

No. EP-267
August 10, 1990

Mr. Ariu Levi
Hazardous Materials Specialist
Department of Environmental Health
Division of Hazardous Materials
Alameda County Health Care Services Agency
80 Swan Way, Room 200
Oakland, CA 94621

SUBJECT: Proposed Soil Remediation Plan at 344 105th Avenue, Oakland, California

Dear Mr. Levi:

Verl's Construction (VCI) proposes a program of investigation and excavation at the above referenced site with emphasis on the following areas:

Former waste oil storage tank
Former boiler location
Fuel oil pipeline area

1. Remove all overburden, screen with a photoionization detector (PDI).
2. Sample and analyze excavated soil for TPH₀ with a mobile laboratory to differentiate contaminated from non-contaminated soil (1 analysis per 20 cubic yards). 3550
3. Contaminated soil will be temporarily placed on triple thickness visqueen and covered. Disposal/treatment will be addressed based on results of excavation analyses.
4. Resample and monitor existing groundwater wells to evaluate the extent of groundwater contamination, if any. Samples will be analyzed for TPH-D/BTEX.
5. Prepare a report summarizing results of initial remedial actions.

It is VCI's intent to excavate from a "known" contamination point radially until non-detectable soil contamination is obtained. A map will be generated and will define the limits of the soil remediation efforts

It is VCI's opinion that the suspected direction of groundwater flow (northwesterly) has the potential to move contaminants onto public property, i.e., 105th Avenue. Investigation of public property will be addressed in a separate work plan.

Water contamination, if any, will be addressed in a separate proposal.

We seek your approval of this plan and intend to perform the actions on August 28, 29, and 30, 1990. We have retained Environmental Geotechnical Consultants, Inc. (EGC) to provide technical support on this project.

Thank you for your valued assistance in this matter and if there are any questions, please call (415) 568-1234.

Sincerely yours,

Verl K. Rothlisberger
President

jmc

SOIL AND GROUNDWATER SAMPLING PROTOCOLS

Soil samples will be procured with a decontaminated backhoe bucket which will undergo steam-cleaning following contamination as indicated by the field screening device and/or mobile lab results. The soil samples will be procured by inserting a decontaminated 4" x 2" diameter brass sleeve into the soil using a mallet or similar device to penetrate resistant materials.

Head-space analyses will be performed in the field to check for the presence of volatile organic compounds. Head-space analyses will be performed using an organic vapor analyzer (either a TIP, HNU, or OVM). Organic vapor concentrations will be recorded on the EGC field log of boring (Figure 1). The selection of soil samples for chemical analysis are typically based on the following criteria:

- a. Soil discoloration
- b. Soil odors
- c. Visual confirmation or chemical in soil
- d. Depth with respect to underground tanks
- e. Depth with respect to groundwater
- f. OVA reading

The soil sampler and brass liners will be cleaned with a tri-sodium phosphate solution, rinsed with clean tap water and air-dried prior to each sampling. Soil samples (full brass liners) selected for chemical analysis are covered with aluminum foil and the ends are capped to prevent volatilization. The samples are labeled and entered onto a Chain-of-Custody form, and relinquished to the on-site laboratory for analysis.

Confirmed uncontaminated soils may be appropriately disposed of on-site by the client. Soils found to contain levels of contaminants above local or state action levels will be placed on triple thickness visqueen and left on-site for proper disposal by the client.

GROUNDWATER SAMPLING AND ANALYSIS

Quality Assurance/Quality Control Objectives

The sampling and analysis procedures employed by EGC for groundwater sampling and monitoring follow specific Quality Assurance/Quality Control (QA/QC) guidelines. Quality Assurance objectives have been established by EGC to develop and implement procedures for obtaining and evaluating water quality and field data in an accurate, precise and complete manner so that sampling procedures and field measurements provide information that is comparable and representative of actual field conditions. Quality Control (QC) is maintained by EGC by using specific field protocols and

requiring the analytical laboratory to perform internal and external QC checks. It is the goal of EGC to provide data that are accurate, precise, complete, comparable, and representative. The definitions for accuracy, precision, completeness, comparability, and representativeness are as follows:

1. Accuracy - the degree of agreement of a measurement with an accepted reference or true value.
2. Precision - a measure of agreement among individual measurements under similar conditions. Usually expressed in terms of the standard deviation.
3. Completeness - the amount of valid data obtained from a measurement system compared to the amount that was expected to meet the project data goals.
4. Comparability - expresses the confidence with which one data set can be compared to another.
5. Representativeness - a sample or group of samples that reflects the characteristics of the media at the sampling point. It also includes how well the sampling point represents the actual parameter variations which are under study.

