



The USGS in cooperation with the Arkansas Water Resource Center and the Faulkner County are combining efforts to characterize the quality of groundwater in Faulkner County, Arkansas by sampling domestic wells throughout the county. The study is designed to describe existing (background) groundwater quality and geochemistry for use in evaluating potential effects from unintended infiltration into shallow aquifers of waste streams associated with drilling and fracturing activities, in addition to identifying any current potential problems.

The three agencies are using a cost-effective phased approach strategy, which involves measuring field specific conductance and collecting grab samples for analysis of chloride; a conservative constituent in the subsurface commonly found in high concentrations in produced water and mud associated with various steps in gas production within the Fayetteville Shale. Based on the time involved in the reconnaissance phase and identifying households amenable to participating in the study, it is anticipated that between 50-100 wells will be sampled for this phase of the project.

The second phase of the study is to perform a one-time sampling and analysis of major ions and trace metals on 6-8 groundwater samples based on sites with the highest chloride concentration and conductance values to assess potential anthropogenic effects and characterize geochemistry across the County as related to rock/water interactions. Water from shale formations can contain relatively elevated concentrations of chloride, sulfate, and trace metals, and a one-time sampling will allow fingerprinting of groundwater to differentiate natural geochemistry of formation groundwater from potential future effects from shale-gas production. Water quality will be correlated to geology to investigate rock/water interactions, which will be used as a fingerprinting tool for assessing and differentiating anthropogenic and natural effects on water geochemistry. These data are necessary for identifying changes in water quality from gas drilling activities.