CAMBRIA
Environmental Technology, Inc.

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April 22, 1994

Susan Hugo
Alameda County Department of
Environmental Health
UST Local Oversight Program
80 Swan Way, Room 200
Oakland, CA 94621

7/18/94 Kee
510 515 talked to Bernie Scott, mechanical report will be coming

Re: Investigation Work Plan
Former Exxon Station
3055 35th Avenue
Oakland, California
Cambria Proj. # 20-002-01

Dear Ms. Hugo:

As you requested in your February 9, 199~~4~~3 letter to Lynn Worthington, we are submitting this work plan for investigation and well installation for the site referenced above. Our investigation objective is to determine whether hydrocarbons from potential onsite sources are in ground water beneath the site. Our scope of work for this investigation is presented below.

PROPOSED SCOPE OF WORK

Our objective in this investigation is to determine the extent of hydrocarbons in ground water beneath the site. To meet this objective, we will:

- Drill five soil borings along the anticipated upgradient and downgradient property lines to collect soil and water samples.
- Survey ground water elevations in the borings to determine the ground water flow direction,
- Install a well along the downgradient property line using the results of the ground water elevation survey and field indications of hydrocarbons.
- Install ground water monitoring wells downgradient of the former underground storage tanks and former pump islands to determine whether hydrocarbons from these potential source areas have impacted ground water.

The specific tasks to be performed are presented below.

1144 Sixty-Fifth Street Suite C Oakland, CA 94608 Fax (510) 420-9170 Phone (510) 420-0700

Site Safety Plan: We will prepare a comprehensive site safety plan to protect site workers. The plan will be kept on site at all times and signed by all site workers.

Permits: We will obtain well permits from Alameda County Zone 7 for the three ground water monitoring wells.

Underground Utility Location: We will subcontract underground line locating to Down Under Technologies, Inc., who will clear all boring and well locations prior to drilling.

Soil Borings: We will drill three soil borings at the downgradient property line and two soil borings at the upgradient property line (Figure 1). The two upgradient borings should assess whether hydrocarbons are migrating onto the site from an upgradient source. The downgradient borings are designed to assess the downgradient distribution of hydrocarbons on the property. We will collect soil samples from the borings at five ft intervals, at lithologic changes and at the water table. We will also install temporary well casing in the borings, purge the temporary wells and collect grab ground water samples. After sampling, the borings will be backfilled with Portland Type I, II cement through a tremie pipe to grade. We will survey temporary well elevations in selected borings and measure stabilized ground water depths to determine the ground water flow direction. Our standard field procedures are presented in Attachment A.

Install Two Ground Water Monitoring Wells: Using the ground water flow direction determined using the temporary wells, we will install two 4-inch diameter ground water monitoring wells, one within ten ft of the downgradient side of the former underground storage tanks and one on the downgradient side of the southernmost former pump island (Figure 1). During drilling of the wells, we will collect soil samples at five ft intervals, at lithologic changes, and at the water table. Based on conditions described during previous investigations, we will construct wells using #1/20 sand and 0.010-inch slotted PVC well screen. We will screen the wells about ten ft below and five ft above the static ground water elevation. The wells will be developed at least 72 hours after installation and be sampled at least 24 hours after development.

Downgradient Well: We will use the analytic results for the downgradient borings to locate a third well at the downgradient property line. The objective of installing this well is to determine whether hydrocarbons are migrating offsite and to provide a triangulation point for monitoring ground water flow direction. The well will be two inches in diameter and screened similarly to the two source area wells.

Well Elevation Survey: We will subcontract a licensed surveyor to survey the ground water monitoring wells horizontally with respect to site boundaries and vertically with respect to mean sea level or an equivalent nearby marker.

Soil Analyses: We will analyze two soil samples from each boring for total petroleum hydrocarbons as gasoline (TPH-G), TPH as diesel (TPH-D), petroleum oil and grease (POG), and benzene, ethylbenzene, toluene and xylenes (BETX). One of the soil samples analyzed will be from immediately above the water table, the other will be from the portion of the boring containing the highest field indications of hydrocarbons.

Ground Water Analyses: We will analyze ground water samples from the wells and borings for TPH-G, TPH-D, POG and BETX.

Soil Stockpile Sampling: We will analyze samples from the existing stockpiles for TPH-G, TPH-D, POG, BETX and metals to determine the appropriate method of soil disposal. Based on the results of this sampling, we will recommend appropriate soil disposal facilities or onsite treatment options such as landfarming.

Piping Disposal: We will subcontract Integrated Waste Management to dispose of the 50 ft of tank piping that is at the site. The transportation and disposal manifests will be included in the investigation report.

Reporting: After the analytic results are received, we will prepare a subsurface investigation report that, at a minimum, will contain:

- A summary of the site background and history,
- Rationale for the boring and well placements and design,
- Descriptions of the drilling, soil sampling, and well installation, development and sampling methods,
- Boring logs for all soil borings and construction diagrams for the three wells,
- Tabulated soil and ground water analytic results,
- Figures illustrating the distribution of TPH-G in soil and of TPH-G and benzene in ground water,
- Analytic reports and chain-of-custody forms,

- Well elevation survey and ground water elevation data,
- Soil and water disposal methods, and
- Hydrogeologic interpretation.

Ground water Monitoring: After installing the wells we will begin monthly ground water elevation gauging and quarterly ground water sampling and reporting. The quarterly reports will discuss activities performed during the current quarter, activities anticipated in the upcoming quarter and summarize the current sampling results.

Soil and Water Disposal: We will subcontract with Integrated Waste Management to dispose of all drill cuttings and purge water generated during this investigation and provide documentation of disposal as outlined in the RFP.

