



GROUNDWATER TECHNOLOGY, INC.

4057 Port Chicago Highway, Concord, CA 94520

(415) 671-2387 Fax: (415) 685-9148

Alameda County Health services

To: Dept of Enviro Health Date: 6/25/91 Job No. 020301038

Haz Act Program

80 Swan Way, Room 200 Re: SOP of water sampling, CRF

Oakland, CA 94621 Well installation at Chevron station - #9-6941

Attn: Mr Scott Seery From: Glen L. Mitchey

We are sending: Attached Via _____

The following:

- Report Originals Shop Drawings Samples
- Specifications Copy(s) Proposal Other _____

COPIES	DATE	DESCRIPTION
1	-	Water Sampling SOP's

Transmitted as checked:

- Approved For Approval Approved as Noted For Correction
- For Your Use As Requested For Comments
- For Your Records For Distribution _____

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6. Preservatives are required for some types of samples. Use specially prepared vials from GTEL, marked as indicated below, or use the appropriate field procedure (SOP 12 for acidification). Make note on forms that samples were preserved. Always have extra vials in case of problems. Samples for volatile analysis should be acidified below pH 2 with hydrochloric acid. Use vials with care and keep them upright. Eye protection, foot protection, and disposable vinyl gloves are required for handling. Samples designated for expedited service and analyzed within seven (7) days of sampling will be acceptable without preservation.

Acid causes burns. Glasses or goggles (not contact lenses) are necessary for protection of the eyes. Flush eyes with water for 15 minutes if contact occurs and seek medical attention. Rinse off hands frequently with water during handling.

For sampling chlorinated drinking water supplies for chlorinated volatiles, samples shall be preserved with sodium thiosulfate. Use vials labeled "CONTAINS THIOSULFATE". No particular cautions are necessary.

7. Fill vial to overflowing with water, avoiding turbulence and bubbling as much as possible. Water should stand above lip of vial.
8. Carefully but quickly slip cap onto vial. Avoid dropping the teflon septum from cap by not inverting cap until in contact with vial. Disc should have teflon face toward the water. Also avoid touching white teflon face with dirty fingers.
9. Tighten cap securely, invert vial and tap against hand to see that there are no bubbles inside.
10. Label vial using indelible ink as follows:
 - a) Sample I.D. No.
 - b) Job I.D. No.
 - c) Date and Time.
 - d) Type of analysis requested.
 - e) Your name.



11. Unless the fabric type label is used, place scotch tape over the label to preserve its integrity.
12. For Chain of Custody reasons, sample vial should be wrapped end-for-end with scotch tape or evidence tape and signed with indelible ink where the end of the tape seals on itself. The septum needs to be covered.
13. Chill samples immediately. Samples to be stored should be kept at 4°C (39°F). Samples received at the laboratory above 10°C (as measured at glass surface by a thermocouple probe), after overnight shipping will be considered substandard, so use a high quality cooler with sufficient ice or freezer packs. (Coolers are available from GTEL).
14. Fill out Chain of Custody and Analysis Request form. (See Chain of Custody Procedures SOP 11).



**GT ENVIRONMENTAL LABORATORY (GTEL)
STANDARD OPERATING PROCEDURE
CONCERNING CHAIN OF CUSTODY
SOP 11**

1. Samples must be maintained under custody until shipped or delivered to the laboratory. The laboratory will then maintain custody. A sample is under custody if:
 - a) It is in your possession
 - b) It is in your view after being in your possession
 - c) You locked it up after being in your possession
 - d) It is in a designated secure area
2. Custody of samples may be transferred from one person to the next. Each transferee and recipient must date, sign and note the time on the chain-of-custody form.
3. In shipping, the container must be sealed with tape, bearing the sender's signature across the area of bonding at the ends of the tape in order to prevent undetected tampering. Each sampling jar should be taped and signed as well. Scotch tape works well.
4. Write "sealed by" and sign in the "Remarks" box at the bottom of the form before sealing up the box. Place form in a plastic bag and seal it inside the box.
5. The "REMARKS" section in the upper right part of the form is for documenting details such as:
 - a) Correlation of sample numbers if samples are split between labs.
 - b) QC numbers when lab is logging in the samples.
 - c) Sample temperature and condition when received by lab.
 - d) Preservation notation.
 - e) pH of samples when opened for analysis (if acidified).
 - f) Sampling observation or sampling problem
6. The chain-of-custody form should be included inside the shipping container. A copy should be sent to the project manager.
7. When the samples are received by the lab, the chain-of-custody form will be dated, signed, and a note of the time made by a laboratory representative. The form along with shipping bills and receipts will be retained in the laboratory files.

