A.1 Technology Name

Polymeric Sampling Devices

A.1.1 Source

Friedman, Carey L., Mark G. Cantwell, and Rainer Lohmann. 2012. Passive Sampling Provides Evidence for Newark Bay as a Source of Polychlorinated Dibenzo-p-Dioxins and Furans to the New York/New Jersey, USA, Atmosphere. Environmental Toxicology and Chemistry 31(2): 253–61. https://doi.org/10.1002/etc.742.

A.1.2 Summary

Media:	Surface water and air
Study Type:	In-situ
Technology:	LDPE
Peer Reviewed:	Yes
Publication Date:	September 2017

A.1.3 Site Description

- The research involves measurements of freely dissolved water column (C_{free}) and gas phase polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/Fs) in the water column and atmosphere within Newark Bay (New Jersey, USA) from May 2008 to August 2009 with polyethylene (PE) passive samplers.
- Water column PE samplers were deployed at the bottom (~ 30 cm above the sediment–water interface) and the surface (~ 30 cm below the air–water interface).
- Air PE samplers were deployed from the vessels directly above the water column samples or on various structures along the shoreline.
- PE-derived water column C_{free} and gas phase PCDD/Fs concentrations were adjusted for disequilibrium using performance reference compounds (PRCs). The method is based on the linear relationship between percent equilibrium and molecular weights of PRCs.

A.1.4 Remedial Phase

RI/FS.

A.1.5 Outcome

Concentrations of freely-dissolved PCDD/Fs in water column were at least three times below 30,000 fg/L, the U.S. EPA's maximum contaminant level for 2,3,7,8-TCDD. There was a strong tendency for PCDD/Fs to volatilize from Newark Bay, with water-to-air fluxes of 2,3,7,8-TCDD ranging from 14 to 51 pg/m^2 per month. During the summer of 2009, nearly half of the freely dissolved 2,3,7,8-TCDD that entered the bay from the Hackensack and Passaic Rivers was lost via volatilization. The source analysis,

informed by spatial and depth variations in water column concentrations, along with its relationship to freshwater input and salinity, pinpointed Passaic River sediments as the primary source of 2,3,7,8-TCDD in the Bay. In contrast, other PCDD/Fs stemmed from additional pathways: specifically, 2,7/2,8-DiCDD likely originated from photochemical conversion of triclosan released from the PVSC discharge point near the eastern entry to the Kill van Kull; 2,4,8-TriCDF and 2,3,7,8-TCDF were from the sediments in the Elizabeth River near Arthur Kill station.