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MODELING TRANSPORT OF SELECTED ORGANIC TRACE POLLUTANTS DURING RIVERBANK FILTRATION CONDITIONS

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ABSTRACT: Modeling Transport of Selected Organic Trace Pollutants during Riverbank Filtration ConditionsGretchen Oldham, Masters student, Jörg Drewes, PhD, John McCray, PhD, Christiane Hoppe, PhD candidate, Uwe Huebner, Masters student, Rod Brauer, Prairie Waters Project Manager, City of AuroraRiverbank filtration (RBF) is a widely used method of pre-treating surface water. In RBF, aquifer sediments act as a natural filter removing various organic trace pollutants as river water recharges ground water. This project was designed to determine the removal capabilities of organic trace contaminants at a full scale RBF site in Brighton, Colorado. One of the goals of the project was to develop a contaminant transport model in conjunction with a hydrologic model of the site. In preparation for designing the transport component of the model, input parameters were estimated from laboratory column experiments in several scales, and verified using field data from the site. Breakthrough curves for various contaminants, including pharmaceutically active compounds, dissolved organic carbon, and other contaminants of interest, were obtained from the soil column experiments. A parameter-estimation program was used to model the processes controlling the fate of selected contaminants. Relevant processes included sorption, equilibrium or kinetic; biodegradation; and diffusion of contaminants into low-permeability zones. Model parameters from column experiments were super-imposed on field-scale flow paths to simulate the fate of organic trace pollutants during RBF.The contaminant transport model was then used as a tool to optimize the full-scale site by the determination of additional well locations, pumping rates, and other site specifications. The applicability of the contaminant transport parameters to other RBF locations was also evaluated.

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