

Permeameter Tests of the Silty Clay from the Fluvial-Deltaic Beaumont Formation Can Underestimate Hydraulic Conductivity

by Dr. Regina M. Capuano, University of Houston

In U.S. Gulf Coastal areas, clay-rich fluvial-deltaic sediments comprise the surficial sediments that overlie, and are thought to protect, the Coastal Lowlands Aquifer System, which is one of the larger domestic-use aquifers in the U.S. (Williamson et al., 1990). The Beaumont Formation is one of these fluvial-deltaic clays that extends along much of the north Texas Gulf Coast.

Fluvial-deltaic sediments are dominated by thick units of silty clay and clay, with irregular and discontinuous sand layers. While the sands in fluvial-deltaic sediments are known to have a relatively high hydraulic conductivity, they are often considered unimportant in transporting contaminants because of their irregular and discontinuous nature. In contrast, permeameter testing of the thick layers of silty clay that enclose the sands generally show the silty clays to have hydraulic conductivities on the order of 10.5 to 10.7 cm/sec or less, and thus the silty clays are thought to act as a barrier to flow.

Pumping and tracer tests conducted on a 70-foot-thick section of clay-rich (no sand beds) Beaumont Formation, however, indicate that the silty clays are 2 to 4 orders of magnitude more permeable than indicated by permeameter tests and thus can

have a hydraulic conductivity on par with that of the sands. This study was conducted at the hydrogeology research facility at the University of Houston Coastal Center Preserve located approximately 50 miles southeast of Houston, in Galveston County, Texas. The tracer and pumping tests were conducted on closely spaced wells and multilevel piezometers. Detailed information on the site and the results of these studies are presented in a series of papers listed below. Funds for this work were provided by the Gulf Coast Hazardous Substance Research Center (U.S. EPA cooperative agreement R815197 and Texas Hazardous Waste Research Center funds), the University of Houston Coastal Center, and the Environmental Institute of Houston.

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Biographical Sketch

Dr. Regina Capuano is an Associate Professor at the University of Houston. She has Ph.D and M.S. degrees from the University of Arizona. She was formerly with the University of Texas Bureau of Economic Geology and the University of Utah Research Institute. ■