KAPREALIAN ENGINEERING
INCORPORATED

KEI-P91-1004.P5
June 3, 1994

Unocal Corporation
2000 Crow Canyon Place, Suite 400
P.O. Box 5155
San Ramon, California 94583

Attention: Mr. David B. DeWitt

RE: Work Plan/Proposal
Unocal Service Station #5043
449 Hegenberger Road
Oakland, California

Dear Mr. DeWitt:

At the request of Unocal Corporation, Kaprealian Engineering, Inc. (KEI) has prepared this work plan/proposal for the destruction of two existing monitoring wells and the installation of two new monitoring wells. Wells MW4 and MW5 must be destroyed due to the fact that a car wash will be constructed over their present location. Following the construction of the car wash, the wells will be reinstalled in the proposed new locations. This work plan/proposal for the destruction and reinstallation of these wells is presented for your review and consideration.

PROPOSED WELL DESTRUCTION

1. KEI proposes to destroy monitoring wells MW4 and MW5 by fully drilling out the existing well seals, all filter pack sand materials, and the PVC well casings. The wells extend to a depth of 13.5 feet below grade. The boreholes will be overdrilled approximately 1 foot. Permits will be obtained from the Alameda County Flood Control and Water Conservation District, Zone 7, prior to beginning work.

2. The former wells will be fully sealed by the use of either neat cement grout or 11-sack cement/sand slurry, in accordance with the grout mixing guidelines presented in the California Well Standards, Bulletin 74-90, dated June 1991. All grout will be placed by the use of a tremie pipe. Grout will be placed from the bottom of the borings up to the surface in one continuous pour. The upper 1 to 2 feet of grout may contain a hardening agent to allow for reduced curing time.

3. All soil materials generated during well destruction operations will be stored on-site in DOT-approved,

2401 Stanwell Drive, Suite 400
Concord, California 94520
Tel: 510.602.5100 Fax: 510.687.0602

properly labeled, 55-gallon drums, or else covered by visqueen pending further analysis and disposal. All ground water removed during grouting of the borehole and all rinsate generated will be stored in drums as specified above pending proper disposal.

4. The results of the well destruction activities will be documented in a technical report. A copy of the report will be submitted to the ACHCS, and to the Regional Water Quality Control Board (RWQCB), San Francisco Bay Region.

REPLACEMENT OF MONITORING WELLS

1. KEI proposes to install two replacement two-inch diameter monitoring wells, designated as MW4A and MW5A on the attached Figure 1, by the use of hollow-stem auger equipment. Permits will be obtained from the ACHCS, as necessary, prior to beginning work.

   The wells will be drilled 10 feet into the saturated zone of the first encountered ground water, at which time drilling will be terminated. Ground water is anticipated at approximately 2 to 5 feet below grade, based on the ground water level encountered in the existing monitoring wells in May of 1994.

2. Soil samples will be collected at a maximum spacing of 5 foot intervals, at significant 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. Sample intervals will be chosen so that an accurate profile of the subsurface soil conditions can be determined. Sampling for laboratory analyses and lithologic logging purposes will continue until the first water table is encountered. Sampling for lithologic logging purposes only will continue below the water table to the total depth drilled. Classification of soil will be done using the Unified Soils Classification System (USCS) by KEI's field geologist. Samples will be collected in a California-modified split-spoon sampler lined 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 the brass liners. The liners will then be sealed with aluminum foil, plastic caps, and tape. They will be labeled and stored in a cooler, on crushed ice or "blue ice," for delivery to a state-certified laboratory. Properly executed Chain of Custody documentation will accompany all soil samples.

3. During drilling operations, all soil materials will be stored on-site in DOT-approved, 55-gallon drums, or else covered by visqueen. Each drum (if used) will be properly labeled and will include, at a minimum, the date, the interval that soil materials were obtained from, a contact individual, and the phone number at KEI.

4. Finalized Boring Logs will be prepared from the field logs and submitted to the ACHCS and the RWQCB, San Francisco Bay Region.

