Groundwater Sampling and Monitoring in Oil and Gas Production

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With the spotlight being turned increasingly upon drilling operations, environmental concerns are becoming primary drivers in the planning and operation of oil and gas production. The multi-level horizontal drilling with permeability stimulation practices (aka, hydrofracturing, or "fracking" - terms which the drilling industry needs to retire due to the controversial nature of the terms) has become a political football, drawing unreasonable criticism from a number of sources. As a result, rules and regulations are being promulgated to ensure that these operations do not harm the environment. One such instance of rulemaking is the Colorado Oil & Gas Conservation Commission's (COGCC) Proposed Rule 609, which proposes the documentation of baseline groundwater conditions prior to initiation of oil and gas drilling or facility installation activities.

With the likely passage of this first-of-its-kind rule, the hydrocarbons industry can expect similar legislation to be enacted throughout the shale gas plays country-wide. Other industries, most notably the coal mining industry, have dealt with such environmental regulation since the passage of the Surface Mining Control and Reclamation Act (SMCRA) in 1977. While Colorado's proposed groundwater monitoring rule is not as extensive as the rules written for mining, this may prove to be just the beginning of more draconian measures to regulate the industry.

Collection of groundwater samples may be obtained from several sources. These include existing domestic wells, springs or monitoring wells that may be installed by the driller. Pre-drilling sample analyses are intended to reveal baseline conditions of aquifers in the immediate vicinity of the well/facility site. This information, while intended to ensure that any contamination of water resources can be documented, can also protect the operator from false claims from groundwater users that may see an opportunity to improve their lot with respect to historically poor water quality. Of course, if baseline monitoring does indicate that drilling has caused an adverse impact to an aquifer, then this could aid in early implementation of mitigation procedures to rectify the problem.

Due to the types of chemical analyses that may be required to detect the kind of contamination which might be consistent with extraction of hydrocarbons, analytical costs can be high. Costs of $1,200 to

$2,200 per sample may be incurred, plus the cost of labor and other direct costs. Fortunately, multiple samples to account for seasonal variation has not been suggested thus far, but at least two samples per site, representing upgradient and downgradient locations, will likely be the minimum requirement.

It should be noted that responsible oil and gas producers, just like responsible coal miners, do not wish to adversely affect the environment or put their neighbors at risk of adverse health issues. It should also be noted that there has never been a verified instance of horizontal well bore stimulation which has led to contamination of a drinking water well. However, implementation of a groundwater sampling program, such as that proposed by the COGCC, may be valuable as a voluntary Best Management Practice to improve public and landowner relations. If such practices were to be widely employed in jurisdictions that have not made such practice mandatory, there may be less pressure for legislative action to do so.

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