City of Oakland
Public Works Agency
Environmental Services Division

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FAX TRANSMISSION COVER SHEET

Date: **November 6, 1997**

To: **Alameda County Department of Environmental Health**

Attn: **Barney Chan**

Fax: **337-9335**

From: **Mark B. Hersh**

Subject: **Quarterly Groundwater Sampling at the Municipal Service Center**

YOU SHOULD RECEIVE 7 PAGE(S) INCLUDING THIS COVER SHEET. IF YOU DO NOT RECEIVE ALL PAGES, PLEASE CALL (510) 283-7695.

Remarks:

Barney,

As discussed in our telephone conversation earlier today, attached please find a copy of the groundwater sampling letter prepared by DOVE that outlines the groundwater sampling schedule for the November quarterly sampling at the MSC. Please review the schedule and let me know if it meets with your approval.

Please call me at 238-7695, if you require additional information.

Thank you.

Mark

DOVE ENGINEERING GROUP

November 4, 1997

Mr. Mark Hersh
City of Oakland
Environmental Services Division
1330 Broadway, Suite 330A
Oakland, CA 94612

RE: Groundwater Monitoring for Municipal Services Center
Last Quarter, 1997

Dove Engineering Group, Inc. (DEGI) has prepared this letter for the upcoming groundwater monitoring at the City of Oakland (City) Municipal Services Center (MSC). DEGI has reviewed the previous groundwater monitoring and the regulatory correspondence from the Alameda County Health Care Services Agency (ACHCSA) for modifying the groundwater monitoring program. The current monitoring schedule for MSC as understood by DEGI from correspondence and discussions is presented in Table 1 below.

Table 1. Groundwater Well Monitoring Schedule and Analyses

Well	Frequency	TPHG	TPHD	Kero	M Oil	BTEX	Cd	Cr	Pb	Ni	Zn
		5030/ 8015	3510/ 8015	3510/ 8015	3510/ 8015	8020	6010	6010	6010	6010	6010
MW-1	SA	R	R	--	--	R	--	--	--	--	--
MW-2	SA	--	R	--	--	R	--	--	R	--	--
MW-5	SA	R	R	R	R	R	--	--	--	--	--
MW-6	SA	R	R	--	--	R	R	R	R	R	R
MW-7	A	--	--	--	--	--	--	--	--	R	--
MW-8	Q	Q	Q	Q	Q	Q	--	--	--	--	--
MW-9	Q	Q	Q	Q	Q	Q	--	--	--	--	--
MW-10	Q	Q	Q	Q	Q	Q	--	--	--	--	--
Blank		R	--	--	--	R	--	--	--	--	--

-- = not analyzed R - currently recommended analysis
A - Annual in February SA - Semi annual in February and August Q - Quarterly
TPHG - Gasoline TPHD - Diesel Kero - Kerosene M Oil - Motor Oil
BTEX - Benzene, Toluene, Ethylbenzene, Xylenes
TPHD, Kerosene, Motor Oil use EPA Method 3630M for silica gel cleanup.
Cd - Cadmium Cr - Chromium Pb - Lead Ni - Nickel Zn - Zinc
All metals analyses are to be filtered in the laboratory.
MW-8 installed as Uribe B-35. MW-9 installed as Uribe B-39. MW-10 installed as Uribe B-44.

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Field Methods

The groundwater monitoring will be performed by the DEGI subcontractor ACC Environmental Consultants. A copy of their current groundwater monitoring protocol is attached. Three new groundwater wells (MW-8, MW-9 and MW-10) were installed by Uribe and Associates in 1996. At that time, analyses for both contaminants and biologic parameters was recommended as a step to estimating the biodegradation activity in the new monitoring wells. The following bioparameters were noted by the ACHCSA in their letter dated April 25, 1997; Dissolved oxygen, oxidation-reduction potential, nitrate, sulfate, ferrous-ferric iron (iron+2), pH and alkalinity and hydrocarbon degrading bacteria. Wells MW-8, MW-9 and MW-10 will be sampled for these bioparameters in this sampling event.

A site elevation survey will also be performed to update and confirm previous surveys. The elevation survey will continue to use the City of Oakland datum and will be coordinated by the City. Water level measurements and sounding for separate phase product will be done at each well so a current groundwater elevation map can be prepared.

