**DEVELOPMENT OF REVERSE SAMPLERS FOR PHASE II WHOLE SEDIMENT TIES TO IDENTIFY NONIONIC ORGANIC CONTAMINANTS.** M.M. Perron[1], R.M. Burgess[2], M.G. Cantwell[2], K.T. Ho[2], M.C. Pelletier[2], S.A. Ryba[2], J.R. Serbst[2], and J.P. Shine[1], [1]Harvard School of Public Health, 677 Huntington Avenue, Boston, MA 02115 and [2]U.S. EPA, Atlantic Ecology Division, 27 Tarzwell Drive, Narragansett, RI 02882.

Marine and estuarine sediments act as sinks for a wide range of chemicals, including nonionic organic contaminants. These contaminants accumulate in sediments and, as a result, the sediments themselves can act as a source of nonionic organic contaminants. At sufficient levels, these contaminated sediments can cause toxicity to marine organisms and impair the benthic community. Toxicity Identification Evaluations (TIEs) have been used to characterize and identify chemicals causing toxicity in marine whole sediments. The TIE is composed of three phases: Phase I characterizes sample toxicity, while Phase II identifies the specific toxicants causing toxicity, and Phase III confirms the findings of the first two phases. Currently, Phase I methods are well established and have shown nonionic organic contaminants to be the primary cause of marine sediment toxicity. Phase II TIE methods are currently being developed to identify the specific organic contaminants causing this toxicity. One method being investigated is the use of reverse polyethylene samplers (RePES). In this procedure, RePES are used to recreate sediment exposures under controlled conditions that mimic sediment interstitial water. This presentation will summarize research that has been conducted to investigate the use of the RePES. Various RePES designs were evaluated to determine which variation was most applicable for use in TIE. Part of this evaluation was based on required equilibration times and proximity of RePES measured water concentrations of organic compounds to theoretical values. The RePES design used here was shown to adequately partition organic compounds between the sampler, water and air at values comparable to theory. Lastly, the RePES design was assessed with an endosulfan-spiked sediment extract in a toxicity test, comparing results to whole sediment exposures using an amphipod, *Ampelisca abdita*, and a mysid, *Americamysis bahia*. For both organisms, mortality results using the RePES simulated results observed using the whole sediment. In addition, water samples taken at test termination found concentrations to be similar for the RePES, sediment overlying water, and sediment interstitial water.