SELECTING PERFORMANCE REFERENCE COMPOUNDS (PRCS) FOR POLYETHYLENE PASSIVE SAMPLERS DEPLOYED AT CONTAMINATED SEDIMENT SITES RM Burgess U.S. EPA, ORD, Narragansett, RI, USA; MM Perron U.S. EPA, OCSPP, Washington, DC, USA; LA Fernandez, MG Cantwell U.S. EPA, ORD, Narragansett, RI, USA

Use of equilibrium passive samplers for performing aquatic environmental monitoring at contaminated sediment sites, including Superfund sites, is becoming more common. However, a current challenge in passive sampling is determining when equilibrium is achieved between the sampler, target contaminants, and environmental phases. A common approach is the use of surrogate contaminants, called performance reference compounds (PRCs), to indicate the degree of equilibrium achieved for target contaminants during the deployment. However, there remain several research and logistical issues related to the use of PRCs. One of these logistical issues is the cost associated with purchasing PRCs. In an effort to address PRC expense, this investigation (1) compared the performance of inexpensive PRCs (e.g., deuterated PAHs) and expensive PRCs (i.e., ^{13}C-labelled PCBs) to estimate dissolved PCB concentrations in deployments at freshwater and marine sites, and (2) evaluated the use of less PRC relative to conventional quantities for estimating dissolved PAH and PCB concentrations. At saltwater sites, differences between total PCB concentrations calculated using ^{13}C-labeled PCBs and deuterated PAHs were less than 0.1 ng/L with differences ranging from -0.08 to 0.08 ng/L. At freshwater sites, concentrations calculated using deuterated PAHs were less than those calculated using ^{13}C-labeled PCBs with differences ranging from -0.92 to 0 ng/L and most approximately -0.4 ng/L or less. Similar findings were observed on an individual congener basis. Calculated total PAH concentrations were very similar (e.g., 17.1±0.85, 17.9±0.72, and 17.1±0.79 ng/L) for the three quantities of PRC evaluated (i.e., conventional, large, and small, respectively). Similarly, calculated total PCB concentrations were 99.5±5.8, 93.7±6.7, and 88.2±6.2 pg/L for the three quantities of PRC assessed. No statistical differences were observed between PRC quantities for total PAHs or total PCBs. Individual PCB congeners and PAH molecules demonstrated comparable behavior. Results of this investigation provide evidence that using inexpensive and smaller quantities of PRCs can be successfully performed to yield substantial cost savings without sacrificing scientific accuracy.