dict 1/2



SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Kaprealian Engineering, Inc.	Client Project ID: Unocal, Oakland, Broadway/40th	Sampled: Feb 15, 1990
P.O. Box 996	Matrix Descript: Water	Received: Feb 15, 1990
Benicia, CA 94510	Analysis Method: EPA 5030/8015/8020	Analyzed: Feb 16, 1990
Attention: Mardo Kaprealian, P.E.	First Sample #: 002-2024 A-B	Reported: Feb 21, 1990

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons	Benzene	Toluene	Ethyl Benzene	Xylenes
		$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)
0022024 A-B	MW1	170	7.9	N.D.	2.2	2.8
0022025 A-B	MW2	N.D.	N.D.	N.D.	N.D.	N.D.
0022026 A-B	MW3	20,000	1,700	2,100	750	3,100
0022027 A-B	MW4	150	8.0	8.0	10	45
0022028 A-B	MW5	24,000	1,500	1,700	260	3,600

Detection Limits:	30	0.30	0.30	0.30	0.30
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Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Belinda C. Vega
Belinda C. Vega
Project Manager



KAPREALIAN ENGINEERING, INC.

CHAIN OF CUSTODY

SAMPLER RAY (KEI)		SITE NAME & ADDRESS UNOCAL OAKLAND BROADWAY / 40TH ST.						ANALYSES REQUESTED				TURN AROUND TIME: 1 Week
WITNESSING AGENCY												REMARKS
SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION		TPHG	PPTX E	
MW1	2-15-90	14:00		X			20			X	X	
MW2	"	"		X			X			X	X	
MW3	"	"		X			X			X	X	
MW4	"	"		X			X			X	X	
MW5	"	"		X			X			X	X	

Relinquished by: (Signature) Ray (KEI)	Date/Time 2-15-90	Received by: (Signature)	The following MUST BE completed by the laboratory accepting samples for analysis: 1. Have all samples received for analysis been stored in ice? <u>YES</u> 2. Will samples remain refrigerated until analyzed? <u>YES</u> 3. Did any samples received for analysis have head space? <u>NO</u> 4. Were samples in appropriate containers and properly packaged? <u>YES</u>
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	
Relinquished by: (Signature)	Date/Time	Received by: (Signature) 2/15/90 Vic Q. Herrera 3:30pm	Signature <u>Vic Herrera</u> Title _____ Date <u>2/15/90</u>



KAPREALIAN ENGINEERING, INC.

Consulting Engineers

P.O. BOX 996 • BENICIA, CA 94510
(707) 746-6915 • (707) 746-6916 • FAX: (707) 746-5581

MAR 16 1990

RONALD E. BOCK

KEI-P89-0805.P4

March 16, 1990

Unocal Corporation
2175 N. California Blvd., #650
Walnut Creek, CA 94596

Attention: Mr. Ron Bock

RE: Work Plan/Proposal
Unocal Service Station #0746
3943 Broadway Street
Oakland, California

INTRODUCTION

1. Background:

The subject site is presently used as a gasoline station. A Site Location Map and detailed Site Vicinity Map are attached to this report.

KEI's work at the site began on August 16, 1989 when KEI was asked to collect soil samples following the removal of two underground fuel storage tanks and one waste oil tank at the site. No apparent holes or cracks were observed in any of the tanks. Water was encountered in the fuel tank pit at a depth of about 10 feet, thus prohibiting the collection of any soil samples from immediately beneath the tanks. Six soil samples, designated as SW1 through SW6, were collected from the sidewalls of the gasoline tank pit approximately six inches above the water table. One soil sample was collected from the bottom of the waste oil tank excavation at a depth of 8 feet.

On August 17, 1989, approximately 1,500 gallons of ground water was pumped from the fuel tank pit. One sample of water, labeled W1, was then collected from the fuel tank pit.

To accommodate the installation of new, larger tanks, additional soil was excavated approximately 14 feet laterally along the north wall of the tank pit, in the vicinity of sample points SW1 and SW2. On August 18, 1989, KEI returned to the site to collect additional soil samples. One soil sample, labeled SW2(R), was collected from the north sidewall of the fuel tank pit after additional excavation at a depth of 9.5 feet. Also, on August 18, 1989, four samples of native soil were collected from the product pipe trenches

at depths ranging from 5.0 to 6.5 feet. After soil sampling, the pipe trenches were excavated to the sample depths.

