Part II
Zinc Enrichment of Bottom Sediments Around a Dredged Material Containment Facility

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The Hart-Miller Island Dredged Material Disposal Facility, located in northern Chesapeake Bay, is an 1100-acre, diked enclosure which contains sediments dredged primarily from the approach channels to Baltimore Harbor and the harbor itself. Construction of the facility was begun in 1981. It began receiving material in 1984 and is now nearly filled to capacity. Dredged material, piped or brought by barge to the island, is mixed with Bay water to form a slurry that can be pumped into the dike. The effluent remaining after most of the sediment in the slurry drops out of suspension is discharged back into the Bay through five spillways.

Surveillance monitoring of the sedimentary environment outside the dike is required by both a State-issued wetlands license and a State discharge permit. Physical and geochemical properties of near-surface bottom sediments have been measured at least twice a year since 1981. The technique described in Part 1 - correlating grain size composition and metal (zinc) concentrations - was developed using the accumulated data. Applying the technique revealed that in April 1989, zinc levels increased significantly in bottom sediments near the most frequently used spillway. Results obtained from a 3-D hydrodynamic model of the upper Chesapeake Bay show that the source of zinc enrichment is the effluent released during normal operation of the dike.