SCHEDULE

We will begin drilling as soon as this work plan is approved in writing and as soon as the well permits are received from Zone 7. We will submit our investigation report about 6 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

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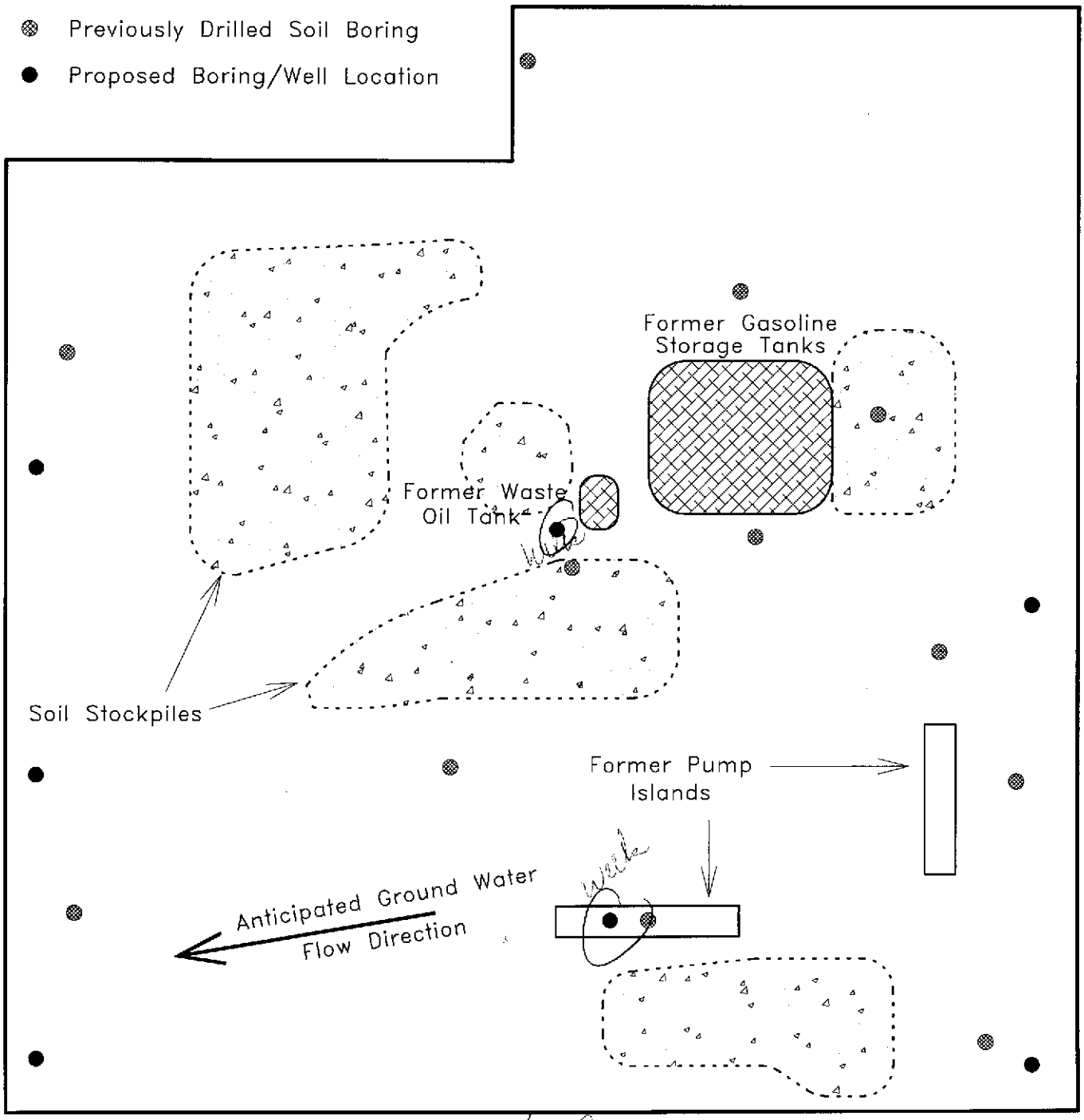
Attachments: A - Standard Field Procedures

cc: Julie Rose, Randick & O'Dea, 1800 Harrison, Suite 2350, Oakland, CA 94612
Lynn Worthington, Better Homes Realty, 5942 MacArthur, Suite B, Oakland, CA 94605



1" = 20'
Scale

North

PROPOSED BORING LOCATIONS

APRIL 14, 1994

PREPARED FOR
MR. LYNN WORTHINGTON

C:\DATA\PROPOSAL\35TH-OAK\PROP-2.DWG

MAP BASED ON 3/31/94 SITE VISIT
LOCATIONS ARE APPROXIMATE

FORMER EXXON STATION
3055 35TH AVENUE
OAKLAND, CALIFORNIA

SHEET ⊥ OF ⊥

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CAMBRIA ENVIRONMENTAL TECHNOLOGY, INC.

ATTACHMENT A

STANDARD FIELD PROCEDURES

This document describes 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 BORING AND SAMPLING

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 solid flight or hollow-stem augers. 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 split-barrel samplers lined with steam-cleaned brass or stainless steel tubes that are driven through the hollow auger stem into undisturbed sediments at the bottom of the borehole. Samples are driven using a 140 pound hammer dropped 30 inches.

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 labelled, stored at or below 4°C, and 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

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 stratigraphy and ground water depth to select soil samples for analysis.

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. If wells are completed in the borings, the well installation, development and sampling procedures summarized below are followed.

MONITORING WELL INSTALLATION, DEVELOPMENT AND SAMPLING

Well Construction and Surveying

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 labelled, placed in protective foam sleeves, stored at 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.