



Kaldveer Associates Geoscience Consultants

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Attention: Mr. Dave Johnson

RE: WORK PLAN FOR SOIL AND GROUND
WATER QUALITY INVESTIGATION
MILLS HALL/TOYON MEADOW
MILLS COLLEGE
OAKLAND, CALIFORNIA

Dear Mr. Johnson:

In accordance with your request, we are pleased to submit this work plan for a soil and ground water quality investigation at Mills Hall/Toyon Meadow on the Mills College campus in Oakland, California. The purpose of this investigation is to provide additional information on the extent and distribution of hydrocarbons in the subsurface related to a former underground fuel storage tank at the site.

BACKGROUND

In June, 1989 a small capacity underground storage tank was removed from the former Mills Kitchen building area located in Toyon Meadow behind Mills Hall. Soil samples collected at the time of tank removal indicated the presence of up to 6,300 ppm total hydrocarbons as diesel fuel in the shallow soil beneath the tank. Two phases of contaminated soil excavation were performed, and approximately 250 cubic yards of contaminated soil were removed from the site by a licensed waste hauler. In addition, Kaldveer Associates performed a preliminary soil and ground water quality investigation which indicated that hydrocarbon contamination has migrated along the ground water surface for a distance of at least 60 feet from the former tank location. Soil samples collected during that investigation indicate that hydrocarbons as diesel fuel are present in soil between the depths of 12 to 15 feet below ground surface at a concentration of from 60 to 2,500 ppm, with one sample found to contain 11,000 ppm diesel. A water sample collected from a monitoring well located approximately 50 feet south of the former tank location did not contain detectable quantities of hydrocarbons.

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As part of the process to obtain County approval for backfilling the former tank excavation, Kaldveer Associates prepared a work plan for soil excavation and tank area backfilling dated July 14, 1989. The work plan summarized the investigations and work performed to that date, outlined a scope of work for additional soil excavation (which was performed), and included a proposed scope of work for additional soil and ground water quality investigation to evaluate the extent of hydrocarbon contamination at the site. In addition, the Alameda County Health Department (ACHD) has requested additional investigation toward this end. The work described in this work plan is designed to provide additional information on the distribution of hydrocarbons in the subsurface and provide for two years of semi-annual ground water monitoring to evaluate potential changes in water quality overtime.

SCOPE OF SERVICES

Our scope of work is based on our previous investigations at the site and our discussions with representatives of the ACHD, and would include the following:

Task 1 - Soil and Ground Water Testing

1. A soil and ground water sampling program consisting of the installation of two monitoring wells to depths of approximately 25 feet. One well will be installed in the immediate vicinity of the former tank, and the other well will be installed between the former tank and Aliso Creek.

Borings for the wells will be drilled using a truck-mounted drill rig equipped with 8-inch diameter hollow-stem augers. Soil samples will be collected in each boring at approximate five-foot intervals, or as otherwise indicated by specific field conditions. One sample collected from near the soil-ground water interface in each boring will be submitted to a certified laboratory for chemical analysis.

The soil samples would be appropriately packed, refrigerated and transported to the chemical laboratory for testing. The augers, samplers and equipment will be steam-cleaned prior to the field investigation.

Applicable local regulations will be followed in permitting and installing the wells. The new wells will be developed and sampled. A ground water sample will also be collected from the existing well. See Appendix I for details.

2. Level-line surveying of well-top elevations and obtaining water level measurements.
3. Two surface water samples will be collected from Aliso Creek to evaluate potential impact to nearby surface waters. One sample will be collected upstream of the former tank site, and one sample will be collected downstream.
4. A chemical testing program consisting of analyzing three ground water samples, two surface water samples, and two soil samples, for total petroleum hydrocarbons (TPH) as diesel using EPA Method 8015. Water samples will additionally be analyzed for benzene, toluene, xylene, and ethylbenzene using EPA Method 8020. A California Department of Health Services approved analytical laboratory will be utilized for all analyses.
5. Submittal of a report presenting a description of the investigation, results of the laboratory analyses, and conclusions and recommendations regarding site environmental quality. This report will include results all work performed at the site since the tank was removed.

