Impact to Underground Sources of Drinking Water and Domestic Wells from Production Well Stimulation and Completion Practices in the Pavillion, Wyoming, Field

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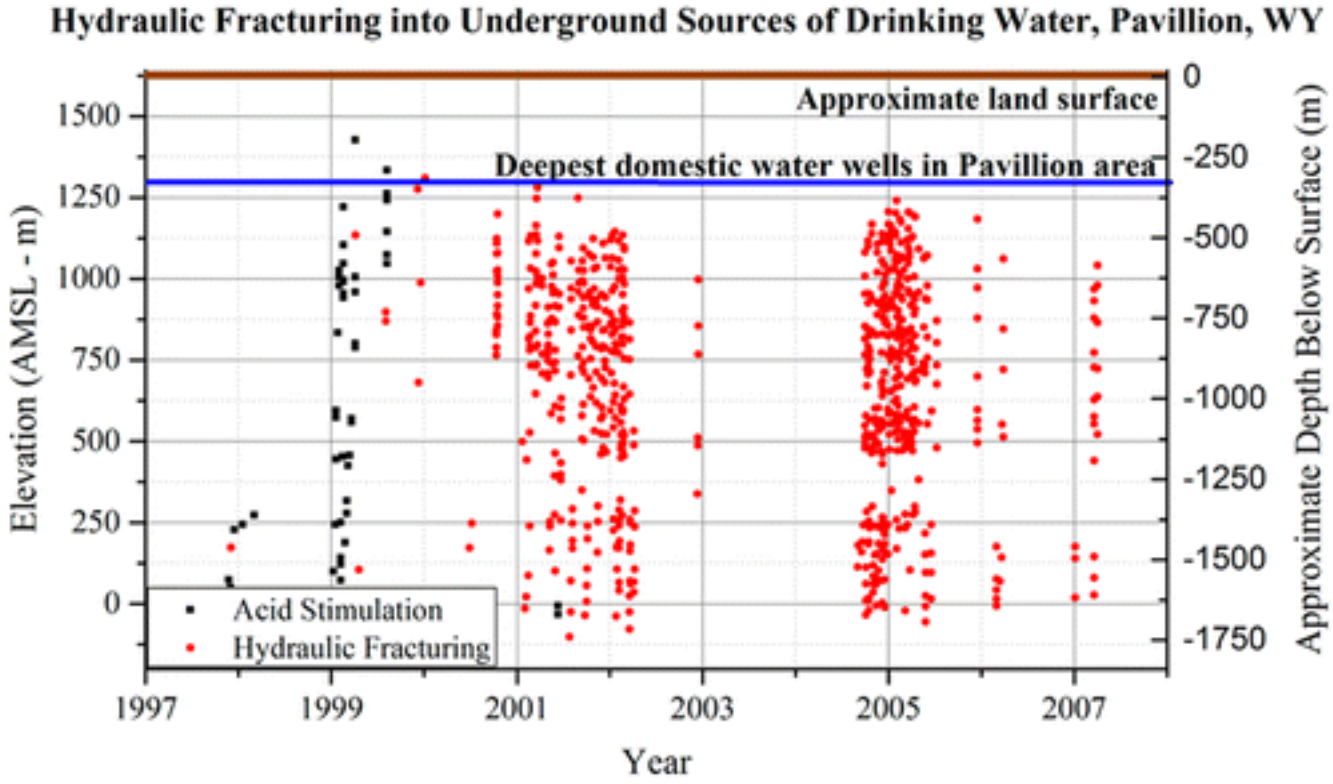
Abstract



A comprehensive analysis of all publicly available data and reports was conducted to evaluate impact to Underground Sources of Drinking Water (USDWs) as a result of acid stimulation and hydraulic fracturing in the Pavillion, WY, Field. Although injection of stimulation

fluids into USDWs in the Pavillion Field was documented by EPA, potential impact to USDWs at the depths of stimulation as a result of this activity was not previously evaluated. Concentrations of major ions in produced water samples outside expected levels in the Wind River Formation, leakoff of stimulation fluids into formation media, and likely loss of zonal isolation during stimulation at several production wells, indicates that impact to USDWs has occurred. Detection of organic compounds used for well stimulation in samples from two monitoring wells installed by EPA, plus anomalies in major ion concentrations in water from one of these monitoring wells, provide additional evidence of impact to USDWs and indicate upward solute migration to depths of current groundwater use. Detections of diesel range organics and other organic compounds in domestic wells <600 m from unlined pits used prior to the mid-1990s to dispose diesel-fuel based drilling mud and production fluids suggest impact to domestic wells as a result of legacy pit disposal practices.