As part of the EGC QA/QC program, applicable federal, state and local reference guidance documents are to be followed. The procedures outlined in these regulations, manuals, handbooks, guidance documents and journals are incorporated into the EGC sampling procedures to assure that: (1) groundwater samples are properly collected, (2) groundwater samples are identified, preserved, and transported in a manner such that they are representative of field conditions, and (3) chemical analyses of samples are accurate and reproducible.

GUIDANCE AND REFERENCE DOCUMENTS USED TO COLLECT GROUNDWATER SAMPLES

U.S.E.P.A. - 339/9-51-002	NEIC Manual for Groundwater/ Subsurface Investigation at Hazardous Waste Sites
U.S.E.P.A. - 503/SW611	Procedures Manual for Groundwater Monitoring at Solid Waste Disposal Facilities (August, 1977)
U.S.E.P.A. - 600/4-79-020	Methods for Chemical Analysis of Water and Wastes (1983)

U.S.E.P.A. - 600/4-82-029	Handbook for Sampling and Sample Preservation of Water and Wastewater (1982)
U.S.E.P.A. - SW-846#, 3rd Edition	Test Methods for Evaluating Solid Waste - Physical/Chemical Methods (November, 1986)
40 CFR 136.3e. Table II (Code of Federal Regulations)	Required Containers, Preservation Techniques, and Holding Times
Resources Conservation and Recovery Act (OSWER 9950.1)	Groundwater Monitoring Technical Enforcement Guidance Document (September, 1986)
California Regional Water Quality Control Board (Central Valley Region)	A Compilation of Water Quality Goals (September, 1988); Updates (October, 1988)
California Regional Water Quality Control Board (North Coast, San Francisco Bay, and Central Valley)	Regional Board Staff Recommendations for Initial Evaluations and Investigation of Underground Tanks: Tri-Regional Recommendations (June, 1988)
Regional Water Quality Control Board (Central Valley Region)	Memorandum: Disposal, Treatment, and Refuse of Soils Contaminated with Petroleum Fractions (August, 1986)
State of California Department of Health Services	Hazardous Waste Testing Laboratory Certification List (March, 1987)
State of California Water Resources Control Board	Leaking Underground Fuel Tank (LUFT) Field Manual (May, 1988), and LUFT Field Manual Revision (April, 1989)
State of California Water Resources Control Board	Title 23, (Register #85.#33-8-17-85), Subchapter 16: Underground Tank Regulations; Article 3, Sections 2632 and 2634; Article 4, Section 2647 (October, 1986)
Alameda County Water District	Groundwater Protection Program: Guidelines for Groundwater and Soil Investigations at Leaking Underground Fuel Tank Sites (November, 1988)

American Public Health Association	Standard Methods for the Examination of Water and Wastewaters, 16th Edition
Analytical Chemistry (journal)	Principles of Environmental Analysis. Volume 55, Pages 2212-2218 (December, 1983)
Santa Clara Valley Water District	Guidelines for Preparing or Reviewing Sampling Plans for Soil and Groundwater Investigation of Fuel Contamination Sites (January, 1989)
American Petroleum Institute	Groundwater Monitoring & Sample Bias; API Publication 4367, Environmental Affairs Department, June 1983

Because groundwater samples collected by EGC are analyzed in the parts per billion (ppb) range for many compounds, care is exercised to prevent contamination of samples. When volatile or semi-volatile organic compounds are included for analysis, EGC sampling crew members will adhere to the following precautions in the field:

1. A clean pair of new, disposable gloves are worn for each well being sampled.
2. When possible, samples are collected from known or suspected wells that are least contaminated (i.e., background) followed by wells in increasing order of contamination.
3. All sample bottles and equipment are kept away from fuels and solvents. When possible, gasoline (used in generators) is stored away from bailers, sample bottles, purging pumps, etc.
4. Bailers are made of Teflon or Stainless Steel. Other materials such as plastic may contaminate samples with phthalate esters which interfere with many Gas Chromatography (GC) analyses.
5. Volatile organic groundwater samples are collected so that air passage through the sample does not occur or is minimal (to prevent volatiles from being stripped from the samples); sample bottles are filled by slowly running the sample down the side of the bottle until there is a positive convex meniscus over the neck of the bottle; the Teflon side of the septum (in cap) is positioned against the meniscus, and the cap screwed on tightly; the sample is inverted and the bottle lightly tapped. The absence of an air bubble indicates a successful seal; if a bubble is evident, the cap is removed, more sample is added, and the bottle is resealed.

6. Extra Teflon seals are brought into the field in case seals are difficult to handle and/or are dropped. Dropped seals are considered contaminated and are not used. When replacing seals or if seals become flipped, care is taken to assure that the Teflon seal faces down.

