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USING TERNARY DIAGRAMS TO CHARACTERIZE BIODEGRADATION AND HYDROPHOBIC SORPTION OF CHLORINATED ETHENES IN GROUNDWATER

M.W. Erbe

Environmental Resources Management, Inc., Annapolis, Maryland, USA

D.I. Siegel

Department of Earth Sciences, Syracuse University, New York, USA

ABSTRACT

Ternary diagrams are a useful and inexpensive approach to evaluate whether biodegradation, retardation by hydrophobic sorption, or hydrodynamic dispersion causes concentrations of dissolved chlorinated solvents in groundwater to decrease with distance or time along a flow path from a continuous source. The results of a series of analytical, 1-dimensional simulations of chlorinated ethene transport and fate were coupled with case studies to show that the proportions of PCE-TCE-DCE or TCE-DCE-VC concentrations in groundwater will 1) plot at nearly the same location at the source if concentrations only decrease by mixing caused by hydrodynamic dispersion 2) under hydrophobic sorption initially trend with distance from the source position on a ternary diagram to the TCE-DCE or DCE-VC limb, respectively and then move along the limb to the least halogenated member and 3) trend in an arcuate pattern from the source position towards the least halogenated member if biodegradation occurs.

Reference: Erbe, M.W. and D.I. Siegel; *Using Ternary Diagrams to Characterize Biodegradation and Hydrophobic Sorption of Chlorinated Ethenes in Groundwater*, Journal of Environmental Hydrology, Vol. 9, Paper 7, March 2001.

CONTACT:

Matthew Erbe

Environmental Resources Management, Inc.

2666 Riva Road, Suite 200

Annapolis, MD 21401

E-mail : matthew_erbe@erm.com

Donald I. Siegel, Ph.D.

307 Heroy Geology Laboratory

Earth Sciences Department, Syracuse University

Syracuse, NY 13244-1070

E-mail: disiegel@mailbox.syr.edu

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