



Memorandum

Date: July 6, 2004

To: RM Employees, GCLN Laboratory Facilities, and Consulting Partners

From: Mr. Thomas G. Tunnickliff – Atlantic Richfield Company

cc: Mr. Rock J. Vitale, CEAC, CPC - Environmental Standards, Inc.
Mr. Dane C. Wren, P.E. – Wren Engineering, P.A.
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Subject: Recommended Procedures for Solid Sample Collection, Storage, Preservation and Analysis for Volatile Organic Compounds

It has come to BP's attention that some confusion may exist regarding the appropriate sample containers and preservation techniques to be used for the collection and preservation of solid samples collected for volatile organic compound (VOC) analysis. The information provided herein is applicable to GC and GC/MS analyses for low-level VOCs (including oxygenates) in soil and solid wastes (e.g., TCL VOAs, BTEX, GRO).

Background of SW-846 Volatile Organic Solid Sampling Methodologies

Prior to the issuance of US EPA *Test Methods for Evaluation of Solid Waste, Third Edition* (SW-846) in June 1997, Methods 5030 and 5030A included provisions for the collection of solid samples for low-level VOC analysis. SW-846 Method 5035, issued in June 1997, precludes previous requirements regarding solid samples collected for VOC analysis and stipulates the preservation of solid samples within 48 hours from collection and analysis within a 14-day collection-to-analysis holding time. Method 5035 (and its more recent version, Method 5035A) removes the allowance for solid samples to be stored in 4-ounce wide-mouth containers or other similar storage devices, such as brass sleeves.

Despite the clear requirements of Method 5035 (emphasized by the deletion of Method 5030 from SW-846), inconsistent adoption of the method created potential misinterpretation or confusion as to how and when the method should be implemented. As a result, some consultants and laboratories continue to follow the techniques described in Methods 5030 and 5030A rather than adhering to the Method 5035 sampling and preservation requirements.

Technical data published in publicly available literature demonstrates that a 14-day holding time for unpreserved soils may be difficult to defend. To continue to use 4-ounce wide-mouth containers or other similar storage devices, such as brass sleeves, with a 14-day holding time for unpreserved soils represent a potential liability to BP.

BP GCLN Recommendations

In order to minimize BP's potential liability with respect to the collection and preservation of solid samples for low-level VOC analysis, the following recommendations are provided.

- Where a regulatory approved, site-specific QAPP/SAP specifies the use of 4 ounce wide-mouth containers or other similar storage devices, such as brass sleeves and a 14-day holding time is stipulated, consultants and laboratories should continue to follow the applicable site-specific QAPP/SAP. An inquiry with the applicable regulatory agency to confirm the continued practice may be prudent, depending on site-specific technical and business strategies.
- When a state-specific analytical method (e.g., Texas 1005, Alaska 101, New Jersey methanol) is being used in the state of origin, consultants and laboratories should continue to follow those methods but continue to monitor new regulations for applicable changes.
- In the absence of a regulatory approved, site-specific QAPP/SAP or a state-specific analytical method being used in the state of origin, the following sample storage and preservation recommendations are offered.
 1. Solid samples may be collected in EnCore[®] samplers, and the entire temporary storage vessel should be shipped to the laboratory. The laboratory must then proceed as indicated in Attachment 1. It should be noted that the use of EnCore samplers introduces an expense, as three sampling devices (\$6 - \$7/ each) will be required for each sample location. With regard to using EnCore samplers, it should be noted that the GCLN laboratories should provide the EnCore samplers to the Alliance Partners, for the same technical reasons as the GCLN laboratories provide the Alliance Partners with bottleware. The pricing is built into the laboratory fees when EnCores are used. To summarize, Alliance Partners should not be purchasing and using their own EnCores samplers for BP projects.
 2. Solid samples may be collected using TerraCore[®] syringes and placed into three pre-weighed VOA vials provided by the laboratory. The laboratory-provided, tared VOA vials can contain either a stir bar only, deionized water and a stir bar, or sodium bisulfate and a stir bar. Note that use of sodium bisulfate is generally not recommended due to potential effervescence, which may volatilize contaminants. The laboratory may then proceed as indicated in Attachment 2.
 3. Solid samples received in 4-ounce wide-mouth containers or similar sampling devices (such as brass sleeves) must be preserved within 48 hours from collection. The laboratory preservation options for samples received in these containers are described in Attachment 3.

If you have any questions regarding the recommendations, please feel free to contact the GCLN program manager or your Project Manager.

