CAMBRIA
Environmental Technology, Inc.

June 20, 1996

Mr. Dale Klettke,
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, #250
Alameda, CA 94502-6577

STID 516

96 JUN 21 PM 1:56
ENVIRONMENTAL PROTECTION

Re: **Investigation Work Plan**
Former Exxon Service Station
3055 35th Avenue
Oakland, California

Dear Mr. Klettke:

As you requested in your May 20, 1996 letter to Mr. Lynn Worthington, Cambria Environmental Technology, Inc. (Cambria) is submitting this workplan to further define the extent of hydrocarbons in ground water beneath the site referenced above. The site history and our scope of work for this investigation are presented below.

## SITE HISTORY

***October 1990 Geotechnical Investigation:*** Geotechnical Engineering of Fremont, California drilled two soil borings at the site. Although a variety of geotechnical tests were performed on soil samples collected from the borings, no chemical analyses were performed.

***January 1991 Tank Removal:*** Pacific Excavators removed four underground gasoline storage tanks and one 500-gallon waste oil tank from the site. Soil samples were collected during the tank removal, but were not analyzed or reported by Pacific Excavators.

***November 1991 Subsurface Investigation:*** Consolidated Technologies of San Jose, California drilled twelve soil borings to depths of up to 35 ft. Total petroleum hydrocarbons as gasoline (TPHg) were detected in soil samples collected from 11 of the 12 soil borings, at up to 2,100 parts per million (ppm). No total petroleum hydrocarbons as diesel or oil and grease were detected.

***May 1994 Subsurface Investigation:*** Cambria drilled seven soil borings and installed three ground water monitoring wells at the site. TPHg were detected in soil samples from six of the seven borings, at concentrations up to 2,900 ppm. TPHg and benzene, ethylbenzene, toluene and xylenes (BETX) were detected in grab ground water samples from all borings, at up to 130,000 parts per billion (ppb) TPHg and 22,000 ppb

benzene. In addition, a hydrocarbon sheen was observed on several soil samples and on water in two of the three wells. Ground water is about 15 ft below grade and flows westward as indicated on Figure 1.

## PROPOSED SCOPE OF WORK

Our investigation objective is to define the horizontal extent of hydrocarbons in ground water. To meet this objective, we propose installing two monitoring wells in the street approximately 80 and 200 feet west of the site. These wells will allow us to determine the down gradient extent of hydrocarbons (Figure 1). As indicated in our previous reports, the former Texaco station up gradient of the site appears to have had a hydrocarbon release. Therefore, we do not recommend installing wells up gradient of the site toward Texaco.

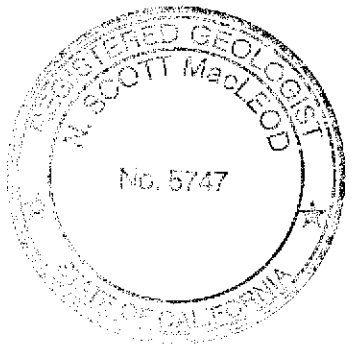
The specific tasks that Cambria will perform for this investigation include:

1. Preparing a site safety plan and coordinating field activities;
2. Obtaining permits necessary for the monitoring wells;
3. Notifying Underground Service Alert of our drilling activities to locate underground utilities prior to drilling;
4. Drilling and sampling two soil borings and logging the samples using the Unified Soil Classification System. Soil samples will be collected at a minimum of 5 ft intervals, at lithlogic changes and from just above the water tabel as outlined in our standard field procedures (Attachment A);
5. Installing two 2-inch diameter, 0.010-inch slotted monitoring wells in the borings screened 5 ft above and 10 to 15 ft below the water table depending upon lithology; and
6. Preparing a subsurface investigation report that, at a minimum, will contain: a summary of the site background and history; descriptions of the drilling, soil sampling, and water sampling methods; boring logs; tabulated soil and ground water analytic results; boring/monitoring well locations; analytic reports and chain-of-custody forms; soil and water disposal methods; and a discussion of the hydrocarbon distribution.

