

Marcellus Shale: Material Drinking Water Risks?

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If natural gas prices continue to fall as a result of the current economic downturn, the rush for a piece of the Marcellus Shale action may also subside. After all, the long-known deposits of natural gas in the Marcellus Shale region, which stretches from New York State to Tennessee, have been all the rage in 2007 and 2008, largely because the price of fossil fuels spiked. But whether drilling happens now or later, it is expected to happen, and one of the oft-asked questions is this: Does the hydraulic fracturing ("fracing") of subsurface rock formations necessary to enhance the extraction of Marcellus Shale gas deposits carry with it a material risk of contamination of potable groundwater? A second question is emerging, driven by expanding land development, climate change concerns, and the recent memory of Georgia's acute water shortage: Is fracing too water intensive?

These questions are of obvious concern to many landowners who have been asked or have agreed to lease their land to gas exploration and production companies, particularly landowners whose land is located in an area where public drinking water is not supplied. While guarantees cannot be provided, the good news for current and prospective lessors (and their neighbors) is threefold: (a) fracing is a well-established and long-employed technology having an established safety record, (b) fracing in the Marcellus deposit occurs well below the depths at which drinking water aquifers are located, and (c) regulators appear to be focused on the subject of drinking water protection (quality and quantity) ahead of the fact, not after the fact. This focus stands in sharp contrast to earlier experiences, such as that with underground storage tanks, which were in use (or in some cases, leaking!) for many decades before regulations were written to protect aquifers.

Fracing

Fracing is a process employed to cause natural gas to move more freely from the rock pores where it is trapped into a drilled well than it could otherwise move. Fracing involves the high-pressure injection of fracturing fluids into discrete sections of the drilled well, causing fractures in the rock and pushing them open. The fracturing fluids consist primarily of water and sand. A small percentage of the fluid consists of chemical additives, including friction reducers and bactericides. The function of the sand is to prevent the fractures from closing when the high pressure is released.

Groundwater Contamination Concerns

Two principal concerns about groundwater contamination have been expressed. The first is that the fracing process itself will cause fracing fluids and/or natural gas to contaminate drinking water aquifers. The second is that fracing fluid mismanagement or other aboveground activities at the drilling site could result in surface spills or other events that in turn will cause groundwater or surface water contamination.

The first of these concerns is being actively addressed in those states and water basins subject to the jurisdiction of regulatory bodies governing water withdrawal. These regulatory bodies include, in addition to state environmental protection departments, the Delaware River Basin Commission ("DRBC") and the Susquehanna River Basin Commission ("SRBC"). The DRBC, a federal-state compact that has legal authority over both water quality and water quantity-related issues arising in the Delaware River basin, has published an informational document advising of its concern, among others, that gas drilling may have a "substantial effect on the water resources of the basin" by reducing the flow in streams and/or aquifers used to supply the significant amounts of fresh water needed in the natural gas mining process. The DRBC expressed itself this way because under its governing compact, "No project having a substantial effect on the water resources of the basin shall hereafter be undertaken by any person, corporation or governmental authority unless it shall have been first submitted to and approved by the commission" The bottom line is that any Marcellus Shale project within the Delaware River basin must be approved by the DRBC before being undertaken.

Process aside, concern about groundwater contamination has received little substantive support from either regulators or the scientific community. For example, Alexander Grannis, the Commissioner of the New York State Department of Environmental Conservation, while expressing the need for study of the impact of water consumption on public water supplies, has publicly testified that no realistic risk of groundwater contamination from the fracing process exists: Grannis said, "It is important to understand that the hydraulic fracturing takes places many thousands of feet underground, well below any groundwater zones. Groundwater zones are typically hundreds, not thousands, of feet below the surface. The same geology that has sealed natural gas in the rock for millions of years - together with our strict well casing and cementing requirements - prevents any risk of groundwater contamination from the drilling and fracing operation. As a result, the only likely vector for possible threats to groundwater comes from the surface management of the water used in the drilling and fracing operations." (Testimony before the New York State Assembly Hearing on Oil and Gas Drilling, October 15, 2008).

In a like vein, the Interstate Oil and Gas Compact Commission states on its website that, "In 2004, the U.S. Environmental Protection Agency completed a study of the environmental risks associated with the hydraulic fracturing of coal bed methane wells. The EPA concluded that the injection of hydraulic fracturing fluids poses little or no threat to underground sources of drinking water. Although thousands of wells are fractured annually, the EPA did not find a single incident of the

contamination of drinking water wells by hydraulic fracturing fluid injection. Effective state regulation has made hydraulic fracturing a safe and environmentally-sound way to maximize and conserve our nation's natural resources." (See <http://www.iogcc.state.ok.us/hydraulic-fracturing>).

