

## *Expert Analysis*

# Environmental Regulation of Hydraulic Fracturing in Pennsylvania

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Between 2007, when Range Resources Corp. publicly reported the success of a hydraulically fractured well in Washington County, Pa., and today, there has been exponential growth in hydraulic fracturing operations designed to tap the natural gas reserves locked in the Marcellus Shale formation, which lies about 5,000 to 8,000 feet below much of the state.

According to the Pennsylvania Department of Environmental Protection, of the 4,192 oil and gas wells drilled in the state in 2008, only 192 were Marcellus Shale wells. In 2010, by contrast, of 2,755 oil and gas wells drilled in the commonwealth, over 1,400 wells were Marcellus Shale wells, marking the first time that Marcellus wells outnumbered non-Marcellus wells in a given year. The popular narrative that has emerged during this time is that Pennsylvania's current environmental laws and regulations have been unable to keep pace with the rapid expansion of Marcellus Shale activities, leaving much of the natural gas industry, and hydraulic fracturing activities in particular, unregulated from an environmental standpoint.

This view, however, ignores the wide-ranging statutes and regulations specifically applicable to natural gas operations in Pennsylvania that are designed to protect the rich environmental resources of the state. This article outlines certain aspects of this effective legal and regulatory environmental framework applicable to Marcellus Shale exploration and production activities in Pennsylvania.

## PENNSYLVANIA'S OIL AND GAS ACT

The primary statute governing natural gas exploration and production activities in Pennsylvania, the Oil and Gas Act, includes a number of important environmental protection provisions.<sup>1</sup> For example, Section 201 prohibits the drilling or altering any oil or gas well without first obtaining a permit from the Pennsylvania Department of Environmental Protection.



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To receive a permit, the well site must adhere to siting restrictions that are designed to protect environmental resources. Specifically, Section 205 requires that wells be located 200 feet from existing water supply wells, 100 feet from any stream, spring or body of water identified on a current U.S. Geological Survey topographic map, and 100 feet from any wetlands greater than 1 acre in size. The DEP can grant a variance from these siting restrictions, but the applicant must identify additional measures, facilities or practices designed to protect property and water resources, and the DEP permit must include conditions to enforce these additional protective measures.

In addition, Section 208 of the Oil and Gas Act contains a number of provisions specifically designed to protect drinking water supplies. These protections are particularly important in Pennsylvania, where census data indicate that over 3 million residents rely on over 1 million private water wells to supply drinking water.

First, well operators are required to replace any private or public water supplies if well operations affect the quality or quantity of the water supply. Furthermore, any pollution discovered in water supplies within 1,000 feet of a well during the first six months of well operations is presumed to have been caused by the well activity, unless the operator conducted a pre-drilling survey that identified pre-existing pollution. As a result of this presumption, pre-drilling surveys are now routine before well construction begins in Pennsylvania.<sup>2</sup> Additionally, any person who believes that their water supply has been affected by drilling or operation of an oil or gas well may request that the DEP investigate the issue. The agency must then conduct an investigation within 10 days and render a determination within 45 days of the complaint's filing.

The regulations promulgated pursuant to the Oil and Gas Act include additional provisions that require activities related to Marcellus Shale wells to adhere to prescribed environmental protection standards.<sup>3</sup> Subchapter C of these regulations lists a number of standards designed to protect the environment from surface operations. For example, Section 78.55 requires operators to develop and provide to the DEP a preparedness, prevention and contingency plan that governs the control and disposal of fluids, residual waste, and drill cuttings associated with well operations.

The balance of Subchapter C provides, among other things, detailed standards for the use of pits (including centralized impoundments) and tanks to store wastes generated by well operations, requirements related to the disposal of drill cuttings and other wastes, and other standards governing the management of wastewater from hydraulic fracturing.

In addition, after a lengthy process that involved extensive input from industry, the public and advisory commissions,<sup>4</sup> the DEP updated its well construction and reporting standards found at Subchapters D and E of the Oil and Gas Act regulations in an effort to incorporate the most current hydraulic fracturing standards.<sup>5</sup> The new well construction standards are designed to prevent gas migration from a natural gas well into fresh groundwater and to contain any hydraulic fracturing fluids used in the wellbore.