5. Well Construction:

   Casing Type: Schedule 40 PVC, flush threaded joints, 0.010 inch factory slot, two-inch diameter. Screen to run from total depth of the well to approximately 3 feet below grade. Monterey sand (#2/12) will fill the annular space from total depth to 0.5 feet above the perforated casing interval. The choice of screen slot size and sand filter pack material is based on soils encountered in previous borings and particle size analysis. A 0.5-foot thick bentonite seal will be placed in the annular space on top of the sand pack. Neat cement grout will be placed on top of the bentonite seal to the surface. A Proposed Well Construction Diagram is attached to this proposal.

   The 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. The elevations of the well casings will be surveyed by a licensed land surveyor to Mean Sea Level and to a vertical accuracy of 0.01 foot.

6. The wells will be developed approximately one week after well completion. Prior to development, the wells will be checked for depth to the water table (by the use of an electronic sounder), and the presence of free product (by the use of an interface probe or paste tape). After recording the monitoring data, the wells will be developed by the use of a surge block and a subsurface pump. Effluent generated during well development will be contained in DOT-approved drums and hauled from the site by a licensed hazardous materials hauler.

7. Ground Water Sampling:

   The wells will be purged (by the use of a pump or bailer) of a minimum of four casing volumes. Purging will be conducted prior to sampling and at least 72 hours after development. During purging operations, the field parameters pH, tempera-

ture, and electrical conductivity will be recorded and presented in a tabular form. Once the field parameters are observed to stabilize and a minimum of approximately four casing volumes have been removed from each well, water samples will then be collected by the use of a clean Teflon bailer and promptly decanted into 40 ml VOA vials and/or one-liter amber bottles, as appropriate. The vials and/or bottles will then 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 non-phosphate soap and clean water rinses between uses.

The wells will be checked for free product (by the use of an interface probe and/or paste tape) prior to development and sampling. The wells will also be checked for the presence of a sheen prior to sampling.

Properly executed Chain of Custody documentation will accompany all water samples.

8. Laboratory Analyses:

Water and selected soil samples will be analyzed by Sequoia Analytical Laboratory, a state-certified laboratory, for total petroleum hydrocarbons (TPH) as gasoline by EPA method 5030/modified 8015, benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA method 8020, and TPH as diesel by EPA methods 3550/modified 8015 (soil) and 3510/modified 8015 (water). add TPH as hydraulic oil or mo.

The analytical results will be presented in tabular form, showing the sample depths, and results. The analytical results will be used to delineate the vertical and lateral extent of the contaminants in soil and ground water.

9. Hydrology:

The ground water flow direction and ground water gradient will be determined from the water level elevations measured in both the new and existing monitoring wells. The flow direction will be shown on the Site Plan.

10. Conclusions:

Conclusions and results of the proposed work will be described in a technical report. The technical report will be submitted to the Alameda County Health Care Services and 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 will be based on the data obtained from the field and laboratory analyses obtained from a state-certified laboratory. We will analyze 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 will be performed in accordance with generally accepted professional principles and practices existing for such work.

Should you have any questions regarding this work plan/proposal, please do not hesitate to call me at (510) 602-5100.

Sincerely,

Kaprealian Engineering, Inc.

