

Temporal and spatial variations in PCB contamination of sediments and source apportionment in a section of the Rhone River, France

Gwenaëlle ROUX^a, Cécile MIEGE^b, Annie ROY^c, Barbara MAHLER^d, Irène LEFEVRE^e, Philippe BONTE^e, Marc DESMET^a, Henri PERSAT^f, Peter van METRE^d and Marc BABUT^c

^a ENTPE, L.S.E, Vaulx en Velin (France)

^b CEMAGREF, UR QELY, Lyon, France

^c CEMAGREF, UR BELY, Lyon, France

^d U.S.G.S., Texas Water Science Center, Austin (TX, USA)

^e LSCE, CNRS-CEA, Gif sur Yvette (France)

^f LEHF, CNRS UMR 5023 – Université Lyon1, Villeurbanne (France)

In fall 2005, fish contamination by dioxin-like PCBs above the threshold for fish consumption was observed in the Rhone river, in the vicinity of Lyon (France). This observation triggered a series of investigations on sediment contamination along the mainstem of the Rhone. In addition to surface sampling in depositional areas along a ~120 km reach, short cores were collected from 3 locations and analyzed for PCBs and age-dating radionuclides. These data could help regional authorities identify the principal PCB sources among the potential ones, provided that distinct congeners source patterns can be identified. PCB congener pattern analysis in sediments is challenging because weathering processes can modify the original patterns. Further, in a large river basin like the Rhone, at mid- or downstream sites the various upstream sources are mixed. We applied two different factor analysis techniques in order to characterize source profiles and their relative contribution to total PCB content in each sediment sample. These results will be discussed in relation to the hydrology, geography, and water management of the area.