

Using an uncertainty analysis of direct and indirect exposure to contaminated groundwater to evaluate EPA's MCLs and health-based cleanup goals*

Brent Finley, Virginia Lau and Dennis Paustenbach

ChemRisk Division, McLaren/Hart Environmental Engineering, 1135 Atlantic Ave., Alameda, CA 94501 (USA)

Abstract

Groundwater which has been contaminated by industrial chemicals has been of significant concern in the U.S. since about 1975. Since then, dozens of regulatory decisions have been made to remediate many of these contaminated aquifers. The selected groundwater clean-up levels will dictate the cost and time frame of the remediation. Most clean-up decisions have been based either on EPA's Maximum Contaminant Levels (MCL) or so-called 'risk-based' levels. For many chemicals, risk-based levels are much lower than the corresponding MCLs. This paper uses an uncertainty analysis of probability density functions (PDF) to assess whether MCLs are sufficient to provide health protection for human populations using remediated groundwater as the sole tap-water source. A case-study involving tetrachloroethylene and chloroform and all the potentially direct and indirect routes of exposure to contaminated water is presented. The results suggest that groundwater need not be cleaned-up to concentrations less than drinking water standards (i.e., MCLs) to achieve health protection.