Texas Commission on Environmental Quality

INTEROFFICE MEMORANDUM

To: Remediation Division Staff **Date:** July 31, 2003

Thru: Jacqueline Hardee, Director
Remediation Division

From: Ann Strahl, QA Specialist

Subject: Sample Handling and Preservation Procedures and the Collection Procedures for Groundwater Samples

This memo 1) addresses actions for handling samples when standard procedures are a) not clear or b) cannot be followed and 2) clarifies existing TCEQ guidance on the collection and filtering of groundwater samples.

1.a. Sample preservation: When samples require temperature preservation, the sample transport coolers or shuttles (shuttles) must contain enough ice to maintain the sample temperature within the specified range, e.g., 4°±2° C. To ensure the laboratory and/or field personnel can check the temperature of the shuttle, each shuttle containing samples which require temperature preservation must also contain a temperature blank. A temperature blank is a labeled sample vial (e.g., "temp blank" or "T-blank") containing approximately 40 milliliters (mL) of water. No custody seal on the temperature blank vial is required, and no chemical analysis of this sample is needed. The vial can be taped to the inside of the shuttle to allow easy access for measuring the temperature of the water in the vial.

1.b. Sample Handling: The standard procedures for handling samples are published in current guidance issued by nationally recognized organizations. Samples intended for use in a demonstration of regulatory compliance should follow the current guidance. One such guidance outlining proper procedures is the USEPA's *Test Methods for Evaluation of Solid Waste,* as amended (SW-846). This memo refers specifically to SW-846 for convenience but does not exclude the relevancy of other available guidance.

Many chemicals undergo biological and/or chemical degradation or volatilization when the matrix in which they reside is disturbed and transferred into a sampling container. Holding times and sample handling procedures are established to minimize the loss of such chemicals from the sample once it is collected. Chapters 2, 3 and 4, and the individual methods, in SW846 specify the holding times and preservation procedures for samples based on the matrix of concern and the chemical of concern. Samples must be properly preserved in the field and received by the laboratory to allow analysis within the holding time specified for the chemical or class of chemicals of concern in the matrix of concern. Chapter 9 of SW-846 specifies that after being collected "[t]he sample should be delivered to the laboratory for analysis as soon as [practical] -- usually within 1 or 2 days after sampling." For samples having a holding time longer than 48 hours, the samples must be received by the laboratory within 2 days of sample collection unless one of the following conditions apply:

- unavoidable circumstances exist, and prior to sample collection, the TCEQ project manager has authorized, in writing, the anticipated delay in getting the samples to the laboratory;
- the TCEQ concurs that the chemicals of concern in the sampled matrix are highly persistent in the environment and resist biodegradation or chemical/physical degradation; or
- project specific data are available to demonstrate no effect on the sample concentration by the holding of the sample beyond the 2 day window.

The TCEQ does not consider inconvenience to the contractor and/or lack of nearby common carrier access to be "unavoidable" circumstances unless, prior to mobilizing for sample collection, the contractor has obtained written

authorization, e.g., an electronic mail message or letter, to delay the laboratory's receipt of the samples beyond 2 days from sample collection. Prior to recommending reimbursement under the Petroleum Storage Tank regulations, ensure the TCEQ project manager authorized any delay in the laboratory's receiving the samples.

In the event unavoidable circumstances cause a delay which precludes the laboratory's receipt of the samples within 2 days from the time of collection, the sample custody log/record and the laboratory's sample log-in records must accompany the sample results submitted to TCEQ and must include the following documentation:

a. The nature/description of the unavoidable circumstance and the associated TCEQ authorization;

b. The reason why the circumstance prevented delivery of the sample(s) to the laboratory within 2 days from sample collection;

c. The custody procedures followed by the person having possession of the sample(s), including
   i. a description of the procedures taken to secure the sample(s) in a restricted area to which only the person has access and which is isolated from non-site sources of the chemicals of concern at all times, and
   ii. a description of the accessibility of that area for inspection by the TCEQ;

d. The handling procedures followed by the person having custody of the sample(s), including the frequency of, and procedures used for, monitoring and maintaining temperature preservation (Attachment 1 lists steps contractors should follow when the samples will not be received by the laboratory within 2 days of sample collection); and

e. The method of shipment/delivery to the laboratory, e.g., common carrier or personal delivery.

