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Expert Analysis

Hydraulic Fracturing: The Influence of State Regulation on Federal Regulatory Action

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As natural gas production grows in the United States, the state regulatory landscape is playing an increasingly prominent role in efforts to access this plentiful domestic energy resource in a manner that protects public health and the environment. As much as any other factor, state regulation is shaping federal action and informing the national debate over the safest means to develop this promising energy resource.

By facilitating natural gas production in formations previously considered inaccessible or uneconomical, the combination of horizontal drilling and hydraulic fracturing has transformed the energy outlook of the United States, providing potentially more than a 100-year domestic supply of natural gas. On Aug. 1 the Energy Information Administration said proven reserves of oil and natural gas in 2010 increased by the highest amounts the agency has recorded since it began publishing proven reserve estimates in 1977.[1] The EIA attributes this growth to the expanded application of horizontal drilling and hydraulic fracturing.

This shale gas "revolution" has also changed the way the public and, by extension, the state and federal governments, view natural gas development and the process of hydraulic fracturing. With the now common use of hydraulic fracturing in most U.S. natural gas wells, issues have been raised about the impact of natural gas development on water and air quality, and local infrastructure and water supply, especially in areas such as the Marcellus Shale region, where natural gas development is a relatively new phenomenon.

These concerns have entered the public dialogue with a flourish. President Obama said in his 2012 State of the Union address that developing our natural gas supplies "will create jobs and power trucks and factories that are cleaner and cheaper, proving that we don't have to choose between our environment and our economy." Interior Secretary Ken Salazar, on the other hand, has described public concerns about hydraulic fracturing as the "Achilles' heel" of natural gas development.[2]

Described below are the principal elements of state regulation of hydraulic fracturing, with a focus on the key Marcellus Shale states of New York,[3] Ohio,[4] Pennsylvania[5] and West Virginia,[6] as well as on energy-producing states with well-developed regulatory regimes: Colorado,[7] Louisiana,[8] Texas[9] and Wyoming.[10] These state regulations have been influential on federal regulatory decision-making, as reflected in rulemaking developments at the Department of the Interior and the Environmental Protection Agency.

STATE REGULATIONS[11]

States have historically exercised primary jurisdiction over regulating hydraulic fracturing, in most cases well before the current shale gas boom. In states with extensive historic energy development, hydraulic fracturing has been regulated for decades, and other aspects of oil and gas development for much longer. A key feature of the debate over the need (or not) for new federal standards governing hydraulic fracturing is whether these long-standing state standards are sufficient to ensure safe drilling and development practices. Some suggest Congress' exemption of hydraulic fracturing from Environmental Protection Agency regulation under the Safe Drinking Water Act in the 2005 Energy Policy Act, aka the EPAct, is attributable in part to the historical primacy of states in regulating hydraulic fracturing. This is illustrated in related regulatory and judicial activity preceding enactment of the EPAct.

A key feature of the debate over the need (or not) for new federal standards governing hydraulic fracturing is whether these long-standing state standards are sufficient to ensure safe drilling and development practices.

In 1995 then-EPA Administrator Carol Browner denied a petition filed by the Legal Environmental Assistance Foundation, or LEAF, challenging the agency's approval of Alabama's Underground Injection Control program.[12] Under the SDWA, the EPA may permit a state to exercise primary enforcement authority over its UIC program if the state can demonstrate that its regulatory program satisfies certain federal requirements.[13]

LEAF said Alabama's UIC program failed to satisfy SDWA requirements for the regulation of hydraulic fracturing used to produce methane gas from coalbed formations.[14] In subsequent litigation, LEAF challenged the EPA's contention that hydraulic fracturing did not fall within the SDWA's definition of "underground injection."[15] Ultimately, the 11th U.S. Circuit Court of Appeals held that hydraulic fracturing "unquestionably falls within the plain meaning of the definition [of underground injection]."[16]

Although the LEAF decision applied only to hydraulic fracturing for coalbed methane production in Alabama, the court's decision suggested that EPA retained authority to regulate hydraulic fracturing under the SDWA. Congress subsequently weighed in on the issue when, in the 2005 EPAct, it specifically excluded hydraulic fracturing from the term "underground injection" as defined in the SDWA, other than for hydraulic fracturing operations using diesel fuels.[17] Consequently, the 2005 law limited the EPA's jurisdiction over hydraulic fracturing to the use of diesel fuel, thereby preserving state primacy for regulating hydraulic fracturing under all other circumstances.

