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HANDLING AND ANALYSIS OF SAMPLES CONTAINING VOCs

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

BLWP132.91

December 17, 1991

Ms. Sharon Meves  
Quality Programs Coordinator  
WMI Environmental Monitoring Laboratories, Inc.  
2100 Cleanwater Drive  
Geneva, Illinois 60134

Dear Ms. Meves:

I am writing to you in response to your inquiry of November 18, 1991, concerning the handling and analysis of samples containing volatile organic compounds. You do not mention any specific matrix in your letter, but the tone of it indicates to us that your questions refer to aqueous samples. My responses are also limited to samples regulated under the Resource Conservation and Recovery Act, and represent the point of view of the Office of Solid Waste.

In general, aqueous samples should be hermetically sealed in volatile organic vials at the time of sampling, and must not be opened prior to analysis to preserve their integrity. The vials should be completely filled at the time of sampling, so that when the septum cap is fitted and sealed, and the vial inverted, no headspace is visible. At the time of analysis, the aliquot to be analyzed should be taken from the vial with a gas-tight syringe inserted directly through the septum of the vial. Only one analytical sample can be taken from each vial. If these guidelines are not followed, the validity of the data generated from the samples is suspect.

The following is the response to your specific questions:

- 1) The sample should exhibit no headspace "at the time of sampling" as I have previously mentioned. However, due to differing solubility and diffusion properties of gases in aqueous matrices at different temperatures, it is possible for the sample to generate some headspace during storage.

-2-

This headspace will appear in the form of micro bubbles, and should not invalidate a sample for volatiles data.

- 2) The presence of a macro bubble in a simple vial generally indicates either improper sampling technique or a source of gas evolution within the sample. The latter case is usually accompanied by a buildup of pressure within the vial, (e.g. carbonate containing samples preserved with acid). Tom Bellar of the Environmental Monitoring Systems Laboratory in Cincinnati (EMSL-Ci) (unpublished data) states from a study that he did several years ago that "pea-sized" bubbles (i.e. bubbles not exceeding 1/4 inch or 6 mm in diameter) did not adversely affect volatiles data. These bubbles were generally encountered in wastewater samples, which are more susceptible to variations in gas solubility than are groundwater samples.
- 3) There is no reason to "flag" data from acceptable samples. However, finite volatiles concentrations (i.e. values above detection limits) from samples containing excessive headspace should either be identified as minimum values or discarded and new samples should be taken. Non-detectable results are invalid.

If you have any further questions, please call me at 202-260-7459.

Sincerely yours,

Barry Lesnik  
Chemist  
Office of Solid Waste-Methods  
Section