Joel G. Greger, C.E.G.
Senior Engineering Geologist

License No. EG 1633
Exp. Date 6/30/94

Robert H. Kezerian
Project Manager

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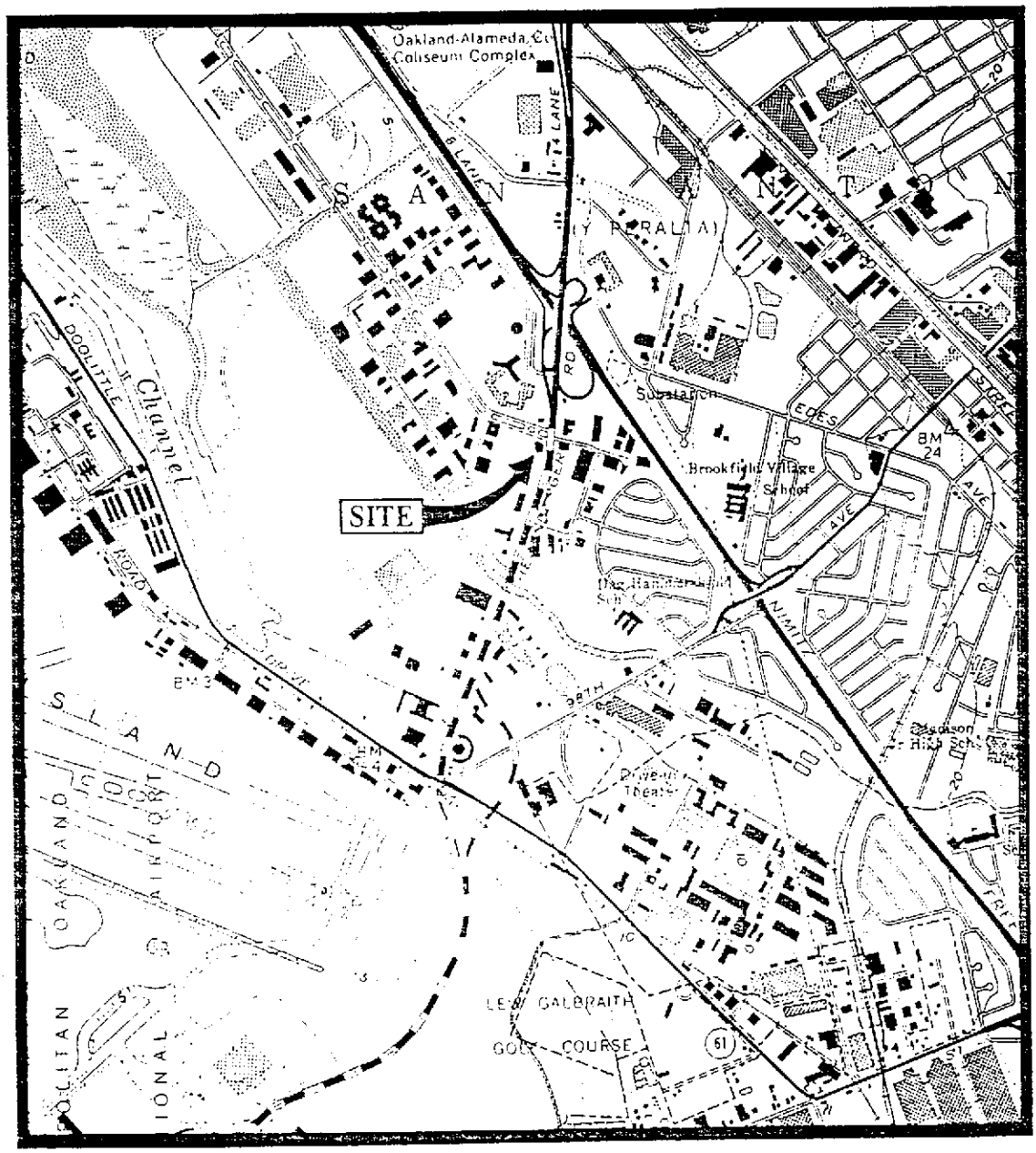
Attachments: Location Map
Figure 1
Proposed Well Construction Diagram

