

Potential Impact of Salt-Water Disposal Wells on Groundwater

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ABSTRACT

Advances in unconventional oil/gas development have led to rapid growth of hydraulic fracturing of shales and tight sands. With this increased oil/gas activity have come concerns regarding the environmental safety of these innovative technologies. Deep-well injection remains the most common means to dispose of flowback and produced water resulting from hydraulic fracturing and hydrocarbon extraction. Evaluation of injection wells in Texas suggests that the greatest risk associated with the full life cycle of hydraulic fracturing may result from the wastewater disposal, and this risk may be exacerbated by legacy oil and gas wells. Threats to the environment, in general, and to groundwater, in particular, have been evaluated to provide a basis to evaluate the risks posed by disposal of liquid wastes from hydraulic fracturing. The biggest risks to groundwater occur when liquid wastes are injected into a horizon that is pressurized and near an existing borehole or well whose integrity is (i) compromised due to age, improper abandonment, and plugging, or (ii) questionable because of incomplete or missing documentation. Fundamentals of deep-well injection, legacy oil and gas wells, and case studies are evaluated to assess potential environmental risks.

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