CHARACTERIZING NATURAL ATTENUATION OF BHCS IN SEASONALLY FLUCTUATING GROUNDWATER

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Abstract

Though commercially produced BHC (lindane) may be reagent grade γ-BHC, it often consists of α-BHC (60-70%), β-BHC (5-12%), and γ-BHC (10-15%), δ-BHC (6-10%) that are each regulated at very low (ng/l) concentrations. Evaluation of natural attenuation for each isomer, following a removal action to meet regulatory standards in groundwater at an Orlando, Florida, site, was confounded by water table oscillations (± 1.5m) that were inversely correlated with groundwater BHC concentrations (i.e., higher water table = lower BHC concentrations). However, when BHCs were evaluated on a total mass basis, a clear decline (10% per year) over seven years was apparent ($r^2 = 0.84$) following first-order kinetics. Over this period, the plume center of mass did not migrate in the direction of groundwater flow, remaining within 30 m of its nexus, compared to contemporaneous rapid transit across the site of an MTBE plume originating upgradient. Because of water-level-induced variability in measurement of individual groundwater BHC isomer concentrations, a total BHC, rather than individual isomer metric, would seem to be an appropriate approach to evaluate the efficacy of natural attenuation and regulatory compliance.

Key words: natural attenuation, water table oscillations, regulatory standards