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# Source Allocation Of PCBs Derived from Quantile Analysis of Cumulative Response Curves Combined with Monte Carlo Analysis

**Background/Objectives.** Two companies on opposite sides of a stream discharged waste oils, including hydraulic fluid, into the stream for decades. Hydraulic fluid containing PCBs was used at both facilities and a dispute arose over the relative contributions of PCBs from the facilities to the stream sediments and floodplain downgradient from the discharge location. The two discharge locations were within about 50 feet of each other and the PCB contamination continued for several miles downstream. The characterization of the Aroclor content of the weathered environmental samples may have been inconsistent.

**Approach/Activities.** Soil and sediment samples from both facilities and the depositional areas were analyzed for PCBs by gc/ecd. Cumulative response curves for each sample were generated from the chromatograms of the samples and grouped as Source A, Source B, or Depositional. Quantile analysis was done to mathematically describe the family of cumulative response curves for each group. Monte Carlo analysis was done by randomly selecting a sample from each of the Sources at predetermined proportions (0%, 2%, 5%, 10%, 20%, 30%, 40%, and 50% from Source A, the balance from Source B) and generating a 'trial' Depositional family of cumulative response curves. Many trials were run and the resultant families of trial cumulative response curves were compared to the family of actual Depositional cumulative response curves. The best fit of the sources was determined to be 5-10 % Source A and 90-95% Source B.

**Results/Lessons Learned.** The results of this analysis, along with other arguments, were used in a negotiated cost allocation settlement between the parties. The utility of using the complete chromatogram, obviating the need to rely on any lab analyst's interpretation of the chromatogram with regard to Aroclor identification or quantification, and objectively handling the comparison of the sample groups was evident in the settlement.