Laboratory and field handling procedures of samples are monitored by including QC samples for analysis with every submitted sample lot from a project site. QC samples may include any combination of the following:

1. Trip Blank. Used for purgeable organic compounds only; QC samples are collected in 40 milliliter (ml) sample vials filled in the analytical laboratory with organic-free water. Trip blanks are sent to the project site, and travel with project site samples. Trip blanks are not opened, and are returned from a project site with the project site samples for analysis.
2. Field Blank. Prepared in the field using organic-free water. These QC samples accompany project site samples to the laboratory and are analyzed for specific chemical parameters unique to the project site where they were prepared.
3. Duplicates. Duplicate samples are collected "second samples" from a selected well and project site. They are collected as either split samples or second-run samples collected from the same well.
4. Equipment Blank. Period QC sample collected from field equipment rinsate to verify decontamination procedures.

The number and types of QC samples are determined on a site-specific basis.

SAMPLE COLLECTION

This section describes the routine procedures followed by EGC while collecting groundwater samples for chemical analysis. These procedures include decontamination, water-level measurements, well purging, physical parameter measurements, sample collection, sample preservation, sample handling, and sample documentation. Critical sampling objectives for EGC are to:

1. Collect groundwater samples that are representative of the sampled matrix.
2. Maintain sample integrity from the time of sample collection to receipt by the analytical laboratory.

Sample analyses methods, containers, preservation, and holding times are presented in Table 1.

Decontamination Procedures

All physical parameter measuring and sampling equipment are decontaminated prior to sample collection using Alconox or equivalent detergent followed by steam cleaning with deionized water. Any sampling equipment surfaces or parts that might absorb specific contaminants, such as plastic pump valves, impellers, etc., are cleaned in the same manner.

Sample bottles, bottle caps and septa used for sampling volatile organics are thoroughly cleaned and prepared in the laboratory. Sample bottles, bottle caps and septa are protected from all potential chemical contact before actual usage at a sample location.

During field sampling, equipment which has been placed in a well shall be decontaminated by cleaning with Alconox or equivalent detergent followed by steam cleaning with deionized water before purging or sampling the next well.

Water-Level Measurements

Prior to purging and sampling a well, the static-water levels are measured in all wells at a project site using an electric sounder and/or calibrated portable oil-water interface probe. Both static water-level and separate-phase product thickness are measured to the nearest ± 0.01 foot. The presence of separate-phase product is confirmed using a clean, acrylic or polyvinylchloride (PVC) bailer, measured to the nearest ± 0.01 foot with an engineer's scale tape.

The monofilament line used to lower the bailer is replaced between wells with new line to preclude the possibility of cross-contamination. Field observations (e.g., well integrity, product color, turbidity, water color, odors, etc) are noted on the EGC Well Sampling Field Data Sheet shown in Figure 3. Before and after each use, the electric sounder, interface probe and bailer are decontaminated by washing with Alconox or equivalent detergent followed by rinsing with deionized water to prevent cross-contamination.

Well Purging

Before sampling occurs, well casing storage water and interstitial water in the artificial sand pack will be purged using: (1) a positive displacement bladder pump constructed of inert, non-wetting, Teflon and stainless steel; (2) a pneumatic-airlift pumping system; (3) a centrifugal pumping system; or (4) a Teflon or Stainless Steel bailer. Methods of purging will be assessed based on well size, location, accessibility, and known chemical conditions. Individual well purge volumes are calculated from casing volumes. As a general rule, a minimum of 3 to 5 casing volumes will be purged. Wells which dewater or demonstrate slow recharge periods (i.e., low-yield wells) during purging activities may be sampled after fewer purging cycles. If a low-yield (low recovery) well is to be

sampled, sampling will not take place until at least 70 percent of the previously measured water column has been replaced by recharge. Removal of stagnant water will either be disposed of or stored in 55-gallon drums for future disposal as outlined for contaminated soil cuttings in the section on soil sampling protocol. Physical parameter measurements (temperature, pH, and specific conductance) are closely monitored throughout the well purging process and are used by the EGC sampling crew as indicators for assessing sufficient purging. Purging is continued until all three physical parameters have stabilized. Specific conductance (conductivity) meters are read to the nearest ± 10 umhos/cm, and are calibrated daily. pH meters are read to the nearest ± 0.1 pH units and are calibrated daily. Temperature is read to the nearest 0.1 degree F. Calibration of physical parameter meters will follow manufacturers specifications. Monitoring wells will be purged according to the protocol presented in Figure 4. Collected field data during purging activities will be entered on the EGC Well Sampling Field Data Sheet shown in Figure 3. Copies of the EGC Field Data Sheets will be reviewed by the EGC Sampling Manager for accuracy and completeness.