***Schedule:*** We will begin drilling as soon as this work plan is approved in writing and as soon as the drilling permits are finalized with the Zone 7 Water Agency. We will submit our investigation report about six weeks after finishing the field work.

Please call if you have any questions or comments.

Sincerely,
Cambria Environmental Technology, Inc.




N. Scott MacLeod, R.G.
Principal Geologist

Attachments: A - Standard Field Procedures

cc: Lynn Worthington, Better Homes Realty

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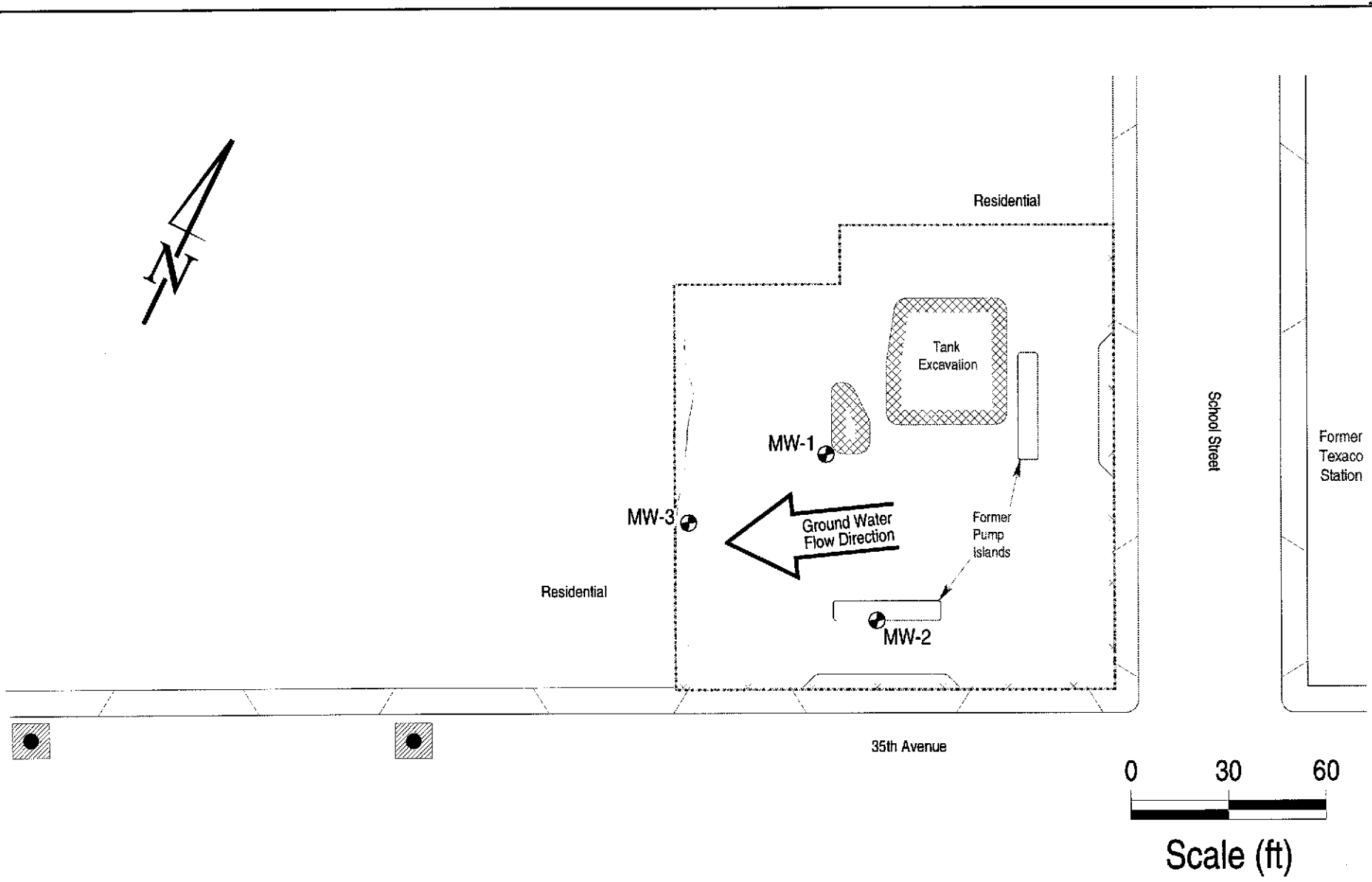