Over the past few years, there has been an unprecedented volume of state regulation and legislation addressing hydraulic fracturing, both from states revising existing regulations and from those creating a regulatory struc-ture for the first time. In Colorado, where oil and gas development began in 1862 and hydraulic fracturing has been utilized since 1947, the Colorado Oil and Gas Conservation Commission extensively revised its oil and gas regulations in 2008, and has updated them multiple times since then.[18] In 2012 alone 19 state legislatures have introduced more than 120 bills addressing hydraulic fracturing.[19]

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Comparison of State Regulation of Hydraulic Fracturing				
State	**Site Development & Preparation**	**Well Drilling & Production**	**Fluid Disclosure**	**Wastewater Storage & Disposal**
CO	Zone- or well-specific pre-drilling water testing 150-350 ft. setback from buildings	Cement circulation requirements Cement 50 ft. below water table	Chemical concentration ("C")/volume of fluids ("V") disclosed within 60 days after hydraulic fracturing operations Publication on FracFocus	2 ft. freeboard Pit liner required (24 mm)
LA	No pre-drilling water testing 500 ft. setback from building	Cement circulation requirements Specified casing and cementing depths	C/V disclosure within 20 days FracFocus or comparable website	2 ft. freeboard Pit liner required
NY	Pre-drilling water testing within 0.19 miles of well 100 ft. and 150-2,000 ft. setback from buildings/ water	Cement type and circulation requirements Cement 75 ft. below water table	C/V disclosure in drilling permit Make publicly available	2 ft. freeboard Pit liner required (30 mm)
OH	Pre-drilling water testing within 0.28 miles of well 100-200 ft. and 50 ft. setback from buildings/ water	Cement type and circulation requirements Cement 50 ft. below water table	C/V disclosure within 60 days FracFocus or state web site	No freeboard requirement No liner required
PA	No pre-drilling water testing 500 ft. and 300-1,000 ft. setback from buildings/ water	Cement type and circulation requirements Cement 50 ft. below water table	C/V disclosure within 60 days FracFocus or searchable website	2 ft. freeboard Pit liner required
TX	No pre-drilling water testing 200 ft. setback from buildings	Cement type and circulation requirements Well-specific cement depths	C/V disclosure with well completion report FracFocus	No freeboard requirement No liner required
WV	Pre-drilling water testing within 0.19 miles of well 625 ft. and 100 – 1,000 ft. setback from buildings/ water	Cement type and circulation requirements Cement 30 ft. below water table	C disclosure before and after well stimulation State agency	2 ft. freeboard requirement Pit liner required
WY	No pre-drilling water testing 350 ft. setback from buildings/water	Cement type and circulation requirements Cement 120 ft. below water	C/V disclosure before and after well stimulation State agency	No freeboard requirement Conditional liner requirement

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Perhaps as noteworthy as the volume of state regulatory and legislative activity, however, is its broad scope, which spans the entire production process from site preparation to drilling and production to well plugging and abandonment. Summarized below are key elements of state regulation in each of these categories in select Marcellus states and in long-standing energy-producing states, and attached is a chart providing an additional comparative overview of hydraulic fracturing regulation in these states.

Site development and preparation

In an effort to address public concerns regarding drought and groundwater contamination, states have begun revising regulatory requirements to ensure continued water availability and water quality. Many states have adopted "setback restrictions" that limit the proximity of wells to buildings or water sources. In Ohio and Colorado, the setback restrictions for buildings vary, with higher setback restrictions in urban areas. The setback requirements for buildings range from 100 to 1,000 feet, and the water source requirements range from 350 to 2,000 feet.