Concerns when samples are not received by the laboratory within 2 days of sample collection

- tampering - e.g., manipulation of the samples by an interested party to affect a desired outcome;
- contamination of the samples during storage - e.g., transport cooler (shuttle) being stored in garage with a lawn mower or car which would be potential source of gasoline constituents;
- sample degradation - e.g., loss of sample preservation resulting from elevated sample temperature because shuttle temperature was not monitored and/or maintained;
- contamination of storage environment - e.g., sample breakage with subsequent shuttle leak; and
- samples accessed by unauthorized individuals - e.g., potential exposure to sensitive receptors, such as children, opening the shuttle.

2. Collection and filtering of groundwater samples should follow the guidance provided in Section IV.2.2. of the July 1998 memo, "Implementation of the Existing Risk Reduction Rule," from the Remediation Division Director to staff. That memo specifies groundwater samples should be collected using a low flow purge and collection rate (when applicable to the hydrogeological conditions). If the turbidity measurement of the water to be sampled is greater than 10 nephelometric turbidity units (NTU), the water can be filtered through a 10 micrometer (or larger) pore size filter into the sample container containing any necessary preservative. Use of low flow collection techniques and filtering through a filter with a pore size of 10 um or larger ensures the sample collected represents the groundwater with its naturally suspended solids, e.g., collodials, and does not exclude any of those solids that could migrate with the water in the saturated zone. This recommendation supercedes national guidance which allows use of a filter with a pore size of 0.45 micrometer.

Attachment 1: Custody and handling procedures the contractor should follow when samples will not be received by the laboratory within 2 days from sample collection.

A1.1 Assign the samples to a sample transport cooler or shuttle (shuttle) and identify the shuttle on the chain-of-custody form for those samples;

A1.2 Custody seal the individual sample bottles/containers with date, time, and signature. Custody seal the shuttle with date, time, and signature before leaving the field. Locate each seal in a position that will require the seal to be broken if the container or shuttle is opened. Only the laboratory can break the custody seal on a bottle/container seal. A shuttle seal can be broken by field personnel as required to maintain temperature preservation (See A1.4, A1.5, and A1.6 below). However, no seal can be broken on a bottle/container and no shuttle seal can be removed from the shuttle except by the laboratory.

A1.2 Include a temperature blank in each shuttle containing samples that require temperature preservation.

A1.3 Prior to custody sealing the shuttle, enter a specific note on the chain-of-custody form requesting that the laboratory, upon receipt of a shuttle, inspect the condition of the custody seals on the sample(s) and the shuttle and document observations in the sample log-in records upon receipt. Further, request that the laboratory retain the seals removed from the shuttle(s) and submit those seals as part of the custody record in the analytical data package.

A1.4 When the shuttle contains temperature preserved samples, the temperature of the shuttle must be monitored and the preservation temperature maintained. To monitor and maintain the temperature in the shuttle, measure and record the temperature of the water in the temperature blank every 6 hours by

a. breaking, but not removing, the shuttle custody seal each time shuttle is opened,
b. measuring and recording the temperature in the temperature blank,
c. adding ice and draining the melt water, as needed, and
d. applying a new custody seal to the shuttle with date, time, and signature as described in A1.2 above but not over the writing on an existing broken seal. No custody seal on the shuttle can be removed until after the laboratory receives the shuttle.

A1.6 During the time the samples are within the contractor's custody, record in the custody log

a. the inside volume (e.g., in cubic inches, quarts, or liters) and type (e.g., brand name or construction material) of each shuttle;
b. the location(s) where the shuttle is held during transport and storage, including a description of the surroundings for the shuttle noting the presence/absence of potential sources of non-site chemicals of concern;
c. a description of the access restrictions to the storage area; and
d. each time the custody seal on the shuttle is broken, record
    i. the time at which the shuttle is opened and the time at which it is closed;
    ii. the temperature of the temperature blank each time the shuttle is opened or every 6 hours, whichever is more frequent;
    iii. the condition of the sample bottles/containers;
    iv. the volume of water removed and the method of the removal; and
    v. the amount of ice added.

A.1.7 Record the date, time, and the approximate volume of ice and water in the shuttle when the shuttle is relinquished to the shipper or the laboratory.