GC/MS not required unless conf for MTBE

Chemical Analysis Methods

Three groundwater samples will be analyzed for TPHG, TPHD, Kerosene, Motor Oil and BTEX using the EPA Methods 5030/8015, 3510/8015, 8020 and 8260 as shown in Table 1. In addition, the three samples will be analyzed for fuel oxygenates using EPA Method 8260 as requested by the State Regional Water Quality Control Board. The analyses will be performed at Chromalab, Inc. (a State certified laboratory) in Pleasanton, CA. The following are the detection limits (dl) in parts per million (ppm) and parts per billion (ppb) which Chromalab reports for each analysis: TPHG 5030/8015 dl = 0.05 ppm; TPHD and Kerosene 3510/8015 dl = 0.05 ppm; motor oil 3510/8015 dl = 0.05 ppm; BTEX 8020 dl = 0.5 ppb; fuel oxygenates 8260 dl = 5.0 ppb.

The bioparameters would be determined by the following methods; EPA 360.1 for dissolved oxygen, SM 2580B for oxidation-reduction potential, EPA 300 for nitrate and sulfate, EPA 6010 for ferrous-ferric iron, EPA 9040 for pH, EPA 310.1 for alkalinity, and hydrocarbon degrading bacteria (14 day incubation proprietary). All analyses would be performed on a normal turnaround basis.

ion chrom

or

Total-Fe^{++} = Fe^{+3}, 3500 Fe D 18th Ed.

Schedule and Report

DEGI will schedule the sampling with the City, which is anticipated to be in November, 1997. A report of the groundwater monitoring sampling will be prepared for inclusion for the next report submittal to the City.

If you have any questions, please call.

Sincerely,

Christopher M. Palmer

Christopher M. Palmer, CEG 1262; HG 246
Project Manager

REGISTERED GEOLOGIST
CHRISTOPHER M. PALMER
No HG 246
CERTIFIED
HYDROGEOLOGIST
STATE OF CALIFORNIA

Attachment: Groundwater Sampling Protocol

GROUNDWATER SAMPLING PROTOCOL

Sampling of groundwater is performed by ACC Environmental Consultants, Inc., (ACC) sampling technicians. Summarized field sampling procedures are as follows:

1. Uncap all wells and inspect condition of the wells. Note and correct any deficiencies.

2. Proceed to first well with clean or new, decontaminated equipment. Allow well to equilibrate to atmospheric pressure for a minimum of 20 minutes prior to measuring depth to water.

3. Measure depth to liquid surfaces (and/or floating product, if applicable) and total depth of each well. Note presence of silt accumulation. Calculate well casing volume.

4. Using new or clean decontaminated equipment for each well, purge the well(s). Start with the well that is historically the cleanest and finish with the well with the highest concentration of constituents of concern (or floating product).

5. Monitor groundwater for temperature, pH, and specific conductance during each purging. Allow well to recover to a minimum of 80 percent of static groundwater level between purgings.

6. Once the parameters have equilibrated and groundwater has recovered to a minimum of 80 percent, collect samples using U.S. Environmental Protection Agency (EPA) approved sample collection devices (i.e., Teflon®, stainless steel, or polyethylene bailers).

7. Transfer samples into laboratory-supplied, EPA-approved containers.

8. Label samples and log on chain of custody record.

9. Store samples in a pre-chilled, insulated container for delivery to a state-certified analytical laboratory.

10. Use new or decontaminate equipment prior to purging and sampling next well.

EQUIPMENT CLEANING AND DECONTAMINATION

All water samples are placed in precleaned laboratory-supplied bottles. Sample bottles and caps remain sealed until they are used at the site. All equipment that contacts the well or groundwater is cleansed thoroughly with an Alconox® or trisodium phosphate solution and rinsed with deionized or distilled water before use at the site. This cleaning procedure is performed between each well sampled for all reused equipment.

Wells are sampled in approximate order of increasing contamination. If a Teflon® cord is used, the tubing is cleaned or replaced with new tubing. If a nylon or cotton cord used, a new cord is used in each well. When equipment is reused (not disposable), equipment blanks are collected before sampling. The blanks are analyzed periodically to ensure proper cleaning procedures.

WATER LEVEL MEASUREMENTS

Prior to purging or sampling, depth to groundwater is measured in each well using a clean, sealed sampling tape or scaled electric sounder. If the well is known or suspected to contain free-phase petroleum hydrocarbons, an electric or optical interface probe is used to measure the hydrocarbon thickness and groundwater level. Measurements are collected and recorded to the nearest 0.01 foot. The total depth of each monitoring well is measured. Wells with excessive silting or depth loss will be redeveloped prior to resampling.

BAILER SHEEN CHECK

If measurable free-phase petroleum hydrocarbons are suspected, a clear acrylic interface sampler is used to determine the presence of a sheen. Any observed film and odor and color of the water is recorded.

