

PCBs in Passaic River Sediments: Some Analytical Considerations

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Analytical results for Aroclor may contain a great deal of uncertainty if the relative ratios of certain PCB congeners are substantially altered following differential environmental degradation. Selective degradation of PCB congeners has been shown to occur in biological tissues, and recent studies have shown that Aroclor analyses may sig-

nificantly underestimate PCB concentrations in fish. The purpose of this study is to assess whether a similar phenomenon can occur with PCB-impacted sediments. Five hundred and thirty-seven sediment samples from the Passaic River were analyzed for Aroclors and selected non-ortho (PCB #77, 126, and 169) and mono-ortho (PCB #105, 114, 118, 123, 156, 157, 167, and 189) coplanar PCB congeners. Aroclors 1248 and 1254 were detected in 67 and 53% of the samples, respectively; 54 samples (approximately 10%) did not contain detectable levels of any Aroclors. In these 54 samples, the sum of the detected PCB congener concentrations was significantly greater, on average, than the Aroclor limit of detection by approximately threefold. In individual samples the sum of the PCB congeners exceeded the Aroclor limit of detection by up to 36-fold. In those samples in which Aroclors were detected, the summed PCB congener concentrations exceeded the Aroclor 1248 and 1254 concentrations, on average, by 41 and 33%, respectively. Given the fact that only a fraction of the 209 PCB congeners were quantitated, these findings indicate that Aroclor data may significantly underestimate total PCB concentrations in Passaic River sediments. Total PCB data obtained from total homologue analysis indicated that Aroclor results underestimated total PCB mass by up to 43-fold. These findings suggest that caution is required when comparing Aroclor sediment data from the Passaic River to total PCB sediment criteria.