A 2005 law limited the EPA's jurisdiction over hydraulic fracturing to the use of diesel fuel, thereby preserving state primacy for regulating hydraulic fracturing under all other circumstances.

Some states also require pre-drilling water well testing to establish baseline water quality in the drilling area. Ohio, for example, requires testing within 0.28 miles of a proposed well. Although no state currently restricts water withdrawals for production of shale gas, Pennsylvania requires comprehensive water management plans, including the disclosure of location, amount and impact of water withdrawal.

Well drilling and production

States impose well-integrity measures, such as cementing and casing requirements, to prevent the migration into groundwater zones of materials from the underground natural gas resource referred to as the "production zone." Many states therefore require layers of casing and cement around the drill pipe to prevent such migration. West Virginia, for instance, requires surface casing and cementing to a depth of 30 feet below the water table; Ohio and Pennsylvania require surface casing and cementing to a depth of 50 feet below the water table; and New York has state proposed regulations that would require surface casing and cementing to a depth of 75 feet below the water table.

Some states, such as Louisiana, take a different approach and mandate the minimum number of feet of casing that must be used, but not the depth below the water table. In addition to regulating the depth to which operators must set and cement the casing, states also regulate the height to which operators must circulate cement down through the wellbore and back up through the space on the outside of the casing, called the annulus. Most states, including the Marcellus Shale states of New York and Pennsylvania, require operators to circulate cement around the drill pipe casing and all the way up through the length of the drill pipe to the surface. Other states require operators to circulate the cement to a certain level above the uppermost level of the production zone. Texas, for example, requires cement circulation to 600 feet above the production zone.

Fluid disclosure

Perhaps the most highly debated area of state regulation involves disclosure of the volume and concentration of the chemicals utilized in hydraulic fracturing operations.

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In 2011 the Ground Water Protection Council, a coalition of state groundwater regulators, and the Interstate Oil and Gas Compact Commission, an organization of governors and state officials from oil- and gas-producing states, launched FracFocus, a national hydraulic fracturing chemical registry.

FracFocus is intended to provide the public access to information about chemicals used for hydraulic fracturing and factual information about hydraulic fracturing operations and groundwater protection. (The attached chart identifies states in the Marcellus Shale region and elsewhere that have begun using FracFocus as the principal means for publicly disseminating certain information disclosed to state regulatory agencies.)

At present, 14 states require well operators or owners to disclose the chemical contents of their fracturing fluids, though the level of detail and the timing of disclosures vary by state. Colorado's chemical disclosure requirement, which took effect in April, is considered the most stringent in the nation. It requires operators to disclose (within 60 days after fracturing operations conclude, but no later than 120 days after they begin) the total volume of water or other base fluid used during all stages of hydraulic fracturing operations and the maximum concentration of each ingredient intentionally added to the fluid.

Many states have adopted "setback restrictions" that limit the proximity of wells to buildings or water sources.

To reduce the risk of disclosing trade secrets, Colorado allows parties to make their chemical disclosures in a format that does not link additives to the chemical composition of the materials. Colorado also requires parties to publish their chemical disclosures on FracFocus. Wyoming is one of the only states to require disclosure of chemical additives, compounds and concentrations or rates before fracturing, but operators are only required to disclose that information to the state and not to a public platform. All states with disclosure requirements provide some form of protection against the disclosure of trade secrets or proprietary formulas of hydraulic fracturing additives.

Wastewater storage and disposal

Many states have also adopted measures to regulate the storage, treatment and transportation of water that flows back to the surface from hydraulic fracturing operations. Although only three states, including Wyoming, currently require operators to report the volume of flowback water produced at a well,[20] the majority of states regulate the storage and disposal of wastewater. The most common disposal options are underground injection, disposal facilities, and evaporation ponds or disposal pits. Most states allow underground injection of wastewater, but some states that have experienced increased seismic activity near injection sites have begun to revisit their wastewater injection regulations. Ohio, for example, recently suspended underground injection near an area that experienced an increase in seismic activity; regulators are investigating the issue.[21] Most states also permit operators to store wastewater in storage pits, typically mandating the amount of space in the pit between the highest water level and the top of the pit, called the freeboard, as well as the thickness and material composition of the protective liners that must be placed within the pits.

