FACT SHEET

Analysis of Dioxin in Sediments of San Francisco Bay

In the summer of 2000, the USEPA's EMAP program in coordination with NOAA National Status and Trends Program conducted an extensive analysis of dioxin in San Francisco Bay sediments. Because of concerns expressed by the public regarding levels of dioxins and furans (D/F) in some fish tissue collected from the Bay, EPA Region 9 funded analyses of the concentrations of dioxins and dioxin like compounds (furans and co-planar PCBs) in Bay sediment.

The locations of the 99 sampling stations were selected using a probabilistic design to provide an unbiased estimate of the concentrations of dioxin-like compounds for the entire Bay. Fifty-six samples were analyzed for dioxins and furans using method 8290 and for co-planar PCBs using method 1668. The sediments were also screened for coplanar PCBs and dioxin/furans using a biomarker assay known as the P450 Human Reporter Gene System (EPA Method 4425) which was modified to document the occurrence of carcinogenic chlorinated compounds.

The potency of PCBs and D/F has been assessed by the World Health Organization (1998) and the combined potency of a sample is expressed as a Toxic Equivalency Quotient (TEQ in parts per trillion; ppt). The range of TEQs as determined by the chemical methods was 0.02 –114 ppt. All but 4 samples of the 56 were below 10 ppt TEQ. The range of TEQs by the Human Reporter Gene System was 3-98 ppt. Fifty-seven of the 99 samples analyzed by this method were below 10 ppt TEQ. The range of TEQ values derived from both methods is similar. The observation that values from the Human Reporter Gene System were slightly higher than those from the chemical method suggests its utility as a conservative screening tool for dioxin-like compounds.

The levels of coplanar PCBs, dioxins and furans found in San Francisco Bay are quite low as compared to other bays and harbors near large metropolitan areas. Concentrations reported from the Hudson-Raritan estuary, Newark Bay, and the northwestern Mediterranean Sea were all higher than those of San Francisco Bay. Lake Ontario and Lake Michigan sediments also contain higher levels of TEQs than the Bay. This suggests the ubiquitous nature of dioxins.