Task 2 - Semi-Annual Ground Water Monitoring

Three additional rounds of ground water sampling and testing will be performed over a period of two years to monitor potential changes in the distribution of hydrocarbons in ground water at the site. This will provide a total of four semi-annual sampling rounds when considering the sampling performed at the time of well installation. Wells will be resampled in December, 1991, and again in April and October of 1992. The task will consist of the following work items:

1. Purging and sampling of three ground water monitoring wells.
2. Analysis of three ground water samples and one duplicate well sample by a contract analytical laboratory. Samples will be analyzed for TPH as diesel and purgeable aromatic compounds using EPA Methods 8015 and 8020, respectively.

3. Preparation of a brief report outlining the investigation results.

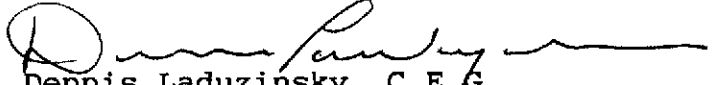
Details regarding the performance of well sampling are described in Appendix I.

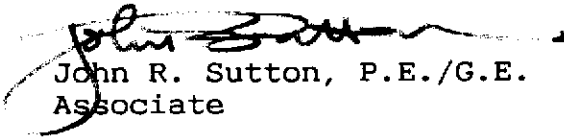
If you have any questions regarding the scope of services outlined in this work plan, please contact the undersigned.



Very truly yours,

KALDVEER ASSOCIATES, INC.


Dennis Laduzinsky, C.E.G.
Senior Engineering Geologist


John R. Sutton, P.E./G.E.
Associate

DL/JRS:pv

Copies: Addressee (4)

APPENDIX I

EXPLORATORY BORINGS

The exploratory borings will be permitted as required. A truck-mounted drill rig equipped with 8-inch diameter hollow-stem augers will be utilized to complete the borings. All equipment will be steam-cleaned prior to drilling and between borings advanced for monitoring well installation. The sampler will be cleaned with TSP (tri-sodium phosphate) detergent and rinsed with clear and then distilled water between samples. Thus, cross-contamination will be minimized.

Borings completed as ground water monitoring wells will be extended approximately 15 feet past the first free water encountered. They will be terminated at a shallower depth if a minimum of five feet of clay, acting as an aquitard (impediment to ground water movement) is penetrated. Borings not completed as monitoring wells will be grouted to the ground surface.

MONITORING WELLS

The borings will be converted to monitoring wells, utilizing 2" schedule 40 threaded PVC pipe and slotted screen. The perforations will extend approximately 15 feet below and 5 feet above the upper zone of saturation. The perforated section annulus will be packed with clean graded sand to a level approximately two feet above the highest screen slots, and a one foot thick bentonite plug will be placed above the sand pack. The remaining annulus will be backfilled with a cement/bentonite slurry to grade.

The wells will be finished with a Cristy-type concrete or metal box grouted to match the existing grade. The well will be completed with a locking cap to guard against vandalism. No solvents or glues will be used during monitoring well construction.

After installation, the wells will be developed utilizing hand bailing or a submersible pump. Development will consist of the rapid removal of water from the well until the water is relatively free of sand, silt, and turbidity.

MONITORING WELL SAMPLING

Following an initial water level measurement, monitoring wells will be sampled using a teflon bailer or submersible pump. Prior to sample collection, a minimum of four well-casing volumes of water will be purged in an attempt to collect a representative formation sample. Should the well become completely evacuated during purging, samples will be collected after the well has recovered to 80 percent of its initial water elevation.

All samples collected will be placed in containers approved for the type of analyses required. Following the addition of any preservatives required per EPA approved sampling protocols, the samples will be labeled and immediately placed in refrigerated storage.

All samples will be labeled in such a manner as to maintain client confidentiality. A chain-of-custody form will be initiated by the sampler and accompany the samples to the analytical laboratory. All soil and water samples collected will be delivered to a laboratory approved by the California Department of Health Services for the type of analysis to be performed.