GROUNDWATER SAMPLING

Prior to groundwater sampling, each well is purged of "standing" groundwater. Either a bailer, hand pump, or submersible pump is used to purge the well. The amount of purging is dependent on the well yield. In a high yield formation, samples are collected when normal field measurement, including temperature, pH, and specific conductance stabilize, provided a minimum of three well casing volumes of water have been removed. Field measurements will be taken after purging each well volume. Physical parameter measurements (temperature, pH, and specific conductance) are closely monitored throughout the well purging process and are used as indicators for assessing sufficient purging. The purging parameters are measured to observe stabilization to a range of values typical for that aquifer. Stable field parameters are recognized as indicative of fresh groundwater from the aquifer. Specific conductance (conductivity) meters are read to the nearest ± 10 umhos/cm and are calibrated daily. Electric pH meters are read to the nearest ± 0.1 pH units and are calibrated daily. Temperature is read to the nearest 0.1°F. Calibration of physical parameter meters follow manufacturer's specifications. Collected field data during purging activities are entered on the Well Monitoring Data Worksheet.

In low yield formations, the well is purged such that the standing water is removed and the well is allowed to recharge. (Normal field measurements are periodically recorded during the purging process.) In situations where recovery to 80 percent of static water level is estimated, or observed to exceed a 2-hour duration, a sample is collected when sufficient volume is available for a sample for each parameter. Attempts are made so the well is not purged dry and formation water does not cascade into the well.

In wells where free-phase hydrocarbons are detected, the free-phase portion is bailed from the well and the estimated volume removed recorded. A groundwater sample is collected if bailing reduces the amount of free-phase hydrocarbons to the point where they are no longer present in the well. Well sampling is conducted using one of the aforementioned methods depending on the formation yield. However, if free-phase hydrocarbons persist throughout bailing, a groundwater sample is not collected.

Volatile organic groundwater samples are collected so that minimal air passes through the sample (to prevent volatiles from being stripped from the samples). Sample bottles are filled by running the sample down the side of the bottle slowly 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 is tapped lightly. The absence of an air bubble indicates a successful seal; however, if a bubble is evident, the cap is removed, more sample is added, and the process is repeated until no bubbles are observed.

CHAIN OF CUSTODY

Groundwater sample containers are labeled with a unique sample number, location, and date of collection. All samples are logged onto a chain-of custody form and placed in a pre-chilled, insulated container for delivery to a laboratory certified by the State of California Department of Health Services.

SAMPLE STORAGE

Groundwater samples collected in the field are stored in a pre-chilled, insulated container cooled to 4°C while in transit to the office or analytical laboratory. Samples are stored in a refrigerator overnight and during weekends and holidays. The refrigerator is set to 4°C and is locked with access controlled by a designated sample custodian.

QUALITY ASSURANCE/QUALITY CONTROL OBJECTIVES

The samples and analytical procedures employed by ACC for groundwater sampling and monitoring follow quality assurance/quality control (QA/QC) guidelines. QA objectives have been established to develop and implement procedures for obtaining a d evaluating water quality and field data in an accurate, precise, and complete manner. In this way, sampling procedures and field measurements provide information that is comparable and representative of actual field conditions. QC is maintained by site-specific field protocols and requiring the analytical laboratory to perform internal and external QC checks.

The goal is to provide data that are accurate, precise, complete, representative, and legally defensible. The definitions as developed by overseeing federal, state, and local agency guidance documents for accuracy, precision, completeness, and representativeness are:

- **Accuracy:** the degree of agreement of a measurement with an accepted reference or true value.

- **Precision:** a measure of agreement among individual measurements under similar conditions. Usually expressed in terms of the standard deviation.

- **Completeness:** the amount of valid data obtained from a measurement system compared to the amount that was expected to meet the project data goals.

- **Representativeness:** a sample or group of samples that reflects the characteristics of the medium at the sampling point. It also includes how well the sampling point represents the actual parameter variations that are under study.

Laboratory and field handing procedures of samples are monitored by including QC samples for analysis with every submitted sample lot from a project site. The number and types of QC samples are determined and analyzed on a project-specific basis. QC samples may include any combination of the following:

- **Trip Blanks:** 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 unopened and are returned from a project site with the project site samples for analysis.

- **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.

- **Duplicate:** Duplicated 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.

- **Equipment Blank:** Periodic QC samples collected from field equipment reinstate to verify decontamination procedures.

SHALLOW GROUNDWATER SURVEY

A shallow groundwater survey employs reconnaissance field sampling and chemical analysis or rapid plume mapping. The subcontractor would sample for analysis at locations marked by the ACC field geologist. The thin-diameter probes from which groundwater is collected are advanced to the water-bearing stratum, sample is withdrawn to the surface, and analyzed immediately thereafter. Probe holes are backfilled with a grout slurry or as the local permitting agency requires. The shallow survey contractor will supply sampling, purging, and field chemical analysis to ACC in a report. ACC considers this type of shallow probe mapping (together with shallow groundwater sampling) to be a reconnaissance technique only.