New York's proposed regulations would require pit liners to be at least 30 millimeters thick and "placed with sufficient slack to accommodate stretching." The regulations would also require 2 feet of freeboard. Pennsylvania recently revised one of its general permits to encourage operators to recycle wastewater and reduce freshwater

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withdrawals through a "closed-loop process," in which 10 authorized treatment facilities would treat the wastewater and return it to the operators for reuse in fracturing operations. Numerous oil field services companies also provide products and services designed to allow greater recycling of flowback waters.

THE INFLUENCE OF STATE REGULATION ON FEDERAL REGULATORY ACTION

State regulation has informed the federal dialogue over the need for and proposed components of federal hydraulic fracturing regulation. In fact, recent rulemaking activity by the Department of the Interior and the EPA suggests the influence state regulations will continue to have on the scope and impact of federal regulatory action.

In May the Interior Department's Bureau of Land Management proposed a rule to regulate hydraulic fracturing on public and Indian lands. BLM's proposed rule includes a chemical disclosure component that BLM said in its proposal "is similar to the one the state of Colorado adopted in 2011."[22] Like the Colorado rule, BLM's proposed rule would require operators to disclose and publish on FracFocus the hydraulic fracturing "stimulation fluid" by additive trade name, purpose, Chemical Abstract Service Registry number and the percent mass of each ingredient in a format that does not link the additives to the specific chemical composition of the materials.

The debate over the timing of BLM's hydraulic fracturing chemical disclosure requirement is also indicative of the potential for state-level dialogue to inform federal rulemaking. A handful of states, including West Virginia and Wyoming, require some form of pre-drilling disclosure of hydraulic fracturing chemicals, and many environmental and community organizations advocated for BLM to adopt similar requirements.

Opponents of early disclosure said the chemical composition of fracturing fluid is continually adjusted prior to treatment of a well, which would make early disclosure a poor reflection of the actual chemicals used. They also said gathering chemical information from contractors and reporting the information to regulators would slow production unnecessarily.[23] BLM ultimately chose not to require early disclosure, instead proposing chemical reporting within 30 days after completion of hydraulic fracturing operations.

EPA recently finalized New Source Performance Standards and National Emissions Standards for Hazardous Air Pollutants for Oil and Natural Gas Wells, which require more stringent controls on air emissions for the entire oil and gas well development process, not just hydraulic fracturing operations.[24] The new standards mandate the use of "reduced emission completions" by 2015, comparable to Colorado regulations directing "flareless" completions when certain well conditions are present, and Wyoming standards mandating flareless completions in concentrated oil and gas development areas. Both states also require flareless completions at all new wells.

The influence of state regulation over federal action is likely to be most noticeable in the context of the EPA's ongoing study of the potential impacts of hydraulic fracturing on drinking water. At the direction of Congress in 2009, the EPA launched a comprehensive study, which the agency has since expanded to include a lifecycle analysis of potential water impacts, including water availability and quality through water withdrawal, storage, transportation and disposal.[25]

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NOTES

[1] According to EIA, natural gas proven reserves alone rose 12 percent in 2010 to 317.6 trillion cubic feet (tcf), marking the first time annual volumes surpassed 300 tcf and continuing a 12-year trend of consecutive annual growth. Energy Information Administration, U.S. Dep't of Energy, U.S. Crude Oil, Natural Gas, and Natural Gas Liquids, Proved Reserves, 2010 at 1 (2012).

[2] *See* The Future of U.S. Oil & Natural Gas Development on Federal Lands and Waters: Hearing Before the H. Natural Resources Comm., 112th Cong. (2011) (statement of Ken Salazar, Secretary, Dep't of the Interior).