8. At the time of receipt of samples by the laboratory, the shipping container will be inspected and the sealing signature will be checked, the samples will be inspected for condition and bubbles and the temperature of a representative sample container will be measured externally by a thermocouple probe (held tightly between two samples) and recorded. The laboratory QC numbers will be placed on the labels, in the accession log, and on the chain-of-custody form. If samples are acidified their pH will be measured by narrow range pH paper at the time of opening for analysis. All comments concerning procedures requiring handling of the samples will be dated and initialed on the form by the laboratory person performing the procedure. A copy of the completed chain-of-custody form with the comments on sample integrity will be returned to the sampler.

GT ENVIRONMENTAL LABORATORY (GTEL)
STANDARD OPERATING PROCEDURE
CONCERNING FIELD PRESERVATION OF BTX SAMPLES
BY ACIDIFICATION
SOP 12

If specially prepared acidified vials are not available, apply the following Field Procedures, using the field acidification kit. The kit contains:

- a) 500 cc glass measuring cup or breaker.
 - b) dropping bottle of 50% hydrochloric acid or nitric acid.
 - c) narrow range pH paper, 1.0-2.5 pH range.
 - d) glass stirring rod.
1. Collect approximately 300cc of water in beaker. Try to minimize turbulence, bubbling, and time of exposure to the air.
 2. For inorganic analysis: use 50% nitric acid
For volatile organic analysis: use 50% hydrochloric acid
Add 30 drops of 50% acid to measuring cup. Hold dropper completely vertically.
 3. Gently mix with glass bar.
 4. Remove bar and touch wetted tip to the pH paper and check color code to assure it is below pH 2. As more acid is added the pH goes lower. Discard used pH strip.
 5. Add more acid if necessary. Too much acid is not a problem, just record how much was added (this will be helpful next time). Don't waste time trying to get it right - just add plenty of acid to get it below pH 2. Ideally, once you know how much acid needs to be added at one well, that amount will be sufficient for the rest. However, test the pH each time.
 6. Pour the water into the vials prepared for that well and cap off with no bubbles inside. Again turbulence and bubbling are to be minimized. Also note that it is important that all of the vials for a given well be poured and sealed one right after another. Make sure the 300cc collected is enough to fill all of the vials with some to spare at the end. The volume collected can be increased but remember to proportionally increase the amount of acid added.
 7. Acidification does not replace chilling. Always chill samples and ship via air for next day delivery.



8. Acid causes burns. Glasses or goggles (not contacts) are necessary for protection of the eyes. Wash eyes with fresh water for 15 minutes if contact occurs and seek medical attention. Rinse off hands frequently with water during sampling.



GROUNDWATER TECHNOLOGY
STANDARD OPERATING PROCEDURE
CONCERNING GROUNDWATER MONITORING
SOP 8

Groundwater monitoring of wells at the site shall be conducted using an ORS Interface Probe and Surface Sampler. The Interface Probe is a hand held, battery operated device for measuring depth to petroleum product and depth to water as measured from an established datum (i.e., top of the well casing which has been surveyed). Product thickness is then calculated by subtracting the depth to product from the depth to water. In addition, water elevations are adjusted for the presence of fuel with the following calculation:

$$\begin{aligned} &(\text{Product Thickness}) (.8) + (\text{Water Elevation}) \\ &= \text{Corrected Water Elevation} \end{aligned}$$

Note: The factor of 0.8 accounts for the density difference between water and petroleum hydrocarbons.

