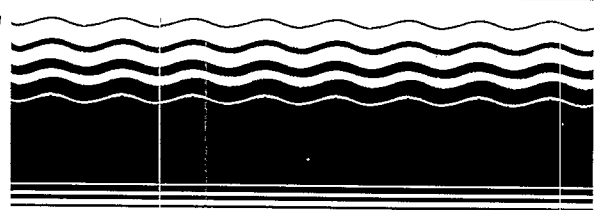




SITE
SUPERFUND INNOVATIVE
TECHNOLOGY EVALUATION



Demonstration Bulletin

Field Analytical Screening Program: PCB Method

U.S. Environmental Protection Agency

Technological Description: The field analytical screening program (FASP) polychlorinated biphenyl (PCB) method uses a temperature-programmable gas chromatograph (GC) equipped with an electron capture detector (ECD) to identify and quantify PCBs. Gas chromatography is an EPA-approved method for determining PCB concentrations. The FASP PCB method is a modified version of EPA SW-846 Method 8000.

To perform the FASP PCB method on soil samples, PCBs are extracted from the samples, injected into a GC, and identified and quantified with an ECD. Chromatograms produced by this equipment for each sample are compared to the chromatograms of PCB standards. Peak patterns and retention times from the chromatograms are used to identify and quantify PCBs in the soil sample extract. In addition to the GC, the operator may use an autosampler that automatically injects equal amounts of the sample extract into the GC column. The autosampler ensures that the correct amount of extract is used for each analysis and allows continual analysis without an operator.

The FASP PCB method has both advantages and limitations when used under field conditions. The method can 1) quickly provide results, 2) provide results that are comparable to formal laboratories in terms of statistical accuracy, 3) identify individual Aroclors, and 4) provide results with detection limits comparable to those of formal laboratories.

Instrumentation and equipment required for the FASP PCB method are not highly portable. When mounted in a mobile laboratory trailer, however, the method can operate on or near most sites relatively easily. Use of this method requires electricity, and Aroclor standards require refrigeration. An exhaust hood and carrier gases also are needed. A trained and experienced operator is needed for the method to produce reliable results. The operator should have at least six months of GC experience and one month of PCB analysis experience.

Soil samples must be extracted before analysis begins. Hexane and sulfuric acid are used during the extraction process. Hexane extracts the PCBs from the soil and sulfuric acid removes potential interferences from the soil sample.

Waste Applicability: The FASP PCB method can identify and quantify PCBs in soil and water samples.

Demonstration Results: The FASP PCB method was demonstrated under the SITE Program at a well-characterized, PCB-contaminated site. During the demonstration, 112 soil samples, 32 field duplicates, and 2 performance evaluation samples were analyzed with the FASP PCB method. A confirmatory laboratory analyzed the samples using SW-846 Method 8080. The accuracy and precision of the FASP PCB method was evaluated by directly comparing its data with the data from the confirmatory laboratory. In addition, the operational characteristics and performance factors of the FASP PCB method were evaluated.

The data from the FASP PCB method were not statistically different from the confirmatory analysis.

The results from this SITE demonstration are included in an Innovative Technology Evaluation Report that will be available in late 1995.

An Innovative Technology Evaluation Report (ITER) describing the complete demonstration will be available in late 1995.

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For Further Information:

EPA Project Manager:
Jeanette Van Emon
U.S. EPA
944 East Harmon
P.O. Box 93478
Las Vegas, NV 89193-3478
702-798-2154

United States
Environmental Protection Agency
National Risk Management Research Laboratory (G-72)
Cincinnati, OH 45268

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