

# **Toxic inhibition of acetoclastic methanogenesis in crude oil- and creosote-contaminated aquifers**

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Studies of methanogenic zones in hydrocarbon-contaminated groundwater indicated that acetoclastic methanogenesis is inhibited near non-aqueous sources. At one location close to crude oil, hydrogen- and formate-utilizing methanogens were found at concentrations one hundred times more than that of acetoclasts. Toxicity assays using crude oil-contaminated acetate, hydrogen, and formate solutions showed that acetate utilizers were inhibited by the crude oil. These results indicate that acetoclastic methanogenesis is inhibited near crude oil. At a creosote site, concentrations of volatile acids increase near the source, then taper off within 100m. Creosote toxicity assays indicated that acetate utilizers were inhibited at lower concentrations than formate and hydrogen utilizers were. The observed high volatile acid concentrations are likely from the inhibition of acetoclasts. The results from these two sites suggest that elevated volatile acid concentrations at a site could be related to the degree of toxic inhibition.