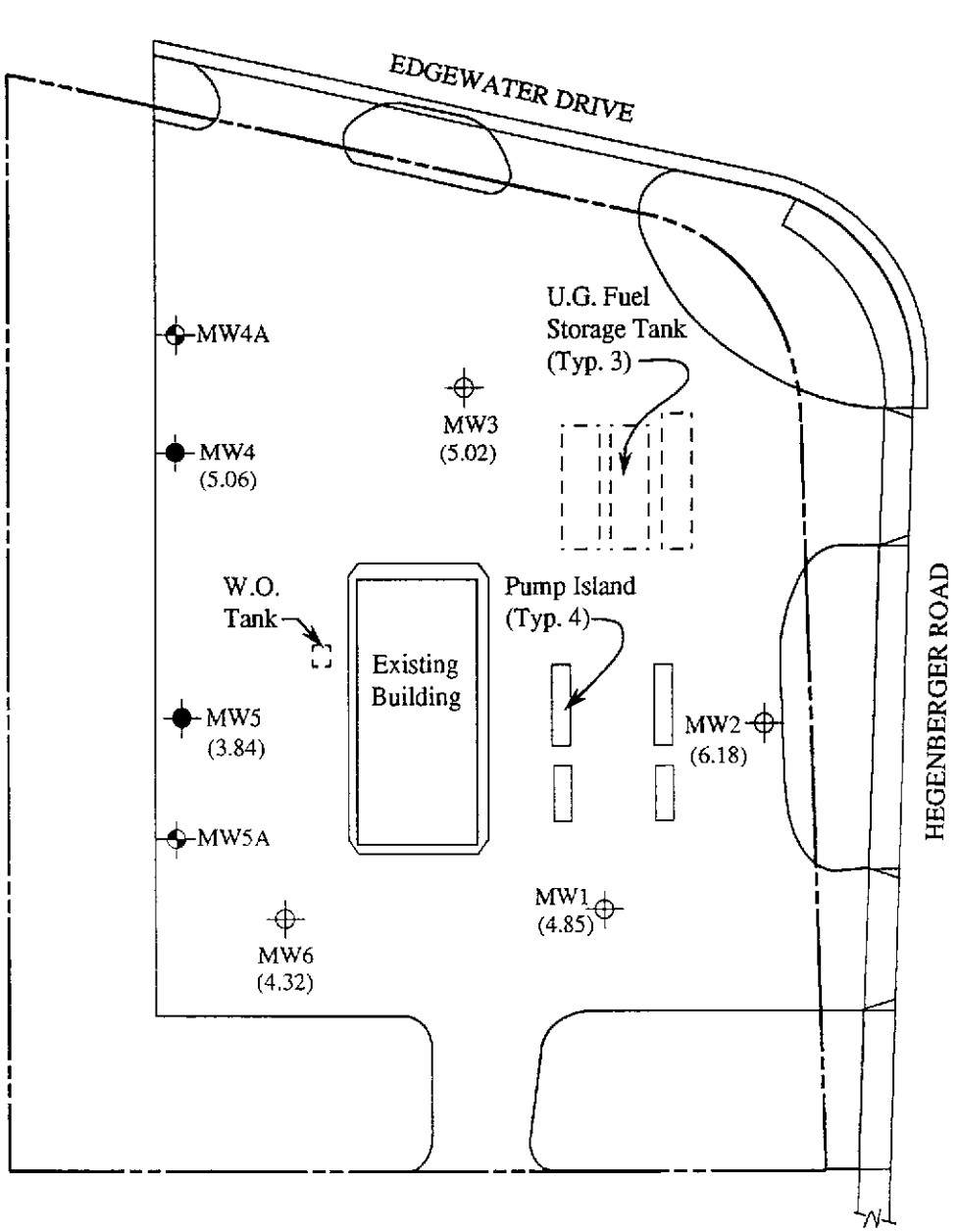


Base modified from 7.5 minute U.S.G.S. San Leandro Quadrangle
(photorevised 1980)

0 2000 4000

Approx. scale feet

KAPREALIAN ENGINEERING INCORPORATED	UNOCAL SERVICE STATION #5043 449 HEGENBERGER ROAD OAKLAND, CALIFORNIA	LOCATION MAP



LEGEND

- Monitoring well (existing)
- Monitoring well (to be destroyed)
- Replacement monitoring well (to be installed)
- ( ) Ground water elevation in feet above Mean Sea Level

0 40 80

Approx. scale feet

MONITORING WELL LOCATION MAP

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UNOCAL SERVICE STATION #5043
449 HEGENBERGER ROAD
OAKLAND, CALIFORNIA

FIGURE
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KAPREALIAN ENGINEERING
INCORPORATED

ALCO HAZMAT
94 OCT 17 PM 3:55

ST(D 521
BC

October 14, 1994

Alameda County Health Care Services
1131 Harbor Way Parkway
Alameda, CA 94501

RE: Unocal Service Station #5043
449 Hegenberger Road
Oakland, California

Gentlemen:

Per the request of Mr. David DeWitt of Unocal Corporation, enclosed please find our work plan/proposal dated June 3, 1994, for the above referenced site.

If you should have any questions, please feel free to call our office at (510) 602-5100.

Sincerely,

Kaprealian Engineering, Inc.

Judy A. Dewey

jad\82

Enclosure

cc: David B. DeWitt, Unocal Corporation

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Tel: 510.602.5100 Fax: 510.687.0602