KEI again returned to the site on August 24, 1989 to collect an additional ground water sample. After approximately 5,000 gallons of contaminated ground water was pumped from the fuel tank pit, one ground water sample, labeled W2, was collected. All soil and water samples were analyzed by Sequoia Analytical Laboratory in Redwood City, California.

Soil and water samples were analyzed for total petroleum hydrocarbons (TPH) as gasoline, and benzene, toluene, xylenes and ethylbenzene (BTX&E). The soil sample from beneath the waste oil tank was analyzed for TPH as gasoline, BTX&E, TPH as diesel, total oil and grease, and EPA method 8010 constituents.

Soil sample analyses from the fuel tank pit indicate non-detectable levels of TPH as gasoline and BTX&E for all samples except samples SW1 and SW2, which showed levels of TPH as gasoline at 13 ppm and 290 ppm, respectively. However, the entire area of sample points SW1 and SW2 was excavated as described above, and the new sample SW2(R) showed non-detectable levels of TPH as gasoline and BTX&E. The soil sample from the waste oil tank pit showed non-detectable levels of all constituents analyzed, except for TPH as gasoline at 1.6 ppm and toluene at 1.3 ppm. The soil samples, collected from pipe trenches, showed levels of TPH as gasoline ranging from 3.8 to 36 ppm, and benzene ranging from non-detectable to 0.52 ppm. However, the ground water sample analyses from the tank pit showed 4,700 ppb TPH as gasoline and 180 ppb as benzene (after purging 1,500 gallons), and 1,200 ppb TPH as gasoline, and 12 ppb of benzene (after purging 5,000 gallons). Documentation of soil sample collection and sample analytical results are presented in KEI's report (KEI-J89-0805.R1) dated August 30, 1989. To comply with the requirements of the regulatory agencies and based on the analytical results, KEI proposed installation of three monitoring wells.

On October 17, 1989, three two-inch diameter monitoring wells, designated as MW1, MW2 and MW3 on the attached Site Plan, were installed at the site. The wells were sampled on November 1, 1989. Based on the soil and water sample analytical results, KEI recommended the installation of three additional monitoring wells to further define the extent of contamination.

On January 26, 1990, two monitoring wells were installed as proposed, each to a depth of 20 feet. A third well could not be installed due to underground utilities and an on-site storage shed. The water from the additional wells was first sampled on February 15, 1990. TPH as gasoline ranged from 150 ppb to 24,000 ppb, while benzene ranged from 8.0 ppb to 1,500 ppb. Based on this information, KEI proposed the installation of four additional monitoring wells in KEI's report (KEI-P89-0805.R5) dated March 16, 1990.

2. Site Description:

The service station site occupies the west corner at the intersection of Broadway Street and 40th Street in Oakland, California. A Location Map and Site Vicinity Map are attached to this report.

PROPOSED FIELD WORK

PHASE II - DEFINING THE EXTENT OF SUBSURFACE CONTAMINATION

1. KEI proposes to install four additional two-inch diameter monitoring wells using hollow stem auger equipment. Permits will be obtained from the Alameda County Flood Control and Water Conservation District and/or the City of Oakland as necessary prior to beginning work.

The wells will be drilled 10 to 15 feet into the saturated zone of the first encountered ground water unless a 5 foot thick clay aquitard is encountered first, at which time drilling will be terminated.

2. Soil samples will be collected at a minimum of 5 foot intervals, changes in lithology, at obvious areas of contamination, and at/or within the soil/ground water interface beginning at a depth of about 4 to 5 feet below grade. Sampling will continue until the first water table is encountered. Classification of soil will be done using the Unified Soils Classification System (USCS) by KEI's field engineer or geologist. Samples will be collected in a California modified split-spoon sampler with two-inch diameter brass liners. The sampler will be advanced ahead of the drilling augers at designated depths by dropping a 140 pound hammer 30 inches. Blow counts will be recorded. Samples will be removed from the sampler and retained in brass liners. The liners will be sealed with aluminum foil, plastic caps and tape. They will be labeled and stored on ice for delivery to a state certified laboratory.

3. Finalized Boring Logs will be prepared from field logs and submitted to the Alameda County Flood Control and Water Conservation District and to the Regional Water Quality Control Board (RWQCB), San Francisco Bay Region.
4. Ground water is anticipated at approximately 10 feet below grade based on the ground water level found in the existing monitoring wells.
5. Well Construction:

Casing Type: Schedule 40 PVC, flush threaded joints, 0.02 inch factory slot, two-inch diameter. Screen to run from total depth of the well approximately 5 feet below grade. Monterey sand (#3) will fill the annular space from total depth to 3 feet below grade. A one foot thick bentonite seal will be placed in the annular space on top of the sand pack. After the bentonite has been hydrated, concrete will be poured on top of the bentonite seal to the surface.