Among the changes are upgraded casing standards (including pressure-rating standards and pressure-testing requirements) and upgraded cement standards (including an eight-hour set period for cement). In addition, the new standards also require that intermediate casing used in Marcellus Shale wells be cemented to the surface, list actions that operators must take if cement is not returned to the surface, and clarify when centralizers and blowout preventers must be used.

The new standards also include new record-keeping and reporting requirements, including mandates to develop a casing and cementing plan that must be maintained on-site for review and possible DEP approval, document actual cementing procedures and cement specifications in a cement job log, and submit a stimulation record as part of a completion report that includes information about the additives used to hydraulically fracture a well.

## OTHER ENVIRONMENTAL PROGRAMS

While the Oil and Gas Act and implementing regulations include many environmental protection standards applicable to natural gas exploration and production activities, they are not the only source of such standards. Many other "traditional" environmental statutes and regulations provide additional compliance standards for natural gas activities in Pennsylvania.

For example, in accordance with Pennsylvania's Clean Streams Law,<sup>6</sup> well permit applicants are required to employ best management practices (to control erosion and sediment discharges during well construction, including enhanced BMPs if the well is located in a "high quality" or "exceptional value" watershed). If the earth disturbance activity for the life of the project is 5 acres or more, the applicant must secure coverage under the general permit for earth disturbance associated with oil and gas exploration production, processing or treatment operations, or transmission facilities (otherwise known as ESCGP-1).

With respect to water use at hydraulically fractured Marcellus Shale wells, the DEP has cited its authority under the Clean Streams Law to protect the "waters of the commonwealth" (which includes groundwater) to require permit applicants to submit a water management plan if the applicant wishes to use water sources in Pennsylvania for fracking activities. Depending on the location of the well, water withdrawal approvals (which the applicant may be required to obtain separately in accordance with federal regulations governing water withdrawals from those river basins) issued by the Susquehanna River Basin Commission or the Delaware River Basin Commission, can satisfy this requirement.<sup>7</sup>

More recently, the DEP promulgated new "total dissolved solids" standards for new and expanded natural gas sources in response to an observed increase in TDS levels in the Monongahela River in southwest Pennsylvania. Despite some significant questions as to whether the discharges from "publicly owned treatment works" that accepted flowback and produced waters did in fact contribute to these elevated TDS results, the new regulations required new and expanded wastewater sources from natural gas operations to be treated first at centralized water treatment facilities to meet secondary drinking-water standards for TDS before being sent to

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a POTW for treatment. Because the new regulations applied to “new and expanded” sources, certain POTWs that had been accepting flowback and produced waters without TDS pre-treatment were allowed to continue to do so.

On the heels of a Carnegie Mellon study that found elevated levels of bromide in surface waters in the western portion of the commonwealth, which could in turn result in the formation of toxic trihalomethanes at POTWs during the chlorine disinfection process, the DEP recently “requested” that well operators cease wastewater deliveries to these grandfathered treatment plants.<sup>8</sup> At least one industry group, the Marcellus Shale Coalition, has initially indicated it will request that its members cease such deliveries.

Certain aspects of natural gas operations also implicate provisions of Pennsylvania’s Solid Waste Management Act,<sup>9</sup> specifically the residual waste program, a unique program that provides requirements for nonhazardous wastes generated by industrial operations. While Section 203 of the Oil and Gas Act exempts activities that take place on permitted well sites from waste-permitting obligations and certain other requirements of the Solid Waste Management Act, this exemption does not extend to the waste materials once they leave the well site.

Accordingly, well operators that generate and send hydraulic fracturing wastewater offsite, the companies that transport the wastewater from the well site to another location, and any facility that accepts this wastewater for treatment or disposal, is potentially subject to the residual-waste requirements applicable to entities that generate, transport or treat residual waste. For generators, these regulations impose, among other things, biennial waste-reporting obligations and source-reduction requirements.

Similarly, facilities that accept produced and flowback water or other drilling wastes for treatment or disposal may be subject to additional permitting requirements. To that end, the DEP has developed a general permit for the beneficial reuse of drilling fluids, raw gas-well flowback and produced water generated during hydraulic fracturing at Marcellus Shale wells, which allows the offsite recycling of these wastes to manufacture hydraulic fracturing makeup water for use at other permitted Marcellus Shale well sites.

