

Gorody, A.W., 2007, Factors affecting the spatial and temporal composition of gas seeps originating from a gas well point source, Piceance Basin, Colorado, *in* 14th Annual International Petroleum Environmental Conference, Abstract #60, University of Tulsa, Houston, TX.

Abstract

Gas seeps appeared in Divide Creek, south of Silt Colorado, after an overpressured gas well temporarily discharged natural gas and condensate into a permeable alluvial aquifer. Both bradenhead and produced gases were sampled to obtain a source gas signature. Two concurrent sample sets, collected monthly over a period of 18 months, are compared: dissolved gas data from monitor wells, and free gas data from ebullient seeps. Early data for stable isotopes of ethane and propane from both sample sets are nearly identical. Heavy isotope enrichment due to bacterially-mediated hydrocarbon oxidation is evident at plume margins and within the plume core as seep rates decline. However, seep gas is enriched with lighter isotopic methane relative to ethane due to mixing with bacterial methane. Because the relative volume of seep gas in contact with flowing groundwater decreases as the seep subsides, seep gases gradually become enriched in the less soluble gas fraction. Dissolved gas samples show that as seeps subside, the influence of oxidation among the higher methane homologs increases at plume margins and at the plume core. Oxidation rates for C2-C5 alkanes increase in order of carbon number. Normal C4 and C5 alkanes are consumed faster than the corresponding isoalkanes.