From the environmentalist community, charges have been made that hydraulic fracturing may result in groundwater contamination. Typically, these charges are relatively mild. For example, the Catskill Riverkeeper organization, while noting "cases in the U.S. where hydraulic fracturing is the suspected source of impaired or polluted drinking water," acknowledges that these are not cases involving fracturing at the depths involved with the Marcellus region: "Most of these incidences involve coal-bed methane production, which is a much shallower drilling process" (See <http://catskillmountainkeeper.org/node/290>).

As for contamination at the ground surface resulting from spills, overflows from storage basins, etc., it is evident that risks exist. However, most of the risks appear to be in line with those associated with the collection, storage, transportation and overall management of wastewater streams generated by numerous other industrial processes. Permitting and regulatory programs already exist to address these risks, which are identifiable and quantifiable.

Groundwater Usage Concerns

The amount of groundwater and/or surface water needed to perform hydraulic fracturing is, by all accounts, substantial. But will it lower aquifers and surface water bodies to levels that pose risks? The answers that are offered in response to these questions differ, of course, based on the source. An Upper Delaware region grassroots organization – Damascus Citizens for Sustainability, Inc. – that is focused on environmental issues believed to be associated with Marcellus drilling, describes "The Real Impact of Gas Drilling" as including "Depletion of Water Tables." (See <http://www.damascuscitizens.org/>). However, the DRBC, which has jurisdiction over water withdrawal within the Delaware River basin, states that, "DRBC will review the proposed withdrawal scenario (either ground or surface) and will recommend the proposal for approval only if it complies with the commission's water withdrawal review criteria." (See <http://www.state.nj.us/drbc/naturalgas.htm>). Ultimately, whether, and to what extent, water resource impairment is a significant concern will likely depend on the specific location of the proposed water withdrawal and the levels of available groundwater or surface water at the time of withdrawal. Areas not clearly subject to water withdrawal regulation and oversight are by definition more likely to see disputes and, perhaps, impacts.

Regulatory Review

At present, each of the New York State Department of Environmental Conservation, the Pennsylvania Department of Environmental Protection, the DRBC, and the SRBC, among other regulatory agencies, are reviewing water withdrawal and/or protection issues associated with drilling for gas in the Marcellus formation. Indeed, some of these bodies are working together: "DRBC is currently working with other regulatory and scientific agencies at the federal and state levels to refine review criteria. Although DRBC's authority is separate from the states' authorities, the commission is working with Pennsylvania and New York to coordinate agency actions and minimize unnecessary duplication of effort in the issuance of DRBC permits or 'dockets' to natural gas drilling companies." (See <http://www.state.nj.us/drbc/naturalgas.htm>).

Particular concern has been expressed by the City of New York, for the simple reason that it obtains drinking water for its citizens from an upstate New York watershed that is located within the Marcellus region. In a July, 2008 letter to the Commissioner of the New York State Department of Environmental Conservation, the Commissioner of the New York City Department of Environmental Protection made a number of requests relating to protection of the City's water supply. These requests included various clarifications, affirmations and commitments to such things as the formation of a technical working group, and public review and comment under New York's State Environmental Quality Review Act. Most notably, the City Commissioner's letter requests the creation of a drilling exclusion zone within a one-mile buffer of all City water infrastructure components, including reservoirs, tunnels, and shafts. This request follows the statement in the City Commissioner's letter that, "We are not advocating a veto of the bill; rather we seek to work with DEC to ensure that the New York City watershed is recognized as a unique resource requiring special protection before this activity is authorized within the City's watershed." (Letter from Emily Lloyd, Commissioner, City of New York Department of Environmental Protection to Alexander Grannis, Commissioner, New York State Department of Environmental Conservation, July 18, 2008).

Summary

Most signs point to the readiness, if not willingness, of environmental regulatory bodies to permit gas extraction wells in the Marcellus formation. Certainly there will be differing degrees of regulatory process, from state to state, designed to satisfy agency and/or public demands for assurance of environmental protection. The extent to which opponents of drilling projects will obtain "traction" will likely be a function of the frequency and severity of the occasions when adverse environmental impact is tied to some aspect of a drilling operation. For example, as recently reported in *The State Journal* of Charleston, West Virginia (November 20, 2008), brine from gas well drilling in Pennsylvania (Oct. 10, 2008) led to excessive total dissolved solids (in this case, salts) being discharged from a wastewater treatment plant into the Monongahela River, leading in turn to impairment of water quality in that river. By October 22, the Pennsylvania

Department of Environmental Protection ordered nine wastewater treatment plants on the Monongahela River to curtail treatment of gas well drilling brine until further notice. The occurrence of a few more "issues" of this kind – particularly as the number of gas wells increases – may put a damper on the Marcellus "gas rush" that to this point has been heavily advertised as a classic "win-win."

For Further Information

If you have any questions about this Alert or would like more information, please contact [Seth v.d.H. Cooley](#), [David M. DeSalle](#), any [attorney](#) of the [Energy, Environment and Resources Practice Group](#) or the attorney in the firm with whom you are regularly in contact.