Well casings will be secured with a waterproof cap and a padlock. A round, watertight, flush-mounted well cover will be concreted in place over the top of each casing.

6. Water levels will be measured with an electronic sounder. The wells will be developed using a surface pump approximately one week after well completion. Wells will be pumped until expelled water is clear and free of turbidity. Effluent generated during well development will be contained in barrels and hauled from the site by a licensed hazardous materials hauler.

Casing elevations will be surveyed to an assumed datum.

7. Ground Water Sampling:

The wells will be purged with a surface bailer approximately four casing volumes prior to sampling, at least 72 hours after development. After recovery, samples will be collected using a clean Teflon bailer and promptly decanted into 40 ml VOA vials and/or one liter amber bottles, as appropriate. Vials and/or bottles will be sealed with Teflon-lined screw caps, labeled and stored on ice for delivery to a state certified laboratory. The sampling bailer will be cleaned with soap and a clean water rinse between uses.

Wells will be checked for free product and sheen (using an interface probe and/or paste tape) prior to development and sampling.

Properly executed Chain of Custody documentation will accompany all samples.

8. Laboratory Analyses:

Water and selected soil samples will be analyzed by Sequoia Analytical Laboratory in Redwood City, California, a state certified laboratory, for TPH as gasoline using EPA method 5030 in conjunction with modified 8015 and BTX&E using EPA method 8020, using EPA analytical methods recommended by the RWQCB, as specified in the Tri-regional guidelines.

Analytical results will be presented in tabular form, showing sample depths, results and detection limits.

The analytical results will be used to delineate the vertical and lateral extent of the contaminants in soil and ground water. A cross sectional profile will be constructed showing the subsurface lithology to depth drilled and first water table depth.

Permits required by the Alameda County Flood Control and Water Conservation District and/or the City of Oakland to perform the proposed work will be obtained as necessary.

9. Hydrology:

Ground water flow direction will be determined from the survey data and water table depths from both the new and existing wells. The flow direction will be shown on the Site Plan.

10. Conclusions:

Conclusions and results of Phase II will be described in a technical report.

The technical report will be submitted to the Alameda County Flood Control and Water Conservation District, and to the RWQCB.

PHASE III

Once the zero line is established through the completion of Phase II, a final remedial plan will be developed.

Interpretations of the subsurface stratigraphy will be used in consideration of various remedial options such as soil venting and/or air stripping.

PHASE V

Implementation of the remediation plan.

LIMITATIONS

Soil deposits and rock formations may vary in thickness, lithology, saturation, strength and other properties across any site. In addition, environmental changes, either naturally-occurring or artificially-induced, may cause changes in the extent and concentration of any contaminants. Our studies assume that the field and laboratory data are reasonably representative of the site as a whole, and assume that subsurface conditions are reasonably conducive to interpolation and extrapolation.

The results of this study are based on the data obtained from the field and laboratory analyses obtained from a state certified laboratory. We have analyzed this data using what we believe to be currently applicable engineering techniques and principles in the Northern California region. We make no warranty, either expressed or implied, regarding the above, including laboratory analyses, except that our services have been performed in accordance with generally accepted professional principles and practices existing for such work.

Approved by:



Don R. Braun
Certified Engineering Geologist

License No. 1310
Exp. Date 6/30/90

Attachments: Location Map
Site Vicinity Map

KEI-P89-0805.P4
March 16, 1990
Page 7

PRICING

All invoicing will be based upon actual time and material expended for the project in accordance with KEI's current fee schedule. Based on this, we estimate that our charges would not exceed \$16,500.00.



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LOCATION MAP

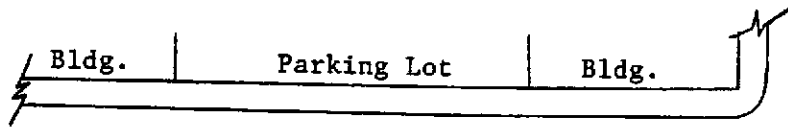
Unocal Service Station #0746
3943 Broadway Street
Oakland, California