DOCUMENTATION

Sample Container Labels

Each sample container will be labeled immediately after the sample is collected. Label information will include:

- Sample point designation (i.e., well number or code)
- Sampler's identification
- Project number
- Date and time of collection
- Type of preservation used

Well Sampling Data Forms

In the field, the EGC sampling crew will record the following information on the Well Sampling Data Sheet for each sample collected:

- Project number
- Client
- Location
- Source (i.e., well number)
- Time and date
- Well accessibility and integrity
- Pertinent well data (e.g., depth, product thickness, static water-level, pH, specific conductance, temperature)

Calculated and actual purge volumes

Chain-of-Custody

A Chain-of-Custody record (Figure 3) shall be completed and accompany every shipment of samples to the analytical laboratory in order to establish the documentation necessary to trace sample possession from time of collection. The record will contain the following information:

- Sample or station number or sample identification (ID)
- Signature of collector, sampler, or recorder
- Date and time of collection
- Place of collection
- Sample type
- Signatures of persons involved in chain of possession
- Inclusive dates of possession

Samples shall always be accompanied by a Chain-of-Custody record. When transferring the samples, the individual relinquishing and receiving the samples will sign, date, and note the time on the Chain-of-Custody record. EGC will be responsible for notifying the laboratory coordinator when and how many samples will be sent to the laboratory for analysis, and what types of analyses shall be performed.

Sample Handling Storage and Transport

All chemical sampling, handling and storage will be conducted under the direction of our consulting Analytical Chemist. All laboratory chemical testing will be accomplished by a State approved laboratory.

All equipment that contacts samples will be thoroughly cleaned prior to arrival to a site and between samplings. New or used samplers will be steam-cleaned or washed with an anionic detergent solution (i.e., Liquinox or Alconox), rinsed well with tap water, rinsed with distilled water, drained of excess water and air-dried or wiped dry with a clean towel.

Equipment blanks will be taken during the final stage of decontamination at the rate of no more than one per groundwater monitoring well. Selected method blanks will be subjected to chemical analysis for quality control.

All samples will be collected in an order such that those parameters most sensitive to volatilization will be sampled first. A general order of collection for some common groundwater parameters follows:

- Volatile Organic Compounds (VOC's)

- Total Organic Halogens (TOX)
- Total Organic Carbon (TOC)
- Extractable Organics
- Total Metals
- Dissolved Metals
- Phenols
- Sulfate and Chloride
- Turbidity
- Nitrate and Ammonia

All samples will be held at 4°C by packing in ice in a covered ice chest specifically designated for that purpose. At no time will the elapsed time between sample collection and delivery at the outside laboratory be greater than 72 hours. Preservatives will not be added to any sample unless instructed, and preservatives will be supplied and requested by the outside laboratory. Under no circumstances will sample containers be opened by anyone other than laboratory personnel who will perform the specified chemical analysis.

If it is necessary for samples or sample chests to leave the immediate control of the sampler prior to delivery to the laboratory, such as shipment by a common carrier (e.g., Federal Express), a custody seal will be placed on each sample container and/or sample chest to ensure that the samples have not been tampered with during transportation. The custody seal will contain the sampler's signature, the date and time the seal was emplaced.

TABLE 1

SAMPLE ANALYSIS METHODS, CONTAINERS, PRESERVATIONS, AND HOLDING TIMES

<u>Parameter</u>	<u>Analytical Method</u>	<u>Reporting Units</u>	<u>Container</u>	<u>Preservation</u>	<u>Maximum Holding Time</u>
Total Petroleum Hydrocarbons (gasoline)	EPA 8015 (modified)	mg/l ug/l	40 ml. vial glass, Teflon	cool, 4 C HCl to pH<2	14 days (maximum)
Benzene Toluene Ethylbenzene Xylenes (BTEX)	EPA 8020	mg/l ug/l	50 ml. vial glass, Teflon lined septum 1 l glass, Teflon	cool, 4 C HCl to pH<2	7 days (w/o preservative) 14 days (w preservative)
Oil & Grease	SM 503E	ug/l	lined septum	H2SO4 to pH<2	28 days (maximum)
Total Petroleum Hydrocarbons (Diesel)	EPA 8015 (modified)	mg/l ug/l	40 ml. vial glass, Teflon lined septum	cool, 4 C	14 days (maximum)
Halogenated Volatile Organics (chlorinated solvents)	8010	mg/l ug/l	40 ml. vial glass, Teflon lined septum	cool, 4 C	14 days (maximum)
Non Chlorinated solvents	8020	mg/l ug/l	40 ml. vial glass, Teflon lined septum	cool, 4 C HCl to pH<2	14 days (maximum)
Volatile Orangics	8240	mg/l ug/l	40 ml. vial glass, Teflon lined septum	cool, 4 C	14 days (maximum)
Semi-Volatile Organics	8270	mg/l ug/l	40 ml. vial glass, Teflon lined septum	cool, 4 C	14 days (maximum)
Specific Conductance (field test)		umhos/cm			
pH (field test)		pH units			
Temperature (field test)		Deg F			