ATTACHMENT 1

Laboratory Options for the Preservation of Solid Samples Received in EnCore Samplers

- The EnCore sampler may be frozen within 48 hours from collection, and the sample must be analyzed within 14 days from collection.
- The laboratory may extrude 5 grams of solid sample into a 40-mL VOA vial containing a stir bar within 48 hours from collection and freeze the sample. The sample must be analyzed within 14 days from collection.
- The laboratory may extrude 5 grams of solid sample into a 40-mL VOA vial containing 10 mL of deionized water and a stir bar within 48 hours from collection and freeze the sample. The sample must be analyzed within 14 days from collection.
- The laboratory may extrude the solid sample into methanol and extract the samples with methanol within 48 hours from collection. The sample must be analyzed within 14 days from collection.
- The laboratory may extrude 5 grams of solid sample into a 40-mL VOA vial containing 10 mL of deionized water and a stir bar and *analyze the sample* within 48 hours from collection.

Laboratory Options for the Preservation of Solid Samples Received in 40-mL VOA Vials Containing a Stir Bar

- The laboratory may freeze the sample within 48 hours from collection. The sample must be analyzed within 14 days from collection.
- The laboratory may inject 10 mL of methanol through the vial septum and extract the sample with methanol within 48 hours from collection. The sample must be analyzed within 14 days from collection.
- The laboratory may inject 10 mL of deionized water through the vial septum and *analyze the sample* within 48 hours.

Laboratory Options for the Preservation of Solid Samples Received In 40-mL VOA Vials Containing Deionized Water and a Stir Bar

- The laboratory may freeze the sample within 48 hours from collection. The sample must be analyzed within 14 days from collection.
- The laboratory may *analyze the sample* within 48 hours from collection.

Field-preserved solid samples (*i.e.*, samples received in a 40-mL VOA vial with sodium bisulfate or in pre-weighed methanol jars) must be analyzed within 14 days from collection.

ATTACHMENT 2

Field Preservation of Solid Samples Using TerraCore® Syringes or Equivalent

The field preservation options using laboratory provided tarred 40 mL VOA vials and TerraCore® syringes (or equivalent) are as follow.

- Using TerraCore® syringes, measure about 5 grams of solid sample into 3 tarred 40-mL VOA vials containing a stir bar.
- Using TerraCore® syringes, measure about 5 grams of solid sample into 3 tarred 40-mL VOA vials containing deionized water and a stir bar.
- Using TerraCore® syringes, measure about 5 grams of solid sample into 3 tarred 40-mL VOA vials containing sodium bisulfate and a stir bar.
- Using TerraCore® syringes, measure about 5 grams of solid sample into 3 pre-weighed methanol jars.

Laboratory Options for the Preservation of Solid Samples Received in 40-mL VOA Vials Containing a Stir Bar (Without Water)

- The laboratory may freeze the sample within 48 hours from collection. The sample must be analyzed (after injecting 10 mL of deionized water through the vial septum) within 14 days from collection.
- The laboratory may inject 10 mL of methanol through the vial septum and extract the sample with methanol within 48 hours from collection. The sample must be analyzed within 14 days from collection.
- The laboratory may inject 10 mL of deionized water through the vial septum and *analyze the sample* within 48 hours.

Laboratory Options for the Preservation of Solid Samples Received In 40-mL VOA Vials Containing Deionized Water and a Stir Bar

- The laboratory may freeze the sample within 48 hours from collection. The sample must be analyzed within 14 days from collection.
- The laboratory may analyze the sample within 48 hours from collection.

Field-preserved solid samples (*i.e.*, samples received in a 40-mL VOA vial with sodium bisulfate or in pre-weighed methanol jars) must be analyzed within 14 days from collection.

ATTACHMENT 3

When Using Bottleneckware or Method 5030/5030A Sample Storage Vessels

Notwithstanding a pre-approved, site-specific QAPP/SAP permitting the use of Method 5030, or use of a state-specific analytical method in the state of origin, consultants should be following the field preservation options described in Method 5035A when collecting solid samples for VOC analyses.

Nonetheless when laboratories receive requests for Method 5030/5030A bottleneckware, they must inform the consultant project manager of the current SW-846 sampling requirements (including the 48-hour holding time from collection to analysis for unpreserved solid samples). Laboratories receiving unpreserved solid samples in Method 5030/5030A sampling vessels must perform one of the following options within 48 hours from sample collection in order for a 14-day collection-to-analysis holding time to apply. In the event samples are received beyond 48 hours of collection, the laboratory should request that the consultant project manager authorize (in writing) the preservation and analysis of the soil samples.

- Within 48 hours of collection, the laboratory may quickly transfer 5 grams of the solid sample into one or more 40-mL VOA vials containing a stir bar and freeze the sample.
- Within 48 hours of collection, the laboratory may quickly transfer 5 grams of the solid sample into one or more 40-mL VOA vial containing 10 mL of deionized water and a stir bar and freeze the sample.
- Within 48 hours of collection, the laboratory may quickly transfer 5 grams of the solid sample into one or more 40-mL VOA vial containing 10 mL of sodium bisulfate and a stir bar.
- Within 48 hours of collection, the laboratory may quickly extract the sample with methanol.
- The laboratory may quickly transfer 5 grams of the sample into a 40-mL VOA vial containing 10 mL of deionized water and a stir bar and analyze the sample within 48 hours from collection.