Fact Sheet

DEVELOPMENT OF VAPOR-FORTIFIED, PERFORMANCE EVALUATION MATERIALS FOR THE ANALYSIS OF VOLATILE ORGANIC COMPOUNDS IN SOIL

PROBLEM

The difficulties associated with homogenizing soils contaminated with volatile organic compounds (VOCs) have thus far prevented the development of performance evaluation materials for this matrix. Instead, the precision and accuracy of soil-VOC analysis is judged based on solution spike and recovery tests that do not mimic the analytical difficulties associated with soil. Therefore, precision and accuracy estimates now obtained are not representative of the ability of a laboratory to perform soil-VOC analysis. Moreover, because these criteria are used to compare analytical results, engineering judgements can be flawed.

SOLUTION

The U.S. Army Cold Regions Research and Engineering Laboratory, in conjunction with the Army Environmental Center, has developed a vapor fortification method for producing VOC-contaminated performance evaluation soil samples. Soil subsamples are fortified with volatile organic compounds by exposing them to vapors from an organic solution in a closed chamber. Various concentrations of VOCs in soil can be obtained by varying the composition of the exposure solution, and the concentration of VOCs in various subsamples has proven to be very consistent and reproducible. The VOC-contaminated soils produced are stable for at least 60 days and can be used internally to judge day-to-day performance, or externally to judge the performance of a contract laboratory, something that was not possible prior to this development.

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