The Interface Probe consists of a dual sensing probe utilizing an optical liquid sensor and electrical conductivity to distinguish between water and petroleum products. A coated steel measuring tape transmits the sensor's signals to the reel assembly, where an audible alarm sounds a continuous tone when the sensor is immersed in petroleum product and an oscillating tone when immersed in water. The Interface Probe is accurate to 1/16-inch.

A Surface Sampler shall be used for visual inspection of the groundwater to note sheens (difficult to detect with the Interface Probe), odors, microbial action, etc.

The Surface Sampler used consists of a 12-inch long cast acrylic tube with a Delrin ball which closes onto a conical surface creating a seal as the sampler is pulled up. The sampler is calibrated in inches and centimeters for visual inspection of product thickness.

To reduce the potential for cross contamination between wells the monitorings shall take place in order from the least to most contaminated wells. Wells containing free product should be monitored last. Between each monitoring the equipment shall be washed with laboratory grade detergent and double rinsed with distilled water.



GROUNDWATER TECHNOLOGY
STANDARD OPERATING PROCEDURE
CONCERNING WATER SAMPLING METHODOLOGY
SOP 9

Prior to water sampling, each well shall be purged by pumping a minimum of four well volumes or until the discharge water indicates stabilization of temperature, conductivity, and pH. If the well is evacuated before four well volumes are removed or stabilization is achieved, the sample should be taken when the water level in the well recovers to 80% of its initial level.

Retrieval of the water sample, sample handling and sample preservation shall be conducted in accordance with Groundwater Technology Laboratory Standard Operating Procedure (GTL SOP 10) concerning Sampling For Volatiles in Water". The sampling equipment used shall consist of a teflon and/or stainless steel samplers, which meets EPA regulations. Glass vials with teflon lids should be used to store the collected samples.

To insure sample integrity, each vial shall be filled with the sampled water such that the water stands above the lip of the vial. The cap should then be quickly placed on the vial and tightened securely. The vial should then be checked to ensure that air bubbles are not present prior to labeling of the sample. Label information should include a sample identification number, job identification, date, time, type of analysis requested and the sampler's name. Chain-of-Custody forms shall be completed as per Groundwater Technology Laboratory Standard Operating Procedure (SOP 11) concerning Chain of Custody.

The vials should be immediately placed in high quality coolers for shipment to the laboratory. The coolers should be packed with sufficient ice or freezer packs to ensure that the samples are kept below 4C. Samples which are received at the Groundwater Technology Laboratory above 10 C. will be considered substandard. To minimize sample degradation the prescribed analysis shall take place within seven days of sample collection unless specially prepared acidified vials are used.

To minimize the potential for cross contamination between wells, all the well development and water sampling equipment which contacts the groundwater shall be cleaned between each well sampling. As a second precautionary measure, the wells shall be sampled in order of increasing contaminant concentrations as established by previous analysis.



**GT ENVIRONMENTAL LABORATORY (GTEL)
STANDARD OPERATING PROCEDURE
CONCERNING SAMPLING FOR VOLATILES IN WATER (DISSOLVED GASOLINE,
SOLVENTS, ETC.).
SOP 10**

1. Use only vials properly washed and baked, available from GTEL or I-Chem.
2. Use clean sampling equipment. Scrub with Alconox or equivalent laboratory detergent and water followed by a thorough water rinse. Complete with a distilled water rinse.

Sampling equipment which has come into contact with liquid hydrocarbons (free product) should be regarded with suspicion. Such equipment should have tubing and cables replaced and all resilient parts washed with laboratory detergent solution, as above. Visible deposits may have to be removed with hexane. Solvent washing should be followed by detergent washing as above.

This procedure is valid for volatile organics analysis only. For extractable organics (for example, pesticides, or base neutrals for EPA method 625) a final rinse with pesticide grade isopropyl alcohol, followed by overnight or oven drying, will be necessary.

3. Take duplicate samples for GTEL. Mark on forms as a single sample with two containers to avoid duplication of analysis.
4. Take a site blank using distilled water or known uncontaminated source. This sample will be run at the discretion of the project manager.
5. Fill out labels and forms as much as possible ahead of time. Use an indelible marker.

