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In Reply
Please Refer to:
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December 5, 1990

Livermore Valley Joint Unified School District
685 Las Positas Boulevard
Livermore, CA 94550

Attention: Mr. R. F. D'Ambra

WORK PLAN TO STUDY SOIL AND GROUND-WATER CONTAMINATION

Gentlemen:

We are pleased to present our proposal to undertake an investigation of the soil and possible ground-water contamination associated with a leaking underground fuel storage tank at the Livermore Valley Joint Unified School District Transportation facility at 2900 Ladd Avenue in Livermore, California. This proposal describes the anticipated tasks necessary to address the soil and/or potential ground-water contamination from the underground regular unleaded gasoline tank. This document was prepared to satisfy the "Regional Board Staff Recommendations for Initial Evaluation and Investigation of Underground Tanks."

We are available at your convenience to discuss the scope of our proposal. Please do not hesitate to contact our office if you have any questions. We appreciate the opportunity to respond to your proposal request.

Very truly yours,

ENGEO INCORPORATED

Brian Flaherty
CEG 1256

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INTRODUCTION

This work plan was prepared to address the soil and ground-water contamination associated with a leaking underground unleaded gasoline storage tank at 2900 Ladd Avenue in Livermore, California. The purpose of our study will be to evaluate the vertical and lateral extent of the petroleum hydrocarbon contamination in the vadose zone soils, at the top of the ground-water table and in the ground water below the tank complex.

Scope of Work

The proposed scope of services includes:

1. Installation of a ground-water monitoring well adjacent to the leaking underground fuel storage tank.

2. Drilling and logging of four to six exploratory test borings around the underground tank complex to determine the extent of the hydrocarbon contamination. An Organic Vapor Meter (PID) will be used during the drilling of the boreholes to monitor for the presence of volatile vapors associated with the leakage.

3. Collection of soil samples from each of the boreholes for laboratory testing. Samples will be analyzed for Total Petroleum Hydrocarbons (TPH) as gasoline and volatile aromatic compounds (BTXE). Collection of a ground-water sample from the monitoring well with the water sample analyzed for TPH as gasoline and BTXE.

4. Analyses of the soil vapor readings and the laboratory test results. The test results and exploratory test boring information will be studied to develop an areal and vertical representation of the soil contaminant plume.

5. Preparation of a report documenting the findings with recommendations for further study, if necessary. This could include the installation of two additional ground-water monitoring wells. The scope of this phase of work could be amended after a review of the laboratory test results for the soil and ground-water samples.

SITE HISTORY

From our review of the BSK & Associates[1] report, it appears that one of the existing underground fuel storage tanks has leaked. Soil samples were collected from beneath a 6,000 gallon regular unleaded gasoline tank. Laboratory testing of the soils beneath the tank exposed total petroleum hydrocarbons (TPH as gasoline) at concentrations of 2,300 ppm at 14 feet and 1,500 ppm at 17 feet. These gasoline concentrations exceeded the State Action level of 100 ppm for gasoline in soil. The detected concentrations of the aromatic volatile hydrocarbons of benzene, toluene, ethylbenzene, and xylene (BTEX) also exceeded the State Action levels.

It is our understanding that the leaking tank has been drained and the Health Department will allow the tank to remain in place at this time. The petroleum hydrocarbon contamination is on the order of 17 feet below the ground surface with the local ground-water level approximately 40 feet below the ground surface. There is insufficient information available at this time to determine if the local ground water has been impacted by the leaking fuel tank.

Consequently, we recommend the installation of one ground-water monitoring well immediately adjacent to the leaking underground fuel tank. In addition, exploratory soil borings are proposed around the tanks. Soil samples would be collected at five foot intervals down to the top of the saturated zone. The soils at the top of the ground-water table will be analyzed for Total Petroleum Hydrocarbons as gasoline and for BTEX.

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[1]BSK and Associates; Soil Boring/Sampling and Chemical Testing, Existing Underground Gasoline Tank, Bus Maintenance Yard, 2900 Ladd Avenue, Livermore, California; August 10, 1990.

It is our opinion that since the ground water may be at least 20 feet below the known hydrocarbon contamination, as a first phase of study, it should be determined whether there is a need for additional ground-water monitoring wells. Analysis of the soil data may also aid in determining the appropriate locations for the monitoring wells with regard to determining the migration of the contaminants across the site.

PROPOSED SOIL AND GROUND-WATER INVESTIGATION

A. Literature Review

This phase of our study will include a review and analysis of the local geology and hydrogeology. We will document the nearby water supply wells. We will also review the available hydrogeologic and environmental reports prepared for properties in the site vicinity. A vicinity map will be prepared showing the nearby properties and the water supply or ground-water monitoring wells. We will attempt to determine the local ground-water flow direction from this review of available data to help in determining the appropriate locations for the ground-water monitoring wells, if needed.

B. Soil Borings

We propose to drill four to six exploratory soil borings to the depth of the local ground-water table. The purpose of the proposed exploratory borings is to evaluate the extent of the gasoline concentrations in the soil within the vadose zone and at the top of the ground water. Once the depth to the local ground-water table has been established, the design and construction of the ground-water monitoring well would be more clearly defined.

The exploratory borings will be advanced using a truck-mounted, 6-inch diameter hollow stem auger. The soil samples will be collected using a 3 inch diameter split spoon barrel sampler retaining 6-inch-long brass tubes. Sampling equipment will be washed with a trisodium phosphate (TSP) and water solution and rinsed with clean water between each sampling event. All drilling equipment will be steam cleaned before and after each boring.