The DEP has also recently explored additional regulation of air emissions from natural gas operations under Pennsylvania’s Air Pollution Control Act.<sup>10</sup> In accordance with regulations that grant the agency the authority to exempt air emission sources of “minor significance” from air permitting requirements, the DEP previously issued guidance that exempts oil and gas exploration and production facilities and associated equipment from air permitting.

In 2010, however, the agency published for comment revised guidance that would essentially make all emission sources at Marcellus Shale exploration and production sites subject to air permitting requirements. In conjunction with that proposed change, the DEP also released for comment a new general permit that would place new conditions upon the use of portable nonroad engines during hydraulic fracturing operations. Based on the comments it received on this general permit,

the agency recently announced that it was reopening the comment period on both the general permit and the current exemption until May 26.<sup>11</sup>

Regardless as to how the DEP proceeds with respect to this air-permitting issue, all air emission sources at Marcellus Shale sites remain subject to all other applicable air quality regulations, including those applicable to "major sources" of air pollutants, such as regulations under the Prevention of Significant Deterioration, New Source Review and Title V programs.

Along these lines, over the past year the DEP has revisited whether air emissions from exploration, extraction or production sources that are separated by distance should be aggregated and considered a single, major source for air-permitting purposes. In December 2010 the DEP released "interim guidance" to its regional offices that recommended a case-by-case analysis of the "functional inter-relationship" between various operations, regardless of the distance between them, paving the way for multiple well-production pads and compressor stations scattered across an area to be considered a single source for major-source, air-permitting purposes.

Based in part on concerns over substantive and procedural issues presented by the issuance of this interim guidance, in February the DEP rescinded the interim guidance but continued to emphasize that these single-source determinations will be made on a case-by-case basis. At the time it rescinded the interim guidance, the agency solicited comment on whether there should be guidance issued on single-source determinations and, if so, the substance of such guidance.<sup>12</sup>

The preceding outline of environmental-protection requirements applicable to natural gas operations and hydraulic fracturing in the Marcellus Shale is not exhaustive, and there are a number of other Pennsylvania laws and regulations applicable to these operations related to environmental protection. But even the limited description in this article demonstrates that, contrary to some perceptions, natural gas operations in the Marcellus Shale are currently subject to a wide variety of detailed and effective environmental protection requirements.

## NOTES

<sup>1</sup> 58 Pa. Stat. § 601.101.

<sup>2</sup> The importance of these pre-drilling surveys is magnified by the fact that private drinking-water wells are unregulated in Pennsylvania. According to a 2009 report from the Center for Rural Pennsylvania, over 41 percent of samples taken from these unregulated private wells in 2006-2007 (before the expansion of the Marcellus Shale play) failed at least one safe drinking water standard. See <http://extension.psu.edu/water/resources/publications/water-pollutants/water-quality/drinking-water-quality.pdf>.

<sup>3</sup> 25 Pa. Code §§ 78.55 to 78.66.

<sup>4</sup> Consistent with Pennsylvania law, the various administrative and legislative entities that provided input on these regulations included the Oil and Gas Technical Advisory Board, the Environmental Quality Board, the standing Environmental Resources and Energy Committees in both houses of the Pennsylvania General Assembly, the state's Office of the Attorney General, and the Independent Regulatory Review Commission.

<sup>5</sup> 25 Pa. Code §§ 78.71 to 78.121.

<sup>6</sup> 35 Pa. Stat. § 691.1.

<sup>7</sup> While the Susquehanna River Basin has been issuing water-withdrawal and -discharge approvals for natural gas activities for some time, the Delaware River Basin Commission has imposed

a moratorium on natural gas development activities in the Delaware River Basin until it finalizes new regulations proposed at the end of 2010 that are specifically applicable to natural gas activities. See [http://www.nj.gov/drbc/notice\\_naturalgas-draftregs.htm](http://www.nj.gov/drbc/notice_naturalgas-draftregs.htm) for additional information.

<sup>8</sup> See <http://www.portal.state.pa.us/portal/server.pt/community/newsroom/14287?id=17071&typeid=1>.

<sup>9</sup> 35 Pa. Stat. § 693.1.

<sup>10</sup> 35 Pa. Stat. § 4001.

<sup>11</sup> 41 Pa. Bull. 1066 (Feb. 26, 2011).

<sup>12</sup> *Id.*



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