[3] New York is currently updating its hydraulic fracturing regulations. The New York State Department of Environmental Conservation proposed new regulations to govern natural gas drilling, which the agency is expected to finalize, along with a broad environmental analysis, this year. High Volume Hydraulic Fracturing Proposed Regulations, 6 N.Y.C.R.R. Pts. 52, 190, 550-556, 560, 750. Once finalized, these regulations will be among the most stringent in the nation.

[4] Ohio Rev. Code Ann. § 1509. 01.

[5] 58 Pa. Con. Stat. § 2301.

[6] W. Va. Code § 22-6-1.

[7] Colo. Code Regs. § 404-1:100.

[8] La. Admin. Code tit. 43 § 101.

[9] 16 Tex. Admin. Code § 3.1 et seq.

[10] Wyo. Code Rules & Regs. Oil Gen., Ch. 3 § 1.

[11] Additional state regulations not discussed in this article include accident reporting, bans and moratoria, severance taxes and impact fees, and plugging and abandonment requirements as surveyed in a state hydraulic fracturing regulation study conducted by Resources for the Future, a nonpartisan, independent energy and environmental research organization. *See* Resources for the Future, A Review of Shale Gas Regulations by State (2012).

[12] *See* Letter from Carol M. Browner, U.S. Envt'l Prot. Agency, to David A. Ludder, Legal Environmental Assistance Foundation (May 5, 1995) (stating "EPA does not regulate and does not believe it is legally required to regulate the hydraulic fracturing of methane gas production wells under its UIC Program," and that "hydraulic fracturing is closely regulated by the state of Alabama State Oil and Gas Board").

[13] Safe Drinking Water Act of 1974, 42 U.S.C. § 300h-1(b)(1)(A) (2006).

[14] *Legal Envt'l Assistance Found. v. EPA*, 188 F.3d 1467, 1471 (11th Cir. 1997).

[15] *Id.*

[16] *Id.* at 1475.

[17] Energy Policy Act of 2005, Pub. L. No. 109-58 § 322 (2005). Congress chose to exclude diesel fuel from the exemption, in part, based on the results of an EPA study of the risks to underground sources of drinking water (USDWs) from hydraulic fracturing, which concluded that hydraulic fracturing in coalbed methane wells posed little threat to USDWs, but that the use of diesel in fracturing fluids posed "the greatest potential threat to USDWs." EPA 816-04-033, Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs, Final Report 4-1 (2004).

[18] State Review of Oil and Natural Gas Environmental Regulations, Colorado Hydraulic Fracturing State Review 8, 19 (2011), *available at* http://67.20.79.30/sites/all/themes/stronger02/downloads/Colorado%20HF%20Review%202011.pdf.

[19] Jacquelyn Pless, National Conference of State Legislatures, Natural Gas Development and Hydraulic Fracturing: A Policymaker's Guide 4 (2012), *available at* http://www.ncsl.org/documents/energy/frackingguide_060512.pdf.

[20] New York's proposed regulations would also require operators to record flowback rates and furnish them to inspectors upon request.

[21] Mike Soraghan, *Drilling Waste Wells Exempt from Earthquake Testing Rules,* Energy Wire, (Mar. 22, 2012), http://www.eenews.net/public/energywire/2012/03/22/1.

[22] Oil and Gas; Well Simulation, Including Hydraulic Fracturing, on Federal and Indian Lands, 77 Fed. Reg. 27,691, 27,698 (May 11, 2012) (codified at 43 C.F.R. pt. 3160).

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[23] *See* Brandon J. Murrill & Adam Vann, Cong. Research Serv., R 42461, Hydraulic Fracturing: Chemical Disclosure Requirements 11 (2012) (discussing public testimony before a hearing of Colorado Oil and Gas Commission).

[24] New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews, 40 C.F.R. § 60.5375 (2012).

[25] U.S. Envt'l Prot. Agency, EPA 600-R-11-112, Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources 1 (2011).

[26] U.S. Envt'l Prot. Agency, EPA 816-R-12-004, Permitting Guidance for Oil and Gas Hydraulic Fracturing Activities Using Diesel Fuels – Draft: Underground Injection Control Program Guidance (2012).




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