Drilling will be performed under the direction of an ENGEO Environmental Geologist who will log the borings in accordance with the Unified Soil Classification System. Soil samples will be obtained at five foot sampling intervals and at the top of the ground water. These samples will be screened in the field using a photoionization detector (PID), a device that provides a field determination of the presence of certain volatile organic compounds.

We anticipate that one soil sample from the vadose zone and one soil sample from the top of the ground-water table will be collected from each borehole for laboratory testing. These samples will be preserved for testing by sealing the sample tube with aluminum foil, plastic end caps and tape. The soil samples would be selected for laboratory testing on the basis of the PID screenings and visual observations. All samples will be placed in a cooled ice chest and transported under documented chain-of-custody to a certified analytical testing laboratory.

The drill cuttings will be stored and covered with plastic in a separate stockpile. These soils could be scheduled for aeration or bioremediation after a review of the laboratory test results. The boreholes will be backfilled in accordance with the Zone 7 Water District guidelines.

C. Ground-Water Monitoring Wells

We presently recommend that one ground-water monitoring well be installed on the subject property. The approximate location for the well would be immediately adjacent to the leaking tank. The purpose of the well is to determine if the ground water beneath the tank has been impacted and to what extent the water is contaminated. If we find that the ground-water contamination is at levels which exceed the State Action levels than at least

two additional wells would be required to determine the direction of the ground-water gradient and the possibility for off-site migration of the contaminants.

If the ground water has been marginally impacted or no ground-water contamination is detected, then the additional wells may not be installed at this time and periodic monitoring of the well could be recommended. Prior to drilling, we will obtain a monitoring well permit from the Alameda County Flood Control and Water Conservation District, Zone 7.

The boring for the well will be drilled to a depth of approximately 50 feet (10 to 15 feet below the estimated top of the ground-water table) using a hollow stem auger. Soil samples will be collected at regular intervals and preserved for laboratory testing as previously described. The soil cuttings will be stored and disposed following the guidelines discussed above.

The monitoring well will consist of 2-inch-diameter PVC casing with flush joints, installed down through the hollow stem auger. The well will be constructed with 10 to 15 feet of screened casing (0.02-inch slot width) and an appropriate length of solid PVC well casing (2-inch-diameter Schedule 40 PVC). The bottom of the PVC screen and boring will be backfilled with No. 3 Monterey sand or an equivalent, to at least 2 feet above the screened section. A 12- to 24-inch layer of bentonite pellets will be placed on top of the sand and the remainder will be backfilled with a cement/bentonite seal. The well will be completed in a locking, traffic-resistant box. The top of the well casing will be secured with a locking water-proof cap.

After the cement/bentonite grout has set for at least 24 to 48 hours, the well will be developed using a surge block in an attempt to produce less turbid water prior to sampling.

We anticipate that ten to twenty well volumes of water will be removed from the well during the development process.

The purged water would be stored on the site in Department of Transportation approved drums until the results of the laboratory testing are available. At that time, the water could be disposed of in an appropriate manner and the drums removed from the site.

Twenty four hours after development, we will measure the depth to the top of the ground-water table and check for the presence of free product. Prior to the collection of ground-water samples for laboratory testing four to seven well volumes of water will be removed from the well. The ground-water samples will be collected using a clean polyethylene dedicated bailer. Samples will be decanted into clean 40-milliliter volatile organic analysis vials (VOA). The samples will be cooled in an ice chest until delivery under a documented chain-of-custody to an analytical testing laboratory.

Sample collection, preservation, chain-of-custody procedures and equipment decontamination will be performed in accordance with ENGEO's standard quality assurance/quality control procedures.

D. Laboratory Testing

The laboratory testing will be performed in accordance with test methods specified in the Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites. (August, 1990).

The soil samples selected for laboratory testing will be analyzed for Total Volatile

Petroleum Hydrocarbons (TPH) as gasoline and for benzene, toluene, xylene and ethylbenzene. (BTXE) (EPA Test Method 8015/5030 and 8020).

The ground-water samples collected from the monitoring wells will be analyzed for Total Volatile Hydrocarbons and for volatile aromatic compounds (BTEX) according to the DHS recommended procedures.

E. Analysis of Data

We will review the data from the exploratory boring logs, the PID readings, and the laboratory test results. A determination will be made regarding the vertical and lateral extent of the hydrocarbon contamination in the soils. The potential for ground-water contamination beneath the subject site will also be evaluated. The presence of petroleum hydrocarbons in the vadose zone soils will be studied to evaluate the extent of the contaminant plume in the soils. The data collected from the top of the ground-water table and from the ground-water monitoring well sample will be studied to learn if the ground water beneath the site has been impacted by the leakage from the tank. The potential for the off-site migration of the ground-water contamination will be evaluated. A determination would be made at this time regarding the need for the installation of additional ground-water monitoring wells.

F. Report Preparation

Upon the completion of the soil investigation and laboratory testing Engeo will prepare a report documenting our field activities and laboratory test results. The report will be prepared under the direct supervision of and will be signed by a registered engineering

geologist. The report will include an analysis of the data collected and conclusions relative to the following items:

The vertical and lateral extent of petroleum hydrocarbons in soils adjacent to the tank complex

An evaluation of the extent of petroleum hydrocarbons in the saturated zone at the top of the ground-water table.

A determination of the possible extent for ground-water contamination and the need for additional grounds-water monitoring wells.

If it is determined that the ground water has been contaminated by the hydrocarbon leakage, two to three additional permanent ground-water monitoring well(s) could be recommended for installation adjacent to the tank excavation. It is possible that the single monitoring well drilled immediately adjacent to the leaking tank would be sufficient at this time to adequately define the extent of the ground-water contamination.