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EXPLANATION

Monitoring Well

Proposed Monitoring Well Location

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Proposed Monitoring Well Locations

3055 35th Avenue
Oakland, California

FIGURE

1

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# ATTACHMENT A

Standard Field Procedures

# STANDARD FIELD PROCEDURE FOR MONITORING WELLS

This document presents standard field methods for drilling and sampling soil borings and installing, developing and sampling ground water monitoring wells. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

## SOIL BORINGS

### Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor or staining, and to collect samples for analysis at a State-certified laboratory. All borings are logged using the Unified Soil Classification System by a trained geologist working under the supervision of a California Registered Geologist (RG) or a Certified Engineering Geologist (CEG).

### Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or push technologies such as the Geoprobe. Soil samples are collected at least every five ft to characterize the subsurface sediments and for possible chemical analysis. Additional soil samples are collected near the water table and at lithologic changes. Samples are collected using lined split-barrel or equivalent samplers driven into undisturbed sediments at the bottom of the borehole.

Drilling and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

### Sample Analysis

Sampling tubes chosen for analysis are trimmed of excess soil and capped with Teflon tape and plastic end caps. Soil samples are labeled and stored at or below 4°C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

### Field Screening

One of the remaining tubes is partially emptied leaving about one-third of the soil in the tube. The tube is capped with plastic end caps and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable photoionization detector (PID) measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. PID measurements are used along with the field observations, odors, stratigraphy and ground water depth to select soil samples for analysis.

### Water Sampling

Water samples, if they are collected from the boring, are either collected using a driven Hydropunch type sampler or are collected from the open borehole using bailers. The ground water samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

### Grouting

If the borings are not completed as wells, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe.

## MONITORING WELL INSTALLATION, DEVELOPMENT AND SAMPLING

### Well Construction and Surveying

Ground water monitoring wells are installed to monitor ground water quality and determine the ground water elevation, flow direction and gradient. Well depths and screen lengths are based on ground water depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and State and local regulatory guidelines. Well screens typically extend 10 to 15 ft below and 5 ft above the static water level at the time of drilling. However, the well screen will generally not extend into or through a clay layer that is at least three ft thick.

Well casing and screen are flush-threaded, Schedule 40 PVC. Screen slot size varies according to the sediments screened, but slots are generally 0.010 or 0.020 inches wide. A rinsed and graded sand occupies the annular space between the boring and the well screen to about one to two ft above the well screen. A two ft thick hydrated bentonite seal separates the sand from the overlying sanitary surface seal composed of Portland type I,II cement.

Well-heads are secured by locking well-caps inside traffic-rated vaults finished flush with the ground surface. A stovepipe may be installed between the well-head and the vault cap for additional security.

The well top-of-casing elevation is surveyed with respect to mean sea level and the well is surveyed for horizontal location with respect to an onsite or nearby offsite landmark.

### Well Development

Wells are generally developed using a combination of ground water surging and extraction. Surging agitates the ground water and dislodges fine sediments from the sand pack. After about ten minutes of surging, ground water is extracted from the well using bailing, pumping and/or reverse air-lifting through an eductor pipe to remove the sediments from the well. Surging and extraction continue until at least ten well-casing volumes of ground water are extracted and the sediment volume in the ground water is negligible. This process usually occurs prior to installing the sanitary surface seal to ensure sand pack stabilization. If development occurs after surface seal installation, then development occurs 24 to 72 hours after seal installation to ensure that the Portland cement has set up correctly.

All equipment is steam-cleaned prior to use and air used for air-lifting is filtered to prevent oil entrained in the compressed air from entering the well. Wells that are developed using air-lift evacuation are not sampled until at least 24 hours after they are developed.

### Ground Water Sampling

Depending on local regulatory guidelines, three to four well-casing volumes of ground water are purged prior to sampling. Purging continues until ground water pH, conductivity, and temperature have stabilized. Ground water samples are collected using bailers or pumps and are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.