

When the Data are Conflicting or Confusing: Which Data Should You Believe?

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Background/Objectives. The results of environmental samples are critical for interpretation of contamination extent and the risk associated with it. When environmental samples are submitted to a laboratory, whether they are soil, water, or air samples, strict quality assurance/quality control (QA/QC) protocols are followed as they are analyzed, and the results of the QA/QC are included with the data packages, allowing those reviewing the data – and making decisions based on the data - to evaluate the quality of the data. Accurate results that can be relied on for making environmental risk and remediation decisions also requires that strict QA procedures be followed in the field. This is perhaps especially true for volatile organic compounds (VOCs) such as chlorinated solvents which are difficult to see in soils and readily lost to the atmosphere when exposed to it. However, it is not clear that strict QA/QC procedures for the field have been developed to the extent of QA procedures in the laboratory, or that they are strictly followed in all field situations. Field practices also appear to suffer from inadequate or incomplete QA/QC documentation, making it difficult to determine if the sampling method may have introduced bias to the sample results.

Approach/Activities. This presentation will provide examples of conflicting analytical data from environmental samples, and discuss how to best interpret the data. Discussion will include sampling methodology, especially for VOCs in soils. The observation and detection of VOCs in soil samples can be dependent on any number of variables, including how the soil core was obtained, how long the soil was exposed to the air before the soil was placed in a vial containing preservative, the integrity of the sample container, and how they are shipped to the laboratory.

Results/Lessons Learned. When working with environmental samples containing VOCs, I can think of many ways to bias the data low, but only one way to bias the data high. Despite this, it seems more common to question data when the concentrations are higher than expected or desired, than to question data that displays lower concentrations than might be reasonably expected. This presentation will discuss how field samples for VOCs can be biased low, and provide some guidance on how to minimize the bias, and document actual field activities that may have caused greater biases in some samples. Those who are using the data to make decisions should understand the quality of the samples collected in the field, as well as the quality of the results obtained from the laboratory.

This is an abstract for a presentation and does not reflect EPA policy.