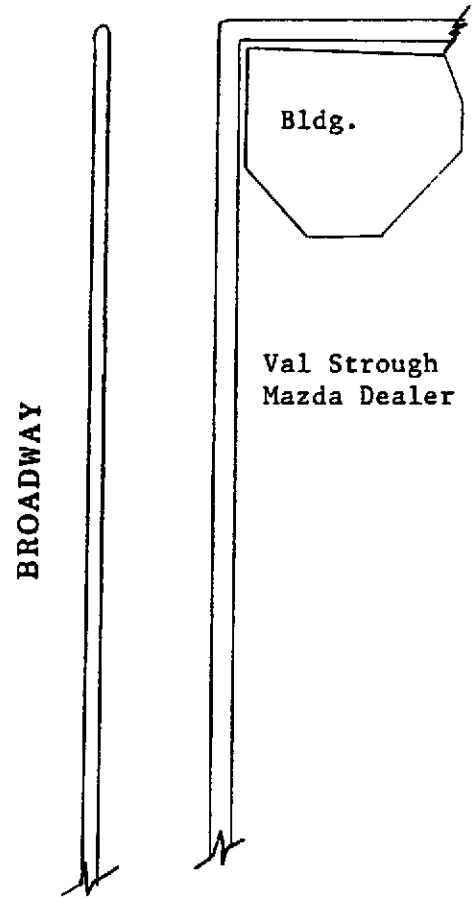
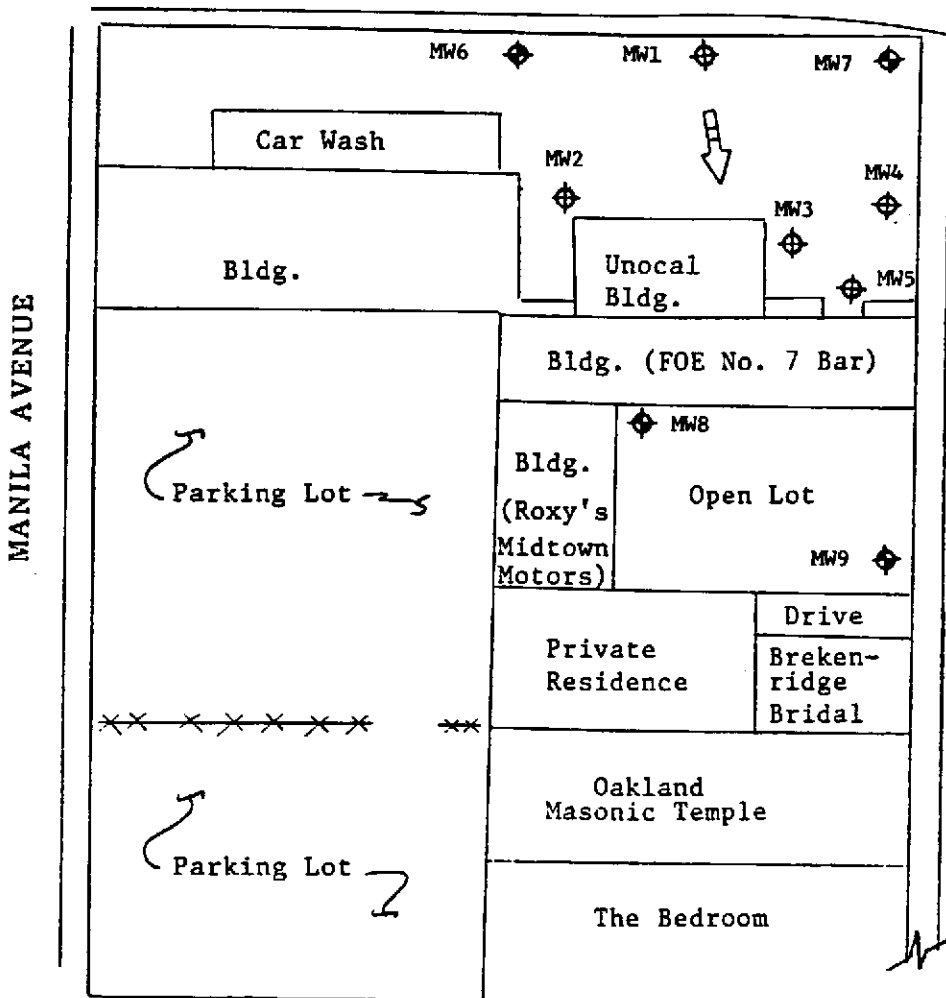
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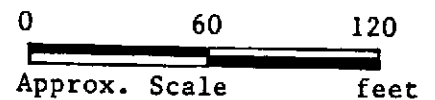
40th STREET



SITE VICINITY MAP

LEGEND

- Monitoring Well (existing)
- Monitoring Well (proposed)
- Direction of Ground Water Flow



Unocal S/